

# Leveraging COBIT 5 in Strategic Information Systems Planning: A Case Study from the Nigerian Pharmaceutical Industry

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**Abstract** - The role of Strategic Information Systems Planning (SISP) in healthcare necessitates a formal process of defining and updating the Information Systems Strategy (ISS). SISP enables the identification of a portfolio of computer-based applications for the execution of business plans and realization of business goals. This paper presents a process- and practice-based approach to SISP at a pharmaceutical organization in Nigeria. We describe a five-phased sequential COBIT 5 (Control Objectives for IT and Related Technologies)-based process that plans for IS planning, analyzes the current environment, conceives strategy alternatives, selects strategy, and plans for strategy implementation. Various COBIT 5 tools and approaches were employed including COBIT 5 generic enterprise goals, generic IT-related goals, RACI charts, questions on governance and management of IT, implementation life cycle, and the ValIT business case template. The process was informed by findings from a structured approach to the review of the SISP process. Process concerns identified in six dimensions suggested application of a good practice framework. COBIT 5 has been applied in the healthcare and related industry in many areas but has not found application in SISP. Application of COBIT 5 in Nigerian Pharmaceutical Company (NPC) would be beneficial to pharmaceutical organizations engaging in similar effort in the future. Such application has implications for both researchers and practitioners.

**Index Terms** - COBIT 5, Healthcare, Information Systems, Information Systems Strategy (ISS), Pharmaceutical, Strategic Information Systems Planning (SISP), Strategic Planning

## 1. INTRODUCTION, ORGANIZATIONAL CONTEXT AND RESEARCH OBJECTIVES

### 1.1 Introduction

Information Technology has become essential to the sustainability and growth of businesses. This critical dependency on IT demands specific attention to IT governance comprising of leadership, organizational structures, and processes that ensure that an organization's IT not only extends, but also sustains its strategy and objectives [10]. Strategic IT planning process is now ever more considered a critical area of focus for sound governance of IT and a major component of corporate planning [11],[37].

Strategic Information Systems planning (SISP) is defined as "the process of identifying a portfolio of computer-based applications that will assist an organization in executing its

business plans and realizing its business goals" [2], [16]. The SISP process was described by [2] by an input, process, and output model. Process inputs include the enterprise external and internal environment as well as resources. The planning process involves routines that are carried out by the enterprise to develop the strategic IS plan. The strategic IS plan is the output of SISP process that details high level steps to be executed by the enterprise to align its information technology and systems with its long-term strategic business objectives.

Given the current stage of Strategic IS planning research, there is neither adequate literature available on frameworks or substantial foundation from research to derive a well-grounded process for conducting SISP [35]. The COBIT 5 framework, however, has been applied in strategic planning and implementation [3], [18], [28], [38]. COBIT is recognized in Information Systems practitioners' communities as an IT governance framework that originated as an IT audit framework in 1996 [12].

Founded on five core principles namely: meeting stakeholder needs; enabling a holistic approach; covering the enterprise end-to-end; separating governance from management; and applying a single integrated framework [17], COBIT 5 provides a business framework that enables

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the achievement of enterprise objectives for IT governance and management and is recognized in Information Systems practitioners' communities since its origin and evolution [11, Fig.1], [12]. Despite its global recognition and application in healthcare and related industries [6], [9], [36], COBIT has yet to be applied in SISP in healthcare. This gap in literature provides a justification for the study of the processual element of SISP and reason for the research question- How can the COBIT 5 framework be employed to address process concerns in SISP efforts?

## 1.2 Research Aims and Objectives

This study aims to deliver a practice- and process-based approach for conducting SISP with a focus on Nigerian pharmaceutical organizations. Our objectives include a critical review of literature on SISP and the application of COBIT in the health and related industry as well as strategic planning; collection of data on SISP practices from a case organization; assessment of the case organization's official SISP process based on collected data; and recommendation of best practices from the application of COBIT.

## 1.3 Research Approach

According to our research aims, an evaluation of the SISP process in multiple dimensions will be conducted in a Nigerian pharmaceutical organization, which happens to be the researcher's work context, using a structured approach from literature.

For each dimension, the researcher will identify the status quo found at the case organization and then present propositions from literature. If process concerns are identified and confirmed by respondents, the researcher will recommend an SISP approach for Nigerian pharmaceutical organizations derived from the application of COBIT in the health and related industry and strategic planning.

## 1.4 Rationale for the Study and the Contribution to the Field

In today's dynamic and highly competitive global marketplace, SISP is critical to the success of organizations [29]. SISP has been identified and remained a critical management issue since 1990s [1], [5]. For many years, SISP and its output, Information Systems Strategy (ISS), was ranked among the top concerns for corporate managers and information systems specialists and dominated management agendas [34], [35]. SISP has the potential to make significant contributions to business organizations by identifying the most suitable targets for automation and scheduling their installation [23]. Effective SISP can guide the use of information systems in the achievement of major objectives of senior IS executives. However, failure to meticulously perform SISP can result in the waste of expensive IS resources, lost opportunities, and initiation of

incompatible projects that may eventually result in the acquisition and implementation of what [16] referred to as "inflexible, redundant, and deficient information systems".

By proposing a COBIT-based approach, this study seeks to extend previous research efforts of [13] on SISP approaches, with emphasis on the Organizational approach as well as [23] work on SISP methodologies, thereby addressing gaps in literature.

## 1.5 Dissertation Outline

The dissertation is organized as follows: A critical review of the literature on SISP, the application of COBIT in the health and related industry, and the application of COBIT in strategic planning is presented in chapter 2. Chapter 3 describes the research design and methodology in which the context of the study, sample selection and size were provided. We also described an instrument for data collection in six dimensions of the SISP process; an analysis of findings in terms of rationality and adaptability to obtain measures in each dimension, validity and reliability of our study as well as ethical considerations. Chapter four presented the results of our analysis in six dimensions: Comprehensiveness - narrow: Focus - control oriented: Formalization - informal: Planning flow - Bottom-up: Participation - narrow: Consistency - low and a description of their implications. In Chapter 5, we proposed a SISP process, founded on COBIT 5, which is both practice- and process-based. The implications for SISP research and practice were also discussed.

## 2. LITERATURE REVIEW

Since its introduction in the 1980s, Strategic Information Systems Planning (SISP) has yet to be widely adopted as a benchmark for exploiting, formulating and adopting IT/IS strategy. In a case study of SISP in a German financial services company, [35] noted that practitioners ignored academic literature in supporting their SISP endeavors, accounting for the misalignment between academic discussions and the practical conduct of SISP. This disregard for academic literature as an accredited source of advice and standard for SISP practice, he argues, was not necessarily caused by limited knowledge transfer, but failure of academia to address the concerns of FSC's practitioners. In another field study of 27 UK-based companies that were among leaders in banking, insurance, retail, chemical, oil, transport, automobile, aerospace, electronics, IT, services, food and drink industries, [13] investigated IS planners' experiences with SISP. From the interview of executives in three stakeholder groups - CEOs/General Managers, IS Directors/IS Strategic Planners, and Senior Line/User Managers- he deduced five approaches to SISP devised by practitioners which he

labelled as: Business-Led; Administrative; Technological; Organizational; and Method-Driven. His findings revealed that the Organizational approach was considered to be most effective with its process and implementation focus.

The significance of the process and implementation components to the success of SISP was underscored by [7] in an interview-based research. From interviews of 7 South African IS planners, activity set, approach, and frequency and horizon from the SISP process category and IS plan implementation focus from IS Plan Implementation category were among key themes that emerged from comparison and analysis of espoused beliefs and practices in SISP. Findings from both perspectives called for comprehensive SISP processes and plans that allow for implementation.

Lederer and Salmela [24], in a theory-generating research, conceptualized SISP as comprising of a plan formulation stage as well as a plan implementation stage.

This concept was supported by [5] who distinguished the strategy formulation phase and implementation phases of the SISP process in a study investigating SISP success in US-based organizations. Regardless of this distinction, [7] advocated for a seamless integration between plan formulation and implementation.

Strategy formulation and strategy implementation planning were included among the IS planning phases proposed by [27] along with Strategic Awareness, Situation Analysis, and Strategy Conception to achieve the full scope of an SISP effort. Among these planning phases, [7] noted disparity between espoused belief and practice for Strategic Awareness. He pointed out the lack of attention to pre-planning practices, which was partly attributable to a lack of clear business strategy in many organizations. This does not only make pre-planning for SISP challenging, it also lead IS planners to the pursuit of activities that has a minor impact on SISP effectiveness, whilst overlooking activities that would. Nonetheless, [20] identified pre-planning activities during strategic IT planning in a pediatric hospital. Pre-planning activities included obtaining agreement from the IS Steering Committee and Partnership Council, that represented the staff perspective, at the project initiation phase. During this stage, which marked the commencement of the strategic planning process, a Table of Contents was developed for the final report to identify the scope of work to be done, provide a guideline, and ensure that every aspect of the strategic plan was considered in subsequent steps. With specific tasks identified for each phases, the Organizational approach can be characterized as process-centric when defined by [27] IS phases. When viewed as a process, SISP can be subjected to maturity assessment [10] as provided by IT Governance Institute [19].

To carry out planning process such as SISP, [1] recommends that IS planners adopt a methodology. He argues that managers could realize benefits from a SISP methodology comprising of techniques that provides information to plan, monitor and control projects. These techniques, he described, are defined by a set of practices, rules, or procedures that transforms organizational inputs into a strategic IS plan. The existence of written procedures, policies, and techniques for an SISP process was characterized the formalization dimension of [32] SISP process evaluation.

With a structured approach to SISP process review, it would not be a surprise that a methodology that specifies a planning process is fraught with problems identified by [23, Table 3] and method concerns identified by [13] in unsuccessful SISP efforts.

Although data on the aims, stimuli, procedures, methods, success factors, benefits, and problems of SISP were gathered in [13] field study, the researcher did not analyze data with an aim of deciding how best to address process, method, or implementation concerns or how SISP might be improved. Earl's [13] field study left us with unsuccessful features and concerns of SISP and an organizational approach that hardly informs SISP practice.

In the absence of a framework, the strategy formation process and the resulting Information Systems Strategy are blurred and most propositions for conducting SISP are based on some conceptual considerations and common sense [35]. De Haes [10], in an exploratory study of IT governance implementations in the finance, insurance, chemical and steel industries, identified SISP as one of the IT governance practices that enables business-IT alignment and yet indigenous pharmaceutical organizations lack a formal process to define and update their IT Strategy.

Recent effort to address this need was provided by [25] who presented a set of guidelines and tools to aid practitioners in planning, implementing and assessing SISP in the healthcare industry and researchers who seek to investigate SISP in other organization at large. In a similar effort, [20] presented a framework and methodology for strategic IT planning in a tertiary care pediatric hospital based in Ontario. They described a five-stage sequential process that assessed the current state of IT, defined the target state, and mapped work required to achieve goals. Various tools and techniques were used such as review of existing documentation, survey and interview of stakeholders, and workshops. Though process-based, this framework does not provide the full scope of SISP effort in terms of [27] to inform practice. What is missing is a process- and practice-based SISP approach that will guide IS planners in the Nigerian pharmaceutical industry towards successful SISP endeavors.

## 2.1 Application of COBIT in the Healthcare and Related Industry

### 2.1.1 NHS Fife (National Health Service), UK

Led by a need for alignment of its e-health services and national and local strategies, coupled with internal pressures for improved compliance with recognized standards as well as audit and security outcomes, NHS Fife sought a higher-level framework that would provide an overall continual improvement process vision [6]. This vision encompassed applicable processes from ITIL (Information Technology Infrastructure Library) service strategy to operations as well as IT governance processes including strategic planning, internal control, risk management, and quality management.

To realize this vision, COBIT was implemented with support from the Meycor COBIT® Suite - a COBIT-based software solution - that aided the establishment of a baseline, development of improvement plans, selection of metrics, and tracking of improvement cycles established for targeted processes.

An external audit of the change management process in 2010 following COBIT implementation revealed an attainment of one of the highest maturity scores and fastest improvements in the organization's e-health practices. This achievement led to a series of improvements in other linked processes including change and configuration, service level management, security management, business continuity, service desk and incident management. In the same year, NHS Fife's also achieved ISO 27001 for its e-health infrastructure and established a corporate IT governance framework. NHS later planned for a review and optimization of the e-health governance structure to meet the challenges of future e-health delivery programme as well as stakeholders' expectations with the COBIT 5 principle of meeting stakeholder needs.

### 2.1.2 Sunnybrook Health Sciences Centre

Following several years of expanding operations, project disruptions and incidents, Sunnybrook Health Sciences Chief Information Officer (CIO) voiced the need for increased attention to process and technical risk management within the IT management team coupled with a need expressed by the audit committee of the board for a presentation from the CIO of IT value and risk management activities [9]. To meet this need, Sunnybrook formally introduced an IT governance programme as one of the five IT strategic goals in the 2012 IT Strategic Plan. The IT governance programme was provided by Sunnybrook's IT

governance framework which was based on ISACA's (Information Systems Audit and Control Association) COBIT 4.1 and complementary Risk IT and Val IT frameworks. While COBIT 4.1 provided needed managerial process control framework for routine IT service creation and delivery, Val IT provided value management objectives and safeguards for IT projects, programs, and portfolios whereas Risk IT provided risk assessment and mitigation across IT services.

