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Role of Governance in e-Business IS Designs and their Evaluations

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Full research paper

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Abstract

The role of governance is undervalued in e-business information system design and development. The transparency, integrity and ethical values are disregarded while articulating e-business artefacts in different organisations. E-Governance can affect e-business growth, including motivations for technology development, compromising the product and service qualities. Corruption, ineffective governance, political instability, flawed regulations, and violation of rules of law, unaccountability are linked attribute dimensions affecting the business alignments, including technology implementations. We need architecture to explore the role of governance indicators in e-business design strategies. The research aims to develop an Information System (IS) architecture with artefacts to connect the governance attribute dimensions with interpreted information management, organisation strategies and e-business needs. Based on empirical research and governance attribute modelling done for several governments, we infer e-government and e-business objectives are connectable and accomplishable through successful implementation of IS framework in business environments through improved governance and transparency.

Keywords: Governance, e-Business, Design Science, Business IS, Multidimensional Modelling

1   Introduction

Managers often envisage orderly use and reuse of resources in organisations for achieving the business goals and objectives. Effective use of informatics tools can keep the organisation and business process move forward in the right direction (Liang and Zheng 2017). The meta-knowledge in business environments can ease implementation challenges, motivate strategic decision support systems, and stimulate investment opportunities in industry contexts (Nimmagadda 2015). In addition, IS governance depends on organisational governance indicators and their attribute strengths. Madon (2005); Sharma and Pokharel (2016) measure governance indicators' to realistically support and regulate the effective use and reuse of IS resources within an organisation. The research aims to examine governance indicators to stimulate IS implementations and offer transparent, fair public services. We have considered various governance indicators as multidimensional for designing and developing the information system articulations in industry situations and aligning business needs and demands. In the current empirical research, we consider only "estimates" for all governance indicator attributes, interpreted as dimensions with their factual instances. In addition, the Economic Fitness (EF) is a primary measure of a country considered to cognize the diversification, ability to produce complex goods on a globally competitive basis and connect periodically and geographically varying governance indicators. The worldwide Corruption Perception Index (CPI 2016) is analysed for discerning the extent of global governance and its indicators in the modelling process, including business-information system management (CPI 2016). Various attributes in information system management, organisation and business strategies are identified to articulate in the modelling process. Before outlining how the governance factors affected the business, information management and organisation strategies, we explore the research gaps through an existing literature survey. We intend to use a Design Science research methodology with various IS articulations that can demonstrate governance needed to align e-businesses in multiple countries.

The research is structured as follows. In Section 2, the relevant research is reviewed with motivation on how the proposed research can bridge the gaps. Section 3 discusses the issues and challenges of artefact designs and their development in e-business alignments. Research objectives and significance are discussed in Section 4. The research methodology and system architecture development are described in Section 5. In Section 6, research findings and analysis are discussed and results and discussions, including contributions and limitations in Section 7. We conclude the research with a future vision in Section 8.

2   Related Work and Motivation

We examine the existing literature to envisage the research gaps. Hadi and Nawafleh (2012) investigate e-governance and e-business scenarios for designing and developing the IS artefacts. Uncertain business environments, unstable governments, political instabilities, governance issues can make the information systems' practice unpredictable (Misra 2010). Information requirements may emerge periodically with business needs for which the information management needs prioritization. Accordingly, IS artefact design and development need attention. Information management is an emergent task, implying that discernment in e-business management can rapidly change the perception of information system designs and their implementations in industry environments (Liang and Zheng, 2017).

Madan (2005) adopts a practical reflexive-interpretative methodological approach, motivating the business growth and reshaping theoretical ideas of governance through empirical data science. Governance has brought out new reforms and policies in developing countries. Marche and McNiven (2009) propose a two-dimensional framework with the dimensions of e-Government versus e-Governance. They analyse the relationships between citizen- and organisation-centric issues and challenges. Hadi and Nawafleh (2012) aim to identify the e-Government project's implementation challenges in developing countries through effective laws and legislation, cultural, political and social factors. Alshehri and Drew (2010) review previous research work on e-government with advantages, including barriers of e-Government in different countries. Twizeyimana and Annika (2019) consider a multidimensional framework with various attributes to value the governance and improve the value of e-Government that affected the design and implementation considerations. Singh and Sharma (2009) focus on various e-government initiatives in India and China. The study aims at finding user perception to the level of satisfaction from the e-filling project in Indian companies with implications in Indian contexts. Liang and Zheng (2017) have done a multilevel analysis for 28000 respondents across 32 European countries regarding the supply and demand of e-government services with performance satisfaction correlations with e-service and e-participation. Tripathi and Parihar (2011) aim at studying

government online services of various businesses through e-Governance, with the significance of cloud computing with cost savings. Service-oriented architectures are analysed to investigate cloud computing services and applications concerning e-government management. Smitha et al. (2012) emphasize the significance of e-governance in ICT application development. The article discusses a survey on cloud-based e-governance systems that motivated us to develop a framework in the current research.

