ADAPTING IT MANAGEMENT FOR EFFECTIVE IT STRATEGY LEADERSHIP

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ABSTRACT

This article argues that the lack of consistent information technology (IT) and organisational strategies heightens the proclivity to cancel IT initiatives. Organisational strategy loosely conveys a compounded perspective pertaining to business and organisational strategies. The combination of these strategies logically hinge on efficient enterprise IT integration concepts contextualising conceptual links between their respective architectures to best suit prevailing business and socioeconomic needs. However, an effective socioeconomy demands contextual strategic management of IT, aligned with geopolitical and other factors affecting the nature of IT, to optimise the applied context of principles of governance and management. Strategic management of IT is alleviated by the concept of levels of abstraction inherent in the principle of separation of concerns. Hence the strategic use of the concept in 'opinion' formulation within the paradigm of a sociotechnical system design, development and management. Accordingly, optimal business performance demands that business and IT leadership and management develop mechanisms to establish symbiosis between governance and management principles, glued together by an adaptive enterprise-wide standard architecture. There is therefore a contended need to integrate IT, processes and strategies. This demands that business and IT professionals possess an interdisciplinary and a multidisciplinary set of competencies. The perceived set of competencies supposedly help professionals to effectively navigate the interdisciplinary and multidisciplinary nature of information technology management (ITM). Thus the ensuing sociotechnical system constructs represent the challenge imposed by the journey to purposefully adapt ITM for effective IT strategy leadership for a competitive economic system. The research used an advanced mixed research methodology embedding quantitative methods in a qualitative study. This was balanced by deontological and teleological philosophies underlining a systemic approach aimed at optimising similarly credible research findings as well as provide a realistic perspective. Consequently, analysis employs an approach based on four contextual themes, viz. administrative, investment management, management and technology practices and a closing perspective, in deliberate efforts to optimise triangulation. The outcome is an adaptive ITM process model facilitating discovery, construction, governance and management of a purposeful sociotechnical system in any given geopolitical context. The model can benefit academics and practitioners in their quests to contextualise philosophies and concretise processes sustaining purposeful sociotechnical systems. In principle, the research introduces a general theory of collaboration thriving on ITM as the art, philosophy and science of orchestrating strategic management principles to enliven the value of IT in pursuit of an optimum strategic intent in a continuum.

Key words: Business strategy, Contextual, IT strategy, Level of abstraction, Organisational strategy.

INTRODUCTION

The notion of globalisation continues to challenge information technology (IT) systems which are central to global convolution and support for a thriving economic system within the context of pertinent socioeconomic challenges (Ibrar, 2013;). Thus contextual understanding of management and technology best practices can play a pivotal role in unravelling this convolution leading to organisational financial prosperity. Thereby create a sustainable global financial system and a stable economy purposefully supported by these IT systems (Weill and Woerner, 2013). Understanding *what to do*, coupled with *how to do it*, to sustain corporate IT assets, processes and activities to strengthen the effectiveness of business, IT and organisational strategies becomes the bone of contention for effective leadership and management of purposeful IT investments (Choe, Pattnaik and Singh, 2015). Management and technology practices Control Objectives for Information and related Technology (COBIT), Information Technology Infrastructure Library (ITIL), Project Management Body of Knowledge (PMBOK) and The Open Group Architecture Framework (TOGAF) address most questions related to *what to do* and *how to do it* within their respective ambit of disciplines such as information technology governance (ITG), project management (PM) and enterprise architecture (EA). These disciplines, as constituents of information technology management (ITM) can contextually be evaluated and/or supported by a number of International Organisation for Standardisation (ISO) standards in order to concretise purpose realisable by means of a project (Selig, 2016). A project is regarded as "a temporary endeavour undertaken to create a unique product, service or result" (Marchewka, 2015:2). However, projects are plagued by high failure rates indicating the need for interventions beyond the project management domain and hence the purpose of this research study (Bannerman, 2008). The purpose of this research study was to examine abstract and concrete constituents of a sociotechnical system pertinent to purposeful ITM. The following subsections position the unit of analysis for this study underlined by principles of management and technology best practices.

