



# A Critical Review of Empirical Research Examining SMEs Adoption from Selected Journals

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**Abstract.** The purpose of this paper is to review the literature on empirical research examined Small and Medium size Enterprises (SMEs) from selected journals. This has been achieved by reviewing the most examined constructs to identify the key significant factors in the literature. The selected research papers for reviewing are accessed from only high-ranking journals. The review addressed technology adoption in the context of SMEs. The paper attempts to review the studies based on technology-organisation-environment (TOE) framework to identify the relevant set of variables for technology adoption in SMEs. The most significant factors found to be relative advantage and compatibility from the technological context, top management support and size from the organizational context, and external pressure from the Environmental context. This review intended to guide future researchers to improve the predictive power of their examined models.

**Keywords:** Technology adoption · SMEs · TOE · Empirical research

## 1 Introduction

Small and Medium Enterprises (SMEs) are considered one of most significant sectors to promote nations financial and economic growth [3]. SMEs are defined based on their employment and economy figures as well as fixed assets and sales volumes. They typically employ less than 500 workers. They are known for their major advantages including employment creation at low capital cost, flexibility, and innovation [1, 59, 67]. Economies of most OCED nations comprise nearly 96% to 99% of small and medium enterprises that account for 80% economic growth for those nations. Their existence is evident in all developed and developing countries to the extent that GDPs for North American and European countries today is contributed significantly by SMEs with 99% of all businesses. Apart from that, around 70% job creation is credited to this sector [65]. SMEs are known for their significant role in driving the economic growth. Governments of emerging nations and developed countries support SMEs sector through encouraging public policies [3]. Large corporations, that normally play their central role in country's formal economy, could not effectively operate in absence of SMEs [2]. In fact, they appear more leading where there's a need to rely less on traditional resources and

effectively support technology and human intellectual capital as they depends on innovation, change adoption, creation of information and knowledge through strategic disposition of knowledge capital [3, 5, 65].

The existence and growth of SMEs sustain through inter-organizational integration and access to knowledge for which SMEs significantly need resources including Information technology, networking, internet and social media, configurable platforms, and prompt data processing models [1]. Such resources, especially information and communications technology enable SMEs to operate cost-effectively, both at national and international levels [5]. They need to earn and maintain competitive advantage through improved service quality and product expansion, customer evaluations, improved effectiveness and efficiency, cost reduction, and sales forecasting.

Research studies show that SMEs profit heavily by ICT in order to achieve sustainable growth in developed economies [51, 79]. The beginning of last decade observed a huge increase in the use of online platforms by businesses in the US and Europe. It showed similar growth in other parts of the world where online business ventures added billions to aggregate revenues [3]. Certain factors, however, affect SMEs' economic development and weaken their access to global markets, including ICT adoption. This adoption of ICT by SMEs is yet to be explored fully. This study will review the literature based on the TOE framework constructs in order to identify relevant set of variables for technology adoption in SMEs.

## 2 Technology Adoption

Technology adoption is defined as the choice to obtain and use a new innovation [25]. The mental acceptance of a technology by an individual or an organization, and the decision, by an individual or organization, to implement and utilize a technology [80]. Various models and theories have effectively explained technology adoption as voluntary individual behavior including; TAM, IDT, TRA, TRB, TOE, and UTAUT proposed by [6, 17, 22, 62, 75, 77] respectively.

This technology adoption was categorized at three distinct levels: organization, group, and team [25]. However, some studies show that TRA, TRB, and UTAUT are more aimed at forecasting individual adoption as compared to organizational context. In contrast, the TOE frameworks are mostly used at the organizational level to analyse the technology adoption. In recent years, the TOE frameworks have gained significant value among several authors who employ them to gain theoretical perspective on the ICT adoption as well as to test its variables for acceptance of new technologies [87].

Even though IDT and TOE framework constructs are suitable for examining organizational adoption, TOE frameworks are given more weight due to their addition of new construct (i.e. environmental) in explaining the technology adoption. [87] found TOE framework having more significance than the IDT in their theoretical evaluations. As a result, this research study will consider organization-based research studies established on TOE due to their high significance over other frameworks.

### 3 TOE Framework

Tornatzky and Fleischer [75] initially developed the TOE framework in order to analyse the organizational-level adoption of a number of information technology products and services. Since then, TOE frameworks have emerged as significant theoretical perspectives by potential researchers studying technology adoption. The addition of various distinct variables including technological, organizational, and environmental in TOE framework has supplemented researchers to test and validate its advantage over other adoption models w.r.t. their ability to technology use, technology adoption, and value created by SMEs sector as a result of technology creation [25, 59]. Therefore, there are many reasons to employ the TOE framework due to its many benefits including; its user adoption of ICT, its influence over value chain undertakings, its implementation, its diffusion among organizations after the adoption, foreseeing obstacles, its ability to develop better organizational competencies using the technology, and other factors impacting business decisions related to innovation-adoption. All three contexts of TOE framework, as explained by [75] influence the technological innovation adoption of the framework and its implementation. The following sections briefly outline those three contexts of Technological, Organizational, Environmental (TOE) framework;

**Technological Context:** According to [15], technological context is set of those variables that shadow their influence over individuals, organizations, and industries in their process of adopting innovations. [18] Further divided it into five innovation attributes that influence the possibility of adoption. A deep insight into technological context reveals that the adoption relies on various technologies, both inside and outside the organization. Moreover, it depends on application's apparent relative advantage, complexity in terms of learning curve, observability (imagination), compatibility (organizational as well as technical), and trialability (experimentation).