Angeletou et al. (2006) describe a case study on e-education and e-business, how educational book publishing organisation can improve its business growth through the electronic system with promptbook production and distribution. We propose a system architecture that can integrate the activities and services of various business entities online. Sanchez et al. (2003) discuss the e-government barriers in the context of IT services and their implementations. Misra (2010); Sharma and Pokharel (2016) analyse case studies to describe how IT strategies can connect and integrate government services with the benefits of digital transformation. Ramachandran (2007) interprets interrelationships between business ethics and corporate governance, portraying how transparency is managed in e-businesses. Various strategic challenges of information management and their effects in corrupt institutions, legal, media, and political establishments are discussed in Khan and Krishnan (2018). They discuss the causative effects of corruptive practices in e-business and governance in terms of measurable market competence, qualities of IS designs, managerial decision-making processes. Galliers and Leidner (2003) present complex and interrelated issues associated with management information systems, emphasizing that without an appropriate IS strategy, the achievements of IS in any organisation and business establishment are certain to be failures. They analyse information needs, information technology, information management, including change management strategies in different business and organisational contexts. Subasinghage et al. (2013) provide new theoretical insights on information systems development, outsourcing services between clients and vendors, addressing the challenges of information managerial strategies with guided IS theories. In our research, e-governance is considered as an attribute dimension in the dimensional artefact designs. The strategic information that controls the e-business strategies needs attention. Fettke et al. (2010); Kannabiran and Srinivasan (2011) examine the application of information systems and their tactical design considerations in e-business contexts. The authors in their research analyse the IS value with improved IS planning procedures that motivate us to build contextual e-business analytics. Pant and Ravichandran (2001) describe a framework for information system development for e-business formulations. The authors explore computer applications with the influence of intra-and inter-firm processes in systems integration. Information systems with improved information architectures can guide researchers for ethical businesses, and their growth is analysed with tactical e-business modelling. The e-governance that can add value to information architecture designs and how the government can help implement the information system is discussed. Ola El-Telbany and Elragal (2014) discuss issues associated with collaborating different information systems in organisational congruence. They focus on the complexity of businesses and the need for e-business alignments through diverse systems. The manner governance process can influence or modulate digital transformation in businesses in a sustainable manner is described in Smith et al. (2005). They add a couple of dimensions to integrate with governance regime for smooth business transformation.

In addition, we examine the quality of service as an added dimension in the e-governance and e-business articulations and their applications. Gacenga (2013) emphasizes shifting from a technology focus to service while managing the IS standards. IT service management and its measurable performance are discussed within an adaptable framework, making operational mechanisms effective with constraints. Further, we believe that high-performance computing (HPC), data analytics, and visualisation have roles in e-business designs and implementations. Han and Cercone (2000) discuss the data visualisation and analytics challenges for envisaging the associativity between attribute dimensions. Guo and Mennis (2009) review the existing technologies relevant to several common spatial data-mining tasks, including spatial classification and prediction, spatial association rule mining, spatial cluster analysis, and geo-visualisation. The authors in their research provide new theoretical and practical insights into spatial data mining with the challenges of disseminating spatial science information and knowledge discovery. Kandogan (2001) uses interactive visualisations as effective tools in mining business data to support the decision-making process and business growth. They describe digital geographic coordinates for discovering hierarchical clusters with analysis of multiple factors, interpreting new insights in real-time datasets. Winter and Strauch (2003) provide information requirement needs and analysis in conventional information systems and data warehouse system-scenarios. They identify service sectors to analyse information requirements and priorities. In the current research, we explore the opportunities of holistic data modelling in e-clouds-guided data warehousing, visualisation and interpretation artefacts to investigate the governance indicators and

their role in e-business development. New cloud-based e-governance is analysed with cloud computing services observed between business and government organisations. The attributes of reduced costs, distributed data storage, managing security, scalability, accountability, and modifiability are the attribute dimensions that are collaborated in the modelling process.

The literature survey suggests the governance indicator dimensions have not been fully exploited to analyse IS designs and implementations. The connectivity between e-business mechanisms is achievable through the manifestation of e-governance processes. The e-governance and its indicators that influenced the IS design practice and information-based decision-making strategies are yet to be tested and validated. Organisation and business establishments have not exploited how e-governance affected the makeup of information system development. Though the previous researchers describe improvements in IS planning in e-business contexts, the governance indicators that affected e-business IS practices have not been reflected in data modelling approaches. The literature does not explain how systems can align electronic businesses while manifesting e-governance strategies and their commitments for e-businesses and their growth. We emphasize our research on how e-governance indicators could influence the digital transformation to take the e-business development process to the next sustainable level. The introduction motivates us to draw the purpose of research and its need in e-governance and e-business contexts.