Research Objective

The primary research objective, directly representing the problem statement, was to investigate if *the proclivity to cancel IT initiatives is imputable to the lack of consistent IT and organisational strategies*. However, in order to achieve the primary objective, the corresponding problem statement is further decomposed to its atomic factors or variables. These factors/variables – critiquing the confluence of people, information and technology – represent secondary objectives, each of which is deemed to be relatively absolute, as contextualised by the following research questions:

- To what extent do perceptions have an influence on the lack of consistent strategy comprehension?
- What are some of the factors that compromise the success of enterprise-wide IT activities?
- To what extent do management and technology practices have an influence on strategy effectiveness?
- To what extent can a purposeful approach to IT management be attributable to experience?

Literature Review

There are a plethora of ITM-related studies from different academic branches including, but not limited to, business management, computer science, information systems (IS) and communications

technology. Preliminary investigations reflect that research tends to focus on very specific themes of ITM, lacking evident interdisciplinary and multidisciplinary lustre. These siloed research expeditions encourage exhaustive inner engagement of the ITM concept, but limit cross-sectional understanding that supports the notion of ITM's interdisciplinary and multidisciplinary nature. This partial engagement of the ITM concept compromises the comprehensive meaning of a sociotechnical system.

ITM is an approach to manage corporate IT assets effectively, including technology, IT-business relationships and human assets, i.e. effective and efficient management of all tangible and intangible corporate information assets (Kjellin and Rusu, 2013). ITM therefore encompasses underlying business alignment with IT and perpetual statutory compliance requirements in line with ITG, PM and EA. This assertion therefore not only positions ITM as a multidisciplinary academic field but also presents subtle features of its interdisciplinary nature meant to contextualise and concretise a purposeful sociotechnical system (Beath, Gallagher, Goles, Kaiser and Simon, 2010). A purposeful sociotechnical system is underlined by management and technology principles, contextualised by disciplines and concretised by practices. This results to efficient organisation cross-cutting constructs that span strategic, tactical and operational perspectives to facilitate consistency between business, IT and organisational strategies leading to optimal business intent as illustrated in figure 1 (Albuquerque, Da Silva Filho, De Andrade and Frota, 2015).

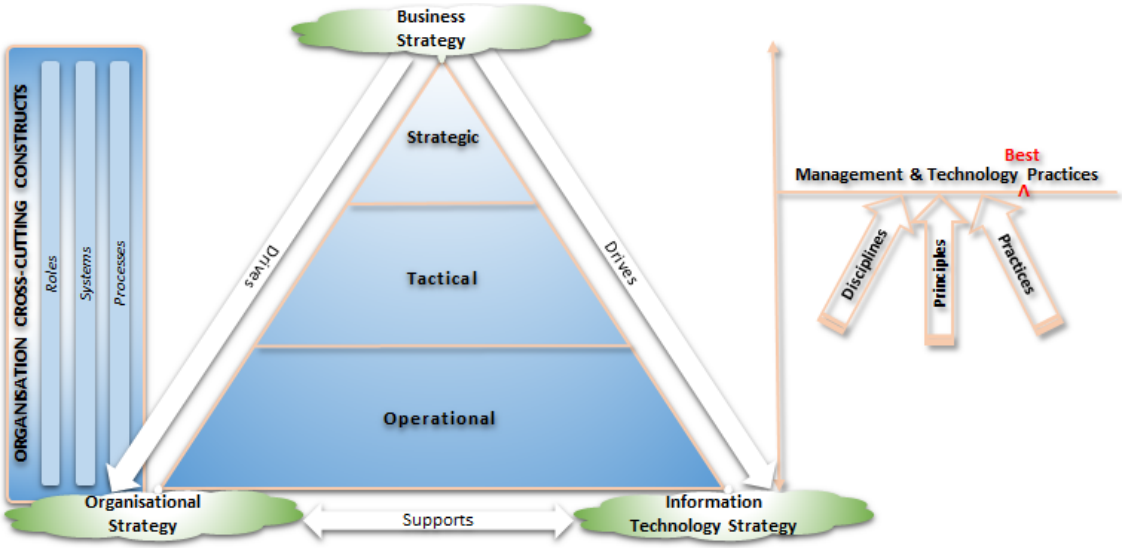


Figure 1: ITM Research Blueprint (Adapted from Pearlson and Saunders, 2009:23)