**Organizational Context:** organizational context comprises of organization's culture, business scope, top management's support, organizational readiness, prior ICT knowledge, owner innovativeness, information intensity, cost, and size [75].

**Environmental Context:** Factors facilitating or delaying areas of operation are covered under environmental context. [8, 65, 87] have captured a number of significant factors including competitive pressure, socio-cultural issues, readiness of business partners, government support and encouragement, and infrastructures for technology support.

### 4 Empirical Studies on SMEs Innovation Adoption from Select Journals

Based on the academic journal guide 2015, a literature review was directed to identify the empirical publications conducted on SMEs innovation adoption from high-ranking journals. Thirty-five journals has published empirical studies on SMEs innovation

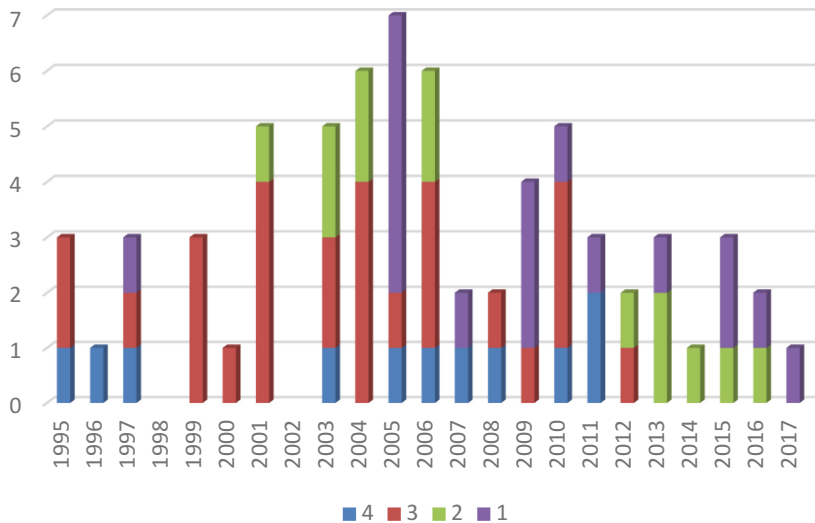
**Table 1.** Empirical studies on SMEs innovation adoption from select journals

ISSN	Journal name	AJG 2015 rating	ABS 2010 rating	Articles
0276-7783	<i>MIS quarterly</i>	4	4	[32]
1047-7047	<i>Information systems research</i>	4	4	[73, 84]
0025-1909	<i>Management science</i>	4	4	[86]
0883-9026	<i>Journal of business venturing</i>	4	4	[34, 63]
0022-2437	<i>Journal of marketing research</i>	4	4	[24]
0047-2506	<i>Journal of international business studies</i>	4	4	[27]
0143-2095	<i>Strategic management journal</i>	4	4	[71]
1042-2587	<i>Entrepreneurship theory and practice</i>	4	4	[48]
0090-4848	<i>Human resource management</i>	4	4	[30]
0378-7206	<i>Information &amp; management</i>	3	3	[12, 16, 28, 31, 36, 46, 49, 54, 61]
0925-5273	<i>International journal of production economics</i>	3	3	[14]
0921-898X	<i>Small business economics</i>	3	3	[19]
0963-8687	<i>Journal of strategic information system</i>	3	3	[35]
0309-0566	<i>European journal of marketing</i>	3	3	[38, 64]
0960-085X	<i>European journal of information systems</i>	3	3	[53, 85, 87]
0305-0483	<i>Omega: the international journal of management science</i>	3	3	[56, 74]
1086-4415	<i>International journal of electronic commerce</i>	3	3	[70]
0742-1222	<i>Journal of management information systems</i>	4	3	[72]
0266-2426	<i>International small business journal</i>	3	3	[45]
0166-4972	<i>Technovation</i>	3	3	[44, 60, 83]
0047-2778	<i>Journal of small business management</i>	3	3	[10, 78, 81]
1462-6004	<i>Journal of small business and enterprise development</i>	2	2	[21, 25, 39, 40, 58]
0003-6846	<i>Applied economics</i>	2	2	[33]

(continued)

