

UNPACKING THE ROLE OF POLITICAL-WILL IN DIGITAL BUSINESS ECOSYSTEM DEVELOPMENT FOR SOCIOECONOMIC BENEFITS

Research paper

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Abstract

As digital technology transforms many organisational alliances, new collaborative networks such as digital business ecosystems have emerged. In digital business ecosystems, participants leverage technological innovations to develop capabilities for value co-creation. Despite the growing number of studies, there is lack of research on how political-will facilitates development of digital business ecosystems. Therefore, this study develops a framework to explicate the role of political-will in the development of digital business ecosystems to achieve socioeconomic benefits. The findings show that political-will leads to provision of resources and legislative support as well as formulation of strategic initiatives required at the birth, expansion and maturity phases of digital business ecosystems to generate socioeconomic benefits such as (1) reduced corruption, (2) improved operational processes, (3) increased government revenue, (4) reduced bureaucracy and (5) improved transparency, fairness and accountability.

Keywords: Digital business ecosystem, Digital business ecosystem development, Political-will, Socio-economic benefits

1 Introduction

Digital business ecosystem is a socio-technical network of digital platforms, individuals and organisations that collectively co-create value (Senyo, Liu, Sun, & Effah, 2016). Digital business ecosystem blurs traditional industry boundaries for organisations to compete and collaborate through digital platforms. A well-known example is Apple's mobile digital business ecosystem, which comprises diverse partners such as mobile application (app) developers, payment service providers, content sellers, end-users and Apple itself. Most of these partners rely on platforms such as the iPhone, AppStore and iTunes within the digital business ecosystem to develop their own innovations (e.g., mobile apps, games, etc.) that become inputs for final values created for end-users.

Though digital business ecosystems present innovative strategies for industry wide-innovation, many organisations still fail to harness the opportunities they offer. Most organisations proceed on individual strategic trajectories whereas an ecosystem requires interdependence between entities (Adner, 2017). While some studies exist on digital business ecosystem development, research gaps still exist. First, studies focusing on development processes have largely been on business ecosystems (e.g., Chou & Huang, 2012; Hu, Rong, Shi, & Yu, 2014; Tan, Pan, Lu & Huang, 2009), e-business (e.g., Huang, Hu, & Lu, 2010; Leong, Pan, Newell, & Cui, 2016), entrepreneurship (e.g., Yue, Tan, & Cui, 2016), innovation (e.g., Kim, Tan, Tan, Ondrus, & Oh, 2017) and fintech (e.g., Leong, Tan, Xiao, Tan, & Sun, 2017; Ng, Tan, & Leong, 2017) but not specifically on digital business ecosystems. Second, research on how political-will facilitates the development of digital business ecosystems remains limited. According to the UK's Department for International Development (DFID), political-will refers to determination of public officials to support an action of public interest (DFID, 2018). Third, prior studies have not gone

beyond the development processes to explicate benefits generated. Lastly, the extant literature has predominately focused on the development of private sector ecosystems while limited knowledge exists on that of the public sector. Given that ecosystems transcend private and public sectors, there is the need to extend existing research into the public sector. In line with these research gaps, *the purpose of this study is to develop a framework that explicates how political-will facilitates development of digital business ecosystems and achievement of socioeconomic benefits.*

The rest of the paper is organised as follows. In the next section, we present literature review on digital business ecosystem and its development as well as political-will and socioeconomic benefits. Next, we present the research methodology with details on the case study background, data collection and analysis. Following this, the paper presents the findings and the framework for digital business ecosystem development. Thereafter, the paper presents the discussion and implications for research and practice. Finally, the paper presents the conclusion, contributions and limitations for future studies.

2 Literature Review

2.1 Overview of Digital business ecosystems

Digital business ecosystem builds on Moore's (1993) business ecosystem concept to account for the influence of digital technologies in value co-creation. While business ecosystem describes an economic community of individuals and organisations operating outside their traditionally defined industry boundaries, digital business ecosystem moves beyond this to account for the influence of digital entities in value co-creation. While both digital business ecosystem and business ecosystem draw inspiration from biological ecosystem concepts such as symbiosis, self-organising and co-evolution, information and communication technologies (ICTs) play a dominant role in the orchestration of the former. In simple terms, digital business ecosystem is a digital version of business ecosystem (Senyo, Liu, & Effah, 2019).

