International Journal of Electronic Government Research
Volume 19 • Issue 1

Perceived Barriers to Business-to-Government (B2G) E-Commerce Adoption:
The Case of Government E-Marketplace (GeM) Portal in India

Mohammad Abdallah Ali Alryalat, Al-Balqa' Applied University, Jordan*
Haroun Alryalat, University of Bahrain, Bahrain
Khalid H. M. Alhamzi, Gulf College, Saudi Arabia
Anuj Sharma, Jindal Global Business School, O. P. Jindal Global University, India
https://orcid.org/0000-0001-6602-9285

ABSTRACT

There are several studies that assess the influence of factors on citizens' intention to adopt e-government services in various contexts. However, there is a lack of research that examines the perceived barriers to B2G e-commerce adoption and develops an understanding of cause and effect group variables among them. This research is the first of its kind to extensively review the relevant literature in e-commerce adoption and assess the selected key factors which are equally relevant in the B2G e-commerce adoption. The authors apply a unique multi-criteria decision-making technique called DEMATEL to understand the nature of the barriers and collect data from eight experts having experience in B2G procurement in the public sector and government organizations. The data findings revealed that out of nine selected variables, five (i.e., lack of IT infrastructure [B1], lack of expertise and technical skills [B2], high cost of technology [B3], perceived information security risk [B5], and lack of awareness of government issues and legal policies [B6]) belonged to the 'cause group' whereas the remaining four (i.e., organisational resistance to change [B4], lack of top management support [B7], low perceived operational benefits [B8], and unwillingness to adopt B2G e-commerce services [B9]) were found to be part of 'effect group'. The theoretical and practical implications of the current study may enhance the understanding of B2G e-commerce adoption.

KEYWORDS

B2G E-Commerce, DEMATEL, E-Marketplace, India, MCDM, Perceived Barriers

INTRODUCTION

Electronic commerce, or e-commerce, has radically redesigned how customers and organizations procure products and services via the Internet (Yoo & Jang, 2019). The growing penetration of the Internet has driven the development, implementation, adoption, and rapid growth of e-commerce

DOI: 10.4018/IJEGR.323571 *Corresponding Author

in the last two decades (Bai & Li, 2022). The contemporary platform-based e-commerce model is well supported by emerging technologies such as software-as-a-service, big data analytics, cloud and fog computing, the internet of things, artificial intelligence, blockchain, and extended reality (Bai & Li, 2022; Ilmudeen, 2021). These emerging digital technologies have provided the necessary impetus and growth opportunities for various e-commerce models like business-to-business (B2B), business-to-consumer (B2C), consumer-to-consumer (C2C), and business-to-government (B2G). At an individual level, e-commerce is revolutionizing consumers' convenience, experience, and satisfaction with online shopping via websites and apps (Bilgihan, Kandampully, & Zhang, 2016; Lai, Ulhas, & Lin, 2014; Nisar & Prabhakar, 2017). There has been a significant increase in the number of consumers preferring to shift to online e-commerce marketplaces due to the vast choices available online, the ubiquity and interactivity of the platform, the rich product information accessibility, and the features for product and service personalization (Gunasekaran, Marri, McGaughey, & Nebhwani, 2002; Ho & Chuang, 2023). In addition, the disintermediation effect of e-commerce creates a greater incentive for consumers to purchase the products quickly and efficiently at a reduced transaction cost (Sen & King, 2003).

At an organizational level, e-commerce has led to a fundamental shift in interorganizational coordination among buyer-seller organizations for competitive sourcing of products and services (Chandrasekar Subramaniam, 2002; Dai & Kauffman, 2002). The other potential benefits of B2B e-procurement using e-commerce platforms include improved efficiency and productivity, transaction cost savings, increased effectiveness, and significant productivity gains (Claycomb, Iyer, & Germain, 2005; Kshetri & Dholakia, 2002). Research has reported that B2B e-commerce is growing faster than B2C e-commerce as leading organizations collaborate to transform the interorganizational transactions for e-procurement (Gunasekaran, McGaughey, Ngai, & Rai, 2009; Ho & Chuang, 2023; Kshetri & Dholakia, 2002). B2B e-commerce plays a vital role in improving the business performance of interorganizational supply chain management, which is an essential antecedent in gaining a competitive advantage (Baršauskas, Šarapovas, & Cvilikas, 2008).

The e-commerce evolution has also impacted government procurement, where government organizations have started leveraging e-commerce platforms to reduce transaction costs, gain operational efficiency, and ensure transparency (Skare, Gavurova, & Rigelsky, 2023). Public procurement refers to the purchase of goods and services by government organizations or state-owned public enterprises (Raymond, 2008). However, the procurement process of government organizations is strategically different when compared to business organizations because government organizations have different strategic goals (Purchase, Goh, & Dooley, 2009). Purchase et al. (2009) report that the strategic objectives in public procurement are focused on ensuring fairness, inclusiveness, accountability, transparency, equality, balanced public interests, and democratic values. Hence, public procurement by government organizations is a complex process requiring operational efficiency, transparency, cost-saving, and inclusiveness (Adjei-Bamfo, Maloreh-Nyamekye, & Ahenkan, 2019; Guarnieri & Gomes, 2019; Knutsson & Thomasson, 2014). In addition, government and public sector organizations are bulk buyers who are governed and controlled by auditors to ensure fair business practices and safeguard the public interest.

Digital transformations in public procurement have introduced electronic procurement methods based on online procurement platforms for government buyers (As-Saber, Waheduzzaman, & Rahman, 2020; McCue & Roman, 2012). These online procurement platforms have digitalized the key purchasing processes executed by government organizations to ensure transparency, accountability, and compliance (Henriksen & Mahnke, 2005). The significant digital reforms in implementing the e-procurement platforms have introduced agile and innovative purchasing processes, which are also improving professionalism and stakeholder satisfaction (Brandon-Jones & Carey, 2011).

The Government e-Marketplace (GeM) portal[1] in India is a web-based public procurement system to facilitate business-to-government (B2G) transactions using e-Commerce. The GeM portal is developed and maintained by the special purpose vehicle GeM, a non-profit organization under the

Ministry of Commerce and Industries, Government of India. With over 5 million sellers and service providers listed on this platform, GeM ensures a complete contactless, paperless, and cashless B2G platform for e-procurement. The efficient, transparent, and inclusive business operations have led to crossing the total order value of USD 42 billion by more than 66,000 buyer organizations. GeM has automated and standardized the procurement cycle and reduced the operating cost of public procurement (Beniwal, 2020). The Government of India has clearly instructed government agencies and public sector enterprises to execute the purchase of goods and services from GeM by amending the General Financial Rules for Procurement (Siddharth, 2017). However, many state government organizations are still finding it difficult to fully leverage the benefits of GeM. Despite the great efforts by the government of India to roll out new features and functionalities to ease and facilitate public procurement, many public enterprises are yet to unlock the full potential of sustainable public procurement of products and services via GeM (Bhaumik, 2017). The issues range from technical (e.g., lack of information technology infrastructure) to organizational (e.g., procedural issues due to lack of awareness of government policies), to name a few.

Clearly, the potential of B2G e-commerce in reducing procurement costs, improving strategic sourcing, and gaining a competitive advantage from operational efficiency motivates a need to investigate the drivers and barriers related to its adoption. In general, many studies have examined the barriers to e-commerce adoption in business-to-consumer (B2C) (Richards & Shen, 2006) and business-to-business (B2B) (Shah Alam et al., 2007) transactions. However, to the best of our knowledge, no previous work has examined the issues related to e-commerce adoption by government organizations under public procurement.

This study investigates the barriers that hinder the adoption of GeM in B2G e-commerce -based procurement of goods and services. Scientific research on the adoption of e-commerce in B2C and B2B is well-developed (Gorla, Chiravuri, & Chinta, 2017). However, the research on the adoption of e-commerce in B2G has not yet been fully developed. The challenges and limitations of government organizations and state-owned public enterprises in the adoption of e-commerce platforms like GeM are much different from individual customers or private business organizations. The aim of this study is to identify the main barriers faced by government sector organizations for B2G e-commerce platform adoption, such as the GeM portal in India.