Business strategy conceptualises and contextualises business futuristic aspirations whereas IT strategy configures IT systems, roles and processes while organisational strategy configures roles and processes to contextually support business aspirations (De Haes, Maes and Van Grembergen, 2014). However, business aspirations are articulated through a business case underlined by strategic information systems planning (SISP) (Aldrees, Altameen and Alsaeed, 2014). SISP allows leadership and management to develop strategic business plans, set IS vision, assess IS, manage IS guidelines and define strategic initiatives (Aldrees et al., 2014; DeLone, McLean, and Petter, 2008).

The Role of the Business Case and Factors Affecting IT

The business case, complemented by SISP, posits various contextual strategic interventions that are realised through activities bearing logical relevance to the business intent as shown in table 1.

Table 1: Business Case Process Model Activities (Bannerman, 2008; De Haes et al., 2014)

Activity	Logically Related Practices
Business Case Development	Identify integrated investment information to justify investing in an initial investment idea to fortify strategic success dependent on market potency as well as direct competitors and other industry stakeholders' perceptions.
Business Case Maintenance	Evaluate whether execution and implementation are aligned with business case and adjust same to reflect reality to facilitate product success, ensuring a fit-for-purpose artefact reasonably meeting beneficiaries' expectations.
Business Case Review	Determine benefits realisation from using the product or service and facilitate evaluating investment success to fortify business success resulting in accrual of financial or other benefits pertinent to the investment strategy.
Business Case Process Accommodation	Facilitate business case process execution continuously evaluated against investment and institutional context solidifying project management success pertaining to stipulated time, allocated budget and required specification (scope).

These activities give rise to the activity theory limited to institutional logic in an organisational setting, and extending to institutional context in a national or global setting (Clark, Murphy and Singer, 2014; MacDonell and Mcleod, 2011). Thus the activities assimilate geopolitical evaluation encouraging prudent governance and management of business investments in support of IT solutions aligned with business intent and palatable to the country's internal challenges (Mbaku and Yu, 2013; Qureshi, 2011; Teschke, 2006). Intrinsically, geopolitical evaluation caters for three broad categories, viz. control, mediating and dependent variables as illustrated in table 2.

Table 2: IT Centric Geopolitical Factors (Leewongcharoen and Tan, 2005)

Geopolitical Variable	Effect Category	Degree of Influence	IT Success Context
Culture	Dependent	Institutional Logic	Each (such as culture) or a combination (such as IT adoption and Government policies) of geopolitical variables can influence user perspective and productivity when performing a task affecting project outcome and organisational performance with overall impact on social technology determined by the IT Success Model (Aldrees et al., 2014; DeLone et al., 2008).
IT Adoption	Dependent	Institutional Logic	
Infrastructure	Mediating	Institutional Context	
Political Stability	Control	Institutional Context	
Human Resources	Mediating	Institutional Logic	
Size of The Country	Control	Institutional Context	
Government Policies	Control	Institutional Context	
Geographical Location	Mediating	Institutional Context	
Economic Development	Control	Institutional Context	

The control category refers to a set of independent variables beyond organisational influence. Whereas the mediating category provides context adapting mechanisms to optimise the IT activity outcome. Thus the dependent category predicts the IT activity success based on the dynamic interplay between control and mediating variables aiding regard for the probability of politics to put the stability of an enterprise at risk (Masiero, 2014). However, plausible enterprise risk management evolves from EA principles resulting to an enterprise security architecture (ESA) that comprehensively covers various inherent IT risk perspectives (Bernard, Doucet, Gotze and Saha, 2008; Harris, 2013: 49).