The COBIT 4.1, Val IT, and Risk IT frameworks were combined to deliver a comprehensive IT governance programme that supported board-level and managerial visibility and control for the performance of the organization's IT strategic programmes while complementing existing IT service delivery best practices.

The resulting IT governance programme was focused specifically on the application of strategic alignment, value delivery, risk management, resource management, and performance measurement to Sunnybrook's IT management. For performance reporting purposes, these focus areas were cascaded into selected IT objectives, associated process, and outcome measures that reflected IT governance goals for each perspective of a four quadrant, IT balanced scorecard, reportable to the board. The corporate perspective ensured value delivery and risk management; learning and growth perspective ensured IT sustainability; internal (operations) perspective ensured achievement of operational excellence; and customer perspective ensured customer expectations were exceeded. By measuring and managing associated balanced scorecard indicators, visibility and accountability was ensured for strategic IT programme as well as operational goals and objectives.

De Haes, Van Grembergen and Debrecey [11] points out that COBIT has built on balanced scorecard concepts and adapted it for the IT domain. He highlighted COBIT 5 provision of outcome measures, in the form of process goals and related metrics. They maintain that a comprehensive scorecard, built by the consolidation of metrics at the COBIT process, IT-related, and enterprise levels, would serve as a measurement instrument to verify the fulfilment of stakeholder needs.

They also presented the COBIT 5 framework as an overarching framework for enterprise governance and management of IT owing to its integration of all knowledge gained from the research of enterprise governance areas that are dispersed over ISACA's COBIT 4, Risk IT, and Val IT frameworks, as illustrated in Fig. 1.

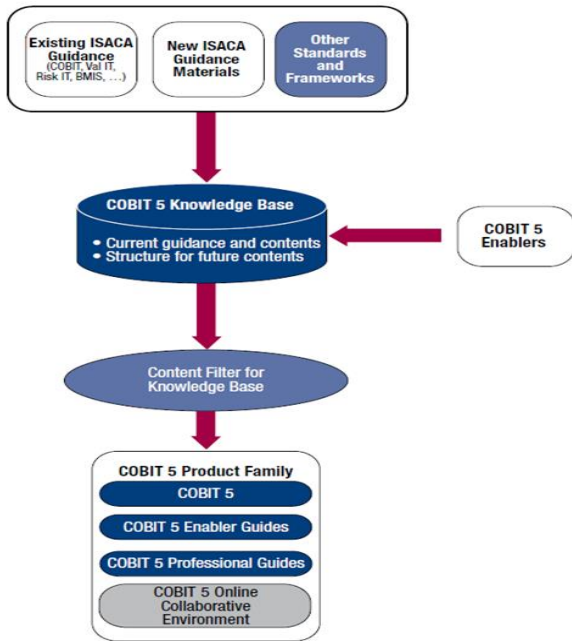


Fig.1. COBIT 5 Single Integrated Framework (ISACA, 2012, p. 25)

Aligning with other frameworks and standards such as COSO ERM, ISO/ IEC 9000, ITIL [17, Appendix E], as well as used practices such as Sunnybrook’s IT service delivery best practices and Sunnybrook’s Audit Committee’s enterprise risk management (ERM) makes enterprise coverage complete with COBIT 5. It is on this basis that [17] referred COBIT 5 as a framework integrator and good practice reference base, providing an integrated and consistent source of guidance to the IS community in a non-technical and technology-agnostic common language.

2.1.3 GlaxoSmithKline

Following the formation of its global support department, GlaxoSmithKline (GSK) realized that an evaluation of governance processes was needed to verify that appropriate structures, processes and controls were in place for the newly formed organization to ensure alignment with the enterprise strategy and its successful execution [36].

In support for this exercise, GSK’s centralized IT support group developed an organizational IT governance framework. The IT governance framework was organized along IT governance focus areas mapped to selected COBIT 4.1 process areas most applicable to GSK’s goals.

The definition of control objectives, key risk factors, and implementation for each governance focus area gave a point-in-time evaluation that enabled identification of threats, risk factors, inefficiencies, issues, and vulnerabilities with the application support department’s controls.

During a department-wide governance audit in 2013, the IT governance framework document provided a basis for audit preparedness, aided assessment for the adequacy of the controls structures that were place, ensured effectiveness of mitigation techniques, and served as a key source of information for ongoing programme improvement.

GSK later planned the inclusion of process capability assessment models in subsequent evolution of the governance framework. Planned capability assessment for critical process areas marked transition of GSK from COBIT 4.1 to COBIT 5. Founded on the ISO/IEC 15504 (SPICE) standard for IT process assessment, COBIT 5 process capability assessment model ensures that an assessed process is actually fulfilling its purpose and delivering expected outcomes [11], [17].

Table 1 summarizes the application of COBIT in healthcare from extant literature and presents a justification for the use of the more recent COBIT 5 in strategic information system planning.

2.2 Application of COBIT 5 in Strategic Planning

Ali [3] maintains that the COBIT 5 framework and its supporting materials provide strategic planning guidance that ensure that the principles of COBIT 5, as shown in Fig. 2, are achieved. He summarized the strategic planning guidance of the COBIT 5 product family, as shown in Table 2, and provided a step-by-step approach to strategic planning.



Fig. 2: COBIT 5 Principles (ISACA, 2012, pp. 13)

COBIT 5 explicitly assume that organizations analyze the status of their business/IT alignment by defining enterprise goals, mapping enterprise goals to IT-related goals, and then to COBIT IT process [11]. This cascade constitutes COBIT 5 core entry point. However, most business leaders' lack of clarity of how IT can enable the achievement of their business target and what is required of them [38]. They relegate new initiatives proposed for IT-enabled investments to the IT function which lacks understanding of business key drivers and get involved with the system post- implementation, when it becomes costlier to correct issues. This situation is exacerbated by either a lack of formalized business cases for acquisition initiatives or business cases with scant details, strategically unaligned benefits, and undefined benefits realization accountability. Once prepared, business cases, become one-off document that neither support benefits realization nor tracking of value creation from IT enabled investments. There is therefore a tendency for organizations to acquire new systems without a clear understanding of enterprise business requirement; strategic and performance goals; or enterprise processes. There is also unwillingness from enterprise management to drive implementation in some initiatives relinquishing system implementation to vendors who deliver a system that hardly meets users' expectations, enterprise strategic and performance goals, or conform to enterprise-wide governance controls.

With the goals cascade serving as nerve center of COBIT 5, [38] identified stakeholders of a local government municipality in South Africa (in this case, the enterprise) which included residents, councillors, regulators, national government, employees and vendors. Influenced by different drivers, stakeholder needs for value creation were identified and presented as a governance objective achieved by benefits realization while optimizing risk and resource cost, as shown in Fig. 3. COBIT 5 defines 17 generic goals, categorized in the balanced scorecard (BSC) dimensions [11], [17, pp. 19] as shown in Table 3, which enables the fulfilment of stakeholder needs in any enterprise. This set of generic goals typifies commonly used enterprise goals that would have allowed the definition of municipality goals which [38] identified as 'mission, vision, values, strategy and objectives'. Also identified was an integrated development plan (IDP), 5-year strategic plan ratified by residents and the local government in a public participation process. IDP enabled councillors decide among the different and conflicting needs and priorities of their respective communities, which COBIT 5 describes as 'governance' [17, pp.17].

To support delivery of municipality strategic plans, a service delivery and budget implementation plan (SDBIP) that detail the annual performance objectives and annual performance plan for implementing the municipality's

service delivery was prepared by a municipality and approved by the mayor [38].

Delivering municipality's goals, captured in the IDP and SDBIP, necessitated adoption and adaptation to IT to fulfil stakeholder requirements. Given the dependency on IT, the IT function, IT strategy, IT projects that enabled business investments, structures, processes, procedures, and the annual performance plan were identified as enablers needed to ensure municipality's governance and management practices and activities achieved stakeholder needs.

De Haes, Van Grembergen and Debreceeny [11] identified seven categories of interacting COBIT 5 enablers, illustrated in Fig. 4 that provides a holistic approach to the implementation of an organizational system. They describes these enablers as factors that individually and collectively influence the outcome of governance and management over enterprise IT.

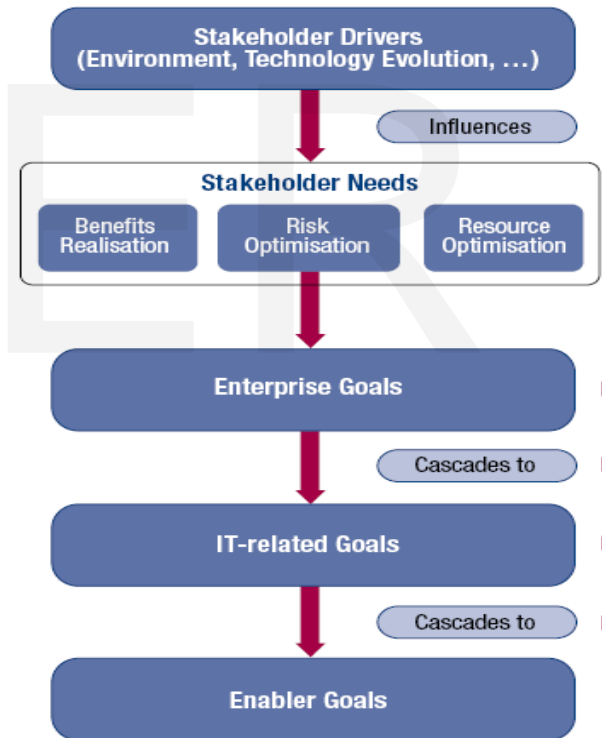


Fig. 3. COBIT 5 Goals Cascade Overview (ISACA, 2012, pp. 18)

They argue that the routine that an organization adopts in getting its people to collaborate and carry out the business can be described by the interactions amongst the organizational structures, processes, and people and relational aspects such as culture, behavior, and ethics.

They included organizational units, function and, roles such as IT steering committees as outcomes of definition and application of structures. They featured relational mechanisms as collaborative relationships and active participation of the board, senior, corporate executives, business management, and IT management. They

illustrated collaborative relationships between business and IT roles using COBIT 5 RACI (Responsible, Accountable, Consulted, Informed) charts, which provided 26 predefined organizational structures and roles [17, Figure 33] and their level of involvement, delineating who is responsible, accountable, consulted or needs to be informed.

TABLE 1  
 APPLICATION OF COBIT IN THE HEALTHCARE AND RELATED INDUSTRY

Enterprise	Application	Reference
NHS Fife (National Health Service), UK	<ul style="list-style-type: none"> <li>▪ Strategic alignment</li> <li>▪ Risk management</li> <li>▪ Standards compliance</li> <li>▪ Continual improvement</li> </ul>	(Beratarbide, Borges, & Wilson, 2012)
Sunnybrook Health Sciences Centre	<ul style="list-style-type: none"> <li>▪ IT Service Delivery</li> <li>▪ Performance Management</li> </ul>	(Curtis, 2013)
GlaxoSmithKline	<ul style="list-style-type: none"> <li>▪ Strategic alignment</li> <li>▪ IT organization and relationship governance</li> <li>▪ Quality and risk management</li> <li>▪ Communications, training, and knowledge management</li> <li>▪ Investment management, financial management, and value delivery governance</li> <li>▪ System development, deployment, and maintenance</li> <li>▪ Supplier management/ third-party services</li> </ul>	(Williamson, 2014)

Processes are regarded as the vehicle by which strategic IT decision are formalized, institutionalized and monitored to ensure consistency of day-to-day outcomes with policies as well as provide a feedback loop. De Haes, Van Grembergen and Debreceeny [11] identified 37 COBIT 5 IT processes dispersed over the domains of governance and management as illustrated in Fig.5. This process reference model provides five governance processes within the governance domain that defines the board’s responsibilities for IT as well as four subdomains in the management domain that defines the responsibility of business and IT Management.

In its quest to streamline strategic planning and alignment, which was relatively new and critical for organizational growth but ineffective, a Mexico City-based document solutions and print services provider adopted an end-to-end vision and holistic approach from COBIT 5 for generating strategies and tactics [28].

By taking into consideration relevant enablers and their interrelationships, a holistic thought process by the executive group enabled definition of good, integrated, and comprehensive strategies and tactics for the organization

and employees. The executive group also adopted an end-to-end thinking and approach that took into consideration all aspects, areas, elements, stakeholders, internal or external, that are pertinent to the achievement of the strategies and tactics.