The key characteristics of digital business ecosystems are platform, symbiosis, co-evolution and self-organisation (Stanley & Briscoe, 2010). First, platform refers to a collection of tools, innovations and services that partners use to enhance their service innovations (Selander, Henfridsson, & Svahn, 2013). With platforms, partners can develop innovations through collaboration with others, thereby shifting concentration from product to network value co-creation. Second, symbiosis refers to interdependencies between digital business ecosystem entities such as partners, processes and technologies that support value co-creation (Senyo et al., 2019). Based on symbiosis, digital business ecosystem partners become entangled with one another, resulting in a network of relationships. Symbiotic relationship acknowledges the power of synergy to co-create value greater than the sum of individually created value. What distinguishes symbiosis in digital business ecosystems from traditional value chains is the fluidity and flexibility of spanning different industry boundaries.

Third, co-evolution refers to a situation where two or more entities reciprocally affect each other's development as a result of their symbiotic relationships. In co-evolution, entities apply selective pressure on their partners through complementary capabilities for each other's evolution as a result of changes in their ecosystem conditions (Moore, 1993). As a dynamic environment, digital business ecosystems constantly evolve as new changes emerge. Thus, it is incumbent on digital business ecosystem participants to have a flexible posture and always scan for new changes. Lastly, self-organisation is a process where a digital business ecosystem learns from its context and accordingly adapt to disorders (Peltoniemi, 2006). Self-organising involves initial interactions among local entities until an entire digital business ecosystem evolves; often triggered when new requirements, opportunities or threats emerge. Due to the network nature of relationships, a reaction to changes between two entities may result in ripple effects on an entire digital business ecosystem. Given that self-organising processes occur spontaneously, digital business ecosystems are not static but dynamic.

2.2 Digital business ecosystem development

Digital business ecosystem development processes are incremental, transcend different stages and involve distinct individuals. Specifically, digital business ecosystem development requires consented effort of different actors. Though digital business ecosystem development varies, there are some commonalities such as (1) development phases and (2) roles.

In terms of development stages, most ecosystems transcend three phases, namely birth, expansion and maturity. For instance, Leong et al. (2016) posit that the development of e-commerce ecosystems goes through three phases, namely birth, expansion and self-renewal. Similarly, Ng et al. (2017) find that the development of fintech ecosystems traverses three sequential phases: value definition, stakeholder empowerment and co-evolution. First, the birth phase marks the genesis where the ecosystem seeks centrality and critical mass (Tan et al., 2009). Second, the expansion signifies a phase of steady growth of an ecosystem through strengthening of internal networks and extension of external boundaries (Leong et al., 2016). Last, the maturity represents an apex growth in the ecosystem development phase where there is high symbiosis and improved value co-creation (Ng et al., 2017).

Concerning ecosystems roles, two key actors are identified, namely keystones and complementors. Keystones are core organisations with lots of power due to ownership of critical resources in ecosystems (Senyo et al., 2016). On the other hand, complementors represent collaborators such as suppliers, producers and customers that work with keystones to co-create value (Senyo et al., 2019). Generally, keystones tend to pioneer ecosystems from the birth phase while some complementors join during expansion and maturity phases.

Though some studies exist on the development of ecosystems in general, the focus has been on private sector domain while there is limited knowledge on the public sector. In addition, existing studies have not gone beyond the development phases to explore the benefits that ensue from the development of digital business ecosystems. Without addressing these gaps, the true implications of developing digital business ecosystems remain limited.

2.3 Political-will and Socioeconomic Benefits

As a policy and public administration lexicon, political-will is an ambiguous concept with varied perspectives (Brinkerhoff, 2000). However, in simple terms, political-will is the determination of public officials to support an action of public interest (DFID, 2018). Political-will entails effecting changes through policy formulation, implementation, provision of resources and support to address a societal problem. According to Brinkerhoff (2000), political will incorporates (1) individual actors and their aspirations (2) institutions within which individuals operate and act on their behalf; (3) socioeconomic and governance structure that frame incentives and constraints as well as (4) policies and programmes executed by actors. Through political-will, there is bound to be some form of desirable outcomes that address societal problems. Hence, political-will can be viewed as a medium by which socioeconomic benefits are derived through provision of conducive environment and resources to execute policy directions.