Enterprise Leadership and Management Integration

IT leadership and management challenge is to establish symbiosis, based on a robust architecture, between management and technology frameworks or standards at an enterprise-wide level. However, established symbiosis should not compromise the high degree of autonomy to heterogeneous business unit level technological and business needs that are consistent with the business strategy (Brancato, Cullens, and Suer, 2014; De Haes et al., 2014).

The architecture facilitates employing the art and science to organise and guide contextual design, providing mechanisms to objectively link governance and management principles to optimise current business desires and future strategic intentions (Ayed, Fielt, Korthaus, and Rosemann, 2011; Dehlinger and Rosasco, 2011; Lapalme, 2012). Thus the principles serve to establish and permeate synergism between varying contextual needs, as encapsulated in figure 2.

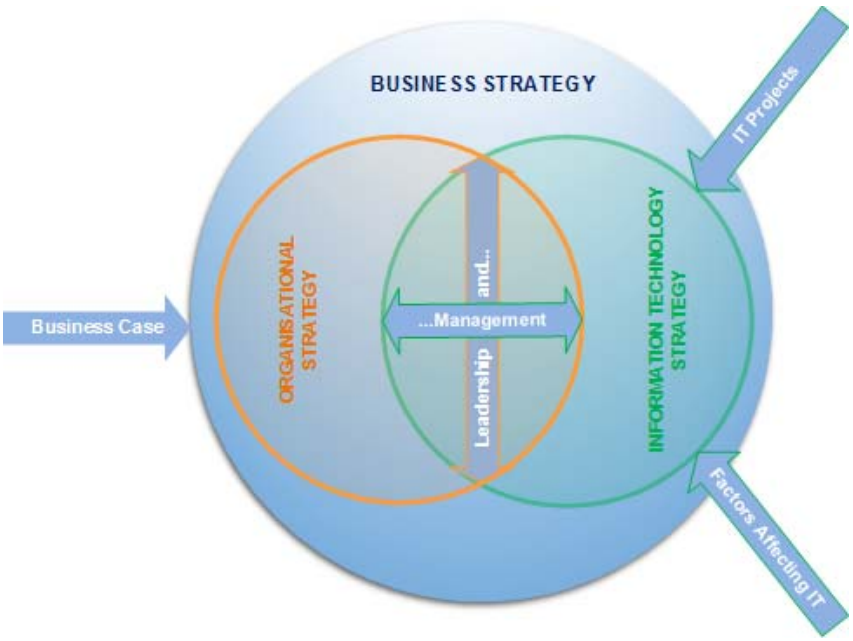


Figure 2: Integrated Business and IT Leadership and Management Roles in ITM

The challenge with an interdisciplinary and a multidisciplinary field like ITM is that it is not plausible to single out a view without scrutinising the view's effect on interrelated and correlated domains (Mueller, 2015). Complementary concepts can be shared either using the business process management notation (BPMN) or the unified modelling language (UML) to convey the intended message (Hinkelmann and Pasquini, 2014). EA recommends the principle of separated concerns polarising extreme views from different levels of abstraction in order to optimise IT agility in support of a desired business intent (Albuquerque et al., 2015). This facilitates consistent, consonant and coherent strategies introducing equilibrium evident through innovation and business efficacy (Rumelt, 2008).

In summary, the business case supports the business strategy, with IT projects and factors affecting IT placing considerable pressure on the IT strategy. Leadership and management orchestrate the integration of the business, IT and organisational strategies to realise structural equilibrium and concretise strategic management of IT. This collaboration is aimed at adapting the concept of ITM to optimise effective IT strategy leadership governed by the principles entrenched in activity theory.

Article Structure Overview

This article is presented over four self-contained standard sections which should, preferably, be read in normal chronological order to contextualise various concepts pertinent to the study. However, figure 3 presents recommended chronologies depending on the reader's information needs.

