TECHNOLOGICAL, ORGANIZATIONAL AND ENVIRONMENTAL FACTORS: THE MEDIATION OF E-COMMERCE AND MODERATION OF ENTREPRENEURIAL COMPETENCIES ON SME PERFORMANCE

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ABSTRACT

In the 21st century, e-commerce is essential for a rapidly changing business environment and increases the firm's overall value. The study aims to explore the influence of technological (relative advantage and technology readiness), organizational (cost of adoption and top management support), and environmental (government support and competitive pressure) factors of the TOE model with mediation effect of the use of e-commerce on manufacturing SMEs' performance. Also, the present study includes the mediator variable e-commerce use between TOE factors and firm performance. The research framework was developed based on the resource-based view (RBV) combined with the diffusion of innovation (DOI) theory and TOE model. The research chose a stratified proportionate random sampling method to collect data by selecting four (04) heterogeneous strata (textile, leather, sports, and surgical). The 800 questionnaires were distributed to top and middle-level managers of Pakistan's manufacturing SMEs. Thus, 368 were returned. The study applied partial least square structural equation modeling (PLS-SEM) by utilizing the SmartPLS3 to investigate the hypothesized relationships and SPSS 24 for the data screening. The result showed that technological factors, directly and indirectly, have a significant positive relationship with e-commerce and firm performance. However, organizational factors, top management support has proved a significant positive influence on the use of e-commerce directly and indirectly. Furthermore, in environmental factors, competitive pressure found a significant influence on e-commerce usage and subsequently on firm performance. The study provides theoretical and practical implications. The contribution of the study is introducing entrepreneurial competencies as a moderator between e-commerce use and firm performance. The study helps SME managers and practitioners understand the underlying factors for the successful implementation of e-commerce.

Keywords: Resource-based View, Relative advantage, Cost of adoption, Top management support, Technology readiness, Competitive Pressure

ABSTRAK

Dalam abad ke-21, e-dagang adalah penting kepada persekitaran perniagaan yang sering berubah dan juga untuk meningkatkan nilai keseluruhan syarikat. Kajian ini bertujuan untuk meneroka pengaruh teknologi (kelebihan relatif dan kesediaan teknologi), organisasi (kos penggunaan dan sokongan pengurusan atasan), dan faktor persekitaran (sokongan pemerintah dan tekanan kompetitif) model TOE dengan kesan mediasi penggunaan e-dagang ke atas prestasi pembuatan Industri Kecil dan Sederhana (IKS). Selain itu, kajian ini turut mengambilkira penggunaan e-dagang sebagai pembolehubah pengantara di antara faktor TOE dan prestasi syarikat. Rangka kerja penyelidikan dibangunkan berdasarkan kepada *Resource Based View* (RBV) yang digabungkan dengan Teori *Diffusion of Innovation* (DOI) dan juga TOE Model. Penyelidikan ini menggunakan kaedah Pensampelan Rawak Berstrata Mengikut Nisbah bagi mengumpul data dengan memilih empat (04) strata heterogen (tekstil, kulit, sukan, dan pembedahan). 800 soal selidik diedarkan kepada pengurus peringkat tinggi dan pertengahan dalam industri pembuatan kecil dan sederhana (IKS) di Pakistan. Daripada jumlah itu, 368 soal selidik dikembalikan. Kajian ini menerapkan Model *Partial Least Square Structural Equation* (PLS-SEM) dengan menggunakan SmartPLS3 bagi meneroka hubungan yang dihipotesiskan dan SPSS 24 bagi tujuan penyaringan data. Hasil kajian menunjukkan bahawa faktor teknologi, secara langsung dan tidak langsung mempunyai hubungan positif yang signifikan dengan e-dagang dan prestasi syarikat. Walau bagaimanapun, faktor organisasi iaitu sokongan pengurusan atasan telah membuktikan pengaruh positif yang signifikan terhadap penggunaan e-dagang secara langsung dan tidak langsung. Selanjutnya, bagi faktor persekitaran, tekanan kompetetif didapati mempunyai pengaruh yang signifikan terhadap penggunaan e-dagang dan juga terhadap prestasi syarikat. Kajian ini memberikan implikasi teori dan juga praktikal. Sumbangan kedua kajian ini adalah dengan mengetengahkan kompetensi keusahawanan sebagai moderator di antara penggunaan e-dagang dan prestasi firma. Kajian ini membantu pengurus dan pengamal IKS untuk memahami faktor-faktor yang mendasari kejayaan pelaksanaan e-dagang.