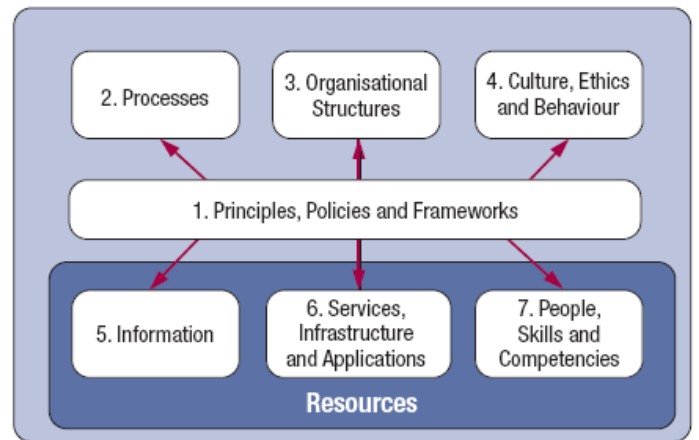


Fig.4. COBIT 5 Enterprise Enablers (ISACA, 2012, pp.24)

TABLE 2  
COBIT 5 PRODUCT FAMILY GUIDE FOR STRATEGIC PLANNING

COBIT 5 Product Family	Strategic Planning Guidance
COBIT 5 framework	Generic enterprise goals
	Goal cascade for strategically aligning goals at all levels
	Governance objectives (guidance and mapping)
	IT generic goals
	Mapping between IT strategic goals and enterprise strategic goals
COBIT 5 enabler guides	Enabler goals
	Guidance on enabler-related stakeholders, life cycle and good practices
	Enabling processes for governance and management
COBIT <sup>®</sup> 5 Implementation	Recognizing pain points and trigger events
	Stakeholder involvement
	Capturing stakeholder needs
	Details on Implementation life cycle phases (1-4)
COBIT <sup>®</sup> 5 for Risk	Understanding the associated risk in achieving the goals

Source: Strategic Planning Using COBIT 5 (Ali, 2014)

De Haes, Van Grembergen and Debrecey [11] argues that COBIT 5 covers all functions and processes within the enterprise and articulates examination and treatment of information and related technologies as valuable like other enterprise assets or capabilities. They advocate for attitudinal and behavioral change for the governing board, general business and the IT management of organizations. They emphasized the need for general business management ownership and accountability for IT use in value creation from IT-enabled business investments. They pointed out the risk of investing in multiple tactical IT initiatives without clarifying their impact on organizational capabilities as well as risk of IT becoming a liability, rather than a strategic asset, should senior managers fail to accept accountability for IT.

During the implementation of its S22 strategy, ISACA, had to determine who received benefits? Who bore risks? Who was/provides resources? to succinctly identify stakeholders and roles players [18]. Individuals with specific responsibilities and ad hoc teams were formalized with clear roles and responsibilities to ensure effective implementation. Among the roles added was a project management resource that supported the organization of the portfolio and program as well as project scheduling

tasks needed to progress initiatives that underpinned the strategy.

To apply COBIT concepts in strategy execution, ISACA had to build among staff, a level of COBIT understanding, to facilitate the application of its general concepts to specific strategic activities. A training session for initiative team leaders was facilitated by a staff COBIT expert that covered COBIT 5 basics such as principles, enablers, and goals cascade as well as addressed the application of COBIT 5 to ISACA strategy.

For the execution of its strategic plans, ISACA employed COBIT 5 professional guide that detailed seven phases of an implementation and improvement life cycle [11] as illustrated Fig. 6.

The cycle - composed of core continual improvement life cycle, change enablement, and programme management components - is characterized by initiatives portrayed as continual life cycles that are part of an ongoing implementation and improvement process.

From this seven-stage lifecycle, [38] recommended phases (1-4) of change enablement and program management for strategic IT planning highlighting the relevance of each phase to strategic planning.



TABLE 3  
COBIT 5 ENTERPRISE GOALS

BSC Dimension	Enterprise Goal	Relation to Governance Objectives		
		Benefits Realisation	Risk Optimisation	Resource Optimisation
Financial	1. Stakeholder value of business investments	P		S
	2. Portfolio of competitive products and services	P	P	S
	3. Managed business risk (safeguarding of assets)		P	S
	4. Compliance with external laws and regulations		P	
	5. Financial transparency	P	S	S
Customer	6. Customer-oriented service culture	P		S
	7. Business service continuity and availability		P	
	8. Agile responses to a changing business environment	P		S
	9. Information-based strategic decision making	P	P	P
	10. Optimisation of service delivery costs	P		P
Internal	11. Optimisation of business process functionality	P		P
	12. Optimisation of business process costs	P		P
	13. Managed business change programmes	P	P	S
	14. Operational and staff productivity	P		P
	15. Compliance with internal policies		P	
Learning and Growth	16. Skilled and motivated people	S	P	P
	17. Product and business innovation culture	P		

TABLE 4  
IT-RELATED GOALS

IT BSC Dimension	Information and Related Technology Goal	
Financial	01	Alignment of IT and business strategy
	02	IT compliance and support for business compliance with external laws and regulations
	03	Commitment of executive management for making IT-related decisions
	04	Managed IT-related business risk
	05	Realised benefits from IT-enabled investments and services portfolio
	06	Transparency of IT costs, benefits and risk
Customer	07	Delivery of IT services in line with business requirements
	08	Adequate use of applications, information and technology solutions
Internal	09	IT agility
	10	Security of information, processing infrastructure and applications
	11	Optimisation of IT assets, resources and capabilities
	12	Enablement and support of business processes by integrating applications and technology into business processes
	13	Delivery of programmes delivering benefits, on time, on budget, and meeting requirements and quality standards
	14	Availability of reliable and useful information for decision making
	15	IT compliance with internal policies
Learning and Growth	16	Competent and motivated business and IT personnel
	17	Knowledge, expertise and initiatives for business innovation

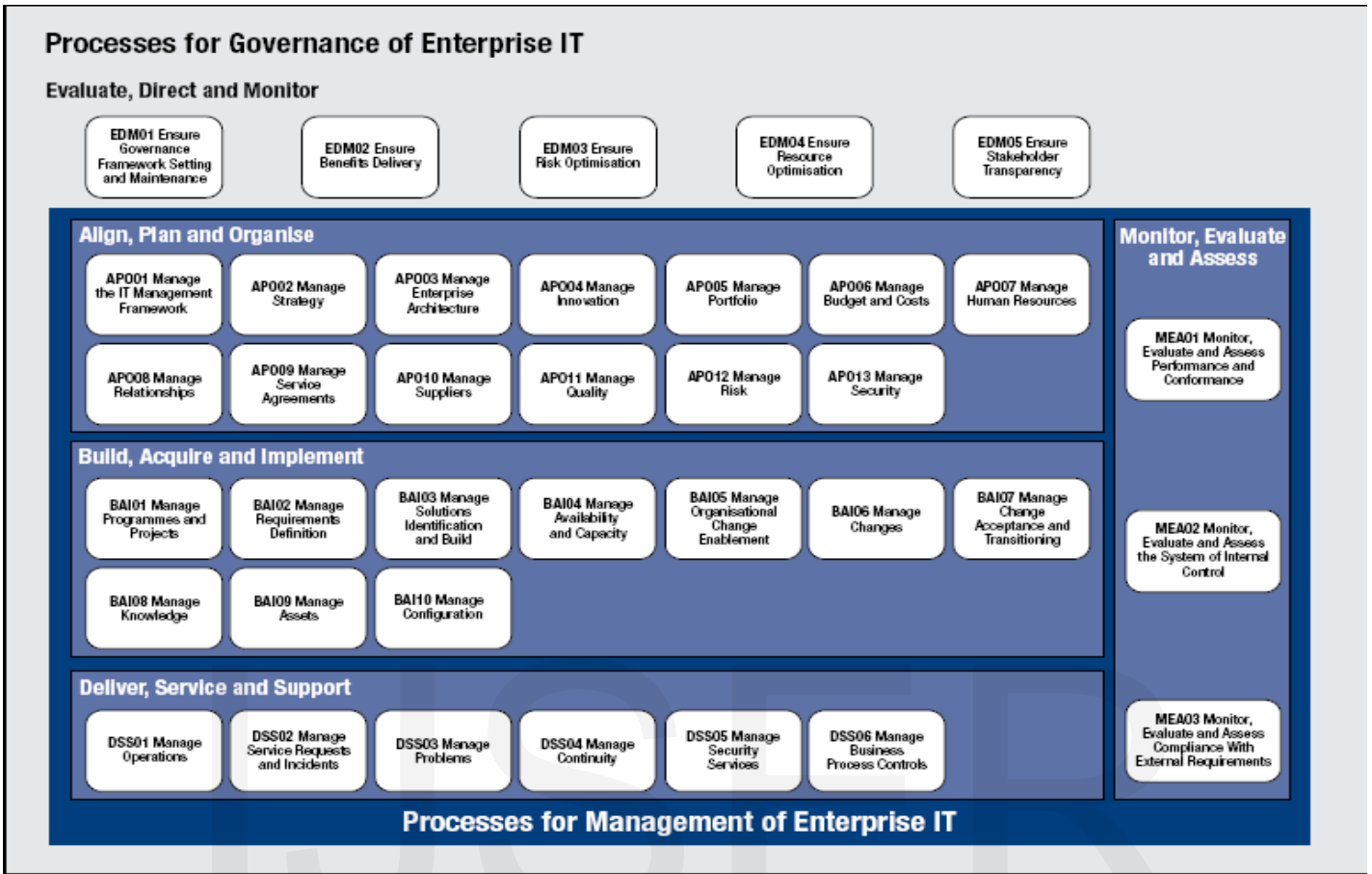


Fig. 5. COBIT 5 Process Reference Model (ISACA, 2012, pp.74)

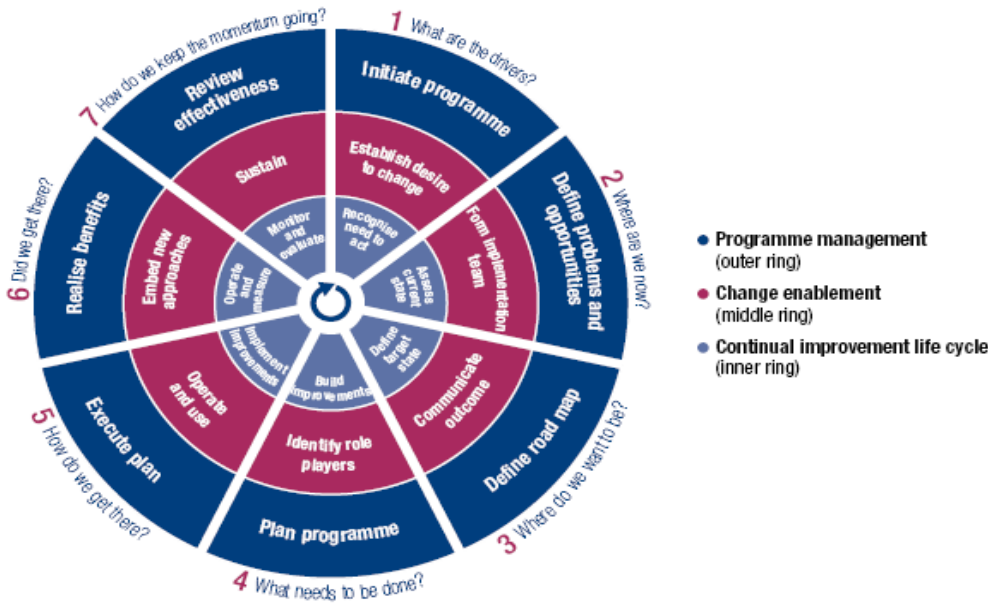


Fig. 6. The Seven Phases of the Implementation Life Cycle (ISACA, 2012, pp. 37)

### 3. RESEARCH DESIGN AND METHODOLOGY

#### 3.1 Context of the Study and Research Design

This study was guided by a constructionist research design that employed qualitative techniques in facilitating theory development. It is worth mentioning that quantitative research and tools such as questionnaires were found inappropriate for this study. Currently, neither the concepts nor the problems of SISP and the resulting Information Systems Strategy (ISS) have been satisfactorily elaborated [35]. This deficiency was confirmed by [24] and [7] who argues that SISP study is hindered by a lack of a theory that describes it. Given the state of SISP research, theory-generating research employing exploratory techniques as well as best practices was employed in this study.

This study required a semi-concealed approach characterized by the researcher's involvement with SISP practices during the case organization's strategic planning cycle or beginning of their financial year. This necessitated the researcher adopting the viewpoint of an independent observer to objectively uncover facts which might not be provided by survey techniques such as in-depth interviews [14]. We did not choose in-depth interview as the primary source of collecting qualitative data due to the difficulty of obtaining responses that were not influenced by the meaning and significance that IS planners might attach to interview questions as well as the situation they find themselves in. IS planners' suspicions of being harmed by data provided led us to adopt participant observation in reviewing the official SISP process. Despite the independence it provides, this study did not rely solely on observation for data collection. Experience from prior studies at the case organization has shown that misleading accounts could be given without confirmation of the situation observed with other data collection techniques.

Therefore responses from IS planners and secondary data sources such as internal documentation and company reports were collected to complement data collected through participant observation [14].