Furthermore, Post, Raile and Raile (2010), identify four key components that underpin political-will as (1) sufficient set of decision makers; (2) common understanding of a problem; (3) commitment to solve a problem and (4) effective policy solution. First, sufficient set of decision makers refers to a group of individuals who have the power to take action. Second, common understanding of a problem relates to a situation where there is general consensus on the need to address an issue, which could be social or economic. Third, commitment to solve a problem involves determination and will to provide the needed support to address a societal issue. Lastly, effective policy solution requires that actions taken to address problems lead to logical conclusion. Combining these components can lead to outcomes that are beneficial to a larger society. These outcomes are what this study terms as socioeconomic benefits, referred to as rewards accrued from implementation of favourable policies (Aklin, Bayer, Harish, & Urpelainen, 2017) such as fairness, increased income, improved processes, reduced workload, improved transparency and reduced corruption.

While political-will has been widely investigated in the public administration field, Information Systems research on the other hand has witnessed sparing investigations. Given that technology deployment and use span both private and public sectors, it is important to assess the role of political-will. In the public sector, decision making on the deployment and use of technology are largely made by individuals with political power. Therefore, it is important to assess how policy decisions in the form of political-will influence the development of digital business ecosystems and the socioeconomic benefits they generate in the public sector environment.

3 Methodology

This study adopts qualitative case study research method (Walsham, 2006) to seek a deeper understanding of digital business ecosystem development. We chose qualitative case study to enable us to provide deeper understanding of the research phenomenon by going beyond description so as to account for the study context and subjective interpretations of the research participants. Second, the choice of the qualitative case study approach is to enable us to go beyond a description of issues into providing a context-sensitive understanding of our research interest. Lastly, using the case study approach will promote analysis of different interpretation given by actors to a phenomenon, a necessary requirement to address our research purpose. For the case study, we chose Ghana's main port, Tema Harbour, due to the following reasons. First, the port has experienced several ICT implementations in recent years and therefore provides a revelatory fit to understand digital business ecosystem development. Second, the port's operation involves complex interaction between different entities including partners, technologies and processes for value co-creation, and thus serves as an instantiation of a digital business ecosystem. Lastly, the port presents a good opportunity to uncover socioeconomic benefits from digital business ecosystems development.

3.1 Case Background

Ghana is a Sub-Saharan African country, bordered by Cote D'Ivoire to the West, Togo to the East, Burkina-Faso to the North and the Atlantic Ocean to the South. Due to its boundary with the sea, most landlocked countries heavily utilise Ghana's ports as transit points. As such, the volume of transactions in Ghana's port increases yearly. Tema Harbour was commissioned for trade facilitation in 1962 (GPHA, 2017). Since then, there have been significant volumes of trade in the port due to its strategic location. Activities at the port include vessel and cargo handling, stevedoring, ship repairs, bunkering and ship chandlery as well as storage and warehousing. However, the dominant activity at the port is clearing of import cargo from abroad since Ghana is highly import-dependent. The core partners in the port are the Ghana Ports and Harbours Authority (GPHA), the Customs Division of the Ghana Revenue Authority (hereafter referred to as Customs), shipping lines, scanner operators, freight forwarders, terminal operators, Government Ministries, Departments and Agencies as well as importers and exporters. These partners interdepend on one another to co-create value through symbiotic relationships.

GPHA is responsible for managing most activities at the port, ranging from docking allocation, container movement, security, inspection scheduling and fees collection. Customs, on the other hand, is responsible for collecting taxes and duties on transactions through the port on behalf of government. The scanner operators are responsible for scanning containers going through the port to determine their contents. Shipping lines transport cargo with their vessels to and from the port. Terminal operators work with GPHA to manage containers in the inland containerised depots. Government Ministries, Departments, and Agencies (MDAs) such as Ministry of Trade and Industry, Ghana Standards Authority and the National Petroleum Authority are responsible for enforcing laws on import or export of goods under their jurisdiction. Freight forwarders are agents that facilitate clearing and export processes on behalf of individuals who are not self-declarants. Lastly, importers and exporters respectively ship goods to or from Ghana.