3   Issues and Challenges

For growth and profitability in e-businesses, we need innovative IS artefacts and renovation of existing Information System (IS) artefacts while absorbing the internal and external influences, including design implementation constraints. The corruption in political, legal, economic institutions causes great concern for the fair and honest conduct of e-businesses (Pant and Ravichandran 2001). The recent trends in electronic businesses suggest a great deal of digital automation and transformation required at the economic front and on ease of supply and demand for online products and services. High valued customers seek improved e-governance attributes in government organisation contexts. Besides, increased competition can lead to the emergence and enhancement of supplier connections in the digital world, making online markets mandatory and ethical, social networks to redefine the businesses and their interactive boundaries. New business models are in great demand but surrounded by challenging online firms with unfair and non-transparent activities forcing them to redefine and fine-tune the existing business models to changed management. In addition, the recent trends in digital ecosystems and technologies motivate governments to participate in online activities in support of public policies with improved methods of governance. A novel research framework with innovative data models, rule mining, visualisation and interpretation artefacts appears in a growing demand for managing e-business challenges (Hadi and Nawafleh 2012). The influence of governance indicators on IS design and information-based decision-making has not been explored. So far, it is not clear how governance indicators can help analyse the requirements of e-business practice and its research in designing the artefacts. However, whether governance-indicator attribute dimensions can provide values to IS designs and e-businesses is not clear. Whether the governance needs must match within information architecture-development requirements is not made explicit in the existing literature.

4   Research Objectives and Significance

Based on the literature review and motivation, we aim at developing innovative methodologies to resolve issues associated with governance for e-businesses. We propose new IS artefacts to add values in e-businesses in new knowledge domains. The effectiveness of various artefacts is examined to match with objectives of information, organisation and government strategies in establishments located in different geographic contexts. We intend to report governance characteristics in various countries that do not fully comply with permissible e-Businesses. We demonstrate how IS articulations affected the development process, and motivational challenges, including the conduct of ethical businesses, are discussed. Based on empirical factual instances, we build IS articulations with quantitative and observational analysis of country-based governance indicator attributes.

The existing literature identifies the research gaps to frame research questions and objectives. We then describe a methodology to solve research questions and achieve the research objectives. As per Design Science research, we develop a framework as discussed in Section 5. The topic is "governance or e-governance" and how it affects the IS artefact designs, and their evaluations in various governmental organisations and countries are described. The study aims to equip countries and their governments with a governance development index in the form of online services that match with telecommunication infrastructure and human capital indices. We propose to model IS articulations, analyse various multidimensional governance indicator attributes through an integrated framework, and analyse its

metadata views. The research objectives are formulated to figure out the connectivity between IS artefacts and governance indicators to achieve multiple tasks. E-business information system development depends on how governance indicators are collaborated within IS framework articulations with favourable e-business implementations. Based on the introduction and literature review, we have designed the following research questions:

1 How do the dimensions of governance indicators usable in IS articulation development. Having used, how do we build a conceptual framework with multidimensional IS artefacts?
2 How do we implement framework articulations to connect governance with e-business scenarios?

The research objectives are made interconnected to make the research claim more holistic. Research objectives are (1) Identify and describe governance indicator dimensions for developing IS articulations within a conceptual framework that can characterize a multidimensional repository (2) Evaluate the framework and its linked artefacts towards governance strategies that can make up successful e-businesses. Despite the immense potential of e-governance application, the e-government initiatives may not succeed in business and government establishments without critical knowledge and interpretation. We envisage e-governance as a composite attribute that can accommodate artefact designs involving e-businesses and linked supply chain operations. As per Research Objective 1, we identify various attribute dimensions, their fact instances associated with governance indicators and examine their link with knowledge-based business and organisation modelling process (Sharma and Pokharel 2016; Winter and Strauch 2003). The significance of the research lies with the fact of undertaking fair, honest and ethical businesses and their alignments, where their data have no boundaries and ambiguities. The existence of many secondary data sources attributed to governance and business issues has motivated us to undertake new IS designs and develop and evaluate their practical implementations in different countries.

Governance is an attribute for each country to pursue in the modelling process and carry out e-Business with honesty, fairness and ethics. The governance between entities is demonstrated through framework modelling development by means of schemas and ontology descriptions that make connectivity between multiple attributes, in particular between countries under investigation. Governance indicators published by the UN are secondary data sources used in the modelling process. Nowadays, many countries, including private organisations, offer government services online, for which e-governance and digital governance are demanding. The concept of e-governance is developed to provide fair, transparent and reliable services online. For offering government services online, we need to investigate control corruption, government effectiveness and political stability, ensuring the governance structures and processes match with public services and products. In addition, e-governance emerges with various governments' combined use of information and communication technology through online tools. The purpose of e-governance is to facilitate government services, exchange of information, communication of transactions, including integration of multiple digital ecosystems and services. Electronic business or e-business is conducted with similar e-governance concepts, but the focus is online trade with commercial transactions, meeting customer supply and demand services. In contrast, e-governance in a government organisation is meant to focus on offering online public services.