Accordingly, the main contribution of this study is expanding the scarce knowledge on the adoption of B2G e-commerce. This study identifies the main barriers and assesses them using a multi-criteria decision-making approach. The findings of this study are critical for emerging economies like India because the B2G e-marketplaces like GeM have started transforming public procurement, but the adoption by state government organizations is still at a nascent state. A proper and deeper understanding of the barriers identified by this study will help the policymakers to understand the various factors that influence government organizations' participation in B2G e-commerce and encourage more effective leverage of B2G e-marketplaces to stay competitive.

LITERATURE REVIEW

This section synthesizes the available scientific literature on the adoption of e-marketplaces for the procurement of goods and services by organizations. In the general e-commerce literature, several studies have determined the factors that lead to the adoption of e-commerce in B2C and B2B transactions (Gorla et al., 2017; Lola & Bakeev, 2021; Richards & Shen, 2006; Sila, 2013). Although various factors reported in the previous studies impact the adoption of e-commerce, empirical studies find them inconsistent across various contexts and organizational settings. However, many of the previous seminal works that operationalized adoption barriers that are relevant to B2G e-marketplaces like GeM are listed in Table 1. Such adoption barriers may be categorized into different categories such as technical, organizational, environmental, legal, and many more (Gorla et al., 2017; Ranganathan, Dhaliwal, & Teo, 2004). However, this study has not used any categorization to avoid subjective bias.

Table 1. B2G e-commerce platform adoption barriers

S. No.	Barrier	Reference(s)
1.	Lack of IT infrastructure	(Lola & Bakeev, 2021)
2.	Lack of expertise and technical skills	(Gunasekaran et al., 2009)
3.	High cost of technology	(Hawking, Stein, Wyld, & Foster, 2004)
4.	Organizational resistance to change	(Gorla et al., 2017; Gunasekaran et al., 2009)
5.	Perceived information security risk	(Glover & Benbasat, 2010; Salam, Rao, & Pegels, 2003)
6.	Lack of awareness of government policies and legal issues	(Kshetri, 2007)
7.	Lack of top management support	(Gunasekaran et al., 2009)
8.	Low perceived operational benefits	(Gorla et al., 2017)
9.	Unwillingness to adopt B2G e-Commerce Services	(Sila, 2013)

Lack of IT Infrastructure

Despite the tremendous growth in the investment for the digital transformation of government processes and ensuring ubiquitous Internet accessibility, a digital divide is still present in emerging economies like India (Malodia, Dhir, Mishra, & Bhatti, 2021). The lack of IT infrastructure includes the issues such as computing infrastructure as well as telecommunication infrastructure, and Internet reliability (Sila, 2013). These IT infrastructure barriers impede government organizations from accessing public procurement services from computers and laptops in the absence of a stable Internet connection, mostly in rural areas (Lola & Bakeev, 2021). In addition, technological innovations such as 5G mobile communication networks maintain a persistent digital divide in regions of marginalized communities (Asrani, 2022). Hence, IT infrastructure is an important facilitating condition that impacts the adoption of e-procurement (Kit, Ahmed, & Tan, 2021).

Lack of Expertise and Technical Skills

Adopting e-commence for procurement has always been a strategic decision as it takes resources and expertise to integrate complex intraorganizational processes using technologies. The strategic direction and focus need expertise and technical skills. Research has reported that the level of technical sophistication and experience with the digital platform are important drivers of the IT maturity of the organization (Gorla et al., 2017). IT maturity and the level of e-commerce knowledge within the government organization can affect the adoption and impede the e-commerce adoption initiatives (Gunasekaran et al., 2009). The necessary expertise and technical skills may be provided by an e-commerce champion or a small group of IT-skilled people working as a task force for e-commerce adoption (Teo & Ranganathan, 2004).

High Cost of Technology

Government organizations in developing countries like India suffer from a lack of financial resources for IT-based implementations (Kshetri, 2007). As a result, government organizations may need to divert the fund from some other heads, like contingency, to bear the cost of technology, which may require administrative approvals. Hence, the cost of acquiring B2G e-commerce infrastructure or participating in B2G e-marketplace platforms is a significant barrier that should be explored and assessed to understand better overall adoption patterns (Hawking et al., 2004).

Organizational Resistance to Change

Government organizations may have a tendency to resist change and maintain the status quo. In addition, due to the inherent complexities related to adopting complex technologies and procedures, managers and decision-makers may resist adapting to newer systems and processes (Lola & Bakeev, 2021). Resistance to change and adapting to e-commerce are internal factors that are found to be significant because they can hinder organizations from leveraging the potential benefits of e-commerce (Teo & Ranganathan, 2004).

Perceived Information Security Risk

Risk-taking propensity has always been a crucial factor in the adoption of new technology by firms. The perceived information security risk and end-user trust in government processes and systems are crucial drivers of their adoption (Suman, Mondal, & Mandal, 2022). The need to reveal personal and financial information over the Internet for e-commerce transactions increases the perceived information security risk as the stakeholders may be concerned about their information privacy and confidentiality (Glover & Benbasat, 2010).

Lack of Awareness of Government Policies and Legal Issues

Due to the disintermediation procedures, e-commerce transactions occur across various geographical regions (such as different states) that may have different tax regimes. In the case of government e-procurement, the supplier may be from a different area that follows different accounting standards. Hence, the lack of awareness of government policies and legal issues plays an important role as a barrier to B2G e-commerce adoption (Kshetri, 2007). The lack of a legal infrastructure and a transparent legal environment hinders the continuance of e-commerce by procuring organizations (Teo & Ranganathan, 2004). Moreover, the literature confirms that administrative procedures and document format should be simple and standardized; otherwise, government employees may find it difficult to use online processes (Iong & Phillips, 2023).

Lack of Top Management Support

The support and commitment of the top management in the organization are crucial for adopting any new technology (Thatcher, Foster, & Zhu, 2006). The literature on e-commerce has also reported that top management support is an essential facilitator in B2B e-commerce adoption and implementation (Gunasekaran et al., 2009). The purchasing committee at government organizations is formed by representatives from diverse domains. The inter-functional team of representatives may be formed by functional executives, and their support is also a deciding factor for e-commerce adoption (Teo & Ranganathan, 2004). In the case of GeM, the lack of top management support may play a vital role in adopting and conducting B2G e-procurement activities.

Low Perceived Operational Benefits

The operational benefits of procurement using e-marketplace platforms include saving transaction costs, operational efficiency, fairness, and transparency (Ho & Chuang, 2023). The cost-benefit perception of buyer organizations leads to the introduction and adoption of e-commerce platforms (Knutsson & Thomasson, 2014). However, significant empirical research suggests that if the stakeholders and decision-makers do not perceive the key operational benefits of a B2G e-procurement platform like GeM, then adoption and continuance are not possible (Gorla et al., 2017).

Unwillingness to Adopt B2G E-Commerce Platforms

Government organizations are reportedly reluctant to adopt B2G e-commerce platforms as they possess authoritative power in traditional commerce transactions (Sila, 2013). Government organizations and state-owned enterprises want to remain in a state of domination as these organizations have

access to unlimited allocative and authoritative resources (Andersson, Hedström, & Karlsson, 2022). The decentralized nature of B2G e-commerce platforms like GeM can become a hindrance in the Institutionalization of e-commerce in B2G. Hence, despite several initiatives of the Government of India to promote the GeM e-marketplace for public procurement, government enterprises may not be willing to shift their procurement processes to GeM.

RESEARCH METHODOLOGY

This study uses the multi-criteria decision-making (MCDM) technique called DEMATEL (Decision Making Trial and Evaluation Laboratory) to understand the interrelationships between the identified barriers and the causal effect between them.

