

# Factors of a Successful Information System Value Chain in Public Sector

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## Abstract

With an increased focus on sound financial management, public sector organisations invest extensively in the systems that direct decision-making activities. To maintain sound financial management practices, public sector organisations rely on the information from the systems in operation for decision-making activities. Information systems (IS), like value chains (VC), aim to create value in the form of information through a series of activities. To support their decision-making activities, public sector organisations invest extensively in successful IS VCs. This paper explores and articulates the attributes and CSFs of a successful IS VC in the public sector of a developing nation. The study was undertaken as a case in a public sector organization and through 20 qualitative interviews. The research study found that successful IS VCs in public sector organisations should consist of 15 attributes and should realise the seven critical success factors confirmed by the participants in the research study. Regarding attributes, three themes emerged: infrastructure, operational, and usability. The infrastructure theme consists of the attributes, namely hardware, software, and telecommunications network. The operational theme consists of four attributes, namely data, people, process, and information. The usability theme consists of seven attributes, namely reliability, relevance, accuracy, completeness, correctness, accessibility, and timeliness. Regarding critical success factors, two themes emerged: value contributors and success measures. The value contributor theme consists of the CSFs of VC quality and overall value. The success measure theme consists of the CSFs, namely IS quality, information quality, service quality, holistic benefit, and user satisfaction. The findings were articulated into a framework that aims to facilitate the design and implementation of IS VCs. The framework is a guideline to understand the intricacies of public sector IS VCs to address perennial issues such as the lack of service delivery and financial mismanagement.

**Keywords:** information system; value chain; information system attributes, critical success factors; financial management; decision making

## 1. Introduction

Organisational innovation hinges on identifying opportunities and issues in the business model and processes. An improved business model and process drives strategic intent and allows an organisation to realise the benefits of innovation initiatives. A perennial tool enabling innovative business models and processes is technology. Technology enables improved decision-making and supports innovative strategic intent. Good decision-making is driven by quality information provided through technological solutions. As defined by Ronald Reagan, *information is the oxygen of the modern age* (Lee, 2015, p. 135). Fundamentally, organisations globally invest extensively in the systems that produce information (Purwita & Subriadi, 2019). As such, information system (ISs) actions are intended to harvest value to direct decision-making activities (Rosenblatt, 2014). However, technology implementation is different across all industries and sectors. Implementing technology in the public sector is particularly challenging, given the various socio-economic and socio-political elements at play. Moreover, the effectiveness of the public sector in developing economies is often questioned, with citizens decrying the lack of service delivery of fundamental human rights and amenities.

In developing countries, the public sector provides social services and economic functions (Fourie & Burger, 2019). In South Africa, the public sector form's part of the monetary system divided into three spheres, namely, national, local, and provincial government (Thornhill, 2011). The three spheres manage public services, infrastructure development services, and ensure sound financial management practices, to name just a few (Fourie & Poggenpoel, 2017). The provincial sphere is particularly important as it is accountable for public service, commercial administration, administration and financial management, and governance functions (South African Government, 2021b). The provincial government ensures that infrastructure investment initiatives, economic planning and development, and sound financial management and governance are achieved through departments such as the department of economic development and the provincial treasury (Gauteng Provincial Government, 2022). Consequently, for the provincial government, decision-making activities towards sound practices are dependent on information that exist across multiple data points.

The value chain (VC) lens arguably provides a holistic view of the flow of information within a public

sector IS. An IS VC comprises interrelated events, actions, and activities that operate as a circular system for the of valuable and actionable information (Rosenblatt, 2014). The IS VC actions allows for unprocessed data to be gathered, transformed, saved, secured, and shared in organisations (Valacich & Schneider, 2018). It follows that IS VCs comprises several factors that must be present to produce the output needed for decision-making activities. These factors directly influence IS VCs and comprise attributes and critical success factors (CSFs) that must be present for the systems to be perceived as successful. Deprived of any significant attributes and CSFs, the systems intended to produce value may be professed as insignificant with public sector decision-making activities being affected.

The public sector is no different and invests extensively in IS VCs for the required information needed to direct decision-making activities (Alipour et al., 2017). The factors of successful IS VCs in the public sector are essential for important managerial actions at strategic and operational financial levels. These IS VCs are significant and produce the required information that directs important financial decision-making activities across all levels. The landscape of the public sector's ISs demand all attributes and CSFs in the sector VCs to function as a unit in pursuit of its joint goals. These are the mandatory factors that serve as the minimum requirements to accept input and produce the output required successfully to direct financial decision-making activities. Multiple influencing factors have a direct effect on the successes of the IS VCs. These are the attributes and CSFs that influence the provincial government's capacity to manage data and information according to a standard that is suitable to direct financial decision-making activities (Soley & Pandya, 2003).

The existing body of knowledge on successful IS VCs is largely applicable to the private sector. The uniqueness of the public sector necessitated the need to identify the attributes and CSFs specific to the public sector and to confirm their influence on successful IS VCs for the sector. The research study sought to identify and confirm the factors that include the attributes and CSFs of successful IS VCs in the public sector. Furthermore, it is imperative to explore the developing nation perspective as the socio-economic and socio-political elements differ from developed nations thus influencing the implementation and realization of an IS VC. Specifically, the provincial level of a developing nation's public sector is underrepresented in the existing body of knowledge. This research paper aims to explore and articulate the attributes and CSFs of a successful information systems value chain in the public sector of a developing nation. The following research questions are subsequently posed:

- (i) What are the attributes of a successful information systems value chain in the public sector?
- (ii) What are the critical success factors of a successful information systems value chain in the public sector?

The research contribution of this paper is argued from multiple perspectives. Firstly, the research reveals the attributes and CSFs of an IS VC from a developing nation perspective and provides a new context for South African public sector research. Secondly, the ramifications of the IS VC attributes and CSFs are articulated in a framework that aims to facilitate the correct design and implementation of technological solutions. This will, in turn, drive innovation and decision-making effectiveness within the provincial government sphere. Thirdly, the framework serves as the foundation for enabling quality information delivery across the provincial, local and national public sector spheres. Professionals operating in the public can use the framework as a guideline to understand the intricacies of a public sector IS VC to address perennial issues such as the lack of service delivery and financial mismanagement. Also, academics and future research could apply the framework in other developing nation contexts and enhance the framework to be more comprehensive and robust.

## 2. Literature Review

The IS VCs in operation in the public sector serve as sources that informs decision-making activities (Nilsson et al., 2016). The goal of this research study is to identify, recognize and review the currently available body of knowledge concerning the factors that includes the attributes and CSFs of successful IS VCs in the public sector. Literature was identified and reviewed to identify the concluded studies for successful ISs and the VCs. The significant attributes and CSFs serve as requirements for successful IS VCs in the public sector and these were identified, recognized, revised and deliberated on. Also, the effect of the attributes and CSFs on successful IS VCs were recognized for their significance towards public services, commercial, administration, financial management and governance functions towards outcomes that are beneficial to the citizens of the republic.

### 2.1. The Public Sector

The public sector is a segment of the general economy of a country that consist of public services and their public entities (Parkin et al., 2012). The public sector is the segment of the economic ecosystem that is managed by the local, provincial and national spheres and its entities that might differ significantly between developed and emerging countries. For developed countries, the general definition of the public sector includes government ownership or control rather than minor functions and includes the exercise of public authority or the implementation of public policy (Gersonskaya, 2020).

