

6-30-2022

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### Recommended Citation

Arayankalam, Jithesh and Krishnan, Satish (2022) "Can E-government Maturity Increase B2C E-Business Use? The roles of corruption and virtual social networks diffusion," *Scandinavian Journal of Information Systems*: Vol. 34: Iss. 1, Article 4.

Available at: <https://aisel.aisnet.org/sjis/vol34/iss1/4>

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# Can E-government Maturity Increase B2C E-business Use?

## The roles of corruption and virtual social networks diffusion

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**Abstract.** The world we live in is getting digitized rapidly, with governments relying on e-government and businesses depending on e-business to meet their objectives. However, the research exploring the link between e-government and e-business is still at a nascent stage. Acknowledging the need for inquiry in this area, we explore the relationships between e-government maturity, corruption, VSN diffusion, and B2C e-business use using publicly available archival data by drawing on the value framework for assessing e-government impact and Blumer's theory of collective behavior. Our analyses substantiate (1) the direct association between e-government and B2C e-business use, (2) the indirect association between e-government maturity and B2C e-business use through corruption, and (3) the moderation effect of VSN diffusion on this relationship. Implications of our findings to research and practice are discussed.

**Keywords:** E-government, B2C e-business, Corruption, VSN.

## 1 Introduction

Globalization of the Internet technologies constitutes one of the most visible manifestations of change in society in general and in businesses in particular (Laudon & Traver, 2017). As a response to this paradigm shift, businesses rely more on the Internet to leverage the new market space for marketing and communicating with their customers (Rodríguez-Ardura & Meseguer-Artola, 2010). Accordingly, electronic business (e-business), defined as “the use of Internet technologies to manage business processes, such as sales and purchase, supply chains, and customer relationships” (Wang &

Accepting editor: Polyxeni Vassilakopoulou

Cheung, 2004, p. 43), has emerged as a critical priority for many businesses across the world. Mainly, business-to-customer (B2C) e-business, which enables them to sell their products and receive payment electronically from customers (Turban et al., 2017), has witnessed dramatic growth in recent times. Considering such growth, the development of the B2C e-business ecosystem has become an important policy tool for fostering economic development by driving business activity in a country (Li et al., 2019). Despite the formidable potential of B2C e-business for the global economy (Li et al., 2019), its growth internationally has been uneven, with large economies such as India still lagging behind the world average (Chen, 2017). Such uneven growth of this electronic technology does not augur well for the global economy, making it a crucial challenge for policymakers and international institutions to improve the B2C e-business use among businesses worldwide. Accordingly, in the present study, we examine how critical stakeholders of businesses can play a crucial role in growing B2C e-business use in a country.

The past studies that inquired into the drivers of B2C e-business adoption/use can be broadly categorized into three based on their level of analysis, namely, (1) customer-level, (2) firm-level, and (2) country-level. In a customer-level study, Kim and Prabhakar (2004) found that propensity-to-trust, structural assurances, and relational content of electronic word-of-mouth influenced initial trust in the B2C e-business; this trust further affected its adoption by banking customers. Similarly, Crespo and del Bosque (2008), in their study with Spanish customers, found that customers' attitudes to the system, their subjective norm, and innovativeness in information technology influence their adoption of B2C e-business. Further, a study by John (2012) observed that the online trust of customers influences its adoption. In a firm-level study, To and Ngai (2006) showed that relative advantage, competitive pressure, and technical resource competence positively influenced the B2C e-business adoption. Similarly, a study by Bordonaba-Juste et al. (2012) found that the level of IT expertise of the employees and perceived benefits of new technologies influence the levels of B2C e-business adoption by businesses. In a country-level study, Adam et al. (2020) found that ICT access, political, human resource development, and political and regulatory environment influence B2C e-business adoption by businesses. While these studies are well placed to offer unique contributions to our understanding of the antecedents to B2C e-business use/adoption, their focus has been on the employees and customers, two key partners of businesses (Chukwu & Timah, 2018). Rarely has the role of the government, an important stakeholder of businesses (Chukwu & Timah, 2018), been conceptualized as a driver of B2C e-business use in a country. Yet, as a significant influencer of business decisions and functioning, the role of government becomes crucial (Cai et al., 2010). Recent studies indicate that the government also plays a significant role in fa-

ilitating the use of new technologies by businesses, particularly B2C e-business. For instance, in their study, Kang and Park (2014) found that the government's national policy initiatives significantly influence the businesses' adoption of e-business platforms by generating positive perceptions about such technologies. As e-government is a major technological policy initiative by the government, we believe it will also help increase B2C e-business use. However, the extant studies have not empirically investigated this relationship, resulting in an "academic disconnect" in this area of inquiry (Srivastava & Teo, 2010, p. 268). Accordingly, through a country-level study, we strive to understand the role of e-government maturity, defined as the extent to which a government in a country has established an online presence (Krishnan et al., 2013; Srivastava & Teo, 2007), in facilitating B2C e-business use. Accordingly, one of the research questions (RQs) that we address in this study is the following:

**RQ1:** *What is the relationship between e-government maturity and B2C e-business use?*

Further, as per Srivastava's (2011) value framework for assessing e-government's impact, e-government is a powerful mechanism that impacts the actions of various entities such as businesses by affecting different intermediate variables. Drawing on this framework, we argue that one such intermediate variable between e-government maturity and B2C e-business use is corruption, defined as "the misuse of entrusted power for private gains" (Kolstad & Wiig, 2009, p. 522). To elaborate, studies indicate that high transparency and accountability are essential to combat corruption in a country. E-government is known to reduce corruption by improving transparency in the governance systems and enhancing the accountability of public officials by facilitating information flow and promoting objectivity in the delivery of government services (Arayankalam et al., 2021; Krishnan et al., 2013). Because a corruption-ridden environment is detrimental for business functioning in a country as it creates various hurdles, such as delays in obtaining permits and licenses, businesses will be reluctant to invest in new technologies when corruption is high (Campos et al., 1999; Habib & Zurawicki, 2002; Mauro, 1995; Sudhir & Talukdar, 2015). As e-government reduces corruption and removes such hurdles, creating a business-friendly ecosystem in a country, businesses are more likely to invest in new technologies, such as B2C e-business (e.g., Campos et al., 1999; Habib & Zurawicki, 2002; Mauro, 1995; Sudhir & Talukdar, 2015). Given the above, we propose corruption as an intermediate effect (Srivastava, 2011), which, in turn, affects e-government maturity's impact on B2C e-business use. Accordingly, the next RQ that we address in this study is the following:

**RQ2:** *What is the role of corruption in the relationship between e-government maturity and B2C e-business use?*

Furthermore, as critical stakeholders of societal development, citizens, through their collective influence, also play a crucial role in influencing the government and businesses (Dahan et al., 2015). The emergence of virtual social networks (VSNs; a.k.a., social media) as the popular communication medium has been offering citizens new platforms for channeling such influence in affecting the processes of the government and businesses (Aharony, 2012; Culnam et al., 2010; Heiss et al., 2019). For instance, Arayankalam et al. (2021), in their study found that VSN diffusion, defined as the extent to which people use VSNs such as Facebook and Twitter, would enhance the positive effect of e-government maturity on two outcomes (i.e., the government administrative effectiveness and corruption) because VSN platforms enable citizens to use their collective influence and complement e-government systems. Similarly, VSN diffusion may likely influence the relationship between e-government maturity and B2C e-business use (another outcome) because citizens on VSN platforms can use their collective influence to enhance and complement the ability of e-government in creating a business-friendly ecosystem. Further, VSNs, through enhanced citizen participation, complement the existing e-government channels for information dissemination (Bødker & Zander, 2015), allowing them to flag any corrupt practices and pressure the government to control corruption (Hilliard & Kemp, 1999). Taken together, it is likely that when VSN diffusion (Kaplan & Haenlein, 2010; Krishnan & Lymm, 2016) varies in a country, the relationships among e-government maturity, corruption, and B2C e-business use will get affected accordingly. So, the second question that we address in this study is the following:

**RQ3:** *What is the role of VSN diffusion in the relationships among e-government maturity, corruption, and B2C e-business use?*

We strive to answer the RQs mentioned above by drawing on the value framework for assessing e-government impact (Srivastava, 2011) and the theory of collective behavior (Blumer, 1939) and construct a conceptual framework (see Fig. 1) to provide an overview of the relationships among the variables. In particular, we theorize the relationships among four key variables of interest, namely, (1) e-government maturity, (2) corruption, (3) VSN diffusion, and (4) B2C e-business use. Subsequently, we use publicly available archival data from 126 countries to test the proposed relationships, the results of which provide support for our research model. Accordingly, we contribute

to the knowledge base of e-government and e-business in two ways. First, this study establishes that one key reason for e-government facilitating B2C e-business use is by reducing its level of corruption. Second, our study conceptualized VSNs as platforms for collective behavior and established the influence of VSN diffusion on its e-government outcomes. Our study also offers a framework for analyzing the relationships among the technological manifestations of the three key actors in society, namely, the government, citizens, and businesses, which we believe will serve as a frame of reference for future scientific investigations.

## 2 Theoretical foundation

We use the value framework for assessing e-government impact (Srivastava, 2011) as an overarching theoretical framework, according to which e-government will have certain intermediate impacts, resulting in some final impact (Krishnan et al., 2013). As per this framework, e-government improves both efficiency and effectiveness of the various targeted processes, creating value for the national stakeholders by improving the performance in their variables of interest. Further, Srivastava (2011) stresses that this framework is a useful theoretical tool in assessing the impacts of e-government at multiple levels, namely, local, state, and country. For instance, drawing on this framework, through a cross-country investigation, Arayankalam et al. (2020) established that e-government maturity reduces corruption in the executive, legislative, and judicial branches of the government by improving the effectiveness of the government administration. Similarly, in their study, Krishnan et al. (2013) established that e-government maturity improved economic prosperity and reduced environmental degradation by removing corruption. In sum, the value framework aids in enhancing our understanding of the impact of e-government and submits this technology will have some intermediate impacts, which in turn creates societal impact such as financial, political, and social, among others. However, this framework does not consider how the active involvement of people with the government and businesses will influence such impacts. With the increasing use of VSNs in our lives, people are now more capable of collectively influencing the government and businesses, making it essential to account for its influence on this relationship. In other words, we argue that VSNs enable collective behavior among individuals to achieve common aims.

According to Blumer (1939), collective behavior is any voluntary group behavior formed spontaneously and is not mandated or regulated by an institution. Such behaviors are formed when a few individuals feel that things are happening against the expected social order, causing restlessness, driving them to act collectively in various

<i>Steps for collective behavior</i>	<i>Role of VSNs</i>
Exciting issue: An exciting issue catches the attention of many individuals.	VSNs are venues for exciting issues. For instance, the recent Me Too movement aimed at generating awareness around the issue of sexual assault on women was initiated on Twitter, and eventually, the issue captured the attention of a large number of people (Anderson & Toor, 2018).
Milling: Talking and discussing the exciting event, leading to a common mood.	VSNs are platforms that facilitate milling. For instance, during the Me Too movement, intense discussions with the #MeToo hashtag ensued on VSN platforms, generating a common mood on the issue of sexual abuse on women (Anderson & Toor, 2018)
The common object of attention: Emergence of a common object of attention, giving a common orientation to the people, triggering them to embark on actions they previously would not likely have thought of.	VSNs are channel public mood to a common objective. For instance, the channeling of public mood towards a common objective was witnessed during the Me Too movement in terms of public outcry on VSN platforms for legal reforms to prevent abuse of women (WEE, 2018).
Fostering common impulses: Social contagion of a yearning to engage in a particular kind of behavior.	VSNs facilitate the social contagion of ideas. For instance, although the Me Too movement was started on Twitter, it was soon shared across other platforms such as Facebook and Instagram, making VSNs the galvanizing platforms against women abuse.
Collective behavior: Individuals engage in collective behavior over the common issue to restore the expected social order.	VSNs are platforms for citizens to engage in various collective behavior, such as protests to establish the expected social order. For instance, once the issue of sexual abuse garnered wide public support through VSNs, thousands took to the streets in Los Angeles protesting against sexual assault and abuse against women (Penegelly, 2017).

Table 1. VSNs as platforms of collective behavior

ways, such as protesting, revolting, and pressurizing, with an aim to restore the expected social order (Blumer, 1939). As shown in Table 1, we argue that VSNs are platforms for collective behavior because they facilitate each of the five steps necessary to develop collective behavior (Blumer, 1939; McPhail, 1989). In other words, VSNs provide a perfect fertile ground in fostering collective behavior surrounding a common issue among the public and channeling the behavior in bringing expected social order. Accordingly, in the context of the present study, we argue that the collective behavior facilitated by VSNs will pressure the government and businesses to align with the expected public order in society.

Thus, because VSNs, as platforms for collective behavior, enable people to exert more influence on the government and businesses, we argue that such influence needs to be incorporated in Srivastava's (2011) value framework for applying it to our study context. Accordingly, our conceptual framework linking the variables of interest in our study (i.e., e-government maturity, corruption, B2C e-business use, and VSN diffu-

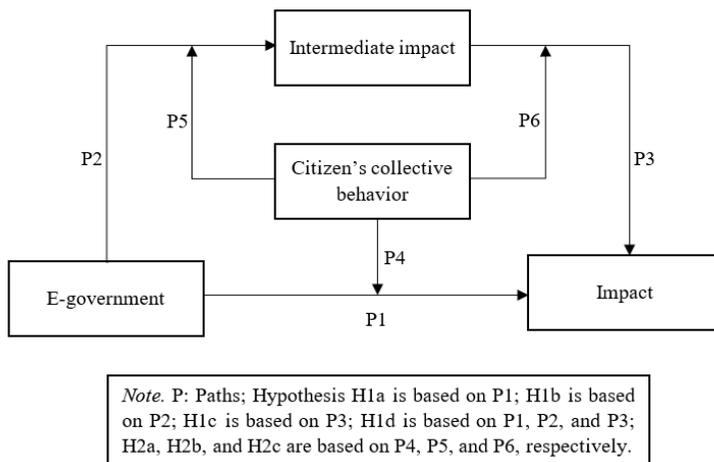


Figure 1. Conceptual framework

sion) is depicted in Figure 1.

### 3 Hypotheses development

As depicted in Figure 1, while hypothesis H1a, based on path P1, discusses the direct relationship between e-government maturity and B2C e-business use, hypothesis H1b, based on path P2, explicates the direct relationship between e-government maturity

and corruption. Further, hypothesis H1c, based on path P3, explains the direct relationship between corruption and its B2C e-business use. And hypothesis H1d, based on paths P1, P2, and P3, discusses the indirect relationship between e-government maturity and B2C e-business use. And finally, Hypothesis H2, based on paths P4, P5, and P6 (grounded in the theory of collective behavior), explains the moderating effect of VSN diffusion on the relationships among e-government maturity, corruption, and B2C e-business use. In the following sub-sections, we use this conceptual framework as

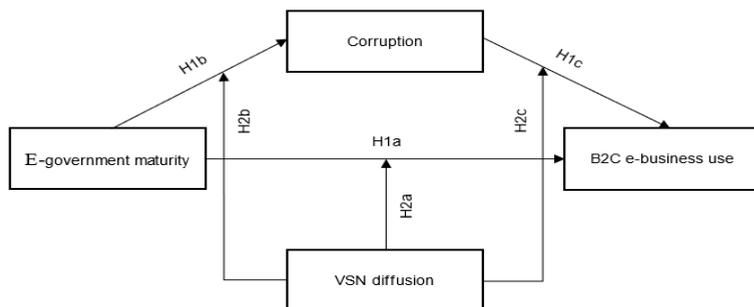


Figure 2. Research model

a theoretical lens in arriving at our hypotheses. Our research model with the hypotheses mentioned above is depicted in Figure 2.

### 3.1 Relating e-government maturity and B2C e-business use

When high uncertainty and ambiguity surround a business decision, according to Tinsling and Parent (2002), memetic isomorphism is likely to dominate businesses' decisions. In other words, businesses tend to mimic the decision choices or behaviors of other organizations such as the government, which they consider legitimate (DiMaggio & Powell, 1983).

In the context of B2C e-business, although this technology has been in vogue since the late 1990s, it is still a relatively new phenomenon in many countries (Rahayu & Day, 2017). To elaborate, when compared to developed countries, the use of B2C e-business is still at a nascent stage in developing countries (Rahayu & Day, 2017). Also, businesses still have perceptible uncertainty about the accrued benefits of B2C e-business use (Hamad et al., 2018). For instance, there is a lack of belief in developing countries that B2C e-business use will positively impact their business performance

(Rahayu & Day, 2017; Salwani et al., 2009). Accordingly, they are “fearful to invest their resources in this technology” (Rahayu & Day, 2017, p. 27) as they do not perceive any competitive advantage in using it (Hamad et al., 2018). Such fear to invest in risky technologies was also witnessed during the recent COVID pandemic. For instance, as per WTO (2020), although there was a spike in B2C e-business use due to the COVID pandemic, such growth was non-uniform worldwide, with many least developed countries lagging behind the developed countries. Although such uncertain situations pressurize businesses to transit from traditional brick-and-mortar way to B2C e-business, as per the McKinsey report (McKinsey & Company, 2020), the transitioning also involves high uncertainty due to increased investment and risk. When there is uncertainty about a practice, businesses look up to legitimate organizations such as the government and mimic their behavior due to mimetic isomorphism (Tingling & Parent, 2002). Because using new technology such as B2C e-business involves uncertainty and risk, businesses will likely mimic the government’s behavior. To elaborate, as e-government maturity is a “demonstrated behavior” (Das et al., 2017, p. 417) of government’s use of ICT (i.e., e-government) in serving the citizens, businesses will tend to mimic the government behavior by using ICT (i.e., B2C e-business) in serving their customers. Corroborating this, Zhang et al. (2007), in their study, highlighted that e-government initiatives would influence technology adoption by businesses. In line with these arguments, a study by Srivastava and Teo (2011) found that e-government development positively affects e-business development. Therefore, we contend that in the countries where the degree of e-government maturity is high, the extent of B2C e-business use is also likely to be high due to the pressure of mimetic isomorphism. Taken together, as depicted in path P1 of Figure 1, we expect that when e-government maturity increases, B2C e-business use in a country also increases. Accordingly, we hypothesize:

**H1a:** *E-government maturity is positively associated with its B2C e-business use.*

### 3.2 Relating e-government maturity and corruption

The problem of corruption can be solved by promoting ethical universalism and impersonalism (Persson et al., 2013). While ethical universalism is a principle that holds that equal treatment applies to everyone without any partiality regardless of the group to which one belongs (Persson et al., 2013), impersonalism refers to a view that decisions need to be taken objectively based on formalized rules that are applied consistently, free from any personal involvement (Weber, 2009). Accordingly, any mechanism that can

promote these two norms in the government will reduce corruption. We contend that e-government can solve the collective action problem of corruption by promoting these two norms in the government in two ways. First, by automating many of the routine tasks of public servants, e-government reduces the role of bureaucratic discretion in decision making, thereby reducing the room for partiality in delivering public service (Cordelia, 2007; Persson & Goldkuhl, 2010). Evidence suggests that e-government has promoted impartiality by improving public services access regardless of social divisions in society. For instance, a study by Smith (2011) found that the implementation of on-line tax services automated various processes and eliminated the “potential for misused discretion” (p. 84) by the public servants, thereby promoting impartiality within the government system. Similarly, Siddiquee (2016) observed that in developing countries, e-government increases equitable access to government services for all sections of society by fostering government responsiveness. Thus, by facilitating the democratic value of impartiality (Cordelia, 2007; Persson & Goldkuhl, 2010), e-government promotes ethical universalism in the government.

Second, e-government promotes impersonalism in delivering public services by removing public servants’ subjectivity affecting the service delivery process. For instance, as per Bannister and Connolly (2014), e-government reduces human intervention from the decision-making process, thereby decreasing or eliminating the risk of abuse of the law by public servants. Given the above arguments, we submit that e-government solves the collective action problem of corruption by promoting the norms of ethical universalism and impersonalism in the public service system. Accordingly, we expect that the corruption will be less when e-government reaches a higher level of maturity in a country. Thus, in line with the path P2 of Figure 1, we hypothesize:

**H1b:** *E-government maturity is negatively related to its corruption.*

### 3.3 Relating corruption and B2C e-business use

One of the key external threats that can affect businesses from realizing their strategic objectives is corruption. Research has shown that corruption in a country is detrimental to businesses (Wild et al., 2000) as it undermines market efficiency and predictability of the business system (Levin & Satarov, 2000). That is, high corruption in a country decreases investment, lowers productivity, creates strategic impediments, and hampers the competitive advantage of businesses, among others (Habib & Zurawicki, 2002; Lambsdorff, 2003; Luo, 2005), creating an inefficient and unpredictable market envi-

ronment not conducive for business activities. In addition, when the businesses perceive a high level of corruption in a country, “a culture of distrust” is created (Melgar et al., 2010, p. 120), increasing their reluctance to invest in such countries (Davis & Ruhe, 2003). A study by Sudhir and Talukdar (2015) among retailers across India found that businesses were less reluctant to invest in new technologies when corruption was high due to the perception that investing in new technologies in a corrupt environment did not increase their competitive advantage.

As corruption is an external threat to businesses (Davis & Ruhe, 2003), a high level of corruption increases businesses’ likelihood to perceive a negative strategic gap. According to Harrison (1996), a negative strategic gap, which is the perception that the internal capabilities are adequate to deal with these challenges, negatively impinges on businesses’ strategic decisions. Considering the costs and benefits of B2C e-business, its use is an important strategic decision for businesses to make. Accordingly, when they detect a negative strategic gap, they may decide against using B2C e-business. Supporting this view, a report by a Swedish government agency argued that both small and big businesses outside the European Union consider the growth of e-business extremely sensitive to the extent of corruption in a country (Jonströmer et al., 2012). Given the above arguments, as depicted in path P3 of Figure 1, we propose that corruption is negatively related to B2C e-business use. Accordingly, we hypothesize:

**H1c:** *Corruption is negatively related to its B2C e-business use.*

### 3.4 The mediating effect of corruption

As argued previously, e-government maturity is a strong driver of its B2C e-business use as businesses mimic another organization when they consider it legitimate (Barreto & Baden-Fuller, 2006). However, when businesses’ institutional environment is plagued with corruption, the perception of the government’s legitimacy gets negatively affected (Seligson, 2002). By reducing corruption (Krishnan et al., 2013; Nam, 2018), e-government tends to increase the government’s legitimacy, motivating businesses to mimic the government’s use of ICT (i.e., e-government) by increasing ICT use (i.e., B2C e-business use) to deliver services to customers. These arguments are also in line with Srivastava’s (2011) value framework for assessing e-government impact, which states that e-government will have some intermediate impact, leading to economic, political, and social impacts. Given that e-government has an intermediate impact in reducing corruption, which further leads to an impact by businesses using B2C e-business, we

underscore the mediating role of corruption in understanding the impact of e-government maturity on B2C e-business use. That is, as demonstrated in paths P1, P2, and P3 of Figure 1, when e-government maturity in a country increases, it indirectly increases B2C e-business use among businesses by reducing corruption. Taken together, we hypothesize:

**H1d:** The relationship of e-government maturity with its B2C e-business use is mediated by corruption.

### 3.5 Moderation effects of VSN diffusion

#### The moderating effect on ‘e-government maturity—B2C e-business use’ relationship

We argued earlier that when there is uncertainty about the benefits of B2C e-business, businesses tend to use it by mimicking another organization such as the government, which they consider legitimate (Tingling & Parent, 2002). Such mimicking behavior will get further enhanced when customers pressure businesses to meet customer demands, such as using B2C e-business. The ability to pressure businesses to meet customer demands will be enhanced when customers can come together on a common platform to discuss their issues and solve them by pressuring the businesses through various collective behaviors.

VSNs, as a platform for collective behavior, provide various affordances, such as groups, that facilitate rallying the customers together over specific demands from businesses (Woisetschläger et al., 2008). For instance, Apple’s page on Facebook has around 12 million followers (Facebook, 2019), while Amazon has nearly 3 million followers on Twitter (Twitter, 2019), who can directly interact and make their demands and grievances visible to these companies. When many customers come together, reluctance to address their needs and issues can negatively affect businesses’ brand reputations (Bernoff & Schadler, 2010). The case of Heather Armstrong, a famous writer with over a million Twitter followers, is a classic example of how customers, through VSNs, can put significant pressure on businesses. Upset over a washing machine company’s services, she tweeted her criticisms, resulting in significant damage to the company’s brand (Bernoff & Schadler, 2010). In another instance, Walmart was forced to stop the sale of ammunition after the US mass shootings because of significant public pres-

sure generated on Twitter using the hashtags #walmartshooting, #boycottwalmart, and #guncontrolnow (Reuters, 2019; Nasdaq, 2019). Such instances show that when VSN diffusion is high, there will be greater pressure on businesses to meet customers' demands. As B2C e-business is known to increase convenience, customer experiences, and service quality (Berry et al., 2002; Kumar & Petersen, 2006), there will be an increased collective demand from citizens for its use by businesses. This increased pressure arising from higher customer demand will give the businesses an additional reason to mimic the government in using B2C e-business when VSN diffusion is high, making the relationship between e-government maturity and B2C e-business use stronger. On the other hand, when VSN diffusion is low, pressure from customers will be relatively low, weakening the relationship. Accordingly, consistent with the paths P4 of Figure 1, we hypothesize the following:

**H2a:** *VSN diffusion positively moderates the relationship between e-government maturity and B2C e-business use.*

### **Moderation effect on 'e-government maturity—corruption' relationship**

As argued earlier, e-government maturity reduces corruption by removing partiality and subjectivity in delivering public services (Cordelia, 2007; Persson & Goldkuhl, 2010). This ability of e-government in tackling corruption, as we submit, will be further strengthened when the citizens can collectively come together to fight corruption by pressurizing the government to be impartial and objective in its service delivery. As corruption is a vice against the expected social order, citizens always feel restless in its presence, prompting them to engage in a collective behavior (Blumer, 1939) to act against it. Accordingly, in the presence of a platform that facilitates citizens' congregation and encourages such collective behavior, we contend that e-government's ability to tackle corruption gets amplified due to public pressure for impartiality and objectivity.

VSNs, as the platform for collective behavior, facilitate such a public congregation and channel public pressure. By doing so, these networking platforms enhance the negative effect of e-government on corruption by pressuring the government to be impartial and objective. To elaborate, VSNs have become complementary platforms to the existing e-government channels for information dissemination by facilitating enhanced citizen participation in public service delivery (Bødker & Zander, 2015), allowing them to flag any bias in services, thereby promoting impartiality in the government system (Hilliard & Kemp, 1999). Further, a study by Dwivedi et al. (2017) stressed the role

of VSNs in complementing e-government initiatives by removing red tape, thereby increasing objectivity within the government (Persson & Goldkuhl, 2010). Accordingly, we argue that when VSN diffusion is high, e-government's ability to improve impartiality and objectivity in the government will be enhanced, which, in turn, will reduce corruption. On the other hand, when VSN diffusion is low, citizens will be limited in their ability in organizing around common issues collectively and put pressure on the government, which will reduce their ability to improve impartiality and objectivity provided by e-government (Cordelia, 2007; Persson & Goldkuhl, 2010), leading to increased corruption. Taken together, based on paths P5 of Figure 1, we hypothesize the following:

**H2b:** *VSN diffusion positively moderates the relationship between e-government maturity and corruption.*

### **Moderation effect on corruption—B2C e-business use' relationship**

We argued earlier that corruption negatively affects its B2C e-business use by increasing businesses' perception of a negative strategic gap. As corruption is generally perceived as a risk (Zhao et al., 2003), such risk perceptions get further amplified when citizens are interconnected as the risk perceptions quickly and widely get shared among them in the network (Scherer & Cho, 2003). Thus, when citizens are more interconnected, perceived corruption will be high, increasing the negative strategic gap, thereby amplifying the negative relationship between corruption and B2C e-business use.

VSNs, as platforms for collective behavior, create a network of people connected over a common issue. Due to their networked nature, these platforms are known to amplify our risk perceptions on various matters such as corruption (Gruber et al., 2015; Scherer & Cho, 2003). Accordingly, we contend that such amplified risk perception of corruption due to the presence of VSNs further enhances the perception of the strategic gap by the businesses, which will negatively affect their strategic decisions, such as using new technology. Corroborating this view, a study by Kasperson et al. (1988) found that a high perception of risk among businesses negatively affects the acceptance of new technology. Given the above arguments, we submit that when VSN diffusion is high in a country, the negative strategic gap due to corruption will be perceived high by the businesses, restraining them from using B2C e-business. On the other hand, when VSN diffusion is low in a country, the perceived negative strategic gap due to corruption will be perceived low by the businesses due to reduced perceived risk, encouraging

them to take the strategic decision of using B2C e-business. Accordingly, consistent with the paths P6 of Figure 1, we hypothesize the following:

**H2c:** *VSN diffusion positively moderates the relationship between corruption and B2C e-business use.*

### **Moderated-mediation on ‘e-government maturity—B2C e-business use’ relationship**

Having postulated Hypotheses 1 and 2, in line with Preacher et al. (2007), we logically propose one more hypothesis. According to them, while these hypotheses allow testing the significance of individual paths, they may not be sufficient to establish moderated mediation effects. Hence, following Preacher et al. (2007), and as depicted in paths P1, P2, P3, P4, P5, and P6 of Figure 1, we hypothesize the following:

**H2d:** *VSN diffusion positively moderates the indirect relationship between e-government maturity and B2C e-business use.*

## **4 Research design**

### **4.1 Data**

We tested the hypotheses using archival data collected from various reputable sources such as Transparency International (TI), World Economic Forum’s (WEF) Global Information Technology (IT) reports, WEF’s Global competitiveness reports, and the World Bank (WB). Two reasons drove the use of archival data. First, as this is a cross-country study, collecting primary data was difficult in terms of time and effort (Frankfort-Nachmias & Nachmias, 1992). Second, using secondary data offered several other advantages such as (1) easy replication and validation (Calantone & Vickery, 2009); and (2) robustness to the issue of common method bias (Woszczyńska & Whitman, 2004). As we collected data from three separate sources, it was necessary to match countries in all the databases. We then pooled together the matched data points for 126 countries, which was sufficient (minimum of 50 data points) to avoid degrees of freedom and efficiency issues (Hair et al., 2006). Further, in line with the previous

research involving corruption (e.g., Brouthers et al., 2008; Krishnan et al., 2013), and considering the advantages of multiyear averages in giving better estimates when compared to single year datasets (Wiggins & Ruefli, 2005; Krishnan et al., 2017), we used mean of values over two successive years for every variable. Furthermore, in line with the extant studies that have suggested a lagged effect of e-government on dependent variables (e.g., Picci, 2006), we allowed a 1-year lag between variables. Accordingly, we gathered data for the dependent variable for years 2015 and 2016, the mediating variable for years 2014 and 2015, and the independent and moderating variables for years 2013 and 2014. Two reasons guided the decision for choosing the mentioned period: (1) the need for the most recent data; and (2) availability of the data.

## 4.2 Variables and measures

The details of the variables and their measures are given in Appendix A. As shown, the *dependent variable* in this study is B2C e-business use, the values for which were sourced from the data reported in WEF's Global IT reports (WEFGITR, 2015; 2016). This measure has been used in a study by John (2017), which examined the effect of country characteristics, business sophistication, technological readiness, and e-government support on e-business development in a country.

The *independent variable* in this study is e-government maturity and was operationalized using the measure of the Online Service Index taken from WEF's Global IT reports (WEFGITR, 2013; 2014). This measure has been used in past studies investigating the antecedents (e.g., Das et al., 2017; Krishnan et al., 2017) and outcomes (e.g., Arayankalam et al., 2020; Krishnan et al., 2013; Srivastava et al., 2016) of e-government growth and development.

The *mediating variable* in this study is corruption, which was operationalized using the Corruption Perception Index (CPI), an index created by TI, and its values ranged between 0 (high corruption) and 100 (low corruption). To make this variable's values more intuitive, we reverse coded the score, thus making a higher value the country in which corruption is high and a lower value the country in which corruption is low. This index has been used in prior studies on corruption (e.g., Krishnan et al., 2013).

The *moderating variable* in this study is VSN diffusion, the values of which were sourced from the data reported in Global IT reports (WEFGITR, 2013; 2014). This measure has been used in prior studies involving VSN diffusion (e.g., Arayankalam et al., 2020; Krishnan & Lymm, 2016; Wang & Sun, 2013).

We used two control variables, namely, (1) economic prosperity and (2) tax rate, to eliminate any extraneous influence on the results. Extant research has shown that

economic prosperity (Goel & Nelson, 2010; Gundlach & Paldam, 2009) and tax rate (DeBacker et al., 2015) influence the level of corruption in a country. Also, studies have found that they affect e-business use (e.g., Gibbs et al., 2003; Bharadwaj & Soni, 2007). Subsequently, in line with the previous studies, we operationalized economic prosperity using WB's Gross domestic product (GDP) per capita (adjusted for purchasing power parity) data (e.g., Tiwari & Mihai, 2011). The tax rate was operationalized using the total tax rate values from WEF's Global competitiveness reports.

### 4.3 Reliability and validity of the data

As mentioned earlier, the key variables in our study were sourced from WEF's GTR reports and TI's CPI. It is worthy to note that both of these agencies followed rigorous procedures to ensure that the data collected was reliable and valid. In ensuring the reliability and validity of data in GTR reports, the WEF undertook several steps, such as the following. First, it followed stringent procedures in collecting the data from business executives through a survey conducted across 140 countries. In administering the survey, WEF relied on its network of partner institutes such as universities and research organizations. Each partner institute was given proper guidelines prepared by survey experts. Second, the agency prepared a sample frame of business executives from various companies of different sizes and sectors to ensure that the sample was representative of the population. Third, outliers in the data were eliminated using the Mahalanobis distance method, a robust way to detect outliers (Atkinson, 1994). Fourth, to avoid the possibility of response bias, respondents who gave the same answer to at least 80% of the questions were removed from the dataset. To reduce biases further, the firms were also randomly selected. Finally, to ensure the data's consistency over time, the inter-quartile range (IQR) test was conducted to detect significant variations between data collected over two time periods.

Similarly, TI also followed rigorous procedures to ensure the reliability and validity of the CPI data. The agency ensured that data was collected from professional institutions that vividly documented their data collection methods. In addition, steps were taken to ensure that the survey sample was representative. Further, prior studies have found that CPI has high validity as a measure for corruption (e.g., Heidenheimer, 1996; Husted, 1999; Barr & Serra, 2010). Moreover, it is worthy to note that data from these reports have been used in recent studies (e.g., Gong et al., 2018; Srivastava et al., 2016), which were published in Senior Scholars' Basket of Journals.

## 5 Analysis and results

### 5.1 Descriptive statistics and correlations

Descriptive statistics and correlations for all variables are shown in Table 2. As shown, the correlations between the key variables were below the threshold value of 0.8, indicating that the concern for multicollinearity would be minimal (Gujarati, 2003; Gujarati & Porter, 2009). However, as an additional check, in line with Hair et al. (2006), we conducted collinearity tests that measure the variance inflation factor (VIF). VIF assesses the effect that the other independent variables have on the standard error of a regression coefficient. Our analysis found that the VIF values ranged between 1.792 and 2.091, which were well within the traditional acceptable range of less than 10 (Belsley et al., 2005; Gujarati, 2003) and the stringent threshold of less than 4 (Fox, 1991). Thus, the concern for multicollinearity in our model appeared to be minimal.

<i>Variable</i>	<i>M</i>	<i>SD</i>	<i>B2C</i>	<i>EGV</i>	<i>CPI</i>	<i>VSN</i>	<i>GDP<sup>a</sup></i>
B2C	4.537	0.868	–				
EGV	0.528	0.223	0.799	–			
CPI	52.980	19.474	-0.721	-0.722	–		
VSN	5.453	0.705	0.791	0.665	-0.674	–	
GDP <sup>a</sup>	9.450	1.184	0.745	0.789	-0.728	0.741	–
TAX <sup>a</sup>	3.642	0.444	<b>-0.101</b>	<b>-0.154</b>	0.187	-0.179	-0.239

Table 2. Descriptive statistics and correlations (N = 126; M: Mean; SD: Standard deviation; <sup>a</sup>Log transformed variable; B2C: B2C e-business use; EGV: E-government maturity; CPI: Corruption; VSN: VSN diffusion; GDP: GDP per capita (PPP); TAX: Total tax rate; Correlations reported were significant at  $p < 0.05$  (2-tailed) except the **bold**.)

### 5.2 Hypotheses testing

We tested the hypotheses using Hayes' PROCESS (version 3.3) macro, which can be used to analyze direct, indirect, and moderating relationships between variables (Hayes, 2017). Table 3 depicts the regression coefficients of the research model.

## Arayankalam and Krishnan: Can E-government Maturity Increase B2C E-Business Use?

<i>Path coefficients (B)</i>		
<i>Variable</i>	<i>CPI</i>	<i>B2C</i>
<i>Control variables</i>		
GDP <sup>a</sup>	-5.719***	-0.008
TAX <sup>a</sup>	2.071	0.136
<i>Independent variables</i>		
EGV	-19.049**	1.645***
<i>Mediating variable</i>		
CPI	–	-0.006 <sup>†</sup>
<i>Moderating variable</i>		
VSN	-8.985***	0.518***
<i>Interaction effects</i>		
EGV * VSN	-34.506***	-0.857 <sup>†</sup>
CPI * VSN	–	-0.008
<i>R-square</i>	0.688	0.780

Table 3. Results of hypotheses testing (N = 126; <sup>a</sup>Log transformed variable; GDP: GDP per capita (PPP); TAX: Total tax rate; EGV: E-government maturity; CPI: corruption; VSN: VSN diffusion; \*p < 0.05 \*\*p < 0.01 \*\*\*p < 0.001 (2-tailed))

As shown, the relationship of e-government maturity with B2C e-business use was positive and significant ( $\beta = 1.645$ ;  $p < 0.001$ ), thus supporting H1a. Similarly, the relationship of e-government maturity with corruption was negative and significant ( $\beta = -19.049$ ;  $p < 0.001$ ), thus supporting H1b. Further, the relationship of corruption with B2C e-business use was negative and significant ( $\beta = -0.006$ ;  $p < 0.05$ ), thus supporting H1c. To test Hypothesis 1d (i.e., the indirect effect of e-government maturity on B2C e-business use through corruption), we adopted the method Preacher and Hayes (2008) suggested for identifying indirect effects. Such a method involves estimating the total and direct effects of the independent variable on the dependent variable, the difference between which is the indirect effect of the independent variable on the dependent variable through the mediator. Further, we used bootstrapping to estimate the confidence intervals for the mediator. It is a resampling technique where many sub-samples (5000

in our study) are created from the main sample, and the parameters are estimated using these subsamples. If the interval for the mediator does not contain zero, it means the indirect effect of the mediator is significantly different from zero. In other words, it means that the independent variable affects the dependent variable through another intermediate variable. The results of mediation analysis are indicated in Table 4, and as shown, the indirect effect was found to be significant, thus supporting Hypothesis 1d, which predicted that e-government maturity indirectly affected B2C e-business use through corruption.

	<i>Total effect</i>	<i>Direct effect</i>	<i>Indirect effect via CPI</i>
<i>EGV</i> → <i>B2C</i>	2.155 (1.510 to 2.799) <sup>a</sup>	1.791 (1.125 to 2.458) <sup>a</sup>	0.363 (0.114 to 0.660) <sup>a</sup>

Table 4. Mediation analysis (N = 126; Confidence intervals are reported in parentheses and computed with bootstrapping using 5000 resamples; EGV: E-government maturity; B2C: B2C e-business use; CPI: Corruption; <sup>a</sup>95% confidence interval does not include zero.).

To test Hypotheses 2a-d (moderations), we used model 59 in PROCESS macro. Moderation by a variable indicates how this variable strengthens or weakens the existing relationship between the independent and dependent variables by interacting with the independent variable. As shown in Table 2, the interaction between e-government maturity and VSN diffusion on B2C e-business use was significant ( $\beta = -0.857$ ;  $p < 0.05$ ), indicating possible support for Hypothesis 2a. Similarly, the interaction between e-government maturity and VSN diffusion on corruption was negative and significant ( $\beta = -34.506$ ;  $p < 0.001$ ), indicating possible support for Hypothesis 2b. We did not find any significant relationship between corruption and VSN diffusion on B2C e-business use, and hence, Hypothesis 2c was not supported. However, to get more clarity on the moderation effects, it is important to plot the effects and conduct a slope analysis. Suppose the slope of the line depicting the relationship between the independent and dependent variables reduces (i.e., flatter) at higher values of moderating variables. In that case, the moderating variables weaken the relationship between the independent and dependent variables. On the other hand, if the slope of the line depicting the relationship between the independent and dependent variables increases (i.e., steeper) at higher

## Arayankalam and Krishnan: Can E-government Maturity Increase B2C E-Business Use?

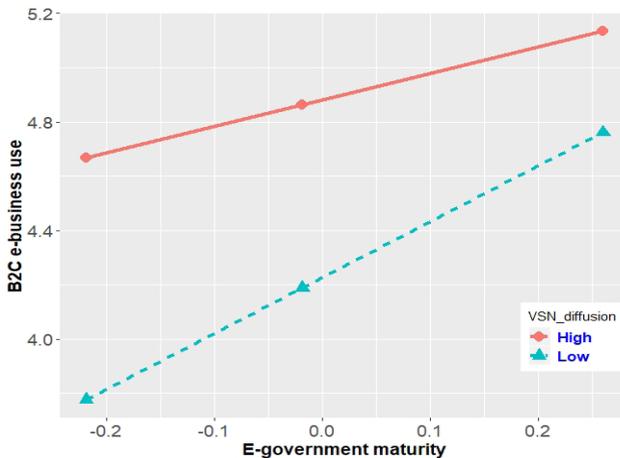


Figure 3. Moderation effect of VSN diffusion on e-government maturity and B2C e-business use

values of moderating variables, it indicates that the moderating variables strengthen the relationship between the independent and dependent variables.

Accordingly, to further explore the nature of interactions, we plotted the moderating effects as recommended by Cohen et al. (2013) and performed slope analysis as recommended by Aiken et al. (1991). Figure 3 shows the interaction of VSN diffusion on the relationship between e-government maturity and B2C e-business use. As depicted, the positive relationship between e-government maturity and B2C e-business use was more prominent at low levels of VSN diffusion. Further, it can be seen from the plot that the slope of the line depicting the positive relationship between e-government maturity and B2C e-business use became flat at higher levels of VSN diffusion, indicating a negative moderating effect. Confirming this, a simple slope analysis showed that the relationship of e-government maturity with B2C e-business use was positive and stronger when VSN diffusion was low (slope = 2.224,  $t = 5.490$ ,  $p < 0.001$ ) in comparison to when it was high (slope = 1.062,  $t = 2.788$ ,  $p < 0.05$ ). Thus, the results did not support hypothesis H2a, which predicted a positive moderating effect of VSN diffusion on the relationship between e-government maturity and B2C e-business use.

Figure 4 shows the moderation effect of VSN diffusion on e-government maturity and corruption. As shown, the negative relationship between e-government maturity and its corruption was more prominent at high levels of VSN diffusion. Further, it can be observed from the figure that there was only a negligible difference in corruption between weak and strong levels of VSN diffusion when e-government maturity was low, but there was a substantial difference when VSN diffusion was high. Corroborat

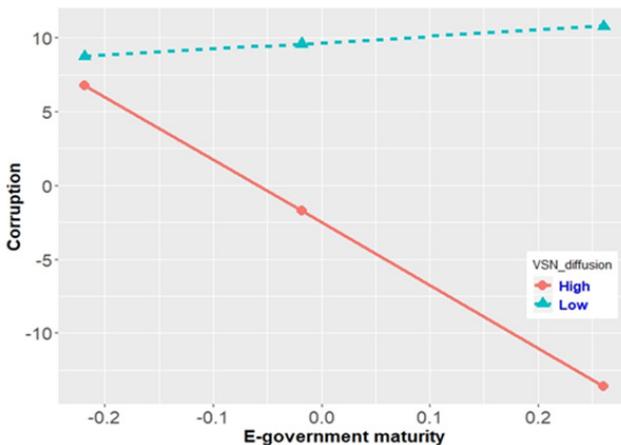


Figure 4. Moderation effect of VSN diffusion on e-government maturity and corruption

ing this, a simple slope analysis revealed that the relationship of e-government maturity with corruption was negative and stronger when VSN diffusion was strong (slope =  $-42.499$ ,  $t = -5.483$ ,  $p < 0.001$ ) in comparison to when it was weak (slope =  $4.260$ ,  $t = 0.436$ ) indicating a positive moderating effect. Taken together, the results from Table 2 and Figure 3 established support for Hypothesis 2b.

To test Hypothesis 2d, we followed the procedure suggested by Hayes (2017). According to him, when a variable moderates more than one path that defines an indirect effect, the conditional indirect effect becomes a non-linear function of the variable. That is, a variable strengthens or weakens a mediated relationship, and thus, such an effect is called moderated-mediation. In such a situation, to identify the presence of moderated-mediation, Hayes (2017) suggested a procedure, which involves the following steps: (1) choose two values of moderator; (2) find conditional indirect effects at those values of moderator; (3) generate a bootstrap confidence interval for the difference between the two conditional indirect effects (i.e., pairwise contrast) at those values of moderator; and (4) check if any bootstrap confidence interval from step 3 includes zero. If not, then it indicates the presence of moderated mediation.

The above procedure is automated in model 59 of PROCESS macro. In our analysis, based on different values of the moderator (VSN diffusion), conditional indirect effects were calculated. Conditional indirect effects show the change in the indirect effect of e-government maturity on B2C e-business use for different values (generally three values with  $-1$  standard deviation (SD),  $0$  SD, and  $+1$  SD) of VSN diffusion. The analysis indicated that at  $+1$  SD, VSN diffusion moderated the indirect relationship between e-government maturity and B2C e-business use ( $0.115 < \beta < 0.913$ ), thus supporting

Hypothesis 2d, which predicted that the indirect relationship between e-government maturity and B2C e-business use through corruption is moderated by VSN diffusion.

Regarding the effects of the control variables, as shown in Table 2, economic prosperity had significant effects on corruption, while the total tax rate did not show any significant relationship. Both the control variables were not significantly related to B2C e-business use. As indicated by the results, our model explained 68.8% of the variance in corruption and 78% in B2C e-business use.

### 5.3 Robustness check

Although the results indicated general support for the hypotheses, we further conducted a robustness test with two other datasets to establish the strength of our proposed model. In the first test, we ran the model with data without taking the mean of consecutive years but with a single-year lag. To elaborate, we used the year 2016 data for the dependent variable, the year 2015 data for the mediation variable, and the year 2014 data for the independent and moderation variables. In the second test, we used data with mean for the data from 2015 and 2016 for all the variables, but without any year lag. The results (see Table 5 and 6) corroborated the initial findings, thereby establishing the robustness of our model.

## 6 Discussion

In recent times, researchers have attempted to understand the factors that promote the use of B2C e-business across countries (e.g., AlGhamdi et al., 2013; Arayankalam & Krishnan, 2020). Although e-government as a factor in promoting B2C e-business is acknowledged (e.g., Srivastava & Teo, 2010), only a few studies have explored more in-depth into this relationship. Through this study, by drawing on Srivastava's (2011) value framework and the theory of collective behavior (Blumer, 1939), we seek to enhance our theoretical understanding of the 'e-government—B2C e-business use' relationship by investigating the role of an intervening factor, that is, corruption, and a moderating factor, that is, VSN diffusion. Accordingly, two key findings emerge from this study. First, e-government as a *technology* affected an *intermediate process* (i.e., corruption), thereby creating an *impact* by increasing the B2C e-business use in a country. This finding is in line with a study by Arayankalam et al. (2020), which showed that e-government maturity in a country by improving an intermediate process (i.e., the government's administrative effectiveness) created an impact (i.e., reduced three types of corruption) in a country. Second, VSNs, as platforms for collective behavior, have the

<i>Path coefficients (B)</i>		
<i>Variable</i>	<i>CPI</i>	<i>B2C</i>
<i>Control variables</i>		
GDP <sup>a</sup>	-5.747*** (-6.556***)	0.283(0.053)
TAX <sup>a</sup>	2.230 (1.245)	0.152 (0.247**)
<i>Independent variables</i>		
EGV	-20.052* (-14.191*)	1.529*** (0.733**)
<i>Mediating variable</i>		
CPI	–	-0.007 (-0.008*)
<i>Moderating variable</i>		
VSN	-9.204*** (-9.198***)	0.470*** (0.624***)
<i>Interaction effects</i>		
EGV * VSN	-33.769*** (-28.232***)	-0.825* (-0.557)
–	–	-0.009 (-.010)
<i>R-square</i>	0.681 (0.654)	0.765 (0.781)

Table 5. Results of hypotheses testing (robustness check) (N = 126; Values in the parentheses are for data with no year lag; <sup>a</sup>Log transformed variable; GDP: GDP per capita (PPP); TAX: Total tax rate; EGV: E-government maturity; CPI: corruption; VSN: VSN diffusion; B2C: B2C e-business use; \*p < 0.05 \*\*p < 0.01 \*\*\*p < 0.001 (2-tailed).)

potential to influence the relationships among e-government maturity, corruption, and B2C e-business use. This finding is also in line with the study by Arayankalam et al. (2020), which showed that VSN diffusion moderated the relationship among e-government maturity, government administrative effectiveness, and corruption. However, the

## Arayankalam and Krishnan: Can E-government Maturity Increase B2C E-Business Use?

	<i>Total effect</i>	<i>Direct effect</i>	<i>Indirect effect via CPI</i>
<i>EGV</i> → <i>B2C</i>	2.079 (1.428 to 2.729) <sup>a</sup> 1.442 (0.896 to 1.987) <sup>a</sup>	1.712 (1.042 to 2.382) <sup>a</sup> 1.122 (0.580 to 1.664) <sup>a</sup>	0.367 (0.120 to 0.667) <sup>a</sup> 0.320 (0.125 to 0.556) <sup>a</sup>

Table 6. Mediation analysis (robustness check) (Note. N = 126; Underlined values are the effect sizes for data with 1-year lag without an average of consecutive years; Confidence intervals are reported in parentheses and computed with bootstrapping using 5000 resamples; EGV: E-government maturity; B2C: B2C e-business use; CPI: Corruption; <sup>a</sup>The empirical 95% confidence interval does not include zero.

results indicated a negative moderating effect of VSN diffusion on the ‘e-government maturity—B2C e-business use’ relationship, which contradict our prediction (i.e., H2a). The results from robustness checks (see Table 4) show no conclusive evidence for this negative moderation as the finding from the analysis using new data sets did not give a significant result. Further study is required to gain deeper insights into this relationship. Furthermore, the results indicated that VSN diffusion did not moderate the relationship between corruption and B2C e-business use (i.e., H2c). We attribute this to the possibility of the differential impact of various types of corruption on business decisions. To elaborate, some of the different types of corruption are media corruption, political corruption, and judicial corruption, among others (Karklins, 2002); businesses likely respond only to specific types of corruption that they think will affect them. This line of thought finds support in a study by Cuervo-Cazurra (2008) that found that it was the pervasive corruption (i.e., the corruption that is widely present) rather than arbitrary corruption (i.e., the corruption that is uncertain) that affected business investments in a country. Thus, the role of various types of corruption on B2C e-business use and how VSNs influence those relationships merit further consideration in future research.

<i>Hypothesis</i>	<i>Supported/ Not-supported?</i>
<i>H1a: E-government maturity is positively associated with its B2C e-business use</i>	Supported
<i>H1b: E-government maturity is negatively related to its corruption</i>	Supported
<i>H1c: Corruption is negatively related to its B2C e-business use</i>	Supported
<i>H1d: The relationship of e-government maturity with its B2C e-business use is mediated by corruption</i>	Supported
<i>H2a: VSN diffusion positively moderates the relationship between e-government maturity and B2C e-business use</i>	Not-supported
<i>H2b: VSN diffusion positively moderates the relationship between e-government maturity and corruption</i>	Supported
<i>H2c: VSN diffusion positively moderates the relationship between corruption and B2C e-business use</i>	Not-supported
<i>H2d: VSN diffusion positively moderates the indirect relationship between e-government maturity and B2C e-business use</i>	Supported

Table 7. Summary of hypotheses results

## 6.1 Implications

This study makes three key contributions to the knowledge base of e-government and e-business. Firstly, drawing on the value framework for assessing e-government impact (Srivastava, 2011), our study is an important step towards extending the understanding of the ‘e-government maturity—B2C e-business use’ relationship by empirically establishing the role of an intervening factor—corruption. In other words, we posit that e-government by reducing corruption improves the government’s legitimacy, motivating businesses to mimic the government’s use of ICT (i.e., e-government) by using ICT (i.e., B2C e-business) for their transactions with customers.

Secondly, with the ubiquitous presence of the Internet and smartphones, VSNs have become a common entity in our lives, and they create a virtual space around us mimicking the real world. Only a few studies (e.g., Arayankalam et al., 2020) have explored its effects on the outcomes of e-government. By adopting Blumer's (1939) collective behavior perspective, our study empirically established the critical role of VSN diffusion in affecting the pay-offs of e-government, particularly in the context of B2C e-business. In essence, our study conceptualized VSNs as platforms for collective behavior and established VSN diffusion's influence on e-government outcomes in terms of (1) reduced corruption; and (2) increasing B2C e-business use. Accordingly, we also contribute to the concept of collective behavior by adopting and establishing its utility to analyze group behavior in the digital space. Given this, our study lays a sound theoretical foundation while establishing the role of VSNs in the context of e-government by deriving the associations between e-government maturity, corruption, B2C e-business use, and VSN diffusion.

Third, our study also provides a fresh theoretical perspective in analyzing the relationship between e-government and corruption by drawing on the collective action theory of corruption (Persson et al., 2013). Most of the existing studies on e-government and corruption primarily draw on principal-agent theory (Klitgaard, 1988); it has been observed that this theory is inadequate in explaining the phenomenon of corruption (Persson et al., 2013). The collective action theory of corruption (Persson et al., 2013) is gaining popularity, and its relevance is further corroborated by the use of this theory in recent studies (e.g., Dávid-Barrett, 2019; Persson et al., 2019). Accordingly, by drawing on this theory and arguing that e-government is an effective mechanism to solve the collective action problem of corruption, our study has further enriched the knowledge base on the relationship between e-government and corruption.

From a practical point of view, our study makes three key contributions. First, this study provided empirical evidence for the positive association between e-government maturity and B2C e-business use through a macro-level analysis. Accordingly, we suggest that policymakers consider e-government maturity as an effective policy tool for improving B2C e-business use. Second, our conceptual model (see Figure 1) shows the mechanisms explaining how e-government maturity indirectly increases B2C e-business use by reducing corruption. Thus, we suggest policymakers be mindful of adopting various measures to control it for promoting B2C e-business use. And third, our findings indicate that VSNs play an essential role in enhancing citizens' and customers' ability to pressurize the government and businesses, respectively. Such pressure derived from the collective behavior impinges strongly upon the functioning of the government and businesses. To elaborate, by facilitating collective behavior centered on a common

issue, VSNs can enhance (1) e-government's ability to control corruption and (2) e-government's indirect ability to improve B2C e-business use by reducing corruption. Accordingly, we recommend that policymakers appreciate the crucial role of VSNs in amplifying e-government outcomes and taking appropriate actions (e.g., promoting FDI in new-generation Internet technologies) to increase the level of VSN diffusion. In sum, for a country to increase B2C e-business use, it must focus on attaining the maturity of e-government, reducing corruption, and increasing VSN diffusion. Given this, we firmly believe that our conceptual framework (see Figure. 1) will serve as a valuable tool for policymakers in ushering national development by improving B2C e-business use.

## 6.2 Limitations and future research directions

The findings from this study should be interpreted in light of three key limitations. First, we have considered a general index (CPI) for corruption given by TI in operationalizing the variable. However, there are different types of corruption, such as media corruption, judicial corruption, and political corruption, which may have differential effects on B2C e-business use. However, in the present study, we did not explore those paths. Second, we have considered only one hindering factor, corruption, that may intervene in the relationship between e-government maturity and B2C e-business use. We acknowledge the possibility of other factors such as inefficiency in settling disputes that may affect this relationship. Third, although we relied on secondary data because of practical considerations, primary data would have given us better control over operationalizing the variables. Besides, we analyzed data only for those countries available in all the sources. For example, we could not include countries like South Sudan, North Korea, and so on, as these countries were not present in all the databases. Accordingly, the number of countries analyzed in this study was limited to 126, an adequate number considering that 50 is the threshold to avoid issues related to degrees of freedom (Hair et al., 2006).

Further, our study offers several directions for further exploration. First, future studies could inquire further into reasons for the indirect relationship between e-government maturity and B2C e-business use through corruption. One such reason could be the role of trust in the government-businesses relationship. As reducing corruption is the government's responsibility, a high level of this vice will be perceived by businesses as the government reneging on its responsibility, which may reduce its trust in the government (Augustine & Enyi, 2020). Thus, it will be interesting to know how e-government will affect the businesses' trust in the government, which in turn may affect its B2C e-business use. Second, as mentioned previously, future studies may explore how

e-government affects different types of corruption, such as political, media, legislative, executive, and judicial corruption, and influence B2C e-business can be taken up in future studies.

## 7 Concluding remarks

This study shows that e-government maturity can improve B2C e-business use indirectly by mitigating corruption. In addition, the study also shows that VSNs, as the platforms for collective behavior, amplify the e-government's role in combating corruption and enhance the e-government's indirect influence on B2C e-business use through corruption. In other words, this study highlights how the government's digitalization (i.e., e-government) drives businesses' technology adoption (i.e., B2C e-business) and how such a relationship is influenced by people's collective behavior enabled by VSN diffusion. At a broad level, this study also underscores the role of the government and citizens as essential stakeholders of businesses in influencing their technology adoption/use decisions. We firmly believe that this study reveals an exciting and hitherto less explored phenomenon, theoretical exposition, and empirical validations that are expected to expand the knowledge base of e-government, e-business, and VSNs, and inspire further research.

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## Appendix A. Key variables and measures

<i>Variable</i>	<i>Measure</i>	<i>Source</i>	<i>Past studies</i>
B2C e-business use	Measured by asking the respondents, “In your country, to what extent do businesses use the Internet for selling their goods and services to consumers?” and was anchored on a scale of “1” representing “not at all to “7” representing “to a great extent.”	WEF’s Global IT reports (WEFGITR, 2015; 2016)	John (2017)
E-government maturity	Online Service Index: Measures the quality of the government’s delivery of online services and their current stage of maturity. The values ranged between 0 and 1, with the low values indicating the lower level of e-government maturity	WEF’s Global IT reports (WEFGITR, 2013; 2014)	Arayankalam et al., 2020; Krishnan et al., 2013; Srivastava et al., 2016
Corruption	Corruption Perception Index (CPI), an index created by TI, and its values ranged between 0 (high corruption) and 100 (low corruption) (Reversed the score to make it more intuitive)	TI	Krishnan et al., 2013
VSN diffusion	Measured by asking the respondents, “In your country, how widely are virtual social networks (Facebook, Twitter, LinkedIn, etc.) used?” The indicator was anchored on a 1-to-7 scale with “1” representing “not at all used” and “7” representing “used extensively.”	WEF’s Global IT reports (WEFGITR, 2013; 2014)	Arayankalam et al., 2020; Krishnan & Lymm, 2016; Wang & Sun, 2013