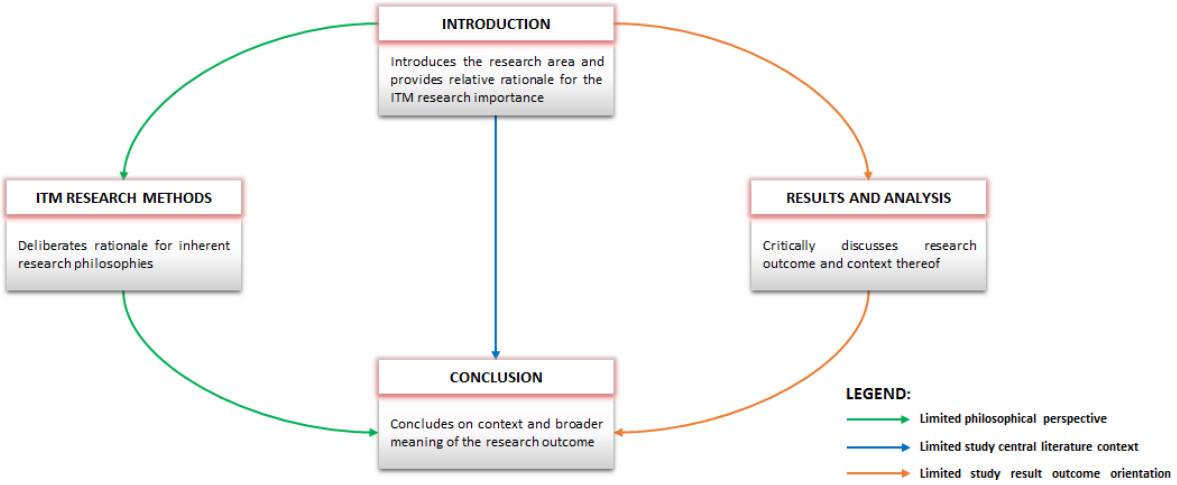


Figure 3: Article Structure and Expected Contextual Reading Outcome

The following section presents the underlying philosophies of the ITM research methods that directly facilitated design of a purposeful instrument.

RESEARCH APPROACH

Research is characterised by the concepts of ontology and epistemology regarding what exists and what humankind derives from what exists, respectively (Huff, 2009: 108). Ontology and epistemology thus form the principles for a set of philosophical and meta-theoretical assumptions governing the technical issues regarding the social relevance of a study (Cameron, 2011).

Philosophical and meta-theoretical considerations facilitate the reasoning behind the researcher's choice of research philosophy (Blumberg, Cooper, and Schindler, 2008: 19). Research philosophies, supporting objective and subjective conclusions regarding what exists, include positivism and interpretivism, with other variances relying on the basic principles. One such philosophical variance (realism), from which this research is based, seeks to polarise each of these two research philosophies. Table 2 summarises the principles and assumptions of the two prominent research philosophies.

Table 2: Prominent Research Philosophies (Blumberg et al., 2008:23)

		Positivism	Interpretivism
Basic Principles	**World View**	The world is external and objective.	The world is socially constructed and subjective.
	Researcher's Involvement	Researcher is independent.	Researcher is part of what is observed and sometimes even actively collaborates.
	Researcher's Influence	Research is value-free.	Research is driven by human interests.
Assumption	**Observation**	Objective, often quantitative, facts.	Subjective interpretations of meanings.
	Knowledge Development	Reducing phenomena to simple elements representing general laws.	Taking a broad and total view of phenomena to detect explanations beyond current knowledge.

A balanced philosophy, realism, purports that the social realities rely on principles that should recognise inherent human subjectivity. A research philosophy thus embraces principles governing ethical scrutiny of the researcher's perspective of reality concerning the research phenomena. The researcher explored corresponding research factors and perspective to design a saturation susceptible instrument, facilitating triangulation rooted in the principles of a mixed method approach as shown in table 3.