For an emerging nation like South Africa, the public sector consist of governmental services and civic goods that are accessible from the three spheres of government

(Thornhill, 2011). The sector is a slice of the fiscal system segregated into the local, provincial and national spheres responsible for the management of civic services, sound financial management practices, and governance functions, to name just a few (Simeon & Murray, 2001). Each of the three sphere's responsibilities is outlined in the Constitution and serves as stewards of public resources (Cheruiyot et al., 2019).

The national government is the political authority or government that controls the nation (Christopher Thornhill, 2011). At a minimum, the national government consists of several ministries with the President of the country as the head. The national government prescribes laws, sets policies, and provides services that fall within the national competencies. The national government is divided into three branches, namely, the legislature, the executive, and the judiciary (Munzhezdi, 2016).

The local government consists of municipalities that are mandated to deliver basic services that are used daily, namely, water, sanitation, and electricity, to name just a few (Reddy, 2016). This sphere of government consists of three categories of municipalities namely, metropolitan, district, and local municipalities (Koma, 2016). The goal of the local sphere is to generate revenue through initiatives to maintain, grow and improve local infrastructure and community services (Ndevu & Muller, 2017). The local government may initiate community economic planning efforts intended to build on their official municipal plan intended to influence community growth and may prescribe land use (Meyer & Meyer, 2016).

The provincial government which is the emphasis of this research study is fixed with its structures demarcated in chapter 6 of the Constitution (South African Government, 2021b). All nine provinces have a legislature that consists of members of the provincial legislature led by a Premier. The Premier as the executive head assigns members of the executive council as the political heads for departments (South African Government, 2021c). The sphere is accountable for public service areas such as health, social development, and education, for commercial functions such as agriculture, infrastructure and roads, and for sound financial administration and governance functions which are the responsibility of departments such as the provincial treasury, human settlements, local government, and the provincial legislature, to name just a few (South African Government, 2021b).

As a result, the provincial government depends on information from the IS VCs in operation for decision-making activities. The IS VCs in operation serve as the input for the insights and information required to direct actions, promote and enforce transparency and ensure sound financial management and governance activities in respect of revenue, expenditure, assets, and liabilities (Olivier, 2016). In so doing, provincial departments and entities are required to adhere to relevant laws such as the Constitution, Public Financial Management Act,

Treasury Regulations, prescripts, policies, and procedures (Ramphal, 2017). Explicitly for this research study, a case study was undertaken in a provincial government department that is responsible to oversee sound financial management and governance practices in the province.

## 2.2. Information System Value Chains Role Towards Sound Provincial Financial Management

Financial management is the practice of handling financial resources in a manner that allows for the organisation to be successful in its activities while complying with laws and regulations as prescribed (Khomnich et al., 2016). Sound financial management refers to the various methods and strategies that public sector organisations, individuals, or businesses employ to realize planned outcomes or to accomplish anticipated financial objectives (Nuryanah & Islam, 2015). Thus, sound financial management is the effective allocation and management of financial resources and their efficient and economical spending to the ideal benefit of all stakeholders (Ramphal, 2017).

To ensure that sound financial management practices are maintained, information is required that serve as the input to direct decision-making activities. Information is transformed from raw data and facts with meaning that serves as input for key decision-making activities. For information to serve a need, public sector organisations invest significant resources that, as a unit, become an IS (Stair & Reynolds, 2018). An IS consists of several interrelated factors that, as a circular system, become responsible for the important insights and information that direct decision-making activities in organisations (Coronel & Morris, 2016). They consist of a chain of value-adding processes, technology, and people that gather, create, process, safeguard, save and dispense information to ratify management, control, and communication (Martins et al., 2019).

Similarly, presented by Michael Porter in 1985, the notion VC denotes a group of sturdily related independent actions or activities that an individual, organisation or system perform to translate input into output that hold some value to the user thereof (Jones & George, 2020). A VC is an integrated arrangement that comprises of several interconnected value adding actions that transform input into the valuable output as projected for the set organisational need (Schwalbe, 2014, 2016).

The goal of IS VCs are to support decision-making activities with facts that are grounded on historical conclusions (Valacich & Schneider, 2018). Decision-making activities are the actions taken to direct or achieve a set outcome through facts that are based on historical data (Abahmane & Binkkour, 2008). This includes actions to collect, manage, allocate and spend public resources by public sector organisations within the prescripts of the law to ensure sound financial management practices are maintained.

IS VCs for sound financial management practices support the automation and integration of public financial management processes including budget formulation, execution, accounting, and reporting as stipulated by the laws of the country (Dew & Jian Xiao, 2011). The success of any outcome is dependent on the factors allied with the matter of interest (Ross et al., 2016). The factors associated with IS VCs in this research study refer to the attributes and CSFs that must be present for the system to successfully direct decision-making activities that ensure sound financial management practices.

### 2.2.1. Attributes of a Successful Information System Value Chain

An attribute is a feature that is seen as the inherent characteristic or part of a system (Coronel & Morris, 2016, p. 38). This may be any condition, fact or outcome that directly influences the success of the system (Rosenblatt, 2014). Successful IS VCs for the public sector are primarily assessed according to the IS attributes, VC contributors, and the system's capacity to function as a circular model with bottom-up and top-down abilities for the information required for decision-making activities (Laudon & Laudon, 2016). As a collective, these significantly different attributes become the mandatory features that successful IS VCs in the public sector should possess. Table 1 illustrates the ISs, VC, circular IS VC, and decision-level attributes needed for successful IS VCs in the public sector. Table 1 illustrates the ISs, VC, circular IS VC, and decision-level attributes needed for successful IS VCs in the public sector.

**Table 1. Attributes of a successful information system value chain**

	<b>Attributes</b>	<b>Description</b>	<b>Authors</b>
<b>Information System Attributes</b>	Accessibility	The quality of being able to be reached	Cho et al. (2015)
	Completeness	The state or condition of having all the required or appropriate parts	Georgiadis (2019)
	Correctness	The quality of being free from errors	Bianchi and Trimigno (2019)
	Flexibility	The ability to be easily modifiable	Forsgren et al. (2016)
	Timeliness	The quality of being done at a favourable time	Forsgren et al. (2016)
	Relevance	The quality of being closely connected or appropriate	Bianchi and Trimigno (2019)
	Reliability	The quality of being dependable or of performing consistently well	Forsgren et al. (2016)
	Accuracy	The quality of being correct	Georgiadis (2019)
	Security	The state of being free from threats or danger	Cho et al. (2015)
<b>Value Chain Contributors</b>	Data	The raw facts available in an organisation	Kruse et al. (2016)
	Process	The activities required to transform something	Valacich and Schneider (2018)
	Information	The new data required for decision-making	Coronel and Morris (2016)
<b>Circular Information System Value Chain Attributes</b>	People	The employees within the organisation	Al-Mamary et al. (2014a)
	Hardware	Visible technology used to process data	Rosenblatt (2014)
	Telecommunications networks	The infrastructure used to connect an organisation into a single unit	Valacich and Schneider (2018); Valdar (2017)
	Software	The application used to interact with the hardware	Laudon and Laudon (2016)
	Data	The evident raw facts within the organisation	Rosenblatt (2014)

	Security	The measures employed to safeguard the system	Valacich and Schneider (2018)
<b>Decision-making Levels of Information System Value Chain</b>	Top-down	The ability to disseminate information from the top to the bottom of the organisation	Valacich and Schneider (2018)
	Bottom-up	The ability to disseminate information from the bottom to the top of the organisation with ease	Valacich and Schneider (2018)

As shown in table 1, ISs should be accessible, complete, correct, flexible, timely, relevant, reliable, accurate, and secure (Stair & Reynolds, 2018). The VC contributors should consist of data, the processes to transform the data, and the information needed for decision-making activities (Coronel & Morris, 2016).