Kata kunci: *Resource Based View*, Kelebihan relatif, Kos penggunaan, Sokongan pengurusan atasan, Kesediaan teknologi, Tekanan kompetetif.

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Best Regards
Arsalan Hussain

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LIST OF ABBREVIATION

ADB	Asian Development Bank
APEC	Asia Pacific Economic Cooperation
ASEAN	Association of South-East Asian Nations
AVE	Average Variance Extracted
DOI	Diffusion of Innovation
EDI	Electronic Data Interchange
ERP	Enterprise Resource Planning
GDP	Gross Domestic Product
ICT	Information and Communication Technology
IoT	Internet of Things
IS	Information System
IT	Information Technology
PLS	Partial Least Square
RBV	Resource-Based View
SBP	State Bank of Pakistan
SCM	Supply Chain Management
SMEs	Small and Medium Enterprises
SMIs	Small and Medium Industries
TOE	Technological, Organizational, Environmental
HTMT	Hetrotrait-Monotrait ratio of correlation
PSGI	Pearl Shine Group International

CHAPTER ONE

INTRODUCTION

1.0 Background of the Study

The COVID-19 started in China, and it tremendously affected governments, societies, and organizations worldwide (Clark, Davila, Regis, & Kraus, 2020). While some businesses affected with minor consequences, firms related to the manufacturing sector decreased their production capacity because of the unavailability of raw material during lockdowns (Shahzad, Hassan, Aremu, Hussain, & Lodhi, 2020). Likewise, small and medium enterprises (SMEs) manufacturers lost businesses largely due to fewer resources and survival capacity (Okorie et al., 2020). Consequently, most of the manufacturing firm's performance is badly affected around the globe.

Firm performance has been discussed broadly in academia and industry researches in terms of non-financial and financial performance (Han & Hong, 2019; Kundu & Gahlawat, 2018; Schneider, Yost, Kropp, Kind, & Lam, 2018; Son, Park, Bae, 2018). The firm financial performance depends on the sales increment, increased market return, investment growth, and return on investment on a year-to-year basis (Azmi, Mohamad, & Shah, 2020; Hussain, Shahzad, & Hassan, 2020). Likewise, the firm non-financial performance depends on the perceived value of the product, customer satisfaction, employee satisfaction, advanced technological innovations, and reduction in production time (Aziz, Hasnain, Awais, Shahzadi, & Afzal, 2017; Lim, Preis, Lee, Mangematin, & Kim, 2020). Similarly, SMEs' performance is also used as an indicator to measure the growth in today's business world

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Appendices

Appendix A:

Research Questionnaire

Othman Yeop Abdullah Graduate School of Business

Sintok-Malaysia

Survey

TECHNOLOGICAL, ORGANIZATIONAL AND ENVIRONMENTAL FACTORS: THE MEDIATION OF E-COMMERCE AND MODERATION OF ENTREPRENEURIAL COMPETENCIES ON SME PERFORMANCE

This study is a Ph.D. research which aims to investigate the influence of technological, organizational and environmental factor on use of e-commerce towards firm performance in SMEs of Pakistan. It is hoped that the outcome of the study will be of immense benefit to improve the performance of manufacturing SMEs of Pakistan. Your effort in filling the questionnaire is highly appreciated in order to ensure the quality of the research output.

Your answer plays a significant role in the success of this study and you are assured that such will be treated with the utmost confidentiality. For an inquiry about the study or if you need any help in completing the questionnaire, please contact

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Organization: …….

Thank you for your time and kind cooperation sincerely

Section One: Demographic Profile

Respondent Name:……..……..……. (Optional)

Gender

- Male
- Female

Age

- 20-30 years
- 31-40 year
- 41-50 year
- More than 50 year

Experience of using e-commerce

- 1-3 years
- More than 3 years

Education

- Graduation
- Masters

Position in the organization's hierarchy

- Top level Manager
- Middle Level Manager

Manufacturing SMEs Type

- Textile SME
- Leather SME
- Sports goods SME
- Surgical Instruments SME

Section Two:

Firm Performance

The following statements relate to firm performance. Please indicate the extent to which the following items describe your organization.