Introduction to DEMATEL

DEMATEL was originally developed between 1972 and 1979 by the Science and Human Affairs Program of the Battelle Memorial Institute of Geneva with the aim of studying complicated and interconnected problematic groups (Shieh et al., 2011). This method has been considered as one of the widely accepted tools to solve the 'cause and effect' relationships among the evaluation criteria (Lin and Tzeng, 2009; Yang et al., 2008). Unlike the conventional multi-criteria decision-making techniques such as analytical hierarchical process (AHP) with the assumption that factors considered for a particular system are independent, this method is one of the structural modeling techniques that can ascertain the interdependence between variables through a causal diagram (Shieh et al., 2011). The causal diagram uses directed graphs (or digraphs) rather than directionless graphs to demonstrate the fundamental concept of contextual relationships and the strengths of impact among the selected variables (Wu, 2008).

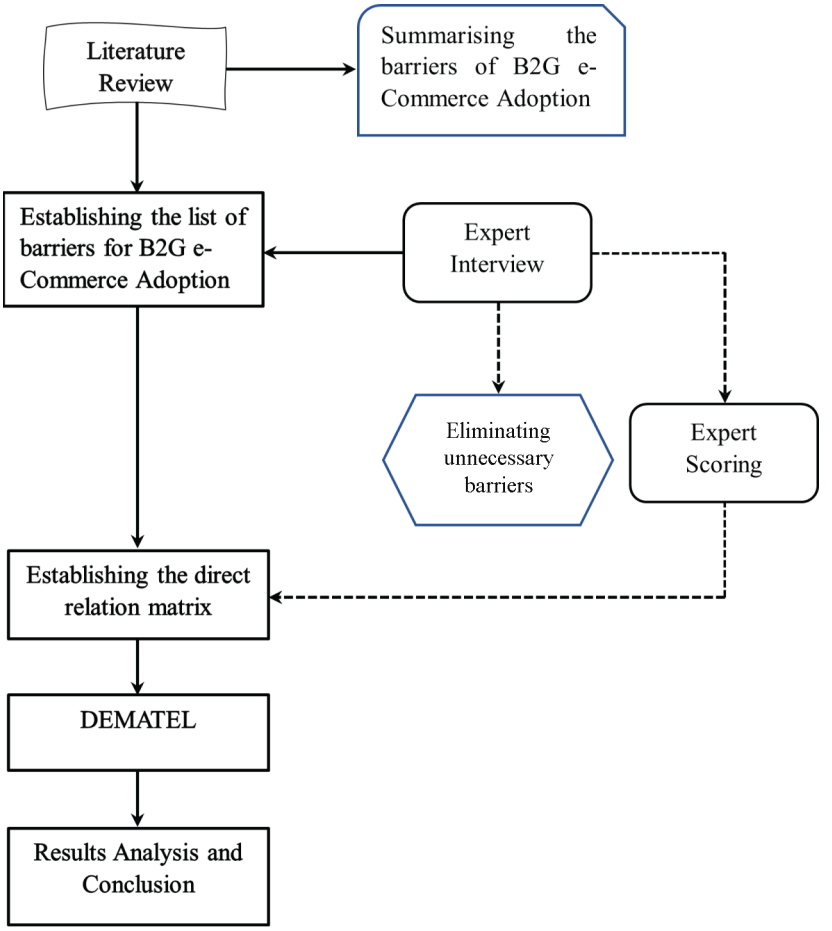
This method has been successfully implemented in the research fields across various sectors such as energy (Zhao et al., 2021), telecommunications (Fu et al., 2012), transportation (Kuzu, 2021), hospitality (Altuntas and Gok, 2021), manufacturing (Singh et al., 2021), supply chain (Menon and Ravi, 2022), banking (Ahmadzadeh et al., 2021), textile and apparel (Gardas et al., 2018), etc. therefore, we believe that this method is fully capable of addressing issues of perceived barriers to business-to-government (B2G) e-commerce adoption. Using this methodology, the values of four degrees for each identified barrier, including "R", "C", "R-C" and "R+C", are calculated to assess the rank and the nature of causality for those barriers. Here, "R" and "C" represent the level of impact exerted on other barriers and received from other factors, respectively. Moreover, "R+C" denotes the rank of the barriers in terms of their relevance, whereas "R-C" presents the overall strength of barriers, which can be divided into dispatchers or receivers (Zhang et al., 2019). The barriers with higher values are considered to have the largest direct impact on the other barriers. The positively valued barriers in "R-C" represent the net cause group factors, and they are supposed to influence the other "R-C" factors whose values come out either as weak positive or negative (Kumar et al., 2017).

DEMATEL Method Procedures

The flow chart for the implemented DEMATEL method is shown in Figure 1. We have explored the relevant literature to identify the key barriers to B2G e-commerce adoption and took the experts' interviews to understand if the selected barriers make sense in the given context. We then used the selected seven barriers to generate the cumulative direct relation matrix based on taking the average of expert responses for the interrelationships between all the barriers. We then apply the technique of DEMATEL to come up with the rankings as well as the set of cause-and-effect barriers to develop a framework for these barriers.

To collect the barriers to B2G e-Commerce adoption, we identified all the relevant literature and outlined the key barriers for this particular perspective. The relevant literature was assessed through the Scopus and Web of Science databases and the Google Scholar search engine. The identified barriers

Figure 1. Proposed research framework using DEMATEL approach (Adapted from Zhang et al., 2019)



were discussed with the experts, and only the most prominent barriers in the context of Indian B2G e-commerce adoption were retained based on their suggestions.

Step 1: Establishing the direct relation matrix.

In this step, the experts are given the five-point comparison scale to provide the relationship between each pair of barriers as per the following influential levels, i.e., (0) for No Influence, (1) for Low Influence, (2) for Medium Influence, (3) for High Influence, and (4) for Very High Influence. The score x_{ij}^{k} is provided by the kth expert and indicates the influential level that barrier i has on barrier j. The [n x n] Matrix A is calculated as provided in Equation 1 by averaging the score from each individual expert.

$$aij = \frac{1}{H}\sum_{k=1}^{H} x_{ij}^{k} \quad (1)$$

Step 2: Normalizing the direct-relation matrix.

Based on the direct-relation matrix A, the normalized direct-relation matrix can be obtained using the following formula:

$$s = \max\left(\max_{1\le i\le n}\sum_{j=1}^{n} a_{ij}, \max_{1\le j\le n}\sum_{i=1}^{n} a_{ij}\right) \tag{2}$$

Then:

$$\mathrm{X} = \frac{A}{s} \tag{3}$$

The sum of each row j of Matrix A provides the direct influence that Barrier i exerts on the other barriers $\max\left(max_{1\le i\le n}\sum_{j=1}^{n} a_{ij}, max_{1\le i\le n}\sum_{i=1}^{n} a_{ij}\right)$ representing the direct effects on others.

Step 3: Obtaining the total-relation matrix.

After obtaining the normalized direct-relation X, the total-relation matrix T can be calculated using the following formula:

$$\mathrm{T} = X(I - X)^{-1} \tag{4}$$

where I represents the identity matrix.

Step 4: Producing a causal diagram.

The sum of rows and the sum of columns are independently denoted by the vectors R_i and C_i. We then calculate the sum of the values calculated for the total-relation matrix, i.e., $R_i + C_i$ called prominence as well as the difference of these values, i.e., $R_i - C_i$ as relation, which will divide the criteria into a causal group and effect group. If the value of $(R_i - C_i)$ is positive, the corresponding barrier can be considered to belong to the cause group, whereas the negative values will belong to the effect group. Therefore, the causal diagram can be obtained by mapping the dataset $(R_i + C_i, R_i - C_i)$.

$$T = \left[t_{ij}\right]_{n\times n} \quad i, j = 1, 2, \ldots, n \tag{5}$$

$$R_i = \left[\sum_{j=1}^{n} tij\right] = \left[t_{i\cdot g}\right]_{n\times 1} \tag{6}$$

$$Ci = [\sum_{i=1}^{n} t_{ij}]_{1\times n}^{t} = \left[t_{g\cdot j}\right]_{n\times 1} \tag{7}$$

Step 5: Setting a threshold value and obtaining the inner dependence matrix.