Equally, the circular IS VC attributes for successful systems are telecommunications networks, data, hardware, software, people, and security (Laudon & Laudon, 2016). The systems must have top-down and bottom-up abilities (Valacich & Schneider, 2018). Together, these attributes serve as the requirements for the systems accountable to transform data into output in the form of information for decision-making activities toward sound financial management practices.

CSFs are also branded as key results areas, which refer to the elements that are mandatory for organisational achievements and successes (Jahangirian et al., 2017). Successful IS VCs in the public sector are significant capabilities that support the efforts of the sector towards a scenery that directs decision-making activities. Successful IS VCs for the public sector are primarily assessed according to the IS CSFs, VC CSFs, and the public sector CSFs. As a collective, these important CSFs must be realized for IS VCs in the public sector to be successful. This is an important competence that directs the public sector's actions toward sound financial management (Mithas et al., 2011).. Table 2 illustrates the CSFs applicable to ISs VC in the public sector.

### 2.2.2. Critical Success Factors of a Successful Information System Value Chain

**Table 2. Critical Success Factors of a successful information system value chain**

	<b>Critical Success Factors</b>	<b>Description</b>	<b>Authors</b>
<b>Information System</b>	Information quality	The anticipated features of the IS output	Aini et al. (2020)
	IS quality	The anticipated features of ISs	Puspitarini et al. (2018)
	Service quality	The suitable support received by users of the IS	Wei and Loong (2009)
	General usage	The degree to which users utilise the ISs in operation	DeLone and McLean (2016)
	User satisfaction	The users' satisfaction with the ISs	Jeyaraj (2020)
	Holistic benefit	The general value realised from the ISs	Chien and Tsaur (2007)
<b>Value Chain</b>	Value chain quality	The anticipated features of the VC output	Mascarenhas et al. (2004)
	Overall value	The general value realised from the VC	Walters and Lancaster (2000)
	Efficiency	The ability to produce the anticipated output with the least amount of input	Kaplinsky and Morris (2014)

	Effectiveness	The extent to which the VC can produce the anticipated output	Kumar and Rajeev (2016)
<b>Public Sector</b>	Economic growth	Economic growth rate of a country	Fourie and Burger (2019)
	Decent work	Fair work opportunities	Blustein et al. (2019)
	Unemployment reduction	Number of employable individuals without work opportunities	Parkin et al. (2012)

As shown in table 2, VCs in the sector should realize CSFs such as VC quality, overall value, efficiency, and effectiveness (Barber & Barber, 2008). Moreover, the ability of the public sector to create a favorable environment is dependent on the successful IS VCs that are in operation realizing the CSFs associated with the systems. IS VCs will only be deemed successful if the systems include the CSFs specific to the public sector: economic growth, decent work, and unemployment reduction that serve as confirmation of sound financial management practices (Cox & Schleier, 2010). Successful IS VCs in the public sector will only be deemed as such if the systems realize all CSFs that serve as input for the framework.

The IS VCs in operation directs the activities in public sector organisations towards sound financial management practices (Barata & Cain, 2001). The public sector's decision-making activities are directed by successful IS VCs. The public sector will persist with investments in systems that are mandatory for decision-making activities (Alipour et al., 2017). The evident IS VCs in operation will only be deemed successful if the systems comprise all the attributes and realise the CSFs. In so doing, the public sector will enable an environment that is conducive to economic growth, job creation, and poverty reduction based on actions, therefore, serving as confirmation that sound financial management practices are maintained. Figure 1 illustrates the framework that consists of the attributes and CSFs as outlined in tables 1 and 2.

### 2.3. A Framework for Successful System Value Chains for Sound Provincial Financial Management

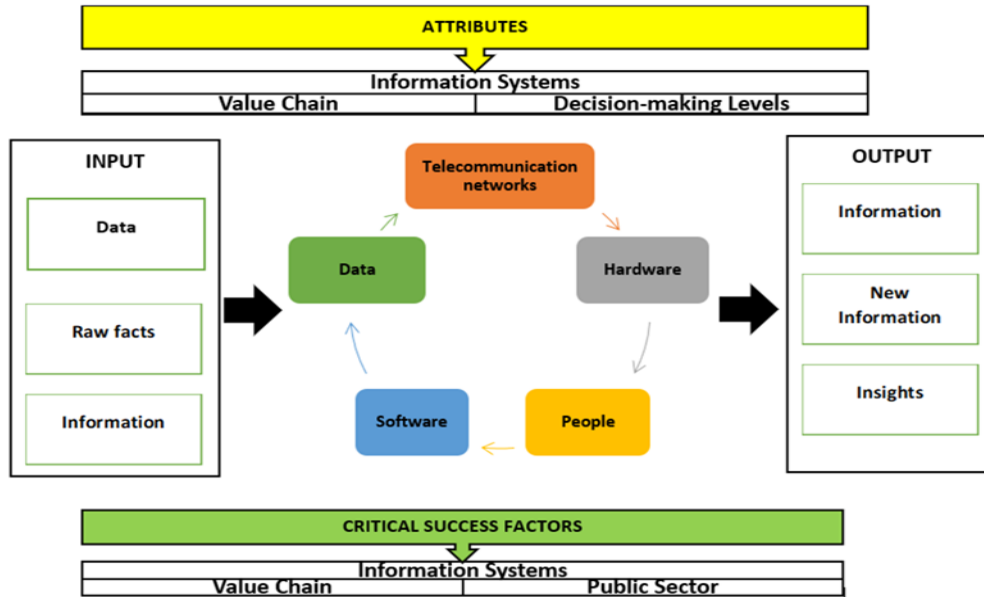


Fig. 1. Framework for a successful information system value chain in the public sector

Figure 1 shows that successful IS VCs in the public sector should resemble a circular model that possess all the attributes and realize the CSFs presented in table 1 and table 2. These serves as the input needed for the

framework towards sound financial management practices ensures that resources are directed and used as intended (Ramphal, 2017). A framework may be a layered

assembly of interrelated elements that stipulates the necessities of achieving an anticipated outcome (Motevali Haghghi & Torabi, 2018). The framework comprises: (i) the circular IS VC, (ii) the mandatory attributes, and (iii) the CSFs that must be present for the systems responsible for providing crucial information for decision-making activities that direct sound financial practices.

### 2.3.1. Success Information System Value Chain Attributes

The framework shows that successful systems should be like a circular IS VC that consists of all the attributes of the first layer (see figure 1). This consists of attributes such as people, hardware, telecommunication networks, software, data, and security (see table 1) (Laudon & Laudon, 2016). This forms the foundation for the systems needed as per the framework. Therefore, serving as the circular model needed for the IS VCs accountable for a setting that is favorable for decision-making activities (Hasan Al-Mamary et al., 2014; Laudon & Laudon, 2016; Rosenblatt, 2014; Valacich & Schneider, 2018; Valdar, 2017).