5   Research Methodology and System Architecture

Vaishnavi and Uechler (2015) propose a cutting-edge design science research methodology for creating IS artefacts in Information and Communication Technology (ICT) fields. We aim to describe a narrative balancing the design research theory and system development in the present contextual applications. We extend similar design strategies in the e-business development contexts. Design of IS articulations in the current application strategizes to collaborate the governance indicator attributes with e-business and e-government approaches. The research is based on empirical secondary data analysis to validate different artefacts in e-business contexts. In addition, the method describes the artefact design and its science to explore governance data, comprehend digital governance in e-businesses and arrive at implementable metadata solutions in various governmental institutions. The metadata structures with meta-knowledge of e-governance are deliverables of the research study. Besides, IS governance ensures effective use of indicators in IS artefact designs and business contexts, ascertaining governmental organisations' information value and accountability (Ramachandran 2007). However, the governance indicators described in the literature for different countries and their governments may constrain the effective use of IT resources and their control in various operational units (Sharma and Pokharel 2016).

As per design-science research approach, several constructs and models are proposed in the study. We investigate various data attribute dimensions through qualitative research on why and how the science of artefact designs has relevance in the analysis. Besides, we intend to assess how many countries are

involved in e-governance and e-business opportunities and scopes. We have used secondary data sources from WGI (2019) to investigate and describe attribute dimensions in artefact designs and their modelling. As per Research Objective 1, we have described the requirements of attributes and their necessity in the artefact design process. To prepare the organisations and facilitate their businesses electronically, we ensure that IS artefacts match and comply with e-governance and e-business contexts. As described in Figure 1a, a couple of schemas is designed to demonstrate the connectivity between governance indicator facts with linked *measurable* instances. As shown in Figure 1a, two schemas, 1 and 2 are construed. Schema 1 represents governance measure attributes, estimate, source number, percentile rank ID, lower bound percentile rank ID, upper bound percentile rank ID, and error ID attribute dimensions with their factual instances. They represent governance-measure fact instance ID as well. One-to-many and many-to-many relationships are interpreted between different dimension and fact instance tables. As per Research Objective 1, we articulate the integrated framework with various IS artefacts that guide and manage governance and business enactments. The domain- and data-modelling, schema selection, data warehousing and mining, visualisation and interpretation, all are made operational in a single canvass (Nimmagadda 2015). We present typical schemas 1 and 2 that depict the spatial-temporal attribute dimensions, as in Figure 1a, to connect with various other schemas, as demonstrated in Figure 1b. The data relationships between attribute dimensions in multiple domains classify schemas with common attributes and instances, forming associations between governance-related data structures in repository systems (Figure 1b). Design science research approach with various artefacts needed to develop the research approach is construed in Figure 1. A couple of schemas chosen in Figure 1 explains the connectivity process between various governance systems, interpretable in cloud computing systems.
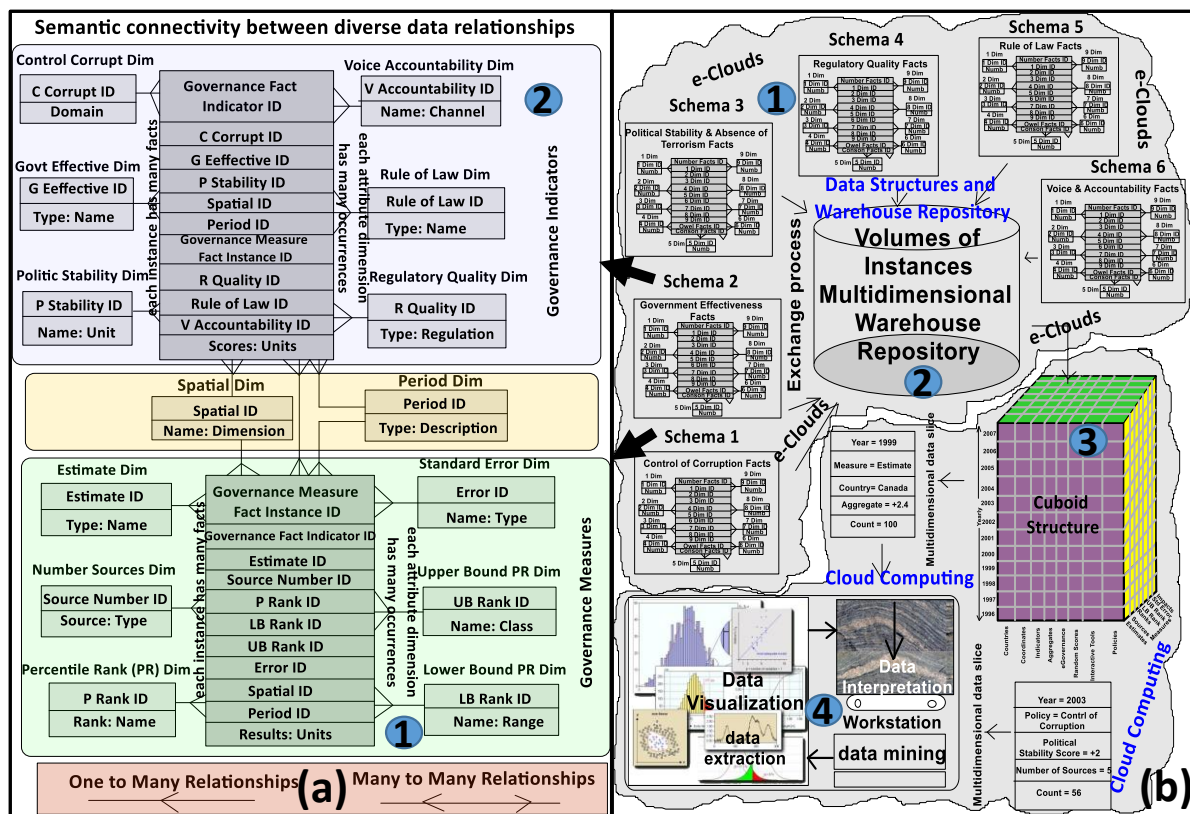