#### 3.2 Sample Selection and Size

The study involved a case study investigating SISP practices in a leading pharmaceutical organization which we called Nigerian Pharmaceutical Company (NPC) and proposing a practice- and process-based SISP approach that can be applicable to other indigenous pharmaceutical organizations.

We employed a contingency approach, such as used by [35], when studying NPC and evaluating its SISP process bearing in mind that a proposed approach must be appropriate to the specific situation of NPC as well as

applicable to other contexts. With this approach, we took into consideration the NPC's business environment as well as context for SISP, which was represented by the overall organization and the IT function.

To avoid misinterpretation and add credibility to our research approach, responses from the IT Manager, who drafted the IT Strategic Plan, and Assistant IT Manager were sought to confirm and accurately portray the SISP situation observed. In addition to their membership of the IT Project Steering Committee these IT Managers were chosen because of their involvement in NPC's effort in conducting a more participative strategic planning exercise in 2014. Comments from the MD/CEO who is charged with decision-making responsibilities following review of internal audit findings and recommendations, were also sought.

#### 3.3 Instrument

##### 3.3.1 Data Collection Process

Live observation of SISP practices, responses to findings, and document reviews took place between January, which marked the beginning of NPC's 2016 financial year, and February 26, 2016. During this period, we checked for the existence written policies and procedures that guide strategic planning process. We also checked for the existence of meeting minutes to identify the roles, responsibilities, and participation profile of organizational structures, corporate managers and divisional managers in strategic planning. Documents reviewed included the IT strategic document and another planning document that stated the NPC's high priority goals. We examined the IT strategic document to assess the SISP methodologies and activities practiced as well as approach to opportunities, threats, and controls. Findings were communicated to the IT Managers and MD/CEO via an assessment instrument.

##### 3.3.2 Measurements

An assessment instrument was constructed to guide the review the official SISP process in the comprehensiveness, focus, formalization, flow, participation, and consistency dimensions proposed by [32] as shown in Appendix A. This review guide was adapted from NPC's internal audit reporting formats which stated objectives, informed by [30], to be achieved from the performance of audit tasks.

Provisions were made for obtaining responses from IS planners based on findings. For each dimension, nominal scales were derived from Table 6.

#### 3.4 Analysis of Findings

For each dimension, we challenged the current SISP practices with findings from literature to determine alignment or deviation from research propositions in terms

of rationality (for comprehensiveness, focus, formalization, and flow dimensions) and adaptability (for participation

and consistency dimensions) in decision making as provided by [30].

TABLE 6  
SISP PROCESS DIMENSIONS AND MEASUREMENT SCALES

<b>SISP Process Dimension</b>	<b>Description</b>
Comprehensiveness	The extent to which an organization attempts to be exhaustive or inclusive in making and integrating strategic decisions (Comprehensive vs. Limited).
Formalization	The existence of structures, techniques, written procedures and policies which guide the planning process (Formal vs. Informal).
Focus	The balance between creativity and control orientations inherent within the strategic planning system (Creative vs. Control Oriented).
Flow	The locus of authority or devolution of responsibilities for strategic planning; in other words, the roles played by corporate and divisional managers in the initiation of the planning process (Top-down vs. Bottom-up).
Participation	The breadth of involvement in strategic planning (Broad vs. Narrow participation profile).
Consistency	Consistency is concerned with the frequency of planning activities or cycles, and relatedly, the frequency of evaluation/revision of strategic choices (High vs. Low)

Source: An Evaluation of SISP Process Stages in the Context of Developing Countries and the Role of Competing Value of Leadership (Osman, (2010))

### 3.5 Validity and Reliability

Combining document reviews with findings obtained through a structured approach to SISP process review from relevant literature as well as responses from experienced IT managers involved in planning not only ensured construct, criterion and construct validity [37, Table 2], it also provided a reliable and consistent interpretation of the SISP situation. These facilitated discussions on process concerns observed, and provided new insights into areas where NPC's IS planners could improve the capacity and effectiveness of SISP process, leveraging on the application of a good practice framework such as COBIT 5.

### 3.6 Ethics

Ethical considerations associated with this study were discussed and agreed between the researcher and supervisor and captured in the ethics response form in Appendix J.

## 4. RESULTS, ANALYSIS AND EVALUATION OF FINDINGS

### 4.1 Nigerian Pharmaceutical Company (NPC)

Founded in 1995 as a local distributor, NPC has evolved to become a key player of the pharmaceutical industry [8]. NPC is a medium sized enterprise with 400 employees with a sales organization of 136 sales representatives. The

company's business activities generally come under marketing, and sales of pharmaceuticals; and sales of medical devices, hospital consumables, laboratory and medical equipment. In addition to selling directly to wholesalers and private hospitals, NPC sell to government hospitals through Federal Ministry of Health or State central medical stores. Delivery of medicines is contracted to private sector logistics providers.

#### 4.1.1 External Context

The Nigerian pharmaceutical industry is a dominant force in the ECOWAS sub-region [8]. Over 50% of medicines and related products consumed in West Africa are produced and sold by Nigerian pharmaceutical companies that have attained an average annual growth of 10-15%, from 2005 to 2010. With NAFDAC (National Agency for Food and Drug Administration & Control) enforcement of quality control, industry growth is driven on the back of strong government regulations. Given its relatively low entry barrier, the Nigerian pharmaceutical industry is highly fragmented with industry players ranging from importers and manufacturer to distributors. With close to 120 local medicine manufacturers, only a few operates at optimal capacity utilization.

Despite the huge efforts taken by NAFDAC to regulate the industry, local producers face the menace of drug counterfeiting. Other industry challenges include excess capacity owing partly to threats from imported medicines, making it difficult for local manufacturers to compete favorably without incurring higher costs. Given the high rate of importation, accounting for 60% of medicines consumed in Nigeria, industry capacity utilization is estimated to be as low as 40% - 45%. Furthermore, medicines distribution is generally cumbersome involving numerous stakeholders at various points of the value chain. Not to mention pricing inconsistencies for medicines, with generic medicines usually priced much higher in Nigeria than in neighboring countries.

Despite the myriad of industry challenges, five Nigerian manufacturers including NPC satisfied two WHO prequalification audit requirements. WHO prequalification and certification will enhance NPC's access to multilateral agencies and NGOs whereas fringe players would either face being acquired by the key industry players such as NPC or fall out in the long term with increasing difficulty to stay competitive on small scale.

#### 4.1.2 Internal Business Context

NPC is organized into functional departments which include Marketing and Sales, Finance and Accounting, Production, Operations, Human Resources, Information Technology, Corporate Services, and General Internal Services. These functional departments combine into

business units that are headed by executive directors, who are accountable for their operations. The IT department report directly to the Managing Director/ Chief Executive Officer who is charged with executive decision making responsibilities regarding IT/IS.

NPC's IT functions comprises about 4 personnel who are responsible for application and infrastructural support. The IT function's internal workforce is provisionally augmented by interns, majorly undergraduates, seeking work experience to satisfy university requirements.

#### 4.2 Strategic Information Systems Planning at NPC

Table 7 presents an analysis of the NPC's SISP process in the comprehensiveness, focus, formalization, flow, participation, and consistency dimensions. For clarity, we organized findings and comments of IT Managers regarding findings around SISP process dimensions. A score was determined for each dimension based on analysis of findings and their implications discussed.

##### 4.2.1 Comprehensiveness

The extent to which an SISP activity set is carried out in terms of [27] IS planning phases and activities, determines an organization's attempt towards SISP comprehensiveness. From its designation, the NPC's strategic IT plan has a departmental scope, i.e. it is basically a plan for the IT department. As a departmental strategy, there is a tendency of including only initiatives in the purview of the IT department [35]. This could result in scarce integration between systems within the IT department's scope and that of the functional departments which presents problems establishing an integrated and enterprise-wide landscape for application system. This could be attributable to activity set of SISP practiced. When compared with this full range of SISP effort, NPC's activity set for SISP can be judged to be narrow.

##### 4.2.2 Focus

Budgets and resource allocation are implementations of an integrative approach [37] that reflects a control orientation within NPC's strategic IS planning system. Teubner [35] identified the risk of placing emphasis on budgets and financial figures despite its alignment and easy integration with the overall business planning. He argues that application of budget cuts and spending limits results in resource-constrained outcomes that NPC is currently facing such as failure to acquire and implement enterprise-level applications for competitive advantage and failure to implement a robust technical infrastructure that responds to immediate business needs and escalating long-term benefits. Analyzing the potential impacts of IT investment decisions intuitively rather than systematically in terms of

benefits, costs, and technology-related risks could have a negative impact on SMEs' profitability as [26] points out.

#### 4.2.3 Formalization

In the absence of more formal methods for the prioritizing IT initiatives, misalignment of SISP and business objectives is inevitable and will negatively impact SISP formulation and implementation [31]. More so, business methods practiced such as CSF Analysis cannot be used solely to determine information requirements of an organization and its managers without support from other methods [1]. Moreover, critical success factors identified failed to identify other areas recognized by [5] that will ensure a more competitive organizational performance. Teubner [35] argues that the strong business and control orientation that emerge from a full business planning-IS planning integration [7, pp. 6] disregards the engineering-like nature of SISP despite the advantage it provides in terms of strategic alignment. He points out the risk of neglecting technical planning concerns such as the implementation of a strategic infrastructure, application and technology integration, or enterprise-wide data modelling.

#### 4.2.5 Planning Flow

The bottom-up approach to strategic planning is administrative [35]. It is characterized with an absence of

strategic thinking, inertia, and domination of 'business as usual' [13]. Under these circumstances, radical and transformational IT applications only emerge when the MD/CEO brakes the administrative rules and informally puts forward and approves an IS investment.

#### 4.2.4 Participation

The role of stakeholders and the extent of their involvement in the SISP process were not defined as suggested by [31] to ensure broad participation. Although the Sales and Marketing Director participated in the review of the strategic IT plan, this level of participation does not ensure top management commitment and involvement without which SISP formulation and implementation fails.

#### 4.2.6 Consistency

Inappropriate planning horizons were among the key reasons identified by [31] for SISP formulation and implementation failures. Judging from [20] suggested time horizon for a strategic plan, we can argue in favor of the IT Manager that the strategic planning cycle practiced did not provide for adequate evaluation and revision of strategic choices required for NPC's dynamic environment.

TABLE 7  
ANALYSIS OF NPC'S SISP PROCESS DIMENSIONS

Dimension	Current Practice	Departmental (Stakeholder) Response	Measure
<b>COMPREHENSIVENESS</b>	<ul style="list-style-type: none"> <li>Strategic document was designated as '6-YEAR STRATEGIC PLAN FOR THE INFORMATION TECHNOLOGY DEPARTMENT' and specified the following activity set: Performance evaluation of the IT department; SWOT analysis; Critical Success Factor (CSF) analysis; Identification of IT initiatives; Risk analysis; Determination of IT budget; Implementation planning; and presentation of the strategic IT plan.</li> <li>Proposed initiatives were distributed towards infrastructural over more strategic initiatives that should enhance competitive advantage, reflecting the "Architectural builder" profile [15] of the IT department.</li> </ul>	".....initiatives proposed by IT were the basic needs of the entire company. They are fundamental things that are supposed to be on ground for future technology growth of the company. There was a presentation to Heads of different departments to make their contributions before the final document was submitted."	Limited

TABLE 7  
ANALYSIS OF NPC'S SISP PROCESS DIMENSIONS (CONTINUED)

Dimension	Current Practice	Departmental (Stakeholder) Response	Measure
<b>FOCUS</b>	<ul style="list-style-type: none"> <li>• Emphasis was placed on judicious financial allocation which is linked with financial planning and capital budgeting routines.</li> <li>• Considerations for prioritizing decisions concerning IS strategy were mostly based on budget margins and common sense. Given this priority setting, IS/IT initiatives proposed documented in the strategic IT plan were either deferred or not approved.</li> <li>• Although Critical Success Factor (CSF) analysis was employed to identify success factors that would either enable exploitation of opportunities or elimination of threats identified by SWOT analysis.</li> </ul>	<p>"...the 6-Year IT Strategic Plan is subject to the prevailing realities of business at all times. (...) issues affecting the business will certainly translate to constraints in implementing the IT strategy. Nevertheless, the management can be trusted to exercise due discretion in allocating resources to critical components in the IT strategic plan. (...) The IT department is open to the auditor's recommendations on the additional critical success factors which will ensure a more competitive organizational performance."</p>	Control-Oriented

TABLE 7  
ANALYSIS OF NPC'S SISP PROCESS DIMENSIONS (CONTINUED)

Dimension	Current Practice	Departmental (Stakeholder) Response	Measure
<b>FORMALIZATION</b>	<ul style="list-style-type: none"> <li>• Strategic IS planning was fully integrated into the overall business planning and was centrally managed by an ad hoc committee comprising of members of the business group with no representative from the IT department.</li> <li>• Rather than a written procedure for strategic planning, the development of departmental plans was guided by a strategy planning template requiring the use of business methods such SWOT and Critical Success Factor (CSF) analysis. CSF analysis was employed to define critical factors that will either enable exploitation of opportunities or elimination of threats identified by SWOT analysis</li> <li>• Despite the existence of an IT Project Steering Committee, there was no method for prioritizing proposed IT initiatives in terms of high priority goals.</li> </ul>	<p>"....a timetable of activities was developed to guide the strategic planning exercise."</p>	Informal