The framework shows that successful IS VCs should consist of all supplementary attributes that form part of the second layer (see figure 1). This includes attributes associated with the ISs, VCs, and decision-making levels in the public sector. An IS will only be deemed successful if it is accessible, complete, correct, timeous, relevant, reliable, accurate, and secured (see table 1) (Bianchi & Trimigno, 2019; Cho et al., 2015; Forsgren et al., 2016; Georgiadis, 2019). These are the attributes needed for a VC to be successful in producing value for decision-making activities in the public sector (Coronel & Morris, 2016; Kruse et al., 2016; Valacich & Schneider, 2018).

The significant information accessible in the public sector is primarily used for operational and strategic decision-making activities (Abahmane & Binkkour, 2008). The IS VCs will only be deemed successful if it is capable to distribute output from the bottom-up for operational decisions and top-down for strategic decision-making activities. This requires information to be accessible based on the needs associated with operations for short-term planning. Also, for strategic activities, this necessitates for information to be distributed from the top through the various support levels for long-term planning (Valacich & Schneider, 2018). Therefore, serving as the decision levels capabilities needed for decision-making activities as per the evident decision levels (Schwalbe, 2016).

### 2.3.2. Success Information System Value Chain Critical Success Factors

The framework shows that successful IS VCs should realize all the CSFs that form part of the third layer of the framework (see figure 1). This consists of the CSFs associated with ISs, VC, and the public sector for the systems required for decision-making activities (see table 2). An IS will only be deemed successful if information quality, IS quality, service quality, general usage, user satisfaction, and holistic benefits serve as CSFs that are allied with the system. Also, the VCs in the public sector will only be deemed successful if VC quality, overall value, efficiency, and effectiveness are realized. These are the mandatory CSFs that must be realized for the IS VCs to be deemed successful (Jones & George, 2020).

The public sector in South Africa is in the forefront to enable a setting that is favorable for economic growth and unemployment reduction through decent work opportunities while maintaining sound financial management and governance practices. These are the CSFs specific to the public sector that must be realized for the IS VCs to be deemed successful. Consequently, serving as key results areas needed for sustainable economic growth towards unemployment reduction through the creation of decent employment opportunities (Nilsson et al., 2016). Accordingly, the IS VC in the public sector will only be deemed successful if the system resembles the framework for the successful implementation and usage of the systems needed for decision-making activities.

## 3. Research Methodology

Pragmatism focuses on the practical conclusions of our thoughts and doings as an outcome to the research problem that was used for the research study (Cohen et al., 2018). A deductive approach was used to explore the current known theories or phenomena to establish their validity and applicability to this study (Saunders et al., 2012). Yin (2009) acclaims that where predominant literature is used to formulate research questions and objectives, the academic propositions informed it, may be used to formulate a framework. Furthermore, an inductive approach was followed to formulate the new insights needed to express the underlying themes, insights and understanding (Bahari, 2010).

A case study strategy that involves an empirical review of a specific present occurrence in a real-life setting was undertaken (Yin, 2018). A sample of 20 participants was identified (Cohen et al., 2018). The purposive sample approach chosen necessitated the identification of contributors across all levels (Cohen et al., 2018). Through this understanding, findings, conclusions, and recommendations were formulated. Table 3 illustrate the participants for the research study.

**Table 3. Research respondents from public sector organisation**

Position	Level	Years of Experience	Identifier	Duration of Interview
Directors	Strategic	22	PISVC01	00:29:57
Deputy Directors	Operational	14	PISVC02	00:28:45
Deputy Directors	Operational	13	PISVC03	00:29:52
Deputy Directors	Operational	13	PISVC04	00:23:14
Directors	Strategic	15	PISVC05	00:17:38
Chief Directors	Strategic	25	PISVC06	00:29:58
Executive	Strategic	24	PISVC07	00:34:32
Directors	Strategic	31	PISVC08	00:21:21
Practitioners	Operational	16	PISVC09	00:26:45
Deputy Directors	Operational	13	PISVC10	00:26:25
Directors	Strategic	20	PISVC11	00:31:51
Assistant Directors	Operational	6	PISVC12	00:22:22
Directors	Strategic	21	PISVC13	00:26:58
Assistant Directors	Operational	12	PISVC14	00:24:17
Directors	Strategic	21	PISVC15	00:26:47
Chief Directors	Strategic	19	PISVC16	00:23:25
Chief Directors	Strategic	26	PISVC17	00:21:08
Executive	Strategic	20	PISVC18	00:39:09
Directors	Strategic	18	PISVC19	00:29:25
Chief Directors	Strategic	25	PISVC20	00:29:00
	<b>Average years</b>	<b>19</b>	<b>Total</b>	<b>09:02:49</b>

Table 3 shows the actual participants with a 100% participation rate as planned, resulting in over nine hours' worth of data. To ensure that quality was achieved, reflexivity, dependability, confirmability, credibility, and transferability were maintained as follows.

- To maintain reflexivity, the relationship between the researcher and participants did not influence the data collection process and professionalism was maintained (Flynn et al., 2019).
- To maintain dependability, all interviews were transcribed verbatim and edited as per the recordings from the interviews with input only being mapped to a maximum of three attributes or CSFs where applicable (Elliott, 2018; Forero et al., 2018; Mårtensson et al., 2016).
- To maintain confirmability, recordings, transcripts, and thematic data were saved and stored on a password-protected laptop (Johnson et al., 2020).
- To maintain credibility, all insights, findings, recommendations, and conclusions are based on the actual data set saved and stored on a password-protected laptop (Kalu, 2017).

- To maintain transferability, all insights, findings, recommendations, and conclusions will be available and transferrable to similar settings with different participants (Moon et al., 2016).

A test interview was conducted to ensure that the participants and the researcher understood the questions and possible probing questions (Turner III, 2010). Standardization was maintained through the creation of a script for the interviews (Saunders et al., 2012). The research questions and possible probing questions were shared electronically in advance (Alshenqeeti, 2014). After consent was granted, the interviews were recorded and transcribed verbatim (Knox & Burkard, 2009).

To analyze the data, a deductive and inductive research analysis approach was followed (Saunders et al., 2012). Line numbers were included for all transcripts (Richards & Hemphill, 2018). This was followed by a color-coding process to group the responses. Yellow was used for the responses that related to attributes. Bright green was used for the responses that related to CSFs. Turquoise was used for the responses that outlined how these factors affect a successful IS VC in the public sector (Stranges et al., 2014).



A thematic analysis process in line with the qualitative data analysis method was applied (Stranges et al., 2014). The bold data informed by the data coding exercise was copied and placed under the relevant columns. The significant quotes of interest were identified and copied as input of interest in the tables of attributes and CSFs (Saunders et al., 2012).

#### 4. Findings and Discussion

The paper represents the findings, recommendations, and conclusions for a case undertaken in a provincial government department that is responsible to oversee sound financial management and governance practices. This serves as the input for the attributes and CSFs mandatory to formulate the framework that will serve as a benchmark for the successful implementation and usage of IS VCs in the public sector.