Figure 1: IS articulations (a) Ontology based star-schemas for connecting various governance attribute dimensions (b) a framework used in e-Business Information System (Research Objective 1)

As described in Figure 1b, itemized numbers 1, 2, 3 and 4 illustrate various artefacts of how the data are acquired from e-Clouds storage systems, software applications and software development platforms. Various schemas (itemized as 1, 2, 3, 4, 5 and 6 in Figure 1b) are articulated to facilitate the data integration process in multiple e-Clouds. 1- describes six schemas construed from multiple domains of e-governance and e-businesses. 2- describes the data warehousing systems in which the schemas are logically connected and physically structured through volumes and varieties of e-governance data instances. 3- is a cuboid data structure from which various data slices are extracted. 4-describes data mining (processing), visualisation and interpretation stages needed to process and interpret the

metadata. In each schema, several attribute dimensions and tables are described to connect with their respective fact tables. Both schemas are, in turn, inter-connectable with spatial-temporal attribute dimensions to link the global governance indexes and their spatial coordinate data. Metadata is created through e-clouds and cloud computing procedures, as demonstrated in Figure 1b. The data views extracted from metadata are analysed for new meta-knowledge. We present the findings of the interpretation of metadata views in the following sections.

6   Research Findings and Analysis

As per Research Objective 1, we report the principal outcomes of the research project and communicate research findings, providing solutions for e-businesses that fulfil the governance criteria. Data instances considered in the interpretation and analysis vary in geographic dimensions and diverse domains. Interoperability is achievable through judicious implementation of IS articulations in diverse contexts. Since the data sources are spatial-temporal, understanding the connectivity phenomena between IS, government and organisation strategies is challenging. Various aspects of data relationships, such as the degree of relationships, roles of entities or attributes dimensions participating in the relationships, architectural features affected by mapping constraints, are considered to support the modelling development process. The integrated framework, articulated with IS articulations in e-Cloud scenarios, provides a logical metadata structure with evaluable meta-knowledge. The integrated framework successfully explores the connections among different domains in geographic contexts and system articulations. The basic designs are the same in multiple environments; in spite of that, the e-governance data vary in different geographic locations and time-periods. The framework (Figure 1b) adds more commercial values since multiple domains manifest organisation and government interests, where and how much to invest in achieving the e-governance objectives. Besides, interpretation is both qualitative and quantitative, using empirical instances of governance indicators. Through bubble and map visualisations, the narrative explains how governance varies in spatial dimensions, meaning thereby how each country can equip for e-business opportunities.
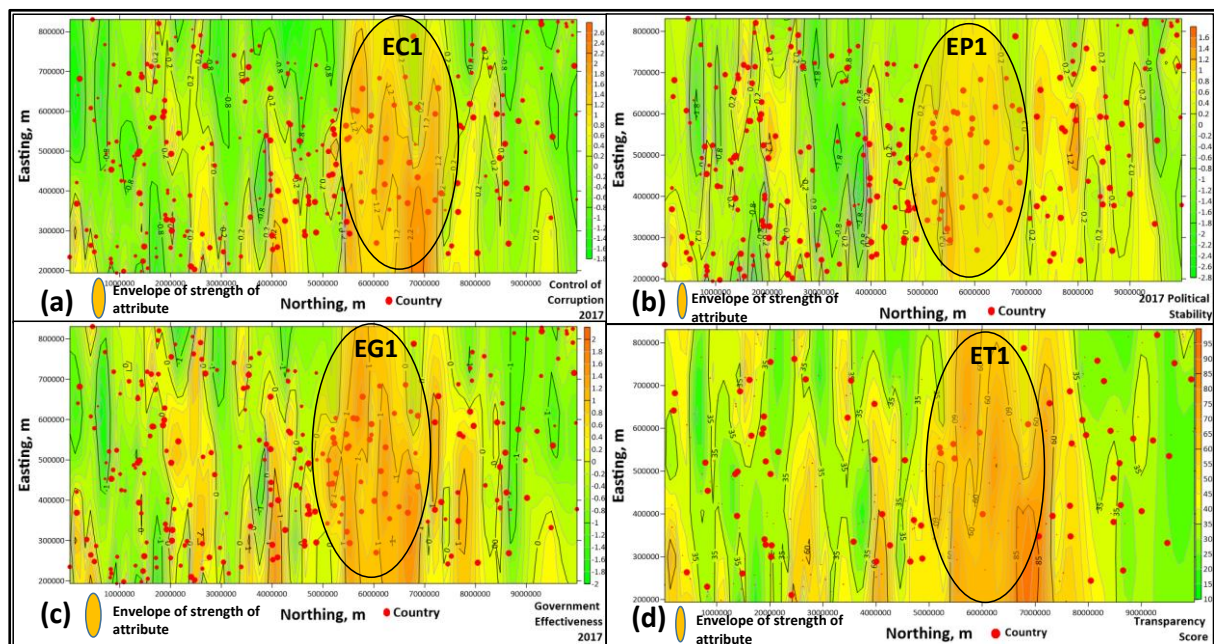