TABLE 7  
ANALYSIS OF NPC'S SISP PROCESS DIMENSIONS (CONTINUED)

Dimension	Current Practice	Departmental (Stakeholder) Response	Measure
<b>PLANNING FLOW</b>	<ul style="list-style-type: none"> <li>• Top management set high priority goals whereas functional departments including the IT department generated project ideas.</li> <li>• The Corporate Planning Committee requested departmental plans from functional departments which were to be integrated into an overall business strategy.</li> </ul>	<p>"...There was a presentation to Heads of different departments to make their contributions before the final document was submitted. (...) The strategy committee [Corporate Planning Committee] will collate the final document and present same to the entire management."</p>	Bottom-up
<b>PARTICIPATION</b>	<ul style="list-style-type: none"> <li>• The Heads of various functional departments were the principal participants in strategic planning of IT.</li> <li>• There was neither evidence of stakeholder engagement during SWOT analysis nor input from technology partners during presentation of strategic IT plan as prescribed by [20].</li> <li>• There was no evidence to suggest that initiatives proposed by functional departments were captured before the presentation of the strategy plan.</li> </ul>	<p>".....Heads of functional departments got contributions from every member of their department before developing the strategy document. Top Management was well represented by the SMD [Sales and Marketing Director] during the presentation."</p>	Narrow

TABLE 7  
ANALYSIS OF NPC'S SISP PROCESS DIMENSIONS (CONTINUED)

Dimension	Current Practice	Departmental (Stakeholder) Response	Measure
<b>CONSISTENCY</b>	<ul style="list-style-type: none"> <li>Strategic planning cycles at NPC was conducted every six years whereas the planning horizon of IT initiatives listed in the strategic plan was approximately less than a year</li> <li>Although a three-year review of the IT department's performance against a set of KPIs was stated in Strategic IT Plan, there was no revision history of the Strategic IT Plan to suggest ongoing evaluation since the 2014 corporate planning exercise that led to its formation.</li> <li>Although quarterly business review meetings were scheduled, meeting minutes could not be provided to suggest that planning activities and reviews were adequately conducted.</li> </ul>	<p>".....IT strategy cannot span to six years considering the frequent change in technology. Any plan that is not executed within the next two years would have been obsolete in the next six years".</p> <p>".....funding is delaying implementation of the IT Strategy. When the plan is implemented then there will be something to evaluate."</p>	Low

## 5. CONCLUSIONS AND RECOMMENDATION

### 5.1 Recommended COBIT-Based SISP Approach

The main intent of this study was to propose a process- and practice- based approach to SISP leveraging on COBIT 5 concepts. Based on a structured review of the SISP process from extant literature complemented by responses of IS planners to process concerns as well as document reviews, a COBIT 5-based SISP process was developed and summarized in Appendix H.

The process was derived by juxtaposing the strategic planning process proposed by [3] with [27] IS planning phases to derive a COBIT-based yet exhaustive SISP activity set with relevant inputs and outputs. Using RACI chart, the level of involvement of different organizational structures, functions, and roles were defined for each phase of the SISP process, as illustrated in Appendix F, to ensure an all-inclusive and end-to-end approach to strategic IS planning. The Corporate Planning Committee, charged with overall responsibility for strategic plan preparation, should include senior managers and representatives from the various business units and should also participate in plan implementation [5].

At the beginning of NPC's strategic planning cycle, business review meetings should be arranged to assess the

extent of plan implementation [5]. Project completion and success, among other performance measures, should determine the achievement of IT strategic goals [9]. Evaluating the achievement of IT strategic goals against the set vision and mission should create a desire in top management for improvement [3] and serve as stimuli for initiating the strategic planning cycle that could result in new or updated goals towards the achievement of the enterprise vision and mission.

Like an organizational steering committee with oversight for strategic planning [5], [20], NPC's Strategic Leadership Team (SLT), composed of senior executives with decision making responsibilities, should govern the strategic planning process.

The output of this phase should include enterprise vision, mission, and values considering that the corporate planning exercise was conducted for the first time and was not completed and therefore requires rework; planning objectives which should be succinctly defined to support the determination of SISP effectiveness [5], [7]; Table of Content for the Corporate Planning Report to determine the scope of work to be done [20],[25]; RACI charts defining roles and responsibilities of stakeholders; Timetable that

schedules planning activities and milestones to ensure that all items listed in the Table of Contents of the Corporate Planning Report are delivered; and a Project Initiation Document from the MD/CEO that formally authorizes the Corporate Planning Committee to apply organizational resources to strategic planning. With the CEO championing, sponsoring, and providing active leadership [31] for SISP as well as allocating resources for plan implementation [5, Table 3), the Corporate Planning Committee secures the much needed top management commitment necessary for a successful SISP endeavor.

Regarding strategic planning methods, COBIT 5-based tools such as generic enterprise goals; generic IT-related goals; questions on governance and management of IT; Val IT business case template; and the implementation and continual improvement lifecycle should be employed at various phases of NPC's SISP process in addition to SWOT and CSF analysis. To make SWOT analysis more effective in supporting strategy conception, the Corporate Planning Committee should ensure that Enterprise SWOT analysis and IT SWOT analysis are performed [3] with survey techniques and interviews [25] with experienced staff members in addition, to document reviews [3], [20].

The resulting Enterprise SWOT analysis and IT SWOT analysis report should serve as input for an arranged enterprise strategy workshop and IT strategy workshop respectively. NPC's strategy workshops should draw attention to the strategic role of IT [3] and afford business leaders clear understanding of the current IT position and how IT strategies will support the business strategies discussed.

Generic enterprise goals should be used during enterprise strategy workshops [3] and mapped with the governance and management questions on IT, shown in Appendix C, to define high priority goals reflecting internal stakeholders' needs and selected value discipline. High priority goals should be structured along the balanced scorecard (BSC) dimensions and visualized in a strategy map to depict interrelationships and dependencies. The workshop should also allow for the selection among product leadership, customer intimacy, and operational excellence value disciplines.

In addition to the IT SWOT analysis report, the high-priority goals, enterprise strategy map, technology trends analysis report and/or vendors, selected value discipline for the enterprise, and the IT generic goals should serve as input for the IT strategy workshop. During the IT strategy workshop, high priority goals should be mapped to IT-related goals, as shown in Appendix D, to derive IT strategic goals visualized in an IT Strategy Map. With the IT

Strategy Map defined, the IT department should identify and present IT initiatives using Val IT business case template as shown in Appendix E. The Val IT business case template support decision making regarding new investments in IT and IT-enabled change by making provision for benefits-, risks-, and resource-, and business impact-related information, which among other criteria, should facilitate project selection. Given a cost, benefits, and risk benchmark metrics for IT [26], a reference point for project evaluation is provided for an established target investment mix.

Following project evaluation, prioritization criteria should be applied to IT programme business cases by the IT Projects Steering Committee to arrive at an investment portfolio mix aligned with high priority goals. The resulting IT portfolio should be integrated with other departmental plans by the Corporate Planning Committee to generate the Corporate Planning Report. This report should be reviewed and approved by a corporate management structure [5] such as NPC's CEO. From the approved Corporate Planning Report, the IT Projects Steering Committee should chart a high-level roadmap for NPC's technology vision and direction [3], [20] that can drive the organization from the 'as is' state to the 'to be' state.

To ensure successful strategy implementation, the IT Project Steering Committee should decompose the roadmap into programme plans [3]. The committee should be accountable for the management and monitoring of programme plans, resource allocation, programme risk management as well as benefits and value delivery [17, Figure 33]. The committee should form implementation teams from which role players are identified, responsibilities defined using RACI charts, and expected outcomes communicated [3].

With roles, responsibilities, and interactions identified for organizational structures, a written procedure for NPC's SISP process can be drafted from this COBIT 5-based activity set and signed off. To ensure adoption of this COBIT 5-based approach at NPC, a training session for IT Managers, members of the Corporate Planning Committee as well as members of IT Projects Steering Committee should be arranged to build among them, a basic understanding of COBIT 5 with emphasis on strategic planning. In addition to its general concepts and COBIT 5-based tools, training should cover investment management for IT Managers and portfolio management for IT Projects Steering Committee members within the context of the Val IT framework.

Although strategic planning cycles are industry-dependent [3], NPC should consider reviewing strategic goals set for its vision and mission within a three to five years' time horizon [20], with each cycle resulting in new or updated goals towards the achievement of NPC's vision.

With the strategy implementation phase targeted for the delivery of set strategic goals [3], the Corporate Planning Committee should schedule and hold their quarterly business review meetings to evaluate achievement of IT-related and SISP process as indicated in Appendix G (which references SISP success measures in Appendix I) as well as reassess the overall strategy within this time horizon. Periodic reassessments of strategic choices based on recommendations should be evidenced by meeting minutes and revision history of the overall strategic document [5].

## 5.2 Implication for Research and Practice

This paper contributes to the extension of [13] work on SISP approaches. By specifying phases and their specific tasks, the Organizational approach can be process-centric and subject to capability assessment. This paper also contributes to the extension of [23] work on SISP methodologies by introducing COBIT-based SISP methodologies, which should be considered for further research.

In addition to process-based methodologies, this paper also provides IS planners a practice-based SISP approach from a framework that benefits from many years of experience and aligns with other frameworks and standards. Our SISP approach informs the information systems audit community of a COBIT 5-based SISP process that should be considered for inclusion among the COBIT 5 enabling processes in the Align, Plan, and Organize domain of processes for the management of enterprise.

## APPENDIX A

ASSESSMENT SHEET FOR SISP PROCESS EVALUATION ADAPTED FROM SEGAR'S ET AL (1998) AND NPC'S INTERNAL AUDIT REPORT  
FORMAT

<b>Dimension:</b>	<b>COMPREHENSIVENESS</b>		
<b>Objective:</b>	An organization should be inclusive and exhaustive in formulating and integrating strategic decisions		
<b>Audit Task:</b>	Assess SISP activities practiced		
<b>Current Practice</b>	<b>Departmental (Stakeholder) Response</b>	<b>Measure</b>	<b>Process Concern</b>
		<b>Comprehensive/ Limited</b>	
<b>Dimension:</b>	<b>FOCUS</b>		
<b>Objective:</b>	Appropriate balance should be maintained between creativity and control orientations within the strategic planning system		
<b>Audit Task:</b>	Evaluate the approach to opportunities, threats, and controls (implemented through budgets, asset management, and resource allocation).		
<b>Findings</b>	<b>Departmental (Stakeholder) Response</b>	<b>Measure</b>	<b>Process Concern</b>
		<b>Creative/ Control Oriented</b>	
<b>Dimension:</b>	<b>FORMALIZATION</b>		
<b>Objective:</b>	A wider range of strategic issues should be considered through the collection, storage and usage of information in a structured manner.		
<b>Audit Task:</b>	Check for the existence of structures, methodologies, written policies and procedures that guide strategic planning process.		
<b>Findings</b>	<b>Departmental (Stakeholder) Response</b>	<b>Measure</b>	<b>Process Concern</b>
		<b>Formal/ Informal</b>	

## APPENDIX A

ASSESSMENT SHEET FOR SISIP PROCESS EVALUATION ADAPTED FROM SEGAR'S ET AL (1998) AND NPC'S INTERNAL AUDIT REPORT  
FORMAT (CONTINUED)

<b>Dimension:</b>	<b>PLANNING FLOW</b>		
<b>Objective:</b>	Corporate managers should initiate the strategic planning process and take responsibility for formulating all new strategic moves.		
<b>Audit Task:</b>	Determine the roles and responsibilities of corporate managers and divisional managers in the strategic planning process		
<b>Findings</b>	<b>Departmental (Stakeholder) Response</b>	<b>Measure</b>	
		<b>Top-down/Bottom-up</b>	
<b>Dimension:</b>	<b>PARTICIPATION</b>		
<b>Objective:</b>	The breadth of stakeholder involvement in strategic planning should be broad		
<b>Audit Task:</b>	Assess stakeholder participation profile in strategic planning		
<b>Findings</b>	<b>Departmental (Stakeholder) Response</b>	<b>Measure</b>	<b>Process Concern</b>
		<b>Broad/ Narrow Participation Profile</b>	
<b>Dimension:</b>	<b>CONSISTENCY</b>		
<b>Objectives:</b>	A high level of consistency in the frequency of planning activities and reviews should be maintained in a dynamic enterprise environment		
<b>Audit Task:</b>	Determine strategic planning cycles and frequency of planning meetings, evaluation of strategic choices, and performance evaluation		
<b>Findings</b>	<b>Departmental (Stakeholder) Response</b>	<b>Measure</b>	<b>Process Concern</b>
		<b>High/ Low</b>	