"(1 = strongly disagree, 2=disagree, 3=somewhat disagree, 4= neither agree nor disagree (neutral); 5=somewhat agree; 6=agree; 7=strongly agree)".

	Firm performance (Deshpandé & Farley, 1998; Jaworski & Kohli, 1993)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
FP1	Our firm sales growth is increasing gradually	1	2	3	4	5	6	7
FP2	Our firm net profit margin is increasing year-to-year	1	2	3	4	5	6	7
FP3	Over the past years, the number of employees are increasing every year	1	2	3	4	5	6	7
FP4	Top management of our firm is satisfied with performance of the last year	1	2	3	4	5	6	7
FP5	The overall performance of our business increased when compare to competitors	1	2	3	4	5	6	7
FP6	Our firm has achieved overall performance expectations from last year	1	2	3	4	5	6	7

The following statements are related to the TOE model factors. Technological factors (relative advantage, technology readiness), organizational factors (adoption cost, top management support), and environmental factors (competitive pressure, government support) Please indicate the extent to which the following items describe your organization.

"(1 = strongly disagree, 2=disagree, 3=somewhat disagree, 4= neither agree nor disagree (neutral); 5=somewhat agree; 6=agree; 7=strongly agree)".

	Relative advantage (Premkumar et al., 1994)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
RA1	The technology usage supports us to communicated better with our business partners	1	2	3	4	5	6	7
RA2	Using technology gives us more control in our business operations to cut cost	1	2	3	4	5	6	7
RA3	Using technology improves our firm effectiveness in terms of Profitability	1	2	3	4	5	6	7

RA4	The Use of technology will provide timely information for decision making	1	2	3	4	5	6	7

	Technology readiness (Molla & Licker, 2005)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
TR1	Our firm has sufficient experience to use technology-based applications	1	2	3	4	5	6	7
TR2	Our firm has necessary business resources to apply e-commerce	1	2	3	4	5	6	7
TR3	Our firm is fully compatible to use LAN and WAN	1	2	3	4	5	6	7
TR4	Our firm has the latest technology to support high bandwidth connectivity	1	2	3	4	5	6	7
TR5	Our current system is flexible to use new technology	1	2	3	4	5	6	7
TR6	Our existing system is customizable as per the need of our customers	1	2	3	4	5	6	7

	Top management support (Soliman & Janz, 2004)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
TMS1	Our top management is likely to invest funds in IT innovations.	1	2	3	4	5	6	7
TMS2	Our top management is agreeable to take risks involved in technology adoption	1	2	3	4	5	6	7
TMS3	Our top management is willing to adopt Internet-based business-to-business transactions to gain a competitive advantage	1	2	3	4	5	6	7
TMS4	Our top management considers the adoption of internet-based business application as a strategic vision of the firm	1	2	3	4	5	6	7

	Adoption cost (Al-Qirim, 2007)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
AC1	The cost of e-commerce use is high for our firm	1	2	3	4	5	6	7
AC2	The amount of money and time of training for usage of e-commerce applications is high for small and medium firms	1	2	3	4	5	6	7
AC3	The maintenance and support fees for technology applications like e-commerce are high for our firm	1	2	3	4	5	6	7

	Competitive pressure (Jaworski & Kohli, 1993)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
CP1	Competition in our industry is cutthroat	1	2	3	4	5	6	7

CP2	There are many promotion wars in our industry	1	2	3	4	5	6	7
CP3	Anything that one competitor can offer, others can match readily	1	2	3	4	5	6	7
CP4	Price competition is a hallmark of our industry	1	2	3	4	5	6	7
CP5	One hears of a new competitive move almost every day	1	2	3	4	5	6	7
CP6	Our competitors are relatively weak in technology usage	1	2	3	4	5	6	7

	Government support (Looi, 2005)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
GS1	The government is helping to reduce the cost of using the technology and e-commerce applications	1	2	3	4	5	6	7
GS2	The government is encouraging to small businesses for e-commerce usage	1	2	3	4	5	6	7
GS3	The government is also focusing on training and development for doing businesses by using e-commerce technology	1	2	3	4	5	6	7
GS4	Government support is vital to encourage small firms to use internet transactions in business	1	2	3	4	5	6	7

The following statements relate to the use of e-commerce. Please indicate the extent to which the following items describe your organization.