Table 3: Data Collection Instrument Design Rationale

Research Factor	Research Perspective	Saturation/Triangulation Rationale
Perspective	Depicted the participant's central perspective.	Participants were interviewed from three different organisational perspectives viz. operations, business systems and information technology.
Management and Technology Practice	Highlighted participant's central discretion.	Participants used frames such as IT Governance/Service Management, Project Management or Enterprise architecture as their source of reference.
Stratum	Indicated participant's management level.	Participants were able to clearly indicate their stratified organisational involvement which was identified either as strategic or tactical or operational.
Theme	Evaluated convergence of different management/IT best practices.	Participants were able to discuss each management/IT best practice view on leadership, IT factors, IT evolution and risk management.
Contextual Factors	Shows central frame of investigation.	Participants explored each instrument factor in line with strategy consistency, consonance, coherence and integrative view.

Saturation and Triangulation Rationale

This study focused on interdisciplinary and multidisciplinary ITM aspects that continue to challenge business and IT leadership and hence are imputable to the termination of IT initiatives. Thus the research context – span roles, processes, technologies and equivalent levels of abstraction – results to a complex sociotechnical system capable of scrutinising complementing and contrasting opinions.

For the chief executive officer (CEO) opinion, this can be mathematically denoted by a 1×3, matrix $E = (e_{11} \quad e_{12} \quad e_{13})$ where E denotes the executive, and each of the matrix entries from e_{11} to e_{13} represents an integrative CEO opinion about each of the respective business areas. The corresponding organisational view is characterised by the convergence of three discrete opinions from three corresponding strata, viz. strategic, tactical and operational. The opinions are represented by three sets of matrices $C = (c_{11} \quad c_{12} \quad c_{13})$, $M = (m_{21} \quad m_{22} \quad m_{23})$ and $L = (l_{31} \quad l_{32} \quad l_{33})$ where C represents chiefs or heads of business areas, M represents senior or middle management and L represents lower level management or operational staff. These sets of discrete opinions are combined to give a 3×3 square matrix, presenting a holistic and integrated organisational opinion O:

$$O = \begin{matrix} C \\ M \\ L \end{matrix} \begin{pmatrix} c_{11} & c_{12} & c_{13} \\ m_{21} & m_{22} & m_{23} \\ l_{31} & l_{32} & l_{33} \end{pmatrix} \qquad where\ E \propto C, \quad E \propto M, \quad E \propto L\ but\ E \propto O^{-1}\ with\ e_{ij}, c_{ij}, m_{ij}, l_{ij}\ for\ i,j \leq 1, \ldots number\ of\ business\ areas$$

The matrix O constituents exhibit a directly proportional relationship, denoted by $\propto$, between each of the strata matrices and the executive matrix E. This effectively means that the matching executive opinion should theoretically correspond to each of the stratum opinions. However, there is an inversely proportional relationship between potential outcomes of matrices E and O. The inverse relationship suggests that the CEO's opinion comparatively carries less weight than a singular opinion about a vertical business area. Respective data exploration involves iterative analysis, supporting emergent design, depending on data analysis computer programs for qualitative exploratory combined with limited quantitative methods. The emergent design concept embraces a flexible approach to research to cater for unanticipated circumstances. The executive matrix E provides an integrated opinion from an individual accountable to the board or corresponding stakeholders. The (internal) heterogeneous views saturate discrete business areas with one homogeneous instance corresponding to a discrete position. This is different from each of the strata corresponding matrices

where each entry denotes a single instance of the respective participants' opinions about a corresponding business area. Matrix O contains nine discrete opinions and therefore the adequate sample size should at least be ten conforming to minimum theoretical saturation. The opinion-saturated matrices illustrate potential triangulation from three different viewpoints.

The primary view compares chief strategic opinion to other strategic opinions from vertical business areas; a secondary view compares each vertical business area opinion to other corresponding vertical business areas and finally each stratum is compared to other strata opinions. This logic allowed an instrument design that embraced elastic properties subject to the matrix theory.

Literature Intersection Rationale

The literature review demonstrates that business investment in technology is directly proportional to expectations for its goals to be met through strategic IT initiatives. However, persistent failure to meet expectations raises concerns about the maturity of the ITM concept, and of business and IT leadership's appreciation of fundamental supporting disciplines and underlying constraining factors. This study's context-driven interview questions had logical ties to the corresponding research questions and hence resultant themes as demonstrated in the following subsections.