For demonstrating the cause-and-effect relationship between the barriers in the diagram while keeping the complexity of the system at a manageable level, it is required that we set a threshold value alpha (α) to keep the negligible effects out of context. We subtract this threshold value of alpha (α) with values represented across every cell and compute the resultant values in the final matrix. If the difference is positive, we mark them in a bold letter or different color to map the barriers in the form of cause and effect in the final diagram. The threshold value alpha (α) can be calculated using the following formula:

$$\alpha = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n}\left[t_{ij}\right]}{N} \tag{8}$$

Step 6: Formation of the causal diagram.

The final step in the DEMATEL technique is to identify the most relevant criteria and their impact levels in order to recognize the driving (or cause) and dependent (or effect) barriers for the considered problem concerning B2G e-commerce adoption.

Data Collection

After finalizing the key barriers to the B2G e-commerce adoption, the experts with relevant experience in B2G procurement from the different public sector and government organizations were contacted. The authors contacted some of the experts as per their individual contacts, and finally, eight experts agreed to provide the data concerning the interrelationships of nine barriers in total. In that way, a rigorous process of data collection was adopted based on a convenience sampling technique (Kumar et al., 2017). It is said that to maintain the efficiency of group-decision making, 5-20 expert respondents should participate and provide data for DEMATEL or any other equivalent multi-criteria decision-making technique to run (Anderson et al., 2001). For the effective evaluation of the suggested key barriers and assessing their cause-and-effect relationship, data from eight experts were collected. All these experts were involved in the procurement of various items using the government e-marketplace portals (such as GeM) through different sellers who are listed on those platforms. The demographic details of the experts are presented in Table 2.

Table 2. Experts' demographic details

E#	Professional Qualification	Exp. (in yrs.)	Professional Rank	Department
1	BTech, MBA	22	Senior Procurement Officer	Public Procurement
2	BCom, PGDM	15	Business Development Manager	Purchase
3	BTech, MBA, PGDCA	20	Transportation Planner	Transportation
4	BBA, MBA	12	Procurement Officer	Procurement Division
5	BSc, MBA	8	Deputy Manager	SME Financing
6	BTech, MTech, PGDM	10	Marketing Manager	Sales and Marketing
7	MBA, PhD	3	Assistant Professor	Marketing
8	BTech, MTech, PhD	15	Professor	Business

Note: E#: Expert Number, Exp.(in yrs.): Experience in years

RESULTS ANALYSIS

After collecting data from eight experts, we took the average of the values obtained in each cell by adding their values and dividing them by eight. The matrix that was obtained after taking the average of each response from each of the eight experts is called the direct relation matrix, and it is presented in Table 3. In addition, this table also contains the values of the sum of all the rows, called row total (RT), and all the columns, called column total (CT).

By standardizing the direct relation matrix following the steps mentioned in the methodology above, we computed the total relation matrix T as presented in Table 4.

This matrix T is obtained by multiplying the direct relation matrix (D) by the inverse of the difference of identity matrix (I) and direct relation matrix (D), i.e., D*inverse of (I-D). We again take the sum of rows and columns and mark them as 'R' and 'C', respectively. We then calculate 'R + C' and 'R – C'. The ranks of barriers are then decided based on the higher to lower values of 'R + C' in ascending order. However, the values obtained for 'R – C' are used to decide if a barrier belongs to

Table 3. Direct relation matrix (D)

D	B1	B2	B3	B4	B5	B6	B7	B8	B9	RT
B1	**0.000**	3.375	1.625	3.000	3.500	1.500	3.000	1.875	3.375	**21.250**
B2	1.500	**0.000**	1.250	3.000	3.500	1.375	3.500	3.625	3.500	**21.250**
B3	3.125	2.125	**0.000**	2.875	2.375	1.375	3.250	3.625	3.750	**22.500**
B4	3.250	3.375	1.500	**0.000**	1.125	3.500	3.625	2.750	3.625	**22.750**
B5	1.500	3.500	1.375	3.000	**0.000**	1.250	3.250	3.750	3.625	**21.250**
B6	1.375	1.000	1.125	3.125	1.750	**0.000**	1.375	3.250	3.125	**16.125**
B7	2.875	3.125	1.875	3.000	1.625	1.625	**0.000**	3.250	3.375	**20.750**
B8	1.625	1.750	1.250	3.500	2.375	1.500	3.500	**0.000**	3.625	**19.125**
B9	1.250	1.750	1.125	3.625	1.250	3.000	3.125	3.375	**0.000**	**18.500**
CT	**16.500**	**20.000**	**11.125**	**25.125**	**17.500**	**15.125**	**24.625**	**25.500**	**28.000**	

B1 = Lack of IT infrastructure, **B2** = Lack of expertise and technical skills, **B3** = High cost of technology, **B4** = Organisational resistance to change, **B5** = Perceived information security risk, **B6** = Lack of awareness of government issues and legal policies, **B7** = Lack of top management support, **B8** = Low perceived operational benefits, **B9** = Unwillingness to adopt B2G e-commerce services

Table 4. Total relation matrix (T)

T	B1	B2	B3	B4	B5	B6	B7	B8	B9
B1	0.1888	**0.3400**	0.1867	**0.3801**	**0.3070**	0.2360	**0.3779**	**0.3477**	**0.4167**
B2	0.2389	0.2286	0.1740	**0.3793**	**0.3031**	0.2315	**0.3915**	**0.3982**	**0.4186**
B3	**0.3010**	**0.3119**	0.1389	**0.3916**	0.2820	0.2417	**0.3997**	**0.4121**	**0.4435**
B4	**0.3016**	**0.3450**	0.1886	**0.2971**	0.2438	**0.3063**	**0.4055**	**0.3846**	**0.4371**
B5	0.2388	**0.3397**	0.1777	**0.3796**	0.1922	0.2280	**0.3848**	**0.4020**	**0.4224**
B6	0.1909	0.2082	0.1386	**0.3178**	0.2032	0.1443	0.2609	**0.3196**	**0.3356**
B7	0.2777	**0.3234**	0.1907	**0.3733**	0.2453	0.2357	0.2737	**0.3791**	**0.4084**
B8	0.2273	0.2670	0.1623	**0.3680**	0.2494	0.2210	**0.3649**	0.2558	**0.3937**
B9	0.2086	0.2549	0.1530	**0.3614**	0.2080	0.2601	**0.3412**	**0.3526**	0.2670

the 'cause' or 'effect' category. If the 'R – C' value is found to be negative, the impact is considered as 'effect', whereas for a positive 'R – C' value, the impact is considered to belong to the 'cause' group. The barriers for which 'R – C' value is positive suggest that the influence of these barriers is more significant on the other barriers than what the other barriers exert on themselves. Moreover, four of the overall barriers have negative 'R – C' values. The results of these barriers indicate that the impact of these barriers on the other barriers is less than the influence that the other barriers impose on themselves. The 'R – C' values in Table 5 indicate that barriers including 'Lack of IT infrastructure (B1)', 'Lack of expertise and technical skills (B2)', 'High cost of technology (B3)', 'Perceived information security risk (B5)', and 'Lack of awareness of government issues and legal policies (B6)' belong to the 'cause group' whereas 'Organisational resistance to change (B4)', 'Lack of top management support (B7)', 'Low perceived operational benefits (B8)', and 'Unwillingness to adopt B2G e-commerce services' (B9)' belong to the 'effect group' of barriers (see Table 5).