APPENDIX B  
GOVERNANCE AND MANAGEMENT QUESTIONS ON IT

Internal Stakeholders	Internal Stakeholder Questions
<ul style="list-style-type: none"> <li>• Board</li> <li>• Chief executive officer (CEO)</li> <li>• Chief financial officer (CFO)</li> <li>• Chief information officer (CIO)</li> <li>• Chief risk officer (CRO)</li> <li>• Business executives</li> <li>• Business process owners</li> <li>• Business managers</li> <li>• Risk managers</li> <li>• Security managers</li> <li>• Service managers</li> <li>• Human resource (HR) managers</li> <li>• Internal audit</li> <li>• Privacy officers</li> <li>• IT users</li> <li>• IT managers</li> <li>• Etc.</li> </ul>	<ul style="list-style-type: none"> <li>• How do I get value from the use of IT? Are end users satisfied with the quality of the IT service?</li> <li>• How do I manage performance of IT?</li> <li>• How can I best exploit new technology for new strategic opportunities?</li> <li>• How do I best build and structure my IT department?</li> <li>• How dependent am I on external providers? How well are IT outsourcing agreements being managed? How do I obtain assurance over external providers?</li> <li>• What are the (control) requirements for information?</li> <li>• Did I address all IT-related risk?</li> <li>• Am I running an efficient and resilient IT operation?</li> <li>• How do I control the cost of IT? How do I use IT resources in the most effective and efficient manner? What are the most effective and efficient sourcing options?</li> <li>• Do I have enough people for IT? How do I develop and maintain their skills, and how do I manage their performance?</li> <li>• How do I get assurance over IT?</li> <li>• Is the information I am processing well secured?</li> <li>• How do I improve business agility through a more flexible IT environment?</li> <li>• Do IT projects fail to deliver what they promised—and if so, why? Is IT standing in the way of executing the business strategy?</li> <li>• How critical is IT to sustaining the enterprise? What do I do if IT is not available?</li> <li>• What critical business processes are dependent on IT, and what are the requirements of business processes?</li> <li>• What has been the average overrun of the IT operational budgets? How often and how much do IT projects go over budget?</li> <li>• How much of the IT effort goes to fighting fires rather than to enabling business improvements?</li> <li>• Are sufficient IT resources and infrastructure available to meet required enterprise strategic objectives?</li> <li>• How long does it take to make major IT decisions?</li> <li>• Are the total IT effort and investments transparent?</li> <li>• Does IT support the enterprise in complying with regulations and service levels? How do I know whether I am compliant with all applicable regulations?</li> </ul>
External Stakeholders	External Stakeholder Questions
<ul style="list-style-type: none"> <li>• Business partners</li> <li>• Suppliers</li> <li>• Shareholders</li> <li>• Regulators/government</li> <li>• External users</li> <li>• Customers</li> <li>• Standardisation organisations</li> <li>• External auditors</li> <li>• Consultants</li> <li>• Etc.</li> </ul>	<ul style="list-style-type: none"> <li>• How do I know my business partner's operations are secure and reliable?</li> <li>• How do I know the enterprise is compliant with applicable rules and regulations?</li> <li>• How do I know the enterprise is maintaining an effective system of internal control?</li> <li>• Do business partners have the information chain between them under control?</li> </ul>

APPENDIX C

MAPPING COBIT 5 ENTERPRISE GOALS TO GOVERNANCE AND MANAGEMENT QUESTIONS

STAKEHOLDER NEEDS	Stakeholder value of business investments	Portfolio of competitive products and services	Managed business risk (safeguarding of assets)	Compliance with external laws and regulations	Financial transparency	Customer-oriented service culture	Business service continuity and availability	Agile responses to a changing business environment	Information-based strategic decision making	Optimisation of service delivery costs	Optimisation of business process functionality	Optimisation of business process costs	Managed business change programmes	Operational and staff productivity	Compliance with internal policies	Skilled and motivated people	Product and business innovation culture	
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	
How do I get value from the use of IT? Are end users satisfied with the quality of the IT service?	■	■				■	■						■				■	■
How do I manage performance of IT?					■				■		■	■		■				
How can I best exploit new technology for new strategic opportunities?	■	■						■					■				■	■
How do I best build and structure my IT department?								■		■	■	■		■	■	■		
How dependent am I on external providers? How well are IT outsourcing agreements being managed? How do I obtain assurance over external providers?			■	■						■								
What are the (control) requirements for information?				■					■						■			
Did I address all IT-related risk?			■				■		■						■			
Am I running an efficient and resilient IT operation?					■		■											
How do I control the cost of IT? How do I use IT resources in the most effective and efficient manner? What are the most effective and efficient sourcing options?										■		■		■				
Do I have enough people for IT? How do I develop and maintain their skills, and how do I manage their performance?										■		■		■				
How do I get assurance over IT?				■											■			



APPENDIX C

MAPPING COBIT 5 ENTERPRISE GOALS TO GOVERNANCE AND MANAGEMENT QUESTIONS (CONTINUED)

STAKEHOLDER NEEDS	Stakeholder value of business investments	Portfolio of competitive products and services	Managed business risk (safeguarding of assets)	Compliance with external laws and regulations	Financial transparency	Customer-oriented service culture	Business service continuity and availability	Agile responses to a changing business environment	Information-based strategic decision making	Optimisation of service delivery costs	Optimisation of business process functionality	Optimisation of business process costs	Managed business change programmes	Operational and staff productivity	Compliance with internal policies	Skilled and motivated people	Product and business innovation culture
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
Is the information I am processing well secured?																	
How do I improve business agility through a more flexible IT environment?																	
Do IT projects fail to deliver what they promised—and if so, why? Is IT standing in the way of executing the business strategy?																	
How critical is IT to sustaining the enterprise? What do I do if IT is not available?																	
What concrete vital primary business processes are dependent on IT, and what are the requirements of business processes?																	
What has been the average overrun of the IT operational budgets? How often and how much do IT projects go over budget?																	
How much of the IT effort goes to fighting fires rather than to enabling business improvements?																	
Are sufficient IT resources and infrastructure available to meet required enterprise strategic objectives?																	
How long does it take to make major IT decisions?																	
Are the total IT effort and investments transparent?																	
Does IT support the enterprise in complying with regulations and service levels? How do I know whether I am compliant with all applicable regulations?																	

APPENDIX D

MAPPING COBIT 5 ENTERPRISE GOALS TO IT-RELATED GOAL

			Enterprise Goal																	
			Stakeholder value of business investments	Portfolio of competitive products and services	Managed business risk (safeguarding of assets)	Compliance with external laws and regulations	Financial transparency	Customer-oriented service culture	Business service continuity and availability	Agile responses to a changing business environment	Information-based strategic decision making	Optimisation of service delivery costs	Optimisation of business process functionality	Optimisation of business process costs	Managed business change programmes	Operational and staff productivity	Compliance with internal policies	Skilled and motivated people	Product and business innovation culture	
			1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	
IT-related Goal			Financial				Customer				Internal				Learning and Growth					
Financial	01	Alignment of IT and business strategy	P	P	S			P	S	P	P	S	P	S	P			S	S	
	02	IT compliance and support for business compliance with external laws and regulations			S	P												P		
	03	Commitment of executive management for making IT-related decisions	P	S	S					S	S		S			P			S	S
	04	Managed IT-related business risk			P	S			P	S		P				S		S	S	
	05	Realised benefits from IT-enabled investments and services portfolio	P	P				S		S		S	S	P		S				S
	06	Transparency of IT costs, benefits and risk	S		S		P				S	P		P						
Customer	07	Delivery of IT services in line with business requirements	P	P	S	S		P	S	P	S		P	S	S			S	S	
	08	Adequate use of applications, information and technology solutions	S	S	S			S	S		S	S	P	S		P		S	S	
Internal	09	IT agility	S	P	S			S		P			P		S	S		S	P	
	10	Security of information, processing infrastructure and applications			P	P			P									P		
	11	Optimisation of IT assets, resources and capabilities	P	S						S		P	S	P	S	S				S
	12	Enablement and support of business processes by integrating applications and technology into business processes	S	P	S			S		S		S	P	S	S	S				S
	13	Delivery of programmes delivering benefits, on time, on budget, and meeting requirements and quality standards	P	S	S			S				S		S	P					
	14	Availability of reliable and useful information for decision making	S	S	S	S			P		P		S							
	15	IT compliance with internal policies			S	S												P		
Learning and Growth	16	Competent and motivated business and IT personnel	S	S	P			S		S						P		P	S	
	17	Knowledge, expertise and initiatives for business innovation	S	P				S		P	S		S		S			S	P	

APPENDIX E  
VAL IT BUSINESS CASE TEMPLATE**Template**

The investment, category size, the impact if not successful, and position in the economic life cycle are factors that determine which components of the business case require greater attention and what level of detail is required. The following example illustrates an overall structure and content of a business case:

**• Cover sheet**

- Programme name
- Business sponsor
- Programme manager
- Revision notes
- Validation signatures
- Approval signature

**• Executive summary**

- Programme context
  - Name
  - Business sponsor
  - Track record of management team
  - Category of investment
  - Programme description/profile
- Synopsis of business case assessment
  - Programme contribution (value)
  - Programme plan and timing (schedule)
  - Change implications
  - Key risks
  - Comparative value summary

**• Introduction/background**

- Opportunity and problem definition
  - Problem to be addressed
  - Purpose
  - Strategic contribution
- Recommended solution
  - Scope
  - Business impact
  - Approach
  - Alternatives
- Value impact (attractiveness)
- Financial and non-financial benefits
  - Description
  - Measures
  - Accountabilities
- Costs (full economic life-cycle and full IT and business costs—best case, worst case, most likely case)
- Organisational change implications (feasibility)
  - Breadth and depth of change
  - Organisational capability and readiness
- Risks and assumptions and their mitigation (feasibility)
  - Delivery risks
  - Benefit risks

**• Implementation approach**

- Programme plan, milestones and time frame
- Programme dependencies
- Enterprise architecture compliance
- Security policy compliance
- Critical success factors
- Stage-gate funding requests
- Resourcing requirements
- Governance arrangements

**• Appendices**

- The Results Chain (or equivalent)
- The detailed programme plan (including individual project plans)
- The resourcing plan
- The financial plan
- The benefits realisation plan (including the benefits register)
- The (organisational) change management plan
- The risk management plan (including the risk register)

The template table of contents could be summarised to contain:

- Executive summary
- Introduction
- Recommendations
- Business attractiveness
- Feasibility
- Approach
- Appendices

APPENDIX F  
 SISP RACI CHART

	Chief Executive Officer	Sales & Marketing Director	Operations Director	Strategic Leadership Team	Chief Accountant	Corporate Planning Committee	IT Projects Steering Committee	Business Process Owners	Internal Control & Audit	IT Manager
<b>Management Practice</b>										
Plan the IS planning process				C		A				
Analyze the current environment	C	C	C			A/R		C	C	R
Conceive strategy alternatives	C	C	C			A		C	C	R
Select strategy	I				C	A	R			C
Plan strategy implementation	I				C	A	R	I	I	I

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## APPENDIX G

## SISP PROCESS DESCRIPTION, PURPOSE STATEMENT, GOALS AND METRICS (ADAPTED FROM COBIT 5 REFERENCE GUIDE CONTENTS (2012))

<b>Process Description</b>	
Defines routines that are carried out by an enterprise to align its information technology and systems with its long-term strategic business objectives. Leverages an enterprise's external and internal environment as well as resources to define and update the information systems strategy	
<b>Purpose Statement</b>	
Identifies a portfolio of computer-based applications that will assist an enterprise in executing its business plans and realizing its business goals	
<b>IT-related Goal</b>	<b>Related Metrics</b>
Alignment of IT and business strategy	<ul style="list-style-type: none"> <li>Existence of a uniform basis for the prioritization of IT projects.</li> </ul>
Delivery of IT services in line with business requirements	<ul style="list-style-type: none"> <li>Level of understanding of the business information needs</li> </ul>
Optimization of IT assets, resources and capabilities	<ul style="list-style-type: none"> <li>Level of control of human, hardware and software resources</li> </ul>
Availability of reliable and useful information for decision making	<ul style="list-style-type: none"> <li>Level of coordination in decision making</li> </ul>
Knowledge, expertise and initiatives for business innovation	<ul style="list-style-type: none"> <li>Number key problem areas identified</li> <li>Number of new ideas and opportunities identified</li> </ul>
<b>Process goals</b>	<b>Related Metrics</b>
1. Anticipate changes and trends in the industry	<ul style="list-style-type: none"> <li>Level of satisfaction of business executives with IT's responsiveness to new requirements</li> <li>Number of critical business processes supported by up-to-date infrastructure and applications</li> </ul>
2. Competitive advantages is gained from IT	<ul style="list-style-type: none"> <li>Percent of products and services that provide competitive advantage</li> </ul>
3. IT is aligned with business needs	<ul style="list-style-type: none"> <li>Percent of enterprise strategic goals and requirements supported by IT strategic goals</li> <li>Level of stakeholder satisfaction with scope of the planned portfolio of programmes and services</li> </ul>
4. An appropriate information architecture is implemented	<ul style="list-style-type: none"> <li>Percent of business process owners satisfied with supporting IT products and services</li> <li>Net present value (NPV) showing business satisfaction on level of the quality and usefulness of the technology solutions</li> </ul>
5. User satisfaction with IT services improves	<ul style="list-style-type: none"> <li>Number of business disruptions due to IT service incidents</li> <li>Percent of business stakeholders satisfied that IT service delivery meets agreed-on service levels</li> <li>Percent of users satisfied with the quality of IT service delivery</li> </ul>