Administrative

The administrative theme elicited information about perceived influence on strategy consistency. The corresponding question, "To what extent do perceptions have an influence on the lack of consistent strategy comprehension?", was examined through a set of underlying questions, as table 4 shows.

Table 4: Rationale for Administrative Questions

Question Posed	Literature Relevance	Category
How long have you been working for the company?	Manoeuvring institutional logic tends to be easier as more time is spent in an organisation.	Qualitative
What is your job title and corresponding job description?	Participants were assumed to logically belong to at least one of the three management strata.	Qualitative
Describe your role in an IT activity with an enterprise-wide mandate.	The activity assumed that the role was consistent with the participant's expectation and perception.	Qualitative
List the primary objectives of this IT activity and explain its strategic intent.	Enterprise-wide initiatives, except for compliance initiatives, were assumed to have a strategic intent.	Qualitative
Please explain the current business strategy	The business strategy's definition should be consistent from different levels of abstraction.	Qualitative

Investment Management

Table 5 shows how aspects concerning IT investments were scrutinised to answer the research question, "What are some of the factors that compromise enterprise-wide IT activities' success?"

Table 5: Rationale for Investment Management Questions

Question Posed	Literature Relevance	Category
To what extent was the business case used to manage invested business resources into the IT activity?	Rigorous business case usage upholds 3C properties deliberately aligning business goals with IT.	Central qualitative
Explain the process followed to review the business case during the IT activity execution.	Organisations must manage enterprise risk in its contextual form spanning conceptual, logical and physical risk.	Embedded qualitative

Explain the process followed to review the business case after closing the IT activity.	Organisations need to employ plausible mechanisms to manage business benefits.	Embedded qualitative
What are some of the factors that compromise enterprise-wide IT activities success?	Applying SISP mechanics introduces mechanisms usable to establish IT activity success and therefore strategy alignment.	Embedded quantitative
Factors concerning IT activity outcome regarded throughout the activity's lifecycle ensured that:	Organisations must be aware of factors, institutional logic and context, that might compromise strategic intentions.	Embedded quantitative
How do you think the IT activity performed against the following metrics?	IT initiatives ensure contextual success relating to business, process, product and project management successes.	Embedded quantitative

Management and T*echnology Practices*

The question, "To what extent do management and technology practices have an influence on strategy effectiveness?", delved into intuitive application of practice(s) without recommending a practice or a standard or a framework, as table 6 shows.

Table 6: Rationale for Management and Technology Practices Questions

Question Posed	Literature Relevance	Category
Explain your understanding of management and technology best practices influence on strategy.	Management and technology practices bear mechanics for active adaptation to environmental changes in accordance with desired outcome.	Central qualitative
Which management and technology frameworks or standards offer most business value?	Management and technology disciplines ability to align business activities reduces the likelihood of compromising strategy.	Embedded quantitative
How is the strategy alignment with IT activity goals achieved using management and technology frameworks or standards?	Proactive use of management and technology disciplines ensures alignment of business and IT to achieve a strategic intent.	Embedded quantitative
Explain how the company perceives risk management or risk optimisation strategy.	EA establishes policies for a sound enterprise security architecture for risk optimisation.	Embedded qualitative
How was the concept of risk management or risk optimisation strategy used to manage IT risks during the IT activity?	IT risks and security concerns are inherent in all EA perspectives.	Embedded quantitative
How were activity level challenges addressed to reach plausible resolutions?	Mature policies preserve 3C properties preventing the need for escalation of problems.	Embedded quantitative

Closing Perspective

Table 7 addresses the question, "To what extent can purposeful approach to IT management be attributable to experience?", intended to establish if prudent ITM can be justified by experience.