The prominence i.e., 'R + C' represents the relevance of each barrier in the overall analysis structure. The prominence of the nine barriers ranks from the largest to the smallest as follows: B4, B9, B7, B8, B2, B5, B1, B3, and B6. In the view of 'R + C' value, the five barriers from the 'cause group' can be attained in order 'Lack of expertise and technical skills (B2)' > 'Perceived information security risk (B5)' > 'Lack of IT infrastructure (B1)' > 'High cost of technology (B3)' > Lack of awareness of government issues and legal policies (B6)' whereas the remaining four barriers from the 'effect group' can be obtained in the order as 'Organisational resistance to change (B4)' > 'Unwillingness to adopt B2G e-commerce services' (B9)' > 'Lack of top management support (B7)' > 'Low perceived operational benefits (B8)'. The higher order of these barriers indicates that those barriers that come earlier in the order are considered to be superior barriers in terms of their importance than those that come later in the order.

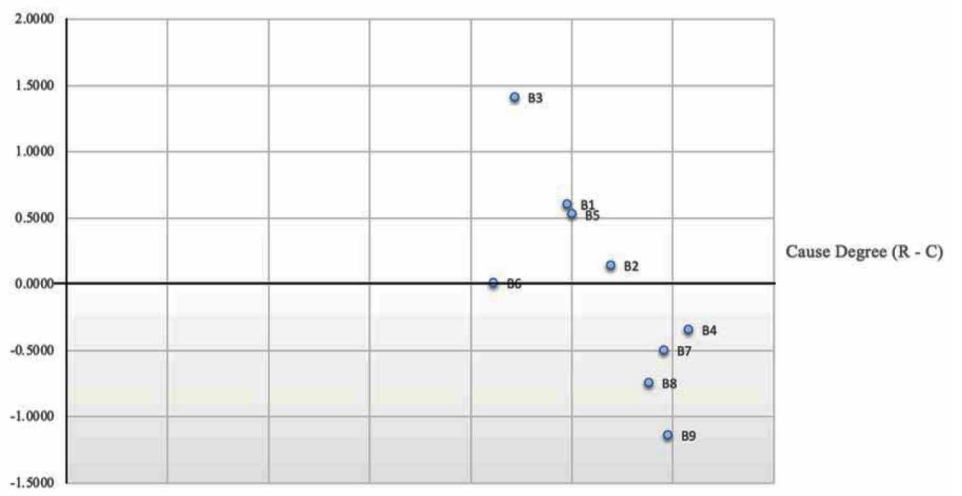
We also compute the threshold value alpha (α) for the Total Matrix T, which is an average of the values of the entire matrix T. This value is reported as 0.2949. All the individual values in matrix T are then compared with this threshold value alpha, and those values which are greater than alpha are marked in bold. These bold marked cells hold relevance when the unidirectional cause and effect relationship is identified between any pair of barriers in the directional graph, also called a digraph. For example, in Matrix T, the first bold value (i.e., 0.3010) from the left to right falls under Row B3 and Column B1. This will indicate that there will be a forward arrow going from B3 to B1 like B3→B1 (see Table 4). Similarly, there are 41 more relationships that can be established based on all the bold values represented in Table 4.

Figure 2 shows the barriers belonging to the 'cause group' and 'effect group'. The barriers (i.e., B1, B2, B3, B5, and B6) for which the 'R – C' value is positive are shown above the x-axis and all

Table 5. Cause and effect values

Barrier	R	C	R + C	R - C	Rank	Impact
B1	2.7808	2.1737	4.9545	0.6071	7	**Cause**
B2	2.7640	2.6187	5.3826	0.1453	5	**Cause**
B3	2.9225	1.5105	4.4330	1.4120	8	**Cause**
B4	2.9095	3.2482	6.1577	-0.3386	1	**Effect**
B5	2.7652	2.2339	4.9991	0.5312	6	**Cause**
B6	2.1190	2.1047	4.2236	0.0143	9	**Cause**
B7	2.7073	3.2001	5.9074	-0.4927	3	**Effect**
B8	2.5094	3.2518	5.7612	-0.7424	4	**Effect**
B9	2.4068	3.5430	5.9498	-1.1362	2	**Effect**

Figure 2. Scatter plot of the 'cause' and 'effect' barriers



these barriers belong to the 'cause group' whereas for the negative 'R – C' values, barriers (i.e., B4, B7, B8, and B9) are being shown below the x-axis and they all are being shown below the x-axis.

This scatter plot graph clearly divides the barriers belonging to the 'cause' and 'effect' groups on the two sides of the x-axis.

DISCUSSION

Implications for Theory

This research provides multi-fold theoretical implications for the research in the area of e-government adoption. First, this is the first study that has comprehensively reviewed the literature on B2G e-government adoption and identified the key barriers to B2G e-commerce adoption. Prior studies (e.g., Gorla et al., 2017; Lola and Bakeev, 2021) identified such barriers in the e-commerce context, but none of them identified these barriers in the B2G context and reviewed them based on their relevance in this context even though several public sector and government organizations are making purchases through the industrial businesses. Second, this is the first study to the best of our knowledge that has implemented a multi-criteria decision-making technique such as DEMATEL to come up with the two broader categories of variables, which are 'cause' and 'effect' type variables in nature. Such findings will help future researchers to find an established research framework using the key barriers and provide further opportunities to validate using the primary survey-based data. Third, this is the first study to implement the barriers of B2G e-commerce adoption for the procurement of goods and services required by public sector organizations and governments from industrial businesses. This is a unique context, and this study provides a novel contribution for becoming the first of its kind to weave together the fragmented set of barriers together and apply the DEMATEL method to put them in some form of relationships based on the data collected from the experts in this area.

Implications for Practice

This research also provides several implications for practice and policy. First, the findings indicate that 'Organisational resistance to change (B4)' is the most important factor as far as the barriers of the unwillingness to adopt B2G e-commerce are concerned. Public sector organizations should motivate their employees to switch to using technology in this changing world where businesses are said to

reap the benefits of competitive advantage only when their employees start moving from the manual way of working to using technology in their work. The use of technology not only provides a higher degree of efficiency in how work can be done but also saves time, the overall cost of the workforce, and the precision and quality of the work performed. Resistance to change is a complex and common problem for any organization (Basyal and Seo, 2017). The top management of government and public sector organizations should ensure that the employees know the benefits of using online systems. Specifically, the purchase committee members handling e-procurement should be given proper training to avoid any misunderstanding related to the use of the new system being implemented for their use (Elgohary and Abdelazyz, 2020). Second, 'Unwillingness to adopt B2G e-commerce services (B9)' is the second most important barrier. The managers should consider the findings of this research to understand what other barriers influence this. The findings indicate that all other barriers influence this barrier. Hence, the management of the public sector or government organizations should consider all other factors if they want responsible individual employees to be willing to adopt such services. Third, both 'Lack of top management support (B7)', and 'Low perceived operational benefits (B8)' are ranked third and fourth most important barriers. This indicates that organizations need to keep their support for the use of B2G e-commerce services affirmative and spread positive word-of-mouth regarding the operational benefits obtained from such services. As all four top-ranked variables are the most important ones and also the effect group variables, the practitioners should endeavor to work on the other five cause group variables (i.e., 'Lack of IT infrastructure (B1)', 'Lack of expertise and technical skills (B2)', 'High cost of technology (B3)', 'Perceived information security risk (B5)', and 'Lack of awareness of government issues and legal policies (B6)') in a way that these barriers can be given priority to be optimized to ensure the organizations' willingness to pay for their B2G e-commerce adoption.

Fourth, the rankings for the 'cause group' barriers in ascending order, i.e., 'Lack of expertise and technical skills (B2)', 'Perceived information security risk (B5)', 'Lack of IT infrastructure (B1)', 'High cost of technology (B3)', 'Lack of awareness of government issues and legal policies (B6)' indicate that the top management executives of the public sector, as well as government institutions, should give more attention toward improving the concerned employees' expertise and technical skills, their perception of being vulnerable and revealing the secure personal information while using such systems as well as providing them with the adequate knowledge and training to make them much closer toward the use of such systems. Moreover, the top management should also make the required investment in technology, and government should plan to buy such applications in bulk to minimize their overall cost to technology. However, the last two barriers are not that much of a problem for the government or the public sector institutions as they generally do not have the dearth of funding to invest in the infrastructure and purchases.