#### 4.1. Attributes of Successful System Value Chains for Sound Provincial Financial Management

The term attribute refers to a feature or quality that is seen as an important characteristic or part (Coronel & Morris, 2016). The research study sought to recognize the attributes of successful IS VCs in the public sector organization (table 4). Attributes or CSFs cited by 10 or more participants were categorised as significant and highlighted in green. Those cited by more than five but fewer than 10 participants were categorised as important but not significant for IS VCs in the public sector and highlighted in yellow. Those cited by five or fewer participants were categorised as insignificant and highlighted in red (Akinyode & Khan, 2018). Further detail regarding the attributes and supporting interview data is presented in Appendix A.

**Table 4. Summary of attributes of a successful information system value chain**

	<b>Attributes</b>	<b>Number of Responses</b>	<b>Standard Label</b>
<b>Information System Attributes</b>	Reliability	13	Significant
	Relevance	13	Significant
	Accuracy	13	Significant
	Completeness	12	Significant
	Correctness	12	Significant
	Accessibility	10	Significant
	Timeliness	10	Significant
	Security	7	Important but not significant
	Flexibility	5	Insignificant
<b>Value Contributors</b>	Data	17	Significant
	Process	16	Significant
	Information	15	Significant
<b>Circular Information System Value Chain</b>	Data	17	Significant
	Hardware	11	Significant
	Software	11	Significant
	People	10	Significant
	Telecommunications network	10	Significant
	Security	7	Important but not significant

Table 4 shows the attributes that were labeled as significant as per the standard adopted for the research study (Akinyode & Khan, 2018). Therefore, confirming that successful IS VCs in the public sector should consist of the attributes associated with ISs, VC contributors and the circular IS VC. Consequently, successful ISs VC will only be deemed as such if the systems possess all the attributes associated with ISs, VC contributors and the circular IS VC (DeLone & McLean, 2016). These

include attributes such as reliability, relevance, accuracy, completeness, correctness, accessibility, and timeliness that are associated with ISs. Also, attributes associated with the VC contributors includes data, processes and information (Coronel & Morris, 2016).

Furthermore, attributes such as data, hardware, software, people, and telecommunication networks are the mandatory attributes that the circular model for sound

financial management and governance practices should possess. These attributes become the attributes for the framework for the successful implementation and usage of IS VCs towards sound financial management and governance practices.

On the other hand, the attributes labeled as important but not significant and insignificant are associated with ISs, circular IS VCs, and decision-making levels. This includes attributes such as security, flexibility, and top-down and bottom-up abilities. These attributes are arguably not required for the framework for the successful implementation and usage of IS VCs in the public sector organisation as per the responses received. However, due to the needs that successful IS VCs in the public sector address and the attributes in question, these should be investigated further in future research.

## 4.2. Critical Success Factors of a Successful System Value Chains for Sound Provincial Financial Management

The term CSFs refers to the anticipated variables that are mandatory for success to be associated with the matter of interest (Bullen & Rockart, 1981). The research study sought to recognize the CSFs of successful IS VCs in the public sector organization (table 5). Further detail regarding the CSF and supporting interview data is presented in Appendix B. This shows the CSFs that were labeled as significant as per the standard adopted for the research study (Akinyode & Khan, 2018).

**Table 5. Summary of critical success factors of a successful information system value chain**

	<b>Critical Success Factors</b>	<b>Number of Responses</b>	<b>Standard Label</b>
<b>Information System</b>	IS quality	18	Significant
	Information quality	16	Significant
	Service quality	16	Significant
	Holistic benefit	15	Significant
	User satisfaction	14	Significant
	General usage	6	Important but not significant
<b>Value Chain</b>	Overall value	14	Significant
	VC quality	12	Significant
	Efficiency	6	Important but not significant
	Effectiveness	5	Insignificant

Table 5 shows the CSFs that were labeled as significant as per the standard adopted for the research study (Akinyode & Khan, 2018). Therefore, confirming that the successful IS VCs in the public sector organisation should consist of the CSFs associated with ISs and VCs. These include CSFs such as IS quality, information quality, service quality, holistic benefit, user satisfaction, overall value, and VC quality that are allied with ISs and VCs correspondingly. Consequently, the IS VCs in the public sector organisation will only be deemed successful if the systems realise the CSFs associated with ISs and VCs as established from the data collected from the respondents (Aini et al., 2020). These CSFs serve as the requirements for the IS VCs in the public sector organisation. In so doing, becoming the CSFs needed for the framework for the successful implementation and usage of IS VCs towards sound financial management and governance practices.

On the other hand, two CSFs were labeled as important but not significant and one CSF was labeled as insignificant. This includes CSFs such as general usage, efficiency, and effectiveness. These CSFs are arguably not required however, due to the needs that successful IS VCs in the public sector organisation address and the nature of the CSFs, these should be investigated further in future research.

## 4.3. Factors Affecting a Successful System Value Chains for Sound Provincial Financial Management

The research study sought to establish the effect of the attributes and CSFs on successful IS VCs in public sector organisation. Accordingly, ISs should include attributes such as reliability, relevance, completeness, correctness, accessibility, and timeliness. Also, the system should include attributes such as data, process, and information for a VC. Lastly, the circular model should

include attributes such as data, hardware, software, people, and telecommunications networks. These are the attributes that serve as input for the framework for the successful implementation and usage of IS VCs towards sound financial management and governance practices. This suggests that the attributes are significant and signify their effect on successful IS VCs in the public sector organisation. According to Laudon and Laudon (2016), successful IS VCs in the public sector are assessed as per the attributes associated with the ISs, VC contributors, and their ability to operate as a circular IS VC. Collectively, these attributes serve as the requirements for the formulation of the framework for the successful implementation and usage of IS VCs toward sound financial management and governance practices.

According to Trkman (2010), CSFs are the fundamentals that successful IS VCs in the public sector organisation must realise. The ISs must realize the CSFs such as IS quality, information quality, service quality, holistic benefit, and user satisfaction. Likewise, the VC must realize CSFs such as overall value and VC quality. This suggests that the CSFs are significant and signifies their effect on successful IS VCs in the public sector organisation. According to Wijayanto (2020), this suggests that the confirmed CSFs associated with successful ISs and VCs have a direct bearing on the ISs VC in the public sector origination. Collectively, these CSFs serve as the requirements for the framework for the successful implementation and usage of IS VCs towards sound financial management and governance practices.

#### 4.4. Framework for the Successful Implementation and Usage of Information System Value Chains for Sound Provincial Financial Management

The overall aim of this research study was to explore and articulate the attributes and CSFs of a successful information systems value chain in the public sector of a developing nation. The subsequent output is a framework formulated for the successful implementation and usage of IS VCs that will serve as a benchmark for the public sector. The factors of significance that appraises successful ISs VC in the public sector organisation were confirmed as per tables 4 and 5. The findings from Tables 4 and 5 serve as input for the formulation of the framework that serves as the requirements for the systems needed for decision-making activities toward sound financial management and governance practices. According to Martins et al. (2019), the public sector's actions are significantly reliant on successful IS VCs for decision-making activities. The IS VCs for the public sector organisation will only be perceived as successful if the systems possess the attributes and realise the CSFs as confirmed by the contributors from the participating public sector organisation (DeLone & McLean, 2016). Figure 2 illustrates the framework for the successful implementation and usage of IS VCs toward sound financial management practices.