Figure 2: Spatial visualisation of (a) control of corruption (b) government effectiveness (c) political stability (d) transparency score attributes (Research Objective 2)

We have done the countrywide governance analysis to assess for new e-business opportunities. We intend to create the scope of governance for e-businesses and online governmental organisations. We have presented various maps achieved from governance attribute-journey mapping and modelling, describing the features and insights of maps in spatial dimensions. The data analysis is crucial in ascertaining e-Governance research. It involves the interpretation of e-governance indicator data acquired through e-Clouds. The logical schemas are constructed to determine data patterns and relationships between e-Businesses and e-Governance features. Various storage and software applications are utilized to connect governance indicators and business scenarios in various country scenarios. The economic effectiveness indices, as business growth indicators, are used to connect with

governance indicators. We identify qualitative associations and document their geographic and periodic connections for various countries. The rankings of transparency score and economic fitness attributes are assessable to discover how many diverse geographic attribute dimensions can make e-business strategies effective and quantitative. Various map views presented in Figure 2 with spatial visualisation depict strengths of control of corruption, government effectiveness, political stability and transparency score attributes for different countries. The metadata views are interpreted for meta-knowledge. EP, ET, EC and EG are attribute envelopes with "yellow" color highlighted, providing stronger attributes, and green envelopes indicate areas of lesser attribute strengths.
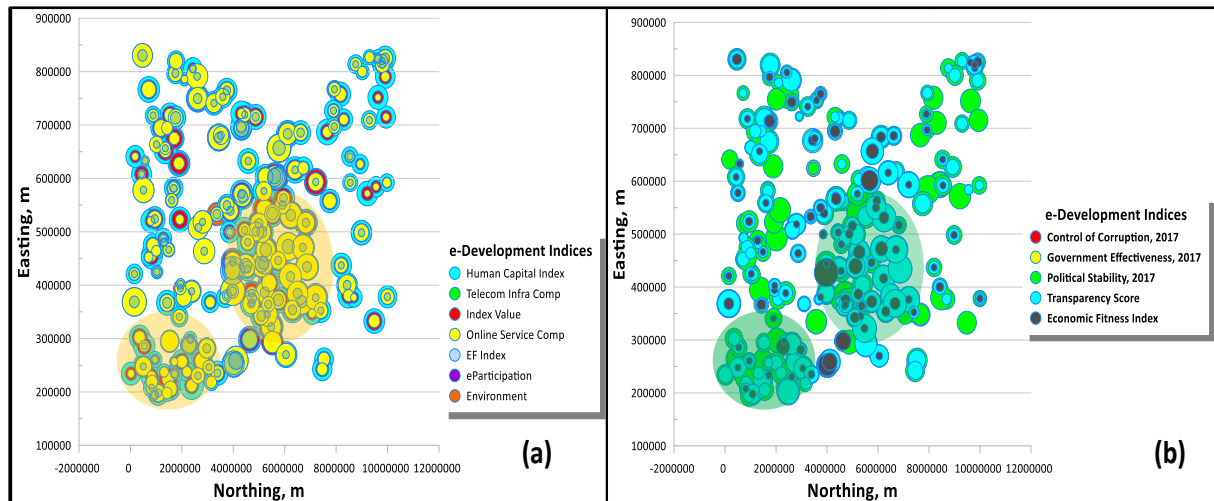