Limitations and Future Research Directions

This research has some limitations. First, this study provides the procurement-related barriers from the B2G e-commerce adoption only for the selected public sector and government organizations. Future research can take some wider opinions from some other government departments at the state as well as the central level and see if there is any difference in the way they think about this procurement. Second, this research is exploratory research providing some fundamental understanding of the barriers and the way they are linked to each other in a framework proposed through the DEMATEL approach. Future research could extend this work and collect some survey-based primary data to validate a relatively parsimonious model out of this framework (Alryalat et al., 2016; Chatterjee et al., 2020, 2021; Rana and Dwivedi, 2016; Rana et al., 2015, 2016, 2019; Sharma et al., 2020; Singh et al., 2022). Third, this investigation is based on one of the MCDM techniques called DEMATEL. Future researchers can also apply other MCDM techniques, such as interpretive structural modeling, analytical hierarchical process, VIKOR, TOPSIS, etc., to perform some different analyses using the same criteria. Finally, the findings of this research are based on the data collected from experts only

relating to any institutional procurements (e.g., raw materials, office equipment, vehicles, energy and utilities, medical equipment and supplies for hospitals, food and catering services, scientific and lab equipment, etc.), and hence its findings cannot be generalized for purchasing in other contexts (e.g., B2C, B2B, C2C, etc.). Moreover, the future research can perform more extensive review of the literature (Alalwan et al., 2016; Alryalat et al., 2012, 2017; Dwivedi et al., 2017; Kizgin et al., 2020; Sarker et al., 2020; Tamilmani et al., 2019) and supplement them with the expert interviews to get more relevant barriers and use to derive and refine the model further (Dwivedi et al., 2020). The future research can also review the barriers based on the meta-analysis and meta-analytic structural equation modelling of the proposed model and their positive constructs to see their performances (Dwivedi et al., 2019; Mishra et al., 2023).

CONCLUSION

This study aims to identify the barriers to B2G e-commerce adoption using the extensive literature review. We then apply the MCDM technique called DEMATEL to interrelate the identified fragmented barriers using a cause-and-effect approach. The data were collected using the respondents from the public sector and government organizations who are involved in procurement in some way. The findings identified five barriers (i.e., 'Lack of expertise and technical skills (B2)', 'Perceived information security risk (B5)', 'Lack of IT infrastructure (B1)', 'High cost of technology (B3)', 'Lack of awareness of government issues and legal policies (B6)') as cause variables whereas the other four as the effect variables (i.e., 'Organisational resistance to change (B4)', 'Lack of top management support (B7)', 'Low perceived operational benefits (B8)', and 'Unwillingness to adopt B2G e-commerce services' (B9)'). Moreover, this research also computes 'R + C' to find out their rankings in terms of the importance of these barriers both as 'cause' as well as 'effect' variables. By doing this research, we also contribute to existing knowledge on e-government and it's implications for practice and policy.

REFERENCES

Adjei-Bamfo, P., Maloreh-Nyamekye, T., & Ahenkan, A. (2019). The role of e-government in sustainable public procurement in developing countries: A systematic literature review. *Resources, Conservation and Recycling*, *142*, 189–203. doi:10.1016/j.resconrec.2018.12.001

Ahmadzadeh, A., Aboumasoudi, A. S., Shahin, A., & Teimouri, H. (2021). Studying the critical success factors of ERP in the banking sector: A DEMATEL approach. *International Journal of Procurement Management*, *14*(1), 126–145. doi:10.1504/IJPM.2021.112377

Alalwan, A. A., Rana, N. P., Algharabat, R., & Tarhini, A. (2016). *A Systematic Review of Extant Literature in Social Media in the Marketing Perspective. I3E2016*. Swansea University.

Alryalat, M., Dwivedi, Y. K., Williams, M. D., Rana, N. P., & Lal, B. (2012). *A systematic review of e-gov research in developing countries.* In European, Mediterranean & Middle Eastern Conference on Information Systems, Munich, Germany.

Alryalat, M. A. A., Rana, N. P., Sarma, H. K. D., & Alzubi, Z. A. (2016). *An Empirical Study of Facebook Adoption among Young Adults in a North-Eastern State of India: Validation of Extended Technology Acceptance Model (TAM). I3E2016*. Swansea University.

Alshehri, M., & Drew, S. (2010). Challenges of e-Government Services Adoption in Saudi Arabia from an e-Ready Citizen Perspective. *International Journal of Industrial and Manufacturing Engineering*, *4*(6), 1086–1092.

Altuntas, F., & Gok, M. S. (2021). The effect of COVID-19 pandemic on domestic tourism: A DEMATEL method analysis on quarantine decisions. *International Journal of Hospitality Management*, *92*, 102719. doi:10.1016/j.ijhm.2020.102719 PMID:33519015

Anderson, T., Liam, R., Garrison, D. R., & Archer, W. (2001). Assessing teacher presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, *5*(2), 1–17.

Andersson, A., Hedström, K., & Karlsson, F. (2022). Standardizing information security – a structurational analysis. *Information & Management*, *59*(3), 103623. doi:10.1016/j.im.2022.103623

As-Saber, S., Waheduzzaman, W., & Rahman, S. (2020). Use of social media in the public e-procurement: Implications for good governance. *International Journal of Electronic Government Research*, 16(4), 113–132. *Scopus*. Advance online publication. doi:10.4018/IJEGR.2020100107

Asrani, C. (2022). Spanning the digital divide in India: Barriers to ICT adoption and usage. *Journal of Public Affairs*, *22*(4). Advance online publication. doi:10.1002/pa.2598

Bai, Y., & Li, H. (2022). Mapping the evolution of e-commerce research through co-word analysis: 2001–2020. *Electronic Commerce Research and Applications*, *55*, 101190. doi:10.1016/j.elerap.2022.101190

Baršauskas, P., Šarapovas, T., & Cvilikas, A. (2008). The evaluation of e-commerce impact on business efficiency. *Baltic Journal of Management*, *3*(1), 71–91. doi:10.1108/17465260810844275

Basyal, D. K., & Seo, J. W. (2017). Employees' resistance to change and technology acceptance in Nepal. *The Journal of University Grants Commission*, *6*(1), 1–14.

Beniwal, V. (2020). *Government's Version of Amazon.com Helps India Save $1 Billion*. Bloomberg News.

Bhaumik A. (2017). *Procurement through GeM portal causes delay, Army wants to continue old system*. Academic Press.

Bilgihan, A., Kandampully, J., & Zhang, T. (2016). Towards a unified customer experience in online shopping environments. *International Journal of Quality and Service Sciences*, *8*(1), 102–119. doi:10.1108/IJQSS-07-2015-0054

Brandon-Jones, A., & Carey, S. (2011). The impact of user-perceived e-procurement quality on system and contract compliance. *International Journal of Operations & Production Management*, *31*(3), 274–296. doi:10.1108/01443571111111928

Chandrasekar Subramaniam, M. J. S. (2002). A Study of the Value and Impact of B2B E-Commerce: The Case of Web-Based Procurement. *International Journal of Electronic Commerce*, *6*(4), 19–40. doi:10.1080/10864415.2002.11044245

Chatterjee, S., Rana, N. P., & Dwivedi, Y. K. (2020). Social Media as a Tool of Knowledge Sharing in Academia: An Empirical Study Using Valance, Instrumentality and Expectancy (VIE) Approach. *Journal of Knowledge Management*, *24*(10), 2531–2552. doi:10.1108/JKM-04-2020-0252

Chatterjee, S., Rana, N. P., Tamilmani, K., & Sharma, A. (2021). The effect of AI-based CRM on organization performance and competitive advantage: An empirical analysis in the B2B context. *Industrial Marketing Management*, *97*, 205–219. doi:10.1016/j.indmarman.2021.07.013