## APPENDIX H

SISP PROCESS PRACTICES, INPUTS, OUTPUTS, ACTIVITIES, TOOLS AND TECHNIQUES (ADAPTED FROM MENTZAS (1997) AND ALI (2014))

Management Practice	Inputs	Tools and techniques	Output
<b>Plan IS planning process</b>	<ul style="list-style-type: none"> <li>Performance Reports</li> </ul>	<ul style="list-style-type: none"> <li>Business Review Meeting</li> </ul>	<ul style="list-style-type: none"> <li>Enterprise Vision, Mission, and Values</li> <li>Planning Objectives</li> <li>Project Initiation Document</li> <li>Table of Contents for Corporate Planning Report</li> <li>RACI Charts</li> <li>Corporate Planning Timetable</li> </ul>
<b>Activities</b>			
<ol style="list-style-type: none"> <li>Determine key planning issues</li> <li>Define planning objectives</li> <li>Define Enterprise Vision, Mission, and Values</li> <li>Review Plan Implementation against IT Strategic Goals</li> <li>Review and Revise Enterprise Goals against Set Vision and Mission</li> <li>Establish Desire to Change</li> <li>Initiate Strategic Planning</li> <li>Form planning team(s)</li> </ol>			
Management Practice	Inputs	Tools and techniques	Output
<b>Analyze the current environment</b>	<ul style="list-style-type: none"> <li>Existing Documentation</li> <li>Surveys</li> <li>Stakeholders' interviews</li> </ul>	<ul style="list-style-type: none"> <li>Document Review</li> <li>Enterprise SWOT Analysis</li> <li>IT SWOT Analysis</li> </ul>	<ul style="list-style-type: none"> <li>Enterprise SWOT Analysis Report</li> <li>IT SWOT Analysis Report</li> </ul>
<b>Activities</b>			
<ol style="list-style-type: none"> <li>Perform Enterprise SWOT Analysis</li> <li>Perform IT SWOT Analysis</li> </ol>			

## APPENDIX H

## SISP PROCESS PRACTICES, INPUTS, OUTPUTS, ACTIVITIES, TOOLS AND TECHNIQUES (ADAPTED FROM MENTZAS (1997) AND ALI (2014)) (CONTINUED)

Management Practice	Inputs	Tools and techniques	Output
<b>Conceive strategy alternatives</b>	<ul style="list-style-type: none"> <li>Value Discipline</li> <li>Enterprise SWOT Analysis Report</li> </ul>	<ul style="list-style-type: none"> <li>Enterprise Strategy Workshop</li> <li>Generic Enterprise Goals</li> <li>Balanced Scorecard</li> <li>Questions on Governance and Management of IT</li> </ul>	<ul style="list-style-type: none"> <li>Selected Value Discipline</li> <li>Final/ Revised High-priority Goals</li> <li>Enterprise Strategy Map</li> </ul>
	<ul style="list-style-type: none"> <li>Final/Revised High-priority Goals</li> <li>Technology Trends Analysis Report</li> <li>Selected Value Discipline</li> <li>IT SWOT Analysis Report</li> </ul>	<ul style="list-style-type: none"> <li>IT Strategy Workshop</li> <li>IT-related Goals</li> </ul>	<ul style="list-style-type: none"> <li>IT Strategy Map</li> </ul>
Activities			
<ol style="list-style-type: none"> <li>Capture Stakeholder Needs</li> <li>Arrange Enterprise Strategy Workshop</li> <li>Align Enterprise Goals to Stakeholder Needs and Governance Objectives</li> <li>Create the Enterprise Strategy Map</li> <li>Arrange IT Strategy Workshop</li> <li>Map IT Strategic Goals to Enterprise Goals</li> <li>Create the IT Strategy Map</li> </ol>			
Management Practice	Inputs	Tools and techniques	Output
<b>Select strategy</b>	<ul style="list-style-type: none"> <li>IT Strategy Map</li> </ul>	<ul style="list-style-type: none"> <li>Val IT Business Case Template</li> <li>Prioritization Criteria</li> <li>Target Investment Mix</li> </ul>	<ul style="list-style-type: none"> <li>IT-enabled Investment Portfolio</li> </ul>
Activities			
<ol style="list-style-type: none"> <li>Identify new business processes, IT architectures, and specific projects</li> <li>Prioritize new projects</li> </ol>			

APPENDIX H

SISP PROCESS PRACTICES, INPUTS, OUTPUTS, ACTIVITIES, TOOLS AND TECHNIQUES (ADAPTED FROM MENTZAS (1997) AND ALI (2014)) (CONTINUED)

Management Practice	Inputs	Tools and techniques	Output
<b>Plan strategy implementation</b>	<ul style="list-style-type: none"> <li>Corporate Planning Report</li> </ul>	<ul style="list-style-type: none"> <li>Road mapping Tool</li> <li>Project Scheduling Tool</li> <li>RACI Charts</li> </ul>	<ul style="list-style-type: none"> <li>Roadmap</li> <li>Programme plan</li> </ul>
		<ul style="list-style-type: none"> <li>Performance Measures for IT Goal Achievement</li> </ul>	<ul style="list-style-type: none"> <li>Programme Completion Tracking Sheet</li> </ul>
<b>Activities</b>			
<ol style="list-style-type: none"> <li>Form Implementation Team</li> <li>Identify Role Players</li> <li>Define Roadmap</li> <li>Plan Programme</li> </ol>			

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APPENDIX I  
SUCCESS MEASURE FOR SISIP PROCESS

Please circle the extent to which you agree or disagree with the level that the SISIP process in your organization has contributed to improving various planning capabilities:

	Strongly Disagree							Strongly Agree						
The SISIP process has contributed to:														
understanding the information needs of the business	1	2	3	4	5	6	7	1	2	3	4	5	6	7
identifying key problem areas	1	2	3	4	5	6	7	1	2	3	4	5	6	7
identifying new ideas and opportunities	1	2	3	4	5	6	7	1	2	3	4	5	6	7
improving coordination of decision making	1	2	3	4	5	6	7	1	2	3	4	5	6	7
establishing uniform basis for prioritizing IT projects	1	2	3	4	5	6	7	1	2	3	4	5	6	7
improving control of human, software and hardware resources	1	2	3	4	5	6	7	1	2	3	4	5	6	7

Please circle the extent to which you agree or disagree with the level that the SISIP process in your organization has contributed to the fulfillment of various SISIP objectives:

	Strongly Disagree							Strongly Agree						
The SISIP process has contributed to:														
anticipating changes and trends in the industry	1	2	3	4	5	6	7	1	2	3	4	5	6	7
gaining a competitive advantage from IT	1	2	3	4	5	6	7	1	2	3	4	5	6	7
aligning IT with business needs	1	2	3	4	5	6	7	1	2	3	4	5	6	7
implementing an appropriate information architecture	1	2	3	4	5	6	7	1	2	3	4	5	6	7
increasing user satisfaction with IT services	1	2	3	4	5	6	7	1	2	3	4	5	6	7
increasing top management commitment to IT	1	2	3	4	5	6	7	1	2	3	4	5	6	7

Source: Contingency Model for Estimating Success of Strategic Information Systems (Bechor et al., 2010)

APPENDIX J  
ETHICS DISCUSSION AND AGREEMENT

ETHICS RESPONSE FORM

Researcher name (student): <b>NNAMDI NWOSU</b>	Faculty reviewer: <b>Dimitrios Koufopoulos</b>	Date of Review: <b>7/1/2016</b>
Working Title of Proposal or summary of study scope: <b>Leveraging COBIT 5 in Strategic Information Systems Planning: A Case Study from the Pharmaceutical Industry</b>		
Proposal attached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> <b>N</b> No	Academic Honesty Declaration signed? <input checked="" type="checkbox"/> <b>Y</b> Yes <input type="checkbox"/> No	

Each of the ethical standards below must be adequately addressed by the researcher in order to obtain ethics approval.

In the first column, the **RESEARCHER (student)** should perform a self-check using these 35 questions before submitting the ethics form to the faculty member supervising the study. In each row of the first column, the RESEARCHER should enter YES, NO, or NA as well as a very brief explanation. The Academic Honesty Declaration must be attached and should be signed and dated.

In the second column the **ETHICS REVIEWER (supervising faculty member)** will enter YES, NO, or NA to confirm or challenge the RESEARCHER'S self-check on each standard. With each NO, the ETHICS REVIEWER will indicate what revisions are required for ethics approval. The faculty reviewer will also render a decision at the end of this form and return the form to the RESEARCHER.

If the ETHICS REVIEWER (supervising faculty member) is able to approve "as is" then the third column is left blank.

In the third column, the **RESEARCHER (student)** will respond to each of the ETHICS REVIEWER'S concerns to explain where/how each of the reviewer's concerns was met in the resubmitted materials.

	Researcher's ethics self-check	Ethics Reviewer's assessment:	Researcher's response to Ethics Reviewer
	In each row, the researcher should confirm compliance with the ethical standard by entering "Yes," "No," or "N/A," along with a brief defense of the response (i.e., stating keywords that point to how the ethical standard has been met).	After the researcher has presented the evidence for compliance with each ethical standard, the Ethics Reviewer should either confirm by entering "Yes" or challenge with "No." With each "No," the reviewer must specify what revisions are needed to obtain ethics approval.	Researcher must use this column to <u>explain how and where</u> each of the Ethics Reviewer's concerns (in the second column) has been addressed.
<i>Example: Will data be stored securely?</i>	<i>Yes. Data files will be kept on a password protected computer.</i>	<i>No. Please also address how the paper surveys will be secured prior to being entered as electronic files.</i>	<i>Paper surveys will be in a locked file cabinet. Proposal has been updated.</i>

The first 11 questions apply to all studies (even when the researcher is not interacting with participants to collect new data).  
Hover the mouse over the footnoted words to view extra tips and definitions.

1. Are participant recruitment and data collection <u>steps</u> * adequately described, such that the study's risks and burdens can be discerned?	Yes. This study has been included in the audit plan of the next financial year which commences in January, 2016 and will be signed off by the Managing Director. Since it has been included in the audit plan, resources will be provided and Stakeholders/ Auditees are compelled to participate in this study	Yes	
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APPENDIX J  
ETHICS DISCUSSION AND AGREEMENT (CONTINUED)

2. Will the research procedures ensure <u>privacy</u> <sup>b</sup> during data collection?	Yes. The organization's Internal Control & Audit department of which the researcher is part of maintains a signed off Audit Charter that demands confidentiality in all audit / assurance programmes	Yes	
3. Will data be stored <u>securely</u> <sup>c</sup> with adequate provisions to maintain the confidentiality of the data?	Yes. Data will be stored in portable document format and password- protected and stored in my Dropbox drive.	Yes	
4. Will the data be stored for at least 5 years?	Yes. Data will be stored for reference purposes and archived.	Yes	
5. If participants' names or contact info will be recorded in the research records, are they absolutely <u>necessary</u> <sup>d</sup> ?	No. Participants' names and contacts will not be recorded in the research	Yes	
6. Do the research procedures and analysis/write-up plans include all possible measures to ensure that participant identities are not directly or <u>indirectly</u> <sup>e</sup> disclosed? For secondary data analyses, the proposal must clearly state when/how de-identification will occur.	Yes. Case organization will be referred to as Nigerian Pharmaceutical Company (NPC) whereas participants would be addressed by their designation	Yes	
7. Have all potential <u>psychological</u> <sup>f</sup> , <u>relationship</u> <sup>f</sup> , <u>legal</u> <sup>f</sup> , <u>economic/professional</u> <sup>f</sup> , <u>physical</u> <sup>f</sup> , and other risks been fully <u>acknowledged</u> <sup>f</sup> and described?	N/A	Yes	
8. Have the above risks been minimized 'as much as possible'?	N/A	Yes	
9. Has the researcher proactively managed any potential conflicts of <u>interest</u> <sup>g</sup> ? Note that student researchers may <u>not</u> utilise research assistants to recruit participants or collect research data on behalf of the researcher.	Yes. The researcher's job description includes continuous process improvement and demands a high level independence. This research has been included in the audit plan of the next financial year	Yes	

APPENDIX J  
ETHICS DISCUSSION AND AGREEMENT (CONTINUED)