Table 7: Rationale for Closing Perspective Questions

Question Posed	Literature Relevance	Category
Please share anything you deem important for alignment of business and IT goals.	question could help identify potential future research areas.	Qualitative
Please list, at least one but not more than five, preferred management and technology practices regarded as crucial to optimise IT activity outcome.	Management and technology best practices recommend plausible practices in order to exploit hypothesised value proposition.	Quantitative
How are you using your IT expertise, background and experience, to optimise a strategic intent?	ITM principles seek to optimise contiguous business events for a strategic intent in a continuum.	Qualitative

These thematic views highlight each research question's systematic relationship to central and probing interview questions, their logical relevance to the literature and corresponding pre-categorisation (Creswell, 2014: 139-142). Hence the rationale, reinforced by embedded a mixed methodology, facilitates data organisation through logical coding laying a firm foundation for further data scrutiny. Table 8 shows a logical breakdown for an advanced mixed methodology, QUAL(quant).

Table 8: Breakdown Matrix of Research Questions

Category	Qualitative Component	Quantitative Component	Category Weight	Cumulative Weight
Administrative	25%	0%	25%	25%
Investment Management	15%	15%	30%	55%
Management and Technology Practices	10%	20%	30%	85%
Closing Perspective	10%	5%	15%	100%
Total Contribution	60%	40%		

Interviews, Feedback and Ethical Considerations

The instrument was adapted to support a total of 20 intra-organisational and interorganisational interviews. However, due to theoretical saturation only 12 unique interviews incorporating institutional logic and context were considered for further scrutiny as logically illustrated in figure 2.1. Each unique interview is therefore identified by $P(i.j)_t^g$ $where$ $\begin{cases} i = 1,2,3 & g = participant\ gender \\ j = 1,2,3,4 & t = interview\ duration \end{cases}$.

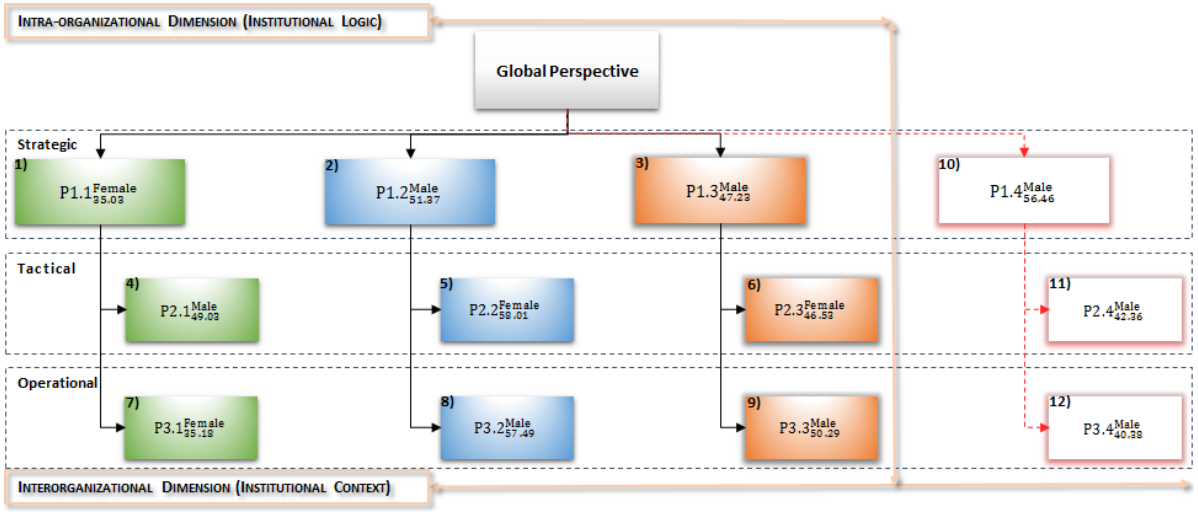


Figure 4: Logical Participation Matrix

The elastic instrument enabled 75% institutional logic and 25% institutional context heterogeneous opinions. This means that the sample was reviewed from a total of 10 to 12 participants without compromising the matrix theory. Table 9 shows data categorisation, resulting from figure 2.1, serving to describe raw interview data. This presents the first iteration meant to clean and prepare data for subsequent data analysis.

Table 9: Raw Interview based Data Perspective.

$ParticipantID$	