Officially, the use of ICT in the port began in 1986 through the introduction of an Automated System for Customs Data (ASYCUDA). ASYCUDA was used mainly by Customs for record management

alongside the single administrative document (SAD) processes. Thereafter, TRADENET system, Ghana Customs Management System (GCMS), e-MDA, and the Ghana Integrated Cargo Clearance System (GICCS) were deployed by the Ghana Community Network Services Limited (GCNet). Later, Pre-Arrival Assessment Reporting Systems (PAARS) was deployed by West Blue to enable Customs perform classification and valuation after taking over from destination inspection companies. These systems created a network of platforms within the port ecosystem. Lastly, on 1st September 2017, a new era began in the port through the introduction of the paperless regime. This regime is an attempt to harmonise trade processes among numerous partners, processes and technologies by eliminating paper documents, reducing face-to-face interactions and facilitating single document submission for trade transaction. With this era came the introduction of the Joint Inspection Management Information Systems (JIMIS) to consolidate inspection processes. As a result, the port ecosystem experienced co-evolution. Given that the port did not rely on external entities to evolve, the ecosystem experienced a self-organisation. In sum, we can argue that the deployment of platforms for performance improvement gradually gravitated the port from a manual paper-based environment to a digital business ecosystem, hence a revelatory case to address the purpose of this study.

3.2 Data collection

Data was collected through in-depth semi-structured interviews, observation and secondary sources. The interviews were conducted with information relevant participants in the port digital business ecosystem through snowballing. Secondary data was collected from reports, websites and operating manuals. Subsequently, we performed observations in the port, terminals, stakeholder meetings and at the offices of freight forwarders, Customs and GPHA officers. Collecting data from all these sources enabled us to perform data triangulation. Interviews were conducted with 6 customs officers, 9 freight forwarders, 3 GPHA officers, 2 terminal managers and 1 preventive officer. In all, a total of 21 interviews, lasting between 60–80 minutes on average were recorded and later transcribed.

3.3 Data analysis

We conducted data analysis in tandem with data collection to take advantage of the flexibility of the case study method (Eisenhardt, 1989). To achieve rigour in our analysis, we used open, axial and selective coding techniques (Corbin & Strauss, 1990). The reason for choosing these techniques was to achieve structure and “qualitative rigour” to overcome challenges when analysing a large unstructured data. During the data analysis, we reviewed interview transcripts and documents to first develop open codes. Next, we analysed the open code excerpts to generate axial categories. Finally, after continuous iterative analysis and refinement of the excerpts and categories, we developed selective codes by mapping, integrating and refining the axial codes (Corbin & Strauss, 1990). For verification purposes, we ensured that each finding was supported by evidence from at least two distinct sources. Drawing on the narration of events, activities in the port and excerpts from the data, we identified the development phases, orchestrations, ecosystem structures, key actors, facilitators as well as associated socioeconomic benefits. For instance, to determine key actors at each phase of the ecosystem’s development, we used interview data in conjunction with operating manuals and reports. This process began by identifying the actors from the interview data and was then triangulated with data from reports and operating manuals. We continued the process by iterating between the data, analysis and framework development until we reached a point of saturation.

4 Findings

The development of Ghana’s port digital business ecosystem can be viewed from three main phases, namely *birth, expansion and maturity*. In each phase of the development, the main trigger was political-will from the Government of Ghana as a result of the need to increase revenue to undertake other social interventions. The birth marks the beginning of the digital business ecosystem, whilst the expansion represents the growth stage. Lastly, maturity represents the apex of the development phase. Using these

phases, this study develops a framework (see Figure 1) that explicates peculiarities during the development of the digital business ecosystem. The framework details orchestrations, which represent the operational arrangement in each phase; ecosystem structure as interactions; facilitators as pioneers of each development phase; key actors as individuals and organisations directly engaged in daily operations; and socioeconomic benefits, which are gains from the development phases. Further discussion on each phase is elaborated in the next subsections.