Figure 3: Bubble Plot Views (a) e-Development Indices (b) e-Government Indices

As per the northing and easting coordinates of the governance data presented in map and bubble plot views in Figures 2 and 3, the *political stability* attribute instances are chaotic in all countries for all periods. We aim to examine the e-development indices and their connectivity in bubble plot views in Figure 3, with a purpose to analyse how effectively the e-governance and e-businesses are connectable among multiple countries within the integrated framework (Figures 3a and 3b). The attribute instances are plotted with the motto of spatial visualisation of the online service, human capital, IT services, e-participation, and economic fitness, including control of corruption, government effectiveness, political stability and transparency scores. The "Pacific-America-Europe", "India-South Africa" and "Asia-Russia-Africa" generate three distinct categories, as observed in the bubble plot visualisation-envelopes in Figure 3a. The governance attributes and their strengths have measurable instances at different periodic times, and definitely, the IS implementations in these countries are successful (Transparency International 2016) as per connectable bubbles in the envelopes. In particular, North Africa and Middle East regions are affected compared with European, Australian, and New Zealand nations. The wealthiest countries exhibit good governance indicators where an opportunity exists for improved e-governance and e-business opportunities through successful IS implementations. Countries with the highest levels of EF suggest (Figure 3b) the creation of a diverse portfolio of products and services with great capability. They can promote their products and services with increasing multifaceted knowledge that predicts more online activity with long-term growth. A competitive stance is attainable relative to other countries in terms of e-businesses. Countries with low EF levels tend to suffer more from poverty, low attainment, less predictable growth, low value-addition, and trouble in upgrading and diversifying faster products or services than other countries. Implementing e-businesses in such governments is challenging. In such contexts, the IS articulations and their implementations are sure failures.

7   Results and Discussions

As per Research Objective 2, the IS artefacts and their implementations analysed, ascertain their efficacy in the current research contexts. In another example, elections held in each country demonstrate the indicator of the democratic process. In many countries, elections are organized through voting systems, but they go through corrupt practices at times. As a result, information systems and their implementations end up in failure. Voters often complain about the information systems and rigging of voting systems. In such scenarios, the methodological framework described in Figure 1 can facilitate the democratic process, besides strengthening *the control of corruption* and *effective government* attributes.

7.1 Practical Implications, Contribution and Benefits of the Research

Distinct benefits are achievable through internal operations by offering quality public services and establishing electronic services. Delivering quality public services reduced waiting times, raising transparency, reinforcing equalities, and smoothening the organisations' overall operations are other value-added attributes of the prospering economies.
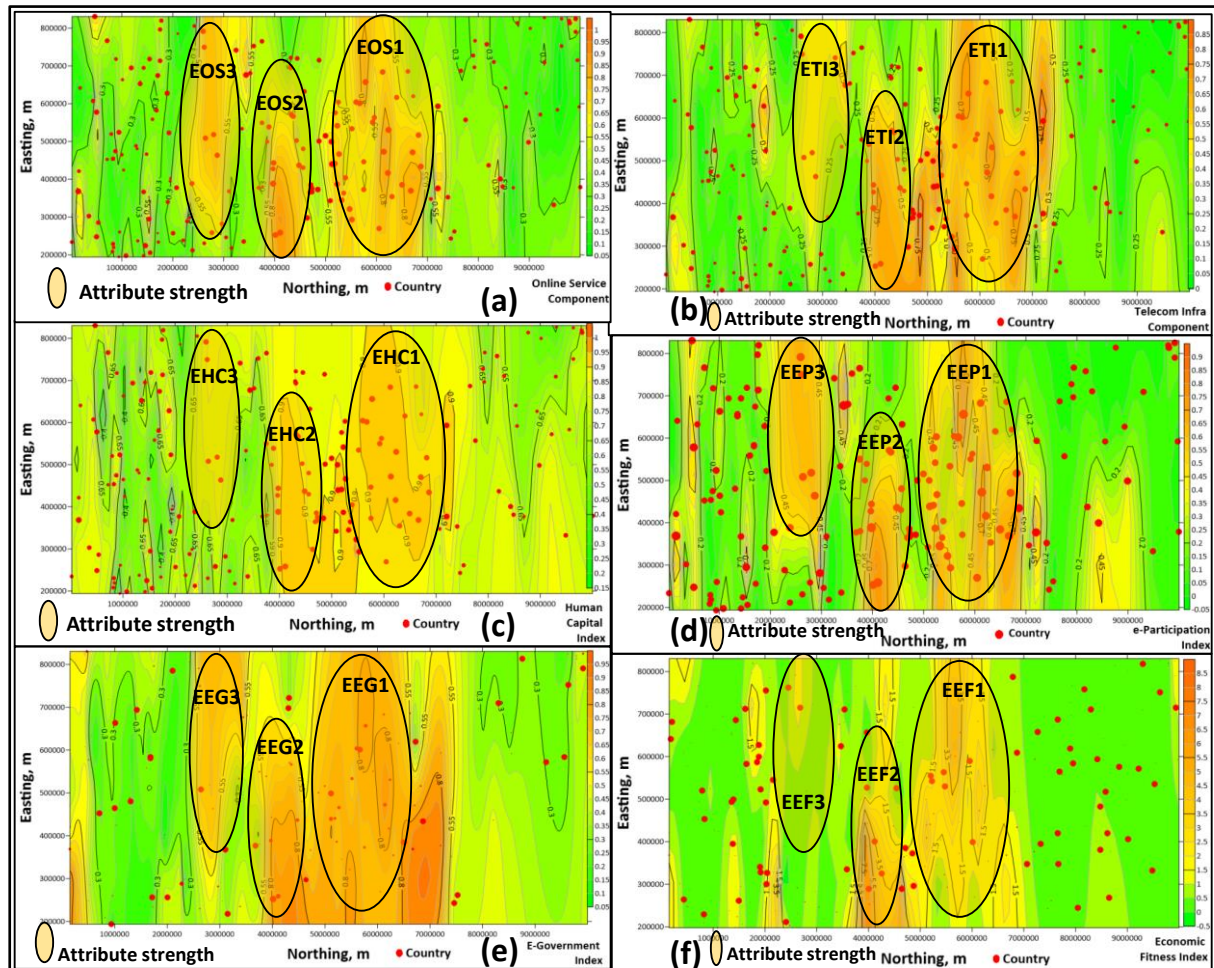