"(1 = strongly disagree, 2=disagree, 3=somewhat disagree, 4= neither agree nor disagree (neutral); 5=somewhat agree; 6=agree; 7=strongly agree)"

	Use of e-commerce (Gibbs & Kraemer, 2004)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
EC1	Our firm is using e-commerce for marketing and advertising of our products and services	1	2	3	4	5	6	7
EC2	Our firm has increased the overall sales of the firm by the use of e-commerce	1	2	3	4	5	6	7
EC3	The e-commerce usage makes after-sales service and supports easy	1	2	3	4	5	6	7
EC4	Doing business with e-commerce has increased purchase quantity	1	2	3	4	5	6	7
EC5	Our firm is using e-commerce to exchange operational data with customers	1	2	3	4	5	6	7

EC6	Our firm is using e-commerce to exchange operational data with suppliers	1	2	3	4	5	6	7
EC7	The use of e-commerce has increased the formal integration with other business partners	1	2	3	4	5	6	7

The following statements relate to the entrepreneurial competency. Please indicate the extent to which the following items describe your organization.

"(1 = strongly disagree, 2=disagree, 3=somewhat disagree, 4= neither agree nor disagree(neutral); 5=somewhat agree; 6=agree; 7=strongly agree)".

	Entrepreneurial competency (Man et al., 2008)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
EC1	Our owner recognizes and works on his/her shortcomings like technology literacy	1	2	3	4	5	6	7
EC2	Our owner negotiates with other managers before the implementation of technology innovation	1	2	3	4	5	6	7
EC3	Our owner develops long-term trusting relationships with other business partners	1	2	3	4	5	6	7
EC4	Our owner identifies goods or services that customers want	1	2	3	4	5	6	7

Appendix B

Rule of thumb for determining sample Size of Known Population

Population (N)	Sample Size (S)
1,000	278
2,000	322
3,000	341
4,000	351
5,000	357
6,000	361
7,000	364*
8,000	367
9,000	368

*Note: In the present study, the population is 6561, the sample size is 364.

Appendix C

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11.542	26.233	26.233	11.542	26.233	26.233
2	4.611	10.479	36.711	4.611	10.479	36.711
3	2.762	6.276	42.988	2.762	6.276	42.988
4	2.526	5.741	48.729	2.526	5.741	48.729
5	2.445	5.557	54.286	2.445	5.557	54.286
6	2.049	4.657	58.943	2.049	4.657	58.943
7	1.921	4.365	63.308	1.921	4.365	63.308
8	1.780	4.047	67.355	1.780	4.047	67.355
9	1.380	3.136	70.490	1.380	3.136	70.490
10	1.297	2.947	73.438	1.297	2.947	73.438
11	1.099	2.497	75.935	1.099	2.497	75.935
12	.974	2.213	78.148			
13	.801	1.821	79.969			
14	.743	1.689	81.658			
15	.728	1.655	83.313			
16	.666	1.513	84.826			
17	.608	1.383	86.209			
18	.568	1.290	87.498			
19	.494	1.123	88.621			
20	.465	1.058	89.679			
21	.459	1.043	90.722			
22	.433	.985	91.707			

23	.396	.899	92.606			
24	.379	.860	93.466			
25	.351	.798	94.264			
26	.324	.735	95.000			
27	.319	.724	95.724			
28	.299	.679	96.403			
29	.292	.663	97.066			
30	.270	.613	97.679			
31	.236	.537	98.217			
32	.198	.450	98.667			
33	.152	.345	99.012			
34	.128	.292	99.303			
35	.110	.249	99.553			
36	.089	.203	99.755			
37	.056	.127	99.883			
38	.034	.077	99.959			
39	.018	.041	100.000			
40	4.184E-16	9.510E-16	100.000			
41	2.550E-16	5.797E-16	100.000			
42	1.411E-16	3.206E-16	100.000			
43	-7.955E-17	-1.808E-16	100.000			
44	-3.631E-15	-8.252E-15	100.000			

Extraction Method: Principal Component Analysis.