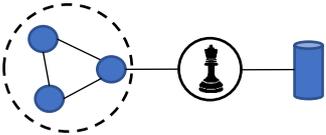
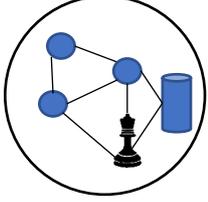
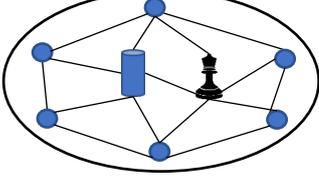
	Development Phases		
	Phase 1 - Birth	Phase 2 - Expansion	Phase 3 – Maturity
Orchestration	Customs had exclusive access to the platform (ASYCUDA) and undertook parallel trade transactions processes	Declarants submit electronic and paper version of trade documents for processing	Declarants only submit trade documents once electronically for processing
Ecosystem Structure	Exclusive Ecosystem 	Networked Ecosystem 	Distributed Ecosystem 
Facilitators	The government of Ghana and UNCTD	The government of Ghana, GCNet	The government of Ghana, GCNet and West Blue consulting
Key actors	Customs	Customs Freight forwarders GPHA MOTI Banks Shipping line agents Importer	Importer Customs Freight forwarders GPHA Terminal operators Shipping line agents Banks and electronic payment service providers Auxiliary government agencies
Socioeconomic Benefits	Improved records management Increase revenue Improved post-clearance audit processes	Increased revenue Improved processes Reduced workload Transparent process Reduced clearing time Improved coverage of other organisations	Increased revenue Increased operational efficiency Reduced corruption Improved data sharing Reduced cost of operation Accessibility and fairness Reduced workload Reduce bureaucracy
Key	 Complementors  Keystone/Focal Partner  Platform		

Figure 1. Framework for digital business ecosystem development

4.1 Phase 1: Birth

The birth phase witnessed the introduction of ASYCUDA, a computerised Customs record management system developed by the United Nations Conference on Trade and Development (UNCTAD). Also, the implementation of ASYCUDA officially marked the beginning of the use of digital platforms in the port. The main facilitators of ASYCUDA were UNCTAD and the government. UNCTAD provided the software while the government provided political-will by offering resources to facilitate smooth implementation. The main motivating factor behind the introduction of ASYCUDA was to increase government revenue and at that time digital technology offered compelling potentials. As was recounted by a

senior customs officer: *“ASYCUDA marked the beginning of technology use by Ghana Customs at the port as all processes were previously undertaken manually.”*

ASYCUDA empowered Customs to store and retrieve electronic transactional data on port activities. In addition, ASYCUDA enabled receipts and other trade documents to be linked to transactions thereby facilitating easy monitoring in post-clearance audits. Post-clearance audits are routines check undertaken by Customs to ascertain revenue losses related to tax evasion, under-declaration and falsification. In effect, ASYCUDA brought some benefits to port operations, especially to revenue collection by serving as a check on document misrepresentation. However, ASYCUDA was exclusively used by Customs. The Sector Commander of Customs at Tema Port commented on this as follows: *“ASYCUDA was solely used for Customs transactions in the port. Thus, the system was not opened to any other partners in the port at that time.”* A freight forwarder corroborated as follows: *“...when ASYCUDA was operational, only officers in the computer room were allowed to use the system as it was exclusively used by Customs.”*

The introduction of ASYCUDA brought some gains in the operation of the port in general. In particular, the birth of the ecosystem resulted in three main socioeconomic benefits as presented in Figure 1. First, there was improved record management. As a result, the level of corruption reduced as people were worried about the electronic evidence of transactions which could later be audited. Second, there was increased government revenue as a result of the introduction of the digital operation. Lastly, the birth of the ecosystem enabled post-clearance audit processes that were not possible previously. As a result, some level of checks and balances was introduced as transaction records could be easily retrieved and mapped to interested parties.