Figure 4: Map Views of e-governance and e-business (a) Online Service Index (b) ICT Index (c) Human Capital Index (d) e-Participation Index (e) e-government Index (f) Economic Fitness Index (spatial visualisation)

The data views drawn from semantically structured metadata are interpreted for knowledge discovery, as presented in Figures 3a-3b. As visualised in Figure 3a, we have shown the metadata views in various bubble plot views using graphic solutions. The *control of corruption* attribute is plotted for different countries. Bubble size and its orientation determine the strength of the attribute instances in different spatial-temporal alignments. We find a couple of distinct trends and patterns of bubbles for Pacific-America-Europe and Asia-Russia-Africa regions. The trends show significant periodic estimates of *control of corruption* and *government effectiveness* attributes (Figures 3a and 3b). The *control of corruption* is phenomenal for Pacific nations, including the USA and European countries, with strong positive e-development instances and estimates. Asian, Russia and African countries exhibit challenging tasks of e-business implementations because of governance issues negative *control of corruption estimates*. The electronic government delivers additional cost savings, improved communications, and coordination with increased government accountability. The e-governance development indices are stronger in European contexts, inferring that *control of corruption* and *effective government* attributes are achievable with necessary measures during the implementation of IS articulations (Figures 1a and 1b). They faultlessly match with attributes of countries that adopted the e-governance and linked e-businesses, which ultimately became a successful business story. Various map views are computed to present spatial variations in Figure 4 and assess online services, human

capital, technology services, e-government, e-participation, connecting them with economic fitness as an e-business attribute. We have chosen to interpret various attribute strength envelopes to analyse the connectivity between various e-development indices. EO, ET, EH, EEP, EEG, and EEF are different amplitude lobes or envelopes interpreted, explaining the match between e-Development attributes in spatial dimensions (Figures 2 and 4). The acronyms describe amplitude *envelopes* signifying control of corruption, government effectiveness, political stability and transparency attribute dimensions.

7.2   Contribution and Limitations

The connectivity is explainable between attributes within various e-government and e-business ecosystems to adjudge the artefact designs and implementations. Applications that determine a future e-business path are based on analysis of changed e-governance. The analysis justifies the unified methodology with integrated innovative IS articulations to contribute to digital e-business solutions. The findings are descriptive, and for complex analysis, multivariate regressions are suggested to investigate attribute strengths envisaged in Figures 2-4. We have managed many factual instances in data analytics, reconciling the data qualities and accuracy in the data models. The data analysis ensures implementation of quantitative and qualitative analysis of cuboid metadata for visualisation and interpretation.

8   Conclusions and Outlook

The research outcomes deduced from governance metadata infer to conclude with quantitative and qualitative descriptions. The e-governance indicators are regarded as attribute dimensions, based on which the IS artefacts made, to connect and align in a way the government and business establishments can cherish as pathways to ethics online business advantages. In addition to achieving control of corruption, government effectiveness, transparency and fit-economics, innovative IS articulations facilitate online businesses and governments worldwide. The governance indicators facilitate the development of infrastructure associated with e-governments and their related e-businesses. We have made good use of multidimensional IS articulations that accommodated multiple dimensions in diverse domains. The influence of governance indicators in e-governance and e-businesses is explicit in our empirical research analysis. The data modelling and integrated framework discussed in the article are successfully implemented to achieve the e-governance and e-businesses objectives. The data analytics, visualisation and interpretation provide new insights on IS framework and its implementation in e-governance and e-businesses for different countries. The methodologies have a further scope of implementing and analysing individual member countries of the United Nations (UN) and assess their governance, transparency and economic fit attributes for viable e-business solutions.

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