Claycomb, C., Iyer, K., & Germain, R. (2005). Predicting the level of B2B e-commerce in industrial organizations. *Industrial Marketing Management*, *34*(3), 221–234. doi:10.1016/j.indmarman.2004.01.009

Dai, Q., & Kauffman, R. J. (2002). B2B E-Commerce Revisited: Leading Perspectives on the Key Issues and Research Directions. *Electronic Markets*, *12*(2), 67–83. doi:10.1080/10196780252844517

Dwivedi, Y. K., Rana, N. P., & Al-Ryalat, M. (2017). Affiliate Marketing: An Overview and Analysis of Emerging Literature. *The Marketing Review*, *17*(1), 33–50. doi:10.1362/146934717X14909733966092

Dwivedi, Y. K., Rana, N. P., Jeyaraj, A., Clement, M., & Williams, M. D. (2017). Re-examining the Unified Theory of Acceptance and Use of Technology (UTAUT): Towards a Revised Theoretical Model. *Information Systems Frontiers*, *21*(3), 719–734. doi:10.1007/s10796-017-9774-y

Dwivedi, Y. K., Rana, N. P., Slade, E. L., Singh, N., & Kizgin, H. (2020). Editorial introduction: Advances in theory and practice of digital marketing. *Journal of Retailing and Consumer Services*, *53*, 101909. doi:10.1016/j.jretconser.2019.101909

Elgohary, E., & Abdelazyz, R. (2020). The impact of employees' resistance to change on implementing e-government systems: An empirical study in Egypt. *The Electronic Journal on Information Systems in Developing Countries*, *86*(6), e12139. doi:10.1002/isd2.12139

Fu, X., Zhu, Q., & Sarkis, J. (2012). Evaluating green supplier development programs at a telecommunications systems provider. *International Journal of Production Economics*, *140*(1), 357–367. doi:10.1016/j.ijpe.2011.08.030

Gardas, B. B., Raut, R. D., & Narkhede, B. (2018). Modelling the challenges to sustainability in the textile and apparel (T&A) sector: A Delphi-DEMATEL approach. *Sustainable Production and Consumption*, *15*, 96–108. doi:10.1016/j.spc.2018.05.001

Glover, S., & Benbasat, I. (2010). A comprehensive model of perceived risk of E-commerce transactions. *International Journal of Electronic Commerce*, *15*(2), 47–78. doi:10.2753/JEC1086-4415150202

Gorla, N., Chiravuri, A., & Chinta, R. (2017). Business-to-business e-commerce adoption: An empirical investigation of business factors. *Information Systems Frontiers*, *19*(3), 645–667. doi:10.1007/s10796-015-9616-8

Guarnieri, P., & Gomes, R. C. (2019). Can public procurement be strategic? A future agenda proposition. *Journal of Public Procurement*, *19*(4), 295–321. doi:10.1108/JOPP-09-2018-0032

Gunasekaran, A., Marri, H. B., McGaughey, R. E., & Nebhwani, M. D. (2002). E-commerce and its impact on operations management. *International Journal of Production Economics*, *75*(1), 185–197. doi:10.1016/S0925-5273(01)00191-8

Gunasekaran, A., McGaughey, R. E., Ngai, E. W. T., & Rai, B. K. (2009). E-Procurement adoption in the Southcoast SMEs. *International Journal of Production Economics*, *122*(1), 161–175. doi:10.1016/j.ijpe.2009.05.013

Hawking, P., Stein, A., Wyld, D. C., & Foster, S. (2004). E-procurement: Is the ugly duckling actually a swan down under? *Asia Pacific Journal of Marketing and Logistics*, *16*(1), 3–26. doi:10.1108/13555850410765140

Henriksen, H., & Mahnke, V. (2005). E-Procurement Adoption in the Danish Public Sector: The Influence of Economic and Political Rationality. *Scandinavian Journal of Information Systems*, *17*(2). https://aisel.aisnet.org/sjis/vol17/iss2/2

Ho, S.-C., & Chuang, W.-L. (2023). Identifying and prioritizing the critical quality attributes for business-to-business cross-border electronic commerce platforms. *Electronic Commerce Research and Applications*, *58*, 101239. doi:10.1016/j.elerap.2023.101239

Ilmudeen, A. (2021). Big Data, Artificial Intelligence, and the Internet of Things in Cross-Border E-Commerce. *Cross-Border E-Commerce Marketing and Management*, 257–272.

Iong, K. Y., & Phillips, J. O. L. (2023). The transformation of government employees' behavioural intention towards the adoption of E-government services: An empirical study. *Social Sciences & Humanities Open*, *7*(1), 100485. doi:10.1016/j.ssaho.2023.100485

Kit, S. K., Ahmed, E. M., & Tan, K. S. (2021). Social influences' effects on Malaysia's SMEs' public electronic procurement usage. *International Journal of Electronic Government Research*, *17*(1), 68–82. Advance online publication. doi:10.4018/IJEGR.2021010105

Kizgin, H., Dey, B. L., Dwivedi, Y. K., Hughes, L., Jamal, A., Jones, P., Kronemann, B., Laroche, M., Peñaloza, L., Richard, M.-O., Rana, N. P., Romer, R., Tamilmani, K., & Williams, M. D. (2020). The impact of social media on consumer acculturation: Current challenges, opportunities, and an agenda for research and practice. *International Journal of Information Management*, *51*, 102026. doi:10.1016/j.ijinfomgt.2019.10.011

Knutsson, H., & Thomasson, A. (2014). Innovation in the Public Procurement Process: A study of the creation of innovation-friendly public procurement. *Public Management Review*, *16*(2), 242–255. doi:10.1080/14719037.2013.806574

Kshetri, N. (2007). Barriers to e-commerce and competitive business models in developing countries: A case study. *Electronic Commerce Research and Applications*, *6*(4), 443–452. doi:10.1016/j.elerap.2007.02.004

Kshetri, N., & Dholakia, N. (2002). Determinants of the Global Diffusion of B2B E-commerce. *Electronic Markets*, *12*(2), 120–129. doi:10.1080/10196780252844562

Kumar, A., Luthra, S., Khandelwal, D. K., Mehta, R., Chaudhary, N., & Bhatia, S. (2017). Measuring and improving customer retention at authorised automobile workshops after free services. *Journal of Retailing and Consumer Services*, *39*, 93–102. doi:10.1016/j.jretconser.2017.07.007

Kuzu, A. C. (2021). Risk analysis of break-in-two accident of ships using fuzzy DEMATEL method. *Ocean Engineering*, *235*, 109410. doi:10.1016/j.oceaneng.2021.109410

Lai, J.-Y., Ulhas, K. R., & Lin, J.-D. (2014). Assessing and managing e-commerce service convenience. *Information Systems Frontiers*, *16*(2), 273–289. doi:10.1007/s10796-012-9344-2

Lawrence, J., & Tar, U. (2010). Barriers to ecommerce in developing countries. *Information, Society and Justice.*, *3*(1), 23–35.