4.2 Phase 2: Expansion

The expansion phase witnessed two key initiatives: (1) working with partners to increase market coverage and output, as well as (2) development of new offerings. The main triggers for these initiatives were the increasing need to modernise the port, coupled with some gains made during the birth phase. Hence, the government embarked on a strategic project to make Ghana's ports the trading hub in West Africa. This strategy led to the formation of GCNet, a private-public partnership joint venture. The formation of GCNet and the subsequent implementation of its flagship TradeNet and GCMS platforms replaced ASYCUDA. According to GPHA's 2016-17 handbook, *“GCNet was established to lead the digitalisation effort towards modernization of the port”*. TradeNet is an electronic data interchange platform for transmitting messages and exchanging trade documents with partners such as importers, freight forwarders, Banks, Customs, GPHA and MDAs involved in a transaction. On the other hand, GCMS is a platform for processing and validating customs declaration by interfacing with the TradeNet system to harmonise and facilitate trade processes. The GCNet platforms became operational in June 2003 at the Tema Port after a successful pilot test at the Kotoka International Airport. The main champions of this era were GCNet and the government.

During the expansion phase, processing duration, bureaucratic processes, high document duplication as well as face-to-face interactions reduced drastically. According to the World Development report (De Wulf, 2005), the introduction of GCNet's platforms made significant positive changes in the port. For instance, *“...some clearance which normally would have taken two weeks and about 28-32 stages were reduced to a day with only 8 stages.”* Similarly, documents that used to be presented in duplicate of 13 copies reduced to 6 under the expansion phase. Some of the improvements and benefits generated by the expansion phase as summarised by the Customs sector commander of Tema Port include: *“(1) increased revenue for government as most tax evasion loopholes were sealed, (2) reduced corruption due to elimination of some physical processes, (3) reduced workload as Customs officers did not have to manually re-enter transactions, (4) improved processes and clearance duration due to the elimination of laborious duplication of paperwork, (5) electronic data interchange with some auxiliary government agencies, and digitalisation of some processes, as well as (6) transparent process as the system provided live audit trails of transactions.”*

Again, the expansion phase as presented in Figure 1 has also resulted in some socioeconomic benefits. First, it has enabled increased government revenue from the port compared to previous years. Second,

there were improved processes at the port. As a result, transactions that took weeks and very laborious steps were completed in days and with few steps respectively. Third, there was improved coverage of auxiliary organisation in the port processes, which in turn increased seamless operations. Lastly, there was improved transparency in the operations of the port, as most activities became digitalised. In effect, the expansion phase enabled more inclusiveness and productivity in the development of the port digital business ecosystem.

4.3 Phase 3: Maturity

To consolidate the gains made in the first two phases, the digital business ecosystem focused on complete digitalising of the port systems. As a result, a captivating vision christened the “paperless” port regime was fashioned to bring more efficiency and effectiveness. This vision was necessitated by increased yearly trade volumes, increased revenue, improved processes and transparency as well as reduced corruption. Though the expansion phase reduced the volume of paper documentation and face-to-face interactions, there was still an opportunity for improvement. The vision of the paperless project was to reduce clearing from an average of 2 days to 4 hours in the port as pointed out by the Vice President of Ghana. As outlined in our framework (see Figure 1), the main facilitators of the maturity phase were the government, GCNet and West Blue.

The paperless era began on 1st September 2017, when trade documents were first electronically submitted only once; without the need to physically present paper copies to the various agencies as was the case previously. As outlined in the current operating manual as well as on GHPA and Customs’ websites, “...document verification, classification, issuance of Customs reports and compliance processes are all done electronically without any physical interaction with the declarant.” Similarly, electronic payment of duties and taxes was introduced so that declarants do not have to join long queues at the bank to make physical payment. Equally, declarants do not have to queue at GHPA offices to schedule delivery orders, receive invoices and waybills as these operations became electronic. Lastly, a risk management engine was introduced to determine if a consignment required physical examination based on the risk profiling result. In cases where there was a need for examination, this was now done jointly by the agencies involved. A freight forwarder narrated this as follows, “... with the new paperless era, there is limited physical interaction with officials especially Customs officers since most processes are digitised. Also, if your container has a green channel risk assessment, there is no need for physical examination.”