**Table 1.** (continued)

ISSN	Journal name	AJG 2015 rating	ABS 2010 rating	Articles
0955-534X	<i>European business review</i>	2	2	[37]
0887-4417	<i>Journal of computer information systems</i>	2	2	[47]
1529-3181	<i>Communications of the association for information systems</i>	2	2	[52]
1062-7375	<i>Journal of global information management</i>	2	2	[76]
0268-4012	<i>International journal of information management</i>	2	2	[43]
1086-1718	<i>Strategic change</i>	2	2	[29]
1467-0895	<i>International journal of accounting information systems</i>	2	1	[11]
1019-6781	<i>Electronic markets</i>	2	1	[7, 8, 41, 54, 82]
1741-0398	<i>Journal of enterprise information management</i>	2	1	[9, 13, 23, 59, 65, 69]
0263-5577	<i>Industrial management and data systems</i>	2	1	[4, 26, 57, 68]
1741-0401	<i>International journal of productivity and performance management</i>	1	1	[50]
<b>Total</b>	<b>35</b>			<b>68</b>

**Fig. 1.** Empirical studies conducted according to journal rating and year

**Table 2.** Construct analysis the most significant factors affecting SMEs adoption

IV	Significant	Insignificant
<b>Technological factors</b>		
R A	DV: BI [43, 61] DV:USE [9, 12, 25, 26, 28, 32, 33, 35, 36, 46, 47, 49, 52–56, 58, 65, 68, 70, 76]	DV:USE [7, 8]
C B	DV:USE [4, 7–9, 12, 25, 26, 28, 35, 47, 49, 52, 54, 58, 68, 70, 76, 85]	
C X	DV:USE [8, 9, 49, 58, 61, 68, 76]	DV: BI [43] DV:USE [28, 35]
TR	DV:USE [9, 35, 58, 59, 68, 82]	DV:USE [8]
O B	DV:USE [58, 68]	DV:USE [8, 35, 59]
SC	DV:USE [19, 21, 40, 68, 85]	
<b>Organizational factors</b>		
T M S	DV: BI [43] DV:USE [9, 12, 14, 47, 49, 54–56, 58, 59, 65, 70, 84]	
O R	DV: BI [14] DV:USE [28, 32, 36, 46, 47, 49, 52, 58, 59, 82, 86]	DV: BI [47]
PK	DV:USE [7, 19, 26, 33, 40, 72–74, 76, 82]	DV:USE [26, 58, 59]
OI	DV:USE [7, 21, 25, 26, 33, 39, 72–74, 76, 82]	
II	DV: BI [26, 72, 74] DV:USE [26, 37, 41, 54]	DV: BI [7, 70]
C O	DV: BI [43] DV:USE [4, 8, 21, 25, 40, 82, 84, 85]	DV:USE [7, 8, 26, 33, 35]
SI	DV:USE [7, 9, 13, 19, 31, 49, 56, 58, 59, 69, 72–74, 76, 84, 87]	DV:USE [26, 33]
<b>Environmental factors</b>		
EP	DV:USE [14, 19, 26, 28, 32, 36, 46, 52, 56, 58, 76, 82, 84–87]	DV: BI [43] DV:USE [7, 9, 33, 37, 47, 49, 59, 70]
CP	DV: BI [43] DV:USE [21, 26, 39, 41, 53, 65, 82, 87]	
IS	DV:USE [9, 14, 21, 31, 53, 54, 58, 69]	DV:USE [59]
MS	DV:USE [9, 33, 37, 58, 59, 84, 87]	DV:USE [13, 86]
ES	DV:USE [9, 26, 65, 82]	DV:USE [7, 58, 59]

IV: Independent variable, DV: Dependent variable, BI: Behavioural Intention, RA: Relative advantage, CB: Compatibility, CX: Complexity, TR: Trialability, OB: observability, SC: Security, TMS: Top management support, OR: Organizational readiness, PK: ICT/IS Prior knowledge, OI: Owner Innovativeness, II: Information Intensity, CO: Cost, SI: Size, EP: External Pressure, CP: Consumer pressure, IS: Industry sector, MS: Market Scope, ES: External ICT Support.

adoption, ranging from 4\* to 1\* rating, and a total of sixty-eight studies was identified (Table 1). These studies were conducted from 1995 to 2017, the highest number of studies has took place in 2005 (Fig. 1).

Based on TOE framework, a construct analysis has conducted to identify the most significant factors affecting SMEs adoption from the studies that has been identified in Table 1. From the technological factors, six constructs has been identified including relative advantage, compatibility, complexity, trialability, observability, and security. From the organizational factors, seven constructs has been identified including top management support, organizational readiness, prior ICT/IS knowledge, owner/entrepreneurial innovativeness, information intensity, cost, and size. From the environmental factors, five constructs has been identified including external/competitive pressure, consumer pressure, industry sector, market scope, and external ICT support (Table 2).

## 5 Summary and Conclusion

The current study makes a significant contribution for academics by reviewing the literature of the empirical studies on SMEs innovation adoption from high-ranking journals. A total of thirty-five journals have presented empirical research papers on SMEs innovation adoption with sixty-eight different studies. The identified studies has been conducted from 1995 to 2017. Based on the TOE framework, a review of the constructs has directed to identify the most significant factors affecting SMEs innovation adoption from the selected journals. The study found that the most significant factors found to be relative advantage and compatibility from the technological context, top management support and size from the organizational context, and external pressure from the environmental context. This analysis intended to guide future researchers to improve the predictive power of their examined models.

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