Lola, I., & Bakeev, M. (2021). What determines the differentiation in the e-commerce adoption by consumers: Evidence from Russia. *Electronic Commerce Research*. Advance online publication. doi:10.1007/s10660-021-09507-7

Malodia, S., Dhir, A., Mishra, M., & Bhatti, Z. A. (2021). Future of e-Government: An integrated conceptual framework. *Technological Forecasting and Social Change*, *173*, 121102. Advance online publication. doi:10.1016/j.techfore.2021.121102

McCue, C., & Roman, A. V. (2012). E-Procurement: Myth or Reality. *Journal of Public Procurement*, *12*(2), 221–248. doi:10.1108/JOPP-12-02-2012-B003

Menon, R. R., & Ravi, V. (2022). An analysis of barriers affecting implementation of sustainable supply chain management in electronics industry: A Grey-DEMATEL approach. *Journal of Modelling in Management*, *17*(4), 1319–1350. doi:10.1108/JM2-02-2021-0042

Mishra, A., Shukla, A., Rana, N. P., Currie, W., & Dwivedi, Y. K. (2023). Re-Examining Post-Acceptance Model of Information Systems Continuance: A Revised Theoretical Model using MASEM Approach. *International Journal of Information Management*, *68*, 102571. doi:10.1016/j.ijinfomgt.2022.102571

Nisar, T. M., & Prabhakar, G. (2017). What factors determine e-satisfaction and consumer spending in e-commerce retailing? *Journal of Retailing and Consumer Services*, *39*, 135–144. doi:10.1016/j.jretconser.2017.07.010

Purchase, S., Goh, T., & Dooley, K. (2009). Supplier perceived value: Differences between business-to-business and business-to-government relationships. *Journal of Purchasing and Supply Management*, *15*(1), 3–11. doi:10.1016/j.pursup.2008.11.003

Rana, N. P., & Dwivedi, Y. K. (2016). Using clickers in a Large Business Class: Examining Use Behavior and Satisfaction. *Journal of Marketing Education*, *38*(1), 47–64. doi:10.1177/0273475315590660

RanaN.P.DwivediY.K.WilliamsM.D.WeerakkodyV. (2015). Investigating Success of an E-Government Initiative: Validation of an Integrated IS Success Model. Information Systems Frontiers, 17(1), 127-142.

Ranganathan, C., Dhaliwal, J. S., & Teo, T. S. H. (2004). Assimilation and Diffusion of Web Technologies in Supply-Chain Management: An Examination of Key Drivers and Performance Impacts. *International Journal of Electronic Commerce*, *9*(1), 127–161. doi:10.1080/10864415.2004.11044319

Raymond, J. (2008). Benchmarking in public procurement. *Benchmarking*, *15*(6), 782–793. doi:10.1108/14635770810915940

Richards, J., & Shen, D. (2006). E-Commerce Adoption Among Chinese Consumers. *Journal of International Consumer Marketing*, *18*(3), 33–55. doi:10.1300/J046v18n03_03

Salam, A. F., Rao, H. R., & Pegels, C. C. (2003). Consumer-perceived risk in E-Commerce transactions. *Communications of the ACM*, *46*(12), 325–331. doi:10.1145/953460.953517

Sarker, P., Hughes, L., Dwivedi, Y. K., & Rana, N. P. (2020). Social commerce adoption predictors: A review and weight analysis. I3E2020, South Africa.

Sen, R., & King, R. C. (2003). Revisit the Debate on Intermediation, Disintermediation and Reintermediation due to E-commerce. *Electronic Markets*, *13*(2), 153–162. doi:10.1080/1019678032000067181

Shah Alam, S., Khatibi, A., Ismail Sayyed Ahmad, M., & Bin Ismail, H. (2007). Factors affecting e-commerce adoption in the electronic manufacturing companies in Malaysia. *International Journal of Commerce and Management*, *17*(1/2), 125–139. doi:10.1108/10569210710776503

Sharma, S. K., Dwivedi, Y. K., Metri, B., & Rana, N. P. (2020). *Re-imagining Diffusion and Adoption of Information Technology and Systems: A Continuing Conversation*. IFIP WG 8.6 International Conference on Transfer and Diffusion of IT, TDIT 2020, Tiruchirappalli, India.

Siddharth. (2017, Feb. 6). Govt e-marketplace set to be mandatory for all departments. *The Times of India*.

Sila, I. (2013). Factors affecting the adoption of B2B e-commerce technologies. *Electronic Commerce Research*, *13*(2), 199–236. doi:10.1007/s10660-013-9110-7

Singh, A., Rana, N. P., & Parayitam, S. (2022). Role of social currency in customer experience and co-creation intention in online travel agencies: Moderation of attitude and subjective norms. *International Journal of Information Management Data Insights*, *2*(2), 100114. doi:10.1016/j.jjimei.2022.100114

Singh, C., Singh, D., & Khamba, J. S. (2021). Analyzing barriers of Green Lean practices in manufacturing industries by DEMATEL approach. *Journal of Manufacturing Technology Management*, *32*(1), 176–198. doi:10.1108/JMTM-02-2020-0053

Skare, M., Gavurova, B., & Rigelsky, M. (2023). Innovation activity and the outcomes of B2C, B2B, and B2G E-Commerce in EU countries. *Journal of Business Research*, *163*, 113874. doi:10.1016/j.jbusres.2023.113874

Suman, R. R., Mondal, B., & Mandal, T. (2022). Security Trend and Trust in India's E-Governance Framework. *International Journal of Electronic Government Research*, *18*(1), 1–16. Advance online publication. doi:10.4018/IJEGR.300775

Tamilmani, K., Rana, N. P., & Dwivedi, Y. K. (2019). *Use of 'Habit' is Not a Habit in Understanding Individual Technology Adoption: A Review of UTAUT2 based Empirical Studies. IFIP 8.6 2018*. University of Portsmouth.

Teo, T. S. H., & Ranganathan, C. (2004). Adopters and non-adopters of business-to-business electronic commerce in Singapore. *Information & Management*, *42*(1), 89–102. doi:10.1016/j.im.2003.12.005

Thatcher, S. M. B., Foster, W., & Zhu, L. (2006). B2B e-commerce adoption decisions in Taiwan: The interaction of cultural and other institutional factors. *Electronic Commerce Research and Applications*, *5*(2), 92–104. doi:10.1016/j.elerap.2005.10.005

Yoo, B., & Jang, M. (2019). A bibliographic survey of business models, service relationships, and technology in electronic commerce. *Electronic Commerce Research and Applications*, *33*, 100818. doi:10.1016/j.elerap.2018.11.005

Zhang, L., Sun, X., & Xue, H. (2019). Identifying critical risks in Sponge City PPP projects using DEMATEL method: A case study of China. *Journal of Cleaner Production*, *226*, 949–958. doi:10.1016/j.jclepro.2019.04.067

Zhao, G., Ahmed, R. I., Ahmad, N., Yan, C., & Usmani, M. S. (2021). Prioritizing critical success factors for sustainable energy sector in China: A DEMATEL approach. *Energy Strategy Reviews*, *35*, 100635. doi:10.1016/j.esr.2021.100635

ENDNOTE

[1] https://gem.gov.in/

Mohammad Alryalat is an Associate Professor in Business Administration at Al Balqa' Applied University, Salt, Jordan. He has completed his PhD degree from Swansea University in the UK. He has published several papers relating to digital government services across different peer reviewed journals. He has also presented his papers across various conferences of international level across different countries.

Haroun Alryalat is an Associate Professor at the University of Bahrain in the Kingdom of Bahrain. His teaching and research interests are in the area of Management Information System, E-Business and Electronic Commerce, Knowledge Management, Customer Relationship Management, Financial Information Systems, IS Project Management, IT Strategy, Enterprise Resource Planning Systems and E-Marketing. He also has an extensive experience in the assessment and accreditation processes of academic programs as well as the development of curricula for undergraduate as well as postgraduate degree programs.

Khalid Hussain M. Alhamzi is an Assistant Professor in Marketing at the Gulf College in Saudi Arabia. He has done his MBA from Swansea University and a PhD from the Norwich Business School of University of East Anglia in the UK. His PhD research touches upon the effects of web quality and customer trust on the customer purchase intentions. His research interest also aims to understand the role of artificial intelligence in customer decision making, attitude, and buying behavior.

Anuj Sharma is a Professor of Information Systems and Analytics at the Jindal Global Business School, O.P. Jindal Global University, Haryana, India. He is a Fellow of the Indian Institute of Management Indore. His current research interests focus primarily on the development and use of information systems, scientometrics, data analytics, e-commerce, digital marketing, and innovation. He has over 12 years of experience in management teaching, research, and consultancy at both Indian and international organizations.