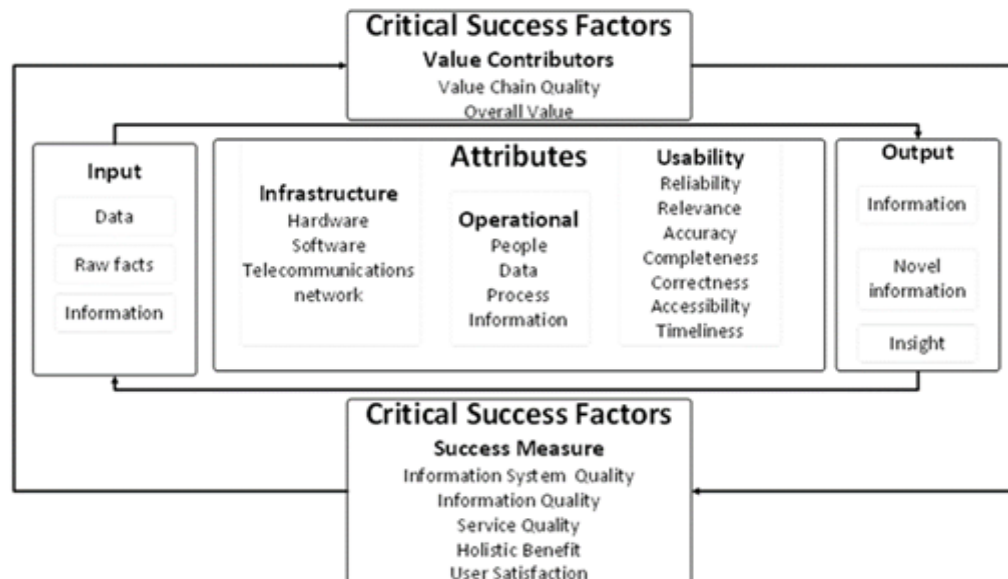


Fig. 2. Framework for the successful information system value chain in the public sector

The confirmed attributes and CSFs highlighted additional fundamental themes for the public sector organisation. A theme can be defined as an idea that exists because of an underlying patterns (Bryman, 2012, p. 580). Expanding on the coding and thematic analysis of the

data (Stranges et al., 2014), five themes were identified across the attributes and CSFs.

Three fundamental themes are associated with attributes that must be addressed for the successful ISs VC in the public sector organisation: (i) infrastructure, (ii)

operational, and (iii) usability. Suitable infrastructure must be in place to support the needs that exist in the organisation. This is shadowed by the operational activities mandatory for the information needed. Also, the usability of the IS VCs in operation serves as the assurance needed for the systems in the public sector organisation to be deemed successful. The usability theme offers assurance from the user's point of view. Accordingly, the infrastructure, operational, and usability themes, become the requirements for the attributes mandatory for successful IS VCs towards sound financial management and governance practices.

Also, two fundamental themes associated with CSFs must be addressed for the successful ISs VC in the public sector organisation: (i) value contributors and (ii) success measures. The value contributor theme suggests that the IS VCs operation delivers value in the form of information through an arrangement of activities for decision-making activities. Likewise, the success measure theme serves as the assurance mandatory and serves as confirmation that the IS VCs in operation realizes satisfactory information. Figure 3 adapts Laudon & Laudon (2016) to illustrate how the five fundamental themes can enable the successful implementation and usage of IS VCs in the public sector organisation.

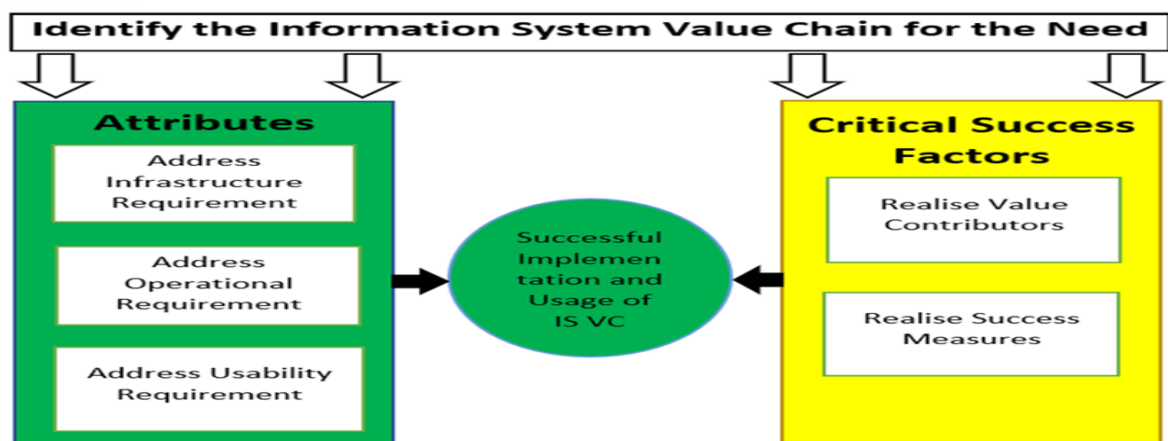


Fig. 3. Applying the themes for the framework of information system value chain in the public sector

The successful ISs VC in the public sector organisation serves as the source of the information needed for decision-making activities toward sound financial management and governance practices. Consequently, the public sector organisation should be able to implement IS VCs that are successful by adopting the framework. Therefore, ensuring that decision-making activities are well informed therefore resulting in sound financial management and governance practices

#### 4.4.1. Practical Application: Attributes for the Framework

The infrastructure theme comprises attributes such as hardware, software, and telecommunications networks. The theme is accountable for the collection, processing, creation, storage, and distribution of information to authorized users. According to Valacich and Schneider (2018), the infrastructure theme attributes serve as the foundation for successful IS VCs for the public sector organisation. Through this theme efficiencies, effectiveness and agility are enabled. These are the requirements for successful IS VCs towards sound financial management and governance practices (Roşca et al., 2010). According to Al-Mamary et al. (2014), suc-

cessful IS VCs in the public sector organisation must include the attributes allied with the infrastructure theme for it to be considered successful.

The operational theme comprises attributes such as people, data, processes, and information. The theme is accountable for the operationalization of the actions needed to transform data into information as argued by Schwalbe (Schwalbe, 2016). These attributes are mandatory for successful IS VCs to produce information for decision-making activities toward sound financial management and governance practices (Rosenblatt, 2014). According to Barber and Barber (2008), successful IS VCs in public sector organisations will only be deemed successful if the system consists of all the operational theme attributes as stated. Furthermore, Coronel & Morris (2016) argue that this theme provides valuable information that is required for decision-making activities in public sector organisations

The usability theme comprises attributes such as reliability, relevance, accuracy, completeness, correctness, accessibility, and timeliness. The theme is accountable for the overall experience of the user. These attributes may be associated with the users' satisfaction levels and are based on the users' overall experience of the successful IS VCs in public sector organisations (Forsgren et al. 2016). According to Laumer et al. (2017), the theme is

associated with service quality, which serves as an indication of the users' net benefits. Therefore, serving as confirmation from the user's perspective (Bianchi & Trimigno, 2019). The usability theme aligns with Zaied (2012) who argues that the theme's attributes produce the information needed for decision-making activities. Collectively, the three themes consist of 15 confirmed attributes that are mandatory for the framework that serves as a benchmark for the successful implementation and usage of IS VCs towards sound financial management and governance practices.