10. Are the research risks and <u>burdens</u> <sup>a</sup> reasonable, in consideration of the new <u>knowledge</u> <sup>a</sup> that this research design can offer?	Yes. The research design assesses the effectiveness of the Strategic Information Systems Planning (SISP) process with an aim of addressing process concerns using COBIT 5 principles and concepts and will provide a foundation for subsequent audit of the SISP process	Yes	
11. Is the research site willing to provide an Authorisation Letter (or email) granting <u>permission</u> <sup>a</sup> for all relevant <u>data</u> access, access to participants, facility use, and/or use of personnel time for research purposes?	Yes. The researcher's job designation as the Senior Information Systems Auditor in the case organization gives him access to all relevant data. This has been provided for in the Audit Charter	Yes	
<p>The remaining questions only apply to studies that involve recruiting participants to collect new data (such as surveys, interviews, observations).</p> <p>_____ Please place an X on this line if <u>NONE</u> of the questions in the next section are applicable to the proposed study.</p>			
12. Applicable for student researchers: Will this researcher be appropriately <u>qualified</u> <sup>a</sup> and <u>supervised</u> <sup>a</sup> in all data collection procedures?	N/A	Yes	
13. Is participant recruitment coordinated in a manner that is <u>non-coercive</u> <sup>a</sup> ? Coercive elements include: leveraging an existing relationship to "encourage" participation, recruiting in a <u>group</u> <sup>a</sup> setting, extravagant compensation, recruiting individuals in a context of their treatment or <u>evaluation</u> <sup>a</sup> , etc. A researcher must disclose here whether/how the researcher may already be known to the participants and explain how perceptions of coerced research participation will be <u>minimized</u> <sup>a</sup> .	YES. Though included in the audit plan, the study necessitates collaboration between the researcher and various stakeholders to improve the Strategic Information System Planning process. A participative approach will be followed	Yes	

APPENDIX J  
ETHICS DISCUSSION AND AGREEMENT (CONTINUED)

14. If anyone would be excluded from participating, is their exclusion justified? Is their exclusion handled respectfully and without stigma?	N/A. Since the audit plan is approved by top management, participants are compelled to take part in the study.	Yes	
15. Where the researcher proposes to use an interpreter, has adequate consideration been given to the interpreter's training regarding confidentiality and principles of informed consent, etc.?	N/A	Yes	
16. Do the informed consent procedures provide adequate time to review the study information and ask questions before giving consent?	N/A.	Yes	
17. Will informed consent be appropriately documented?	N/A	Yes	
18. Is the participant information sheet (PIS) written using language that will be understandable to the potential participants?	N/A	Yes	
19. Does the PIS include an understandable explanation of the research purpose?	N/A	Yes	
20. Does the PIS explain the sample's inclusion criteria in such a way that the participants can understand how/why THEY are being asked to participate?	N/A	Yes	
21. Does the PIS clearly state that participation is voluntary?	N/A	Yes	
22. Does the PIS convey that the participant has the right to decline or discontinue participation at any time?	N/A	Yes	
23. Does the PIS include an understandable description of the data collection procedures?	N/A	Yes	

APPENDIX J  
ETHICS DISCUSSION AND AGREEMENT (CONTINUED)

24. Does the PIS include an estimate of the time <u>commitment<sup>sm</sup></u> for participation?	N/A	Yes	
25. Does the PIS describe any thank you gifts, compensation, or reimbursement to participants (for travel costs, etc.) or lack thereof?	N/A	Yes	
26. Does the PIS include a description of reasonably foreseeable <u>risks<sup>st</sup></u> or discomforts?	N/A	Yes	
27. Does the PIS include a description of anticipated benefits to <u>participants<sup>sm</sup></u> and/or others?	N/A	Yes	
28. Does the PIS explain how the participant can contact the researcher and the university's Research Participant Advocate? (USA number 001-612-312-1210 or email address <a href="mailto:Ethics@roehampton-online.com">Ethics@roehampton-online.com</a> )	N/A	Yes	
29. Does the PIS describe how privacy will be <u>maintained<sup>sm</sup></u> ?	N/A	Yes	
30. Does the PIS disclose all potential conflicts of interest (specifying that this study is separate from the researcher's other professional role)?	N/A	Yes	
31. Do the consent documents preserve the participant's <u>legal<sup>st</sup></u> rights?	N/A	Yes	
<p>The remaining questions regarding sensitive content and vulnerable populations should be reviewed and addressed by the researcher (student) and faculty reviewer, but must also be confirmed by the International Online Research Ethics Committee before the study may go ahead.</p> <p><input checked="" type="checkbox"/> Please place an X on this line if <b>NONE</b> of the questions in the next section are applicable to the proposed study.</p>			
32. If <u>vulnerable<sup>st</sup></u> individuals will be specifically sought out as participants, is such targeted recruitment <u>justified<sup>sk</sup></u> by a research design that will specifically benefit that vulnerable group at large?			
33. If the researcher happens to also serve in a trusted or <u>authoritative<sup>st</sup></u> role to the participant (e.g., health care provider, teacher etc.), do the recruitment procedures ensure voluntary participation?			
34. If the research procedures might reveal or create an acute psychological state that necessitates referral, are there suitable procedures in place to manage this?			
35. If the research procedures might reveal criminal activity, child/elder abuse, or employer policy non-compliance that <u>necessitates<sup>sm</sup></u> reporting, are there suitable procedures in place for managing this? Are limits to confidentiality (i.e., duty to report) appropriately mentioned in the Participant Information Sheet?			

APPENDIX J  
ETHICS DISCUSSION AND AGREEMENT (CONTINUED)

<b>ETHICS APPROVAL DECISION</b>	
<p><b>THIS DOCUMENT MUST BE POSTED IN THE GRADEBOOK AFTER THE SUPERVISING FACULTY MEMBER HAS RENDERED A DECISION.</b></p> <p>The supervising Faculty Member will mark an X next to box A, B, or C. If box A or B is marked, then the supervising faculty member will also mark an X next to the applicable subcategory (1, 2, 3, etc.):</p>	
<b>X</b>	<p><b>A. APPROVED VIA EXPEDITED (LIGHT TOUCH) ETHICS REVIEW:</b></p> <ul style="list-style-type: none"> <li>As the supervising faculty member, I confirm that all applicable criteria 1-35 above are met with either a "Yes" or "N/A."</li> <li>I understand my responsibilities as supervisor, and will ensure to the best of my abilities that the student investigator abides by the University's policy on Research Ethics at all times.</li> <li>I affirm that the research activities fall entirely within the parameters of the design indicated with an X below (1, 2 or 3) that the International Online Research Ethics Committee has authorized faculty members to approve via the expedited (light touch) review:</li> </ul>
	<p>1. analysis of <u>public</u> documents, artifacts, behaviour or data;</p>
	<p>2. secondary analysis of <u>existing</u> data that is privately held but released for research purposes (with all identifiers removed);</p>
	<p><b>X</b> 3. surveys or interviews of <u>non-vulnerable</u> adults on <u>non-sensitive</u> topics (i.e., no potential to participants of coercion, distress, loss of work/school time, damage to professional reputation). Vulnerable populations include children, clinic patients, prisoners, military personnel, facility residents, anyone over whom the researcher holds authority (e.g., students, subordinates), anyone who might feel undue pressure to participate in the study, and any individuals with severe enough mental disabilities to interfere with capacity to consent to the study.</p>
<b>X</b>	<p><b>B. REFERRED TO ETHICS COMMITTEE:</b></p> <ul style="list-style-type: none"> <li>As the supervising faculty member, I am referring this study to the full ethics committee (IOREC) because [mark 1, 2, 3, 4 or Other below].</li> <li>I will email the student's ethics application and all attachments as a single zip file to the ethics committee via <a href="mailto:Ethics@roehampton-online.com">Ethics@roehampton-online.com</a>, copying the Programme Director.</li> </ul> <p>The ethics committee accepts applications until 5 pm GMT on the 3<sup>rd</sup> Thursday of every month. Decisions and feedback will be emailed to the student and DA within 5 business days after the 4<sup>th</sup> Thursday of the month.</p>
	<p>1. the researcher proposes to collect data from vulnerable individuals such as children, clinic patients, prisoners, military personnel, facility residents, anyone over whom the researcher holds authority (e.g., students, subordinates), anyone who might feel undue pressure to participate in the study, and any individuals with severe enough mental disabilities to interfere with capacity to consent to the study.</p>
	<p>2. some (potential) participants may find the research topic or premise sensitive</p>
	<p>3. participants' jobs or livelihoods may be placed at any risk by the study activities</p>
	<p>4. the participants' culture and/or international location suggest that extra participant protections may be necessary</p>
	<p>Other: _____</p>
<p><b>C. REVISIONS REQUIRED:</b></p> <p>The student needs to revise the proposal and ethics materials to address the concerns in the second column and resubmit to me before I can select A or B above.</p>	

APPENDIX J  
ETHICS DISCUSSION AND AGREEMENT (CONTINUED)**Footnotes**

- \* In order to weigh potential risks against benefits, the researcher first needs to plan and clearly articulate all of the following that apply:  
how existing data or contact information of potential participants will be obtained,  
format and content of the initial contact with potential participants,  
informed consent procedures,  
assignment to groups (if applicable),  
description of any pilot activities,  
data collection steps,  
transcript review and/or membercheck (if applicable), and  
how results will be shared with stakeholders.
- \* Privacy risks might include unintended breach of confidential information (such as educational or medical records); being observed/overheard by others while meeting researcher or providing data; or intrusion on the privacy of others who are not involved in the study (e.g. participant's family).
- \* Secure data storage requires password protection on electronic files and locks for physical data.
- \* Note that consent forms do not replace signatures if the participant can indicate consent by some action such as clicking on a link, returning a completed survey, etc.
- \* Participant identities might be "indirectly" and unintentionally disclosed if a researcher's final research report fails to withhold demographic details or site descriptions that might permit a reader to deduce the identity of a participant. So the researcher needs to think about which demographic descriptions are most important to collect and report, while ensuring that the identity of individual participants is protected. Also, the name of the site/organization is typically masked in scholarly research though in some cases, the organization can elect to publicize their name along with the research results.
- \* Psychological risks include stress greater than what one would experience in daily life (e.g., materials or topics that could be considered sensitive, offensive, threatening, degrading).
- \* Relationship risks are present if the recruitment or data collection process are likely to alter the existing dynamics between the researcher and participant (who may be coworkers or have some professional relationship), among participants (if they know one another), or between the participant and the participant's friends, coworkers, or family members.
- \* Legal risks are present if data collection might result in a participant's disclosure of violation of laws.
- \* Economic/professional risks are present if data collection could result in the participant disclosing violation of workplace policies, disagreement with leadership decisions, poor work performance, or anything else that could be damaging to the participant's position, professional reputation, promotability, or employability. Risks are acceptable but participants need to be made aware of professional risks during the consent process so they can make an informed decision.
- \* Physical risks are not common in social science research but would involve risk of serious physical injury to the participant or the researcher.
- \* Minimal risks are acceptable but must be identified upfront. Minimal risk is defined as when "the probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life."
- \* The researcher is responsible for planning measures that will provide participants with reasonable protection from privacy loss, distress, psychological harm, economic loss, damage to professional reputation, and other possible harms.
- \* A conflict of interest is caused when the researcher has some sort of dual role in the research context, such as being a teacher, therapist, investor, business-owner, manager, etc. Conflict of interest must be managed to ensure that the research reveals "truth," not just the outcome that the researcher might desire to see due to their other role.
- \* All research activities place some degree of burden on the participants by asking the participants to share personal information, volunteer time, and assume risks.
- \* Examples of "new knowledge" include: effectively addressing a gap in the literature, generating new theory, enhancing understanding of a phenomenon, assessing effectiveness of a particular professional practice, addressing a local practical problem via data analysis.
- \* No documentation of permission is required (a) if the researcher will simply be asking organizations to distribute research invitations on the researcher's behalf, or (b) if the researcher is using only public means to identify/contact participants.
- \* Note that when medical, educational, or business records would be analyzed or used to identify potential research participants, the site needs to explicitly approve access to data for research purposes (even if the researcher normally has access to that data to perform his or her job).
- \* Researchers must be able to document their training in the data collection techniques and the ethics committee might require the researcher to obtain additional training prior to ethics approval. For most student researchers, the research course sequence is sufficient but some research procedures (such as interviewing people with mental disabilities) may require additional training. For psychological assessments, the manual includes specific qualifications required. Data collection from children requires a background check/clearance through a local agency.
- \* Remote supervision is suitable for most studies but onsite supervision may be required for certain types of sensitive data collection (e.g., interviews or assessment regarding emotional topics).
- \* For example, anonymous surveys and/or low-pressure communications such as email invitations permit potential participants to opt out with minimal fear of retaliation or other negative consequences.
- \* It is not ethically acceptable to invite a "captive audience" to participate in research on the spot (i.e., to ask an entire class or a group of meeting attendees to complete a survey during their session). Such a dynamic would not provide sufficient privacy or respect for their right to decline research participation. However, a researcher may use the last few minutes of a meeting to introduce a study and distribute materials, such that the potential participants can then take their time to decide later about participation.
- \* Generally, data collection cannot be approved during work hours or school hours unless a "free period" has been identified (e.g., lunch) so the research activities can be separated from the participant's regular activities. It is important to maintain an "opt in" dynamic rather than implying that employees/student/group members are expected to participate.



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