The head of Customs Systems explained: “*With the paperless regime, things that were done manually previously have now been captured into our platforms so there are fewer physical interactions during the clearance processes. For example, our compliance officers who used to be in the “long room” where declarants could walk in and talk to them is no more in the paperless era. The compliance officers have all been moved to a secured location at the headquarters where no declarant can physically interact with them. In case there are issues with any declaration, the officers can easily send queries and received feedback from declarants using the GCMS.*”

Similarly, a senior GPHA official highlighted some of the changes: “... now freight forwarders can print their own invoices and waybill in their offices without the need to come and queue in our revenue centre. Initially, some of the declarants did not know how to self-generate some of these invoices so we set up a computer desk at the revenue centre to help them download the electronic documents. Now that most of them [declarants] have learned how to operate the system, there is less pressure. Most of them do not come to the centre for their invoices and waybills anymore, they do it at their offices.”

In just a year, i.e. after the implementation, the port has begun witnessing numerous socioeconomic benefits. Some of these benefits include increased revenue, improved operational efficiency, reduced corruption, reduced cost of operation, improved accessibility and fairness, reduced workload and reduced bureaucracy. In terms of revenue increase, the Vice President claimed that an evaluation of the paperless regime shows revenue collection improvement. The Vice President stated - “*The results are amazing. We just looked at the data this morning – first week of collections under the paperless system*

in September this year compared to last year first week of collections in September 2016 have gone up by 56 percent; 56 percent from around GHS130 million to GHS 213 million per week.”

In the paperless regime, operational efficiency has improved as more state agencies have been integrated into the port platforms. Hence, examinations are now done jointly instead of individually, thereby reducing processing times. Equally, as there is limited face-to-face interaction, it has become difficult for officials to demand bribe from declarants, leading to reduced corruption, favouritism and decreased processing times in the port. Similarly, the paperless regime has introduced electronic payments to reduce processing duration. All these changes have resulted in reduced cost of operation at the port as “facilitation fees” are no longer paid at each stage of the clearance process. For instance, a freight forwarder acknowledged that: *“The paperless era is good [...] it has begun to weed out non-compliant freight forwarders and possibly reduce corruption due to minimisation of physical interaction between parties.”* In summary, the port digital business ecosystem has made many strides throughout the development phases and has brought enormous socioeconomics benefits.

5 Discussion

Using a case study of Ghana’s port, this study developed a framework that explicates the role of political-will in the development of digital business ecosystems (see Figure 1). Moreover, the study outlined socioeconomic benefits associated with development of a digital business ecosystem. Though the development phases in this study correspond to those in some existing studies (e.g., Hu, Huang, Zeng, & Zhang, 2016), unique processes concerning the formation of the ecosystems present some new insights. For instance, while the current literature acknowledges the development of digital business ecosystems through collective efforts of private firms (Kim et al., 2017; Leong et al., 2017), this study presents another perspective of how political-will can necessitate the development of digital business ecosystems. It is found that political-will can propel the development of digital business ecosystem. From our study, it is evident that each phase of the development required strategic intervention and policy direction from the government to enable the intended transformation. Government enabled the development and operation of the digital business ecosystem by providing political support through legislation and logistics. This show of government support at different phases points to the importance of political-will in the development of public sector digital business ecosystem.

Furthermore, this study uncovered socioeconomic benefits that were generated during the digital business ecosystems development. Prior studies (e.g., Leong et al., 2016; Ng et al., 2017) have not gone beyond the development phases of ecosystems. Thus, to move a step further, this study explicates socioeconomic benefits associated with the development of digital business ecosystems. More specifically, this study finds that the development of digital business ecosystems generates benefits such as (1) reduced corruption, (2) improved operational processes, (3) increased government revenue, (4) reduced bureaucracy and (5) improved transparency, fairness, and accountability. So far, the literature has been silent on socioeconomic benefits of developing digital business ecosystems. As such, the benefits uncovered in this study fill that missing gap that is needed to incentivise potential developers of digital business ecosystems. From this finding, this study highlights non-financial benefits accrued through the development of digital business ecosystems. While financial return is paramount in the development of ecosystems in general, this study offers alternative gains that could be derived from digital business ecosystems development (Schuppan, 2009). Similarly, benefits discovered from this study will help to reduce the uncertainties associated with investment in the development of digital business ecosystems.

From the digital business ecosystem literature, the birth phase typically involves defining a new value proposition for customers around a core innovation (Hu et al., 2016; Moore, 1993). However, in this study, the birth phase witnessed the introduction of ASYCUDA as a seed innovation, and the new value proposition was specific to one state organisation, i.e. Customs, to support digitalisation of its processes; as opposed to defining new value proposition for customers. This deviation from the literature points to the fact that in the public sector, digital business ecosystems focus more on state organisations rather

than on customer requirements. This situation confirms the assertion by previous studies that e-government projects focus on state agencies instead of the citizenry (Schuppan, 2009).

A typical expansion phase of an ecosystem involves market coverage extension and development of new offering for customers (Chou & Huang, 2012; Hu et al., 2014). In our study, similar experiences occurred. For instance, the expansion phase witnessed the introduction of new digital platforms, such as the TradeNet and GCMS, which were considered as improvements on the initial ASYCUDA. Also, this phase was the era when the port's digital platforms were expanded to other operational partners; such as shipping lines, freight forwarders, importers, exporters, GPHA, Banks, and MOTI. From this finding, our study confirms the position in previous studies (Hu et al., 2016; Leong et al., 2017) that the expansion phase in the development of digital business ecosystems must result in greater coverage and development of new products and services. This finding eliminates the debate on the effect of contextual idiosyncratic issues at the expansion phase of digital business ecosystem development.

Lastly, this study finds that digital technology platforms enable the development of digital business ecosystems. From our study, the presence of digital platform was experienced at all phases of development. For instance, at the birth phase, ASYCUDA was the digital platform steering operations in the port. Similarly, at both the expansion and maturity development phases, digital platforms - such as GCMS, TradeNet, GICCS, eMDA, and JMIS - powered operations within Ghana's port digital business ecosystem. This finding confirms and reinforces the role of ICT and digital platforms, specifically in the development of digital business ecosystem irrespective of context.

6 Conclusion

This study investigated the development of a digital business ecosystem, and the socioeconomic benefits that it generated. A framework was developed as an outcome that demonstrated the role of political-will in the development of digital business ecosystem. The framework suggests that the development of a digital business ecosystem spans three main phases; i.e. birth, expansion and maturity. Further, our findings show that the development of digital business ecosystems generates socioeconomic benefits such as (1) reduced corruption, (2) improved operational processes, (3) increased government revenue, (4) reduced bureaucracy and (5) improved transparency, fairness and accountability. To a large extent, our knowledge of the development of digital business ecosystem had been limited to the private sector; hence the lack of research from the public sector. Thus, by articulating the development of a digital business ecosystem from the public sector context, our study extends the existing limited private sector knowledge in both research and practice.

In terms of research, this study's contribution stems from it being the first to provide a framework that explicates the role of political-will in the development of digital business ecosystems. Moreover, this study contributes to the ecosystem literature by going a step further from prior studies to unearth socioeconomic benefits that are generated alongside the development phases. Further, this study contributes by presenting an alternative perspective to digital business ecosystem development as prior studies have largely focused on e-business, fintech, entrepreneurship and business ecosystems. Although the importance of digital platform has been acknowledged in the literature, our study is arguably the first to highlight this from the context of a public sector dominated digital business ecosystem.

In terms of practical contributions, this study offers some salient insights. First, the framework outlined in this study offers a practical guide to other public-sector organisations thinking of venturing into the development of digital business ecosystems. Second, this study contributes by pointing practitioners to possible benefits they could derive from the development of digital business ecosystems. This finding is pivotal to project planning stages of digital business ecosystem development. The limitations of this paper are as follows. First, the paper is limited by the use of single case study. Last, the paper is limited by the sole use of a public sector digital business ecosystems. Future studies may consider using multiple case study from both private and public sector digital business ecosystems. In addition, future studies may explore self-organising and co-evolution processes in the development of digital businesses ecosystems.

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