#### 4.4.2. Practical Application: Critical Success Factors for the Framework

Seven CSFs were confirmed as significant and are the minimum requirements that must be included for public sector organisations. These brought to light two themes: (i) value contributors and (ii) success measures. Accordingly, public sector organisations should ensure that the IS VCs in operation includes all the CSFs as confirmed by the participants from the public sector organisation.

The value contributor theme comprises of CSFs such as overall value and VC quality. Including the CSFs associated with the value contributor theme confirms that value is produced by the IS VCs when transforming the raw facts into information required for decision-making activities in public sector organisations. For IS VCs in the public sector to be deemed successful, all value contributors in the chain must add some value to the overall value of the system (Barber & Barber, 2008). Jones and George (2020) further argue that these are the CSFs that must be present for the system to be deemed successful. As argued by Cox and Schleier (2010), successful IS VCs in the public sector organisation are mainly evaluated as per the effectiveness, quality, and efficiency that comes from the chain of activities when producing information for sound financial management and governance practices.

Lastly, the success measure theme comprises of CSFs such as IS quality, information quality, service quality, holistic benefit, and user satisfaction. According to Wijayanto (2020), the successes of the IS VCs are mainly evaluated by the system's ability to realize the CSFs associated with it. Jeyaraj (2020) asserts that metrics are valid for evaluating the success of IS VCs as these are the key result areas that serve as the benchmark for IS VCs in public sector organisations to be perceived as successful. Jointly, the two fundamental themes and seven CSFs serve as confirmed key result areas that must be realized for successful IS VCs towards sound financial management and governance practices.

organisations should include being deemed successful. The CSFs associated with the value contributor

## 5. Conclusions

The research study sought to identify the attributes and CSFs of successful IS VC in the public sector. The study was undertaken through a case study in a public sector department at a provincial level. Interviews were conducted with participants from both operational and strategic levels in response to the research study. This resulted in the insights, knowledge, findings, underlying themes, recommendation, and conclusions that informed the framework for the successful implementation and usage of IS VC towards sound financial management and governance practices.

The first objective of this research study was to better understand the attributes of a successful IS VC in the public sector. As confirmed by the participants from the public sector organisation, successful IS VCs require 15 attributes (table 4) that are the minimum requirements for public sector organisations. These attributes brought to light three underlying themes (figure 2), namely infrastructure, operational, and usability, which are requirements for successful IS VCs in the public sector. The infrastructure theme consists of the attributes, namely hardware, software, and telecommunications network (figure 2). These three attributes are the foundation of the systems and permit efficiencies, effectiveness, and agility which must be addressed by the IS VCs required for decision-making activities in public sector organisations. The operational theme consists of four attributes, namely data, people, process, and information (figure 2). These represent the attributes that are necessary and must be included to transform the vast array of data into information important for decision-making activities. The assurance from the end-users serves as the confirmation that the IS VCs in public sector organisations are successful. The usability-themed attributes are the required confirmation from the users' perspective and must be included for the IS VCs to be deemed successful. The usability theme consists of seven attributes, namely reliability, relevance, accuracy, completeness, correctness, accessibility and timeliness (figure 2). For IS VCs in the public sector to be deemed successful, the systems in operation should include all the attributes associated with the infrastructure, operational and usability themes.

The second objective of this research study was to better understand the CSFs of successful IS VCs in the public sector. Seven CSFs (table 5) were confirmed as significant by the participants from the public sector organisation. These CSFs brought to light two underlying themes (figure 2), namely value contributors and success measures. Public sector organisations should ensure that the IS VCs in operation includes all the CSFs as confirmed by the participants from the public sector organisation. The value contributor theme consists of the CSFs of VC quality and overall value (figure 2), which the systems in operation in the public sector

these confirm that value is produced by the IS VCs when transforming the raw facts into information required for decision-making in the public sector. The success measure theme consists of the CSFs, namely IS quality, information quality, service quality, holistic benefit, and user satisfaction (figure 2). These CSFs must be included for the IS VCs in public sector organisations to be perceived as successful. These CSFs become the key result areas that serve as the benchmark in IS VCs in public sector organisations for them to be perceived as successful.

It is recommended that public sector organisations adopt the practical application of the framework which should be the minimum requirements for the successful IS VCs in operation for information required for decision-making activities. In so doing, public sector organisations will be able to implement and use IS VCs in accordance with the benchmark set by the research study. The information required for decision-making activities will then also be in accordance with the benchmark set for IS VCs in the public sector. This will result in well-informed decisions that will create an environment that is conducive to sustainable economic growth and decent job creation for the betterment of all citizens.

The research study observed the qualitative research methods and standards. As a result of the in-depth interviews needed, the research study was constrained to a small sample. The study was restricted to participants from a public sector organisation at the provincial level in South Africa that serves as a representation of the sector. The limited time for the research study influenced

the overall outcomes of the research study and specific important characteristics might have been omitted. A lack of academic literature specific to the public sector on the subject matter was also a constraint. The study was restricted to a specific public sector department with the data, insights, conclusions, and recommendations stemming from the study being applicable to similar public sector organisations. The restrictions observed because of the COVID-19 pandemic influenced the approach opted for as a standard for the interviews. This removed the one-on-one in-person collaboration needed for research studies like this.

In conclusion, the research study established how these themes should be realized as part of the framework for the successful implementation and usage of IS VCs towards sound financial management and governance practices. The framework serves as a benchmark for public sector organisations at a provincial level in South Africa. Conversely several attributes and CSFs were labeled as important but not significant and insignificant for the public sector organisation. This includes attributes such as security flexibility, top-down and bottom-up abilities. Also, this includes CSFs such as general usage, efficiency, effectiveness, economic growth, decent work, and unemployment reduction. Due to the nature of the public sector organisation and the attributes and CSFs in question, these should be explored in future research studies. Therefore, contributes to a more inclusive framework for the successful implementation and usage of IS VCs towards sound financial management and governance practices.

**Appendix A. Attributes of a successful information system value chain**

	Attributes	Participant Identifier	Transcript Directly Quoted Evidence
<b>Information System Attributes</b>	<b>Reliability</b>	<b>PISVC04</b>	“It highlights if the information system is reliable.”
		<b>PISVC16</b>	“Give assurance on the information that we are reporting on, so accuracy, relevance and reliability.”
		<b>PISVC20</b>	“If we have data or maybe information that is correct and accessible, relevant and reliable as well as accurate and where that information is available on time, then those will be your key attributes to successful information.”
	<b>Relevance</b>	<b>PISVC01</b>	“It must be able to give us relevant information.”
		<b>PISVC08</b>	“I would say that you would need to have access to the relevant data.”
		<b>PISVC15</b>	“Information coming out of that to feed into our decision-making must be relevant.”
	<b>Accuracy</b>	<b>PISVC01</b>	“It must give us accurate information.”
		<b>PISVC03</b>	“Accuracy would be an attribute and the information has to be accurate.”
		<b>PISVC15</b>	“Accurate, verifiable, flexible, uh, information and usable information at cost effective and very efficient so that the information remains relevant.”
	<b>Completeness</b>	<b>PISVC13</b>	“Important attribute would be completeness of the information system.”
		<b>PISVC15</b>	“Accurate, verifiable, flexible information and usable information at cost effective and very efficient so that the information remains relevant.”
		<b>PISVC20</b>	“It should be complete, accurate and relevant and all those things and timely, so that's for me, information system relates to that.”
	<b>Correctness</b>	<b>PISVC05</b>	“Is it reliable and credible.”
		<b>PISVC12</b>	“That data is now trusted, consistent accurate with facts and verify and verifiable.”
		<b>PISVC20</b>	“If we have data or maybe information that is correct and accessible, relevant and reliable as well as accurate and where that information is available on time, then those will be your key attributes to successful information.”
	<b>Accessibility</b>	<b>PISVC01</b>	“So that information should be able to you should be able to retrieve and work.”
		<b>PISVC03</b>	“Maybe, usability and accessibility like the ease of use of the system.”
		<b>PISVC15</b>	“It must also be accessible to those that I want to be accessible to.”
	<b>Timeliness</b>	<b>PISVC01</b>	“They must be timely in the sense that if I want something, I should not be able I should not wait for, I don't know, two days to get it.”
		<b>PISVC11</b>	“And being able to provide you with that data as and when you require it.”
		<b>PISVC15</b>	“It must have timelines.”
<b>Value Chain Contributors</b>	<b>Data</b>	<b>PISVC02</b>	“When we say information system, information or raw data will be one of the components.”
		<b>PISVC14</b>	“Successful attribute would be a system that is able to collect data.”
		<b>PISVC15</b>	“Firstly, are data sources, where are we getting this information.”
		<b>PISVC07</b>	“When combined through that process or system that gathers and gets rid of that information into something.”

	<b>Process</b>	<b>PISVC12</b>	“Store data and process the data and analyse data and distribute information.”
		<b>PISVC19</b>	“It’s processes to integrate the flow of information to be able to make meaningful sense.”
	<b>Information</b>	<b>PISVC03</b>	“Allowing people to access information and data and using it that that data or that information.”
		<b>PISVC09</b>	“We call that the inputs and the also to process that information and the output.”
		<b>PISVC14</b>	“It’s a platform where information can be process or data can be processed into information.”
<b>Circular Information Systems Value Chain Attributes</b>	<b>Data</b>	<b>PISVC05</b>	“Is hosted how the information system transfer and connect data.”
		<b>PISVC16</b>	“A database that will take raw data.”
		<b>PISVC20</b>	“If we have a data or maybe information that is correct.”
	<b>Hardware</b>	<b>PISVC02</b>	“The attributes of a successful information value in the public sector, Include the computer hardware.”
		<b>PISVC13</b>	“Most of the time it is what you call it, an ICT system embedded in an ICT system.”
		<b>PISVC18</b>	“I mean just then there the system you know the physical or IT system.”
	<b>Software</b>	<b>PISVC03</b>	“Uh, then there's a tech which comprises of your software and your hardware.”
		<b>PISVC12</b>	“I'm thinking of this completeness. Which is the software.”
		<b>PISVC18</b>	“I mean just then there the system you know the physical or IT system.”
	<b>People</b>	<b>PISVC02</b>	“And lastly, the officials involved from the start to the end of the value chain.”
		<b>PISVC11</b>	“Uh, successful information system so that you can get to work with, other, uh, stakeholders.”
		<b>PISVC20</b>	“You need people to be working on the system who are knowledgeable of course.”
	<b>Telecommunications Network</b>	<b>PISVC05</b>	“This system will then talk to connectivity.”
		<b>PISVC11</b>	“You also look at the infrastructure.”
		<b>PISVC16</b>	“The infrastructure because it requires infrastructure.”



**Appendix B: Critical success factors of a successful information system value chain**

	Critical Success Factors	Participant Identifier	Transcript Directly Quoted Evidence
<b>Information System</b>	<b>IS quality</b>	<b>PISVC06</b>	“It's of high quality, it's reliable, and as such, at the end of the day, we can achieve.”
		<b>PISVC18</b>	“You know, then, the decision makers with that type of information for them to make right decisions.”
		<b>PISVC20</b>	“And I think if all those critical factors are taken into consideration and as the public sector, we do have an information system that is working, which would be easy for the public sector to be able to look at priorities.”
	<b>Information quality</b>	<b>PISVC05 (273-275)</b>	“To enable extraction of this data as to allow for correct reporting and also enable for proper decision-making in terms of the value chain in the public sector.”
		<b>PISVC16</b>	“Remember the information that is coming from the financial system will assist with the reporting and that reporting will be audited.”
		<b>PISVC20</b>	“As well as making it easier to achieve your objectives where information can be built into a system and that information assist management in taking informed decisions.”
	<b>Service quality</b>	<b>PISVC03</b>	“It can be a means of accessing, storing and presenting data. It can be the actual uhm, how can I say the I don't wanna say process again? But essentially a means of, uh, allowing people to access information and data and using that data or that information in a constructive way. Whether it be strategically, it could be a routine process.”
		<b>PISVC08</b>	“One is able to improve that service all the time.”
		<b>PISVC19</b>	“Information managing management systems and be able to derive the value at the end of the of the process.”
	<b>Holistic benefit</b>	<b>PISVC01</b>	“It's basically that type of information that is used by an organisation in its daily operations all the way up to a strategic level, I think.”
		<b>PISVC03</b>	“But essentially a means of, allowing people to access information and data and using it that data or that information in a constructive way. Whether it be strategically, it could be a routine process.”
		<b>PISVC20</b>	“Information system that is able to assist you, in meeting the operational requirements and saving you on cost and, uh, enabling you to report timeously, then that should be deemed as a successful information system.”
	<b>User satisfaction</b>	<b>PISVC02</b>	“Is it easy to maintain this system? And then there's service ability as well of the information system, remember when you when you do the information system, you also install the third-party software in your system, in your, in, you're in your environment. So, is it, is it easier to service those software's?”
		<b>PISVC06</b>	“Something that even someone with the lowest level of education can access that system and it's user friendly in terms of inputting whatever information.”
		<b>PISVC15</b>	“It must also be time bound and flexible and easy to access. Easy to interpret. That will then speak to the usability of that information.”
<b>Value Chain</b>	<b>Overall Value</b>	<b>PISVC01</b>	“I think for any value chain to work, the one system must be able to work with the next or into the interconnecting factors.”

	<b>Value Chain Quality</b>	<b>PISVC19</b>	“And it has got a value to add to the whole process or the whole chain. Uh, and it may be one of the dependence or interdependence that will contribute to the whole.”
		<b>PISVC20</b>	“Information system that is able to assist you, in meeting the operational requirements and saving you on cost and, uh, enabling you to report timeously, then that should be deemed as a successful information system.”
		<b>PISVC03</b>	“So, what you would need is a constant revision economizing of your value chain process to make sure that other you're doing things most efficiently, cost-effectively or producing the best results you can out of the uh, number of inputs that you have in that chain.”
		<b>PISVC10</b>	“It needs to have certain steps and within those steps value needs to derive therefrom.”
		<b>PISVC19</b>	“And it has got a value to add in the whole process or in the whole chain. Uh, and it may be one of the dependence or interdependence that will contribute to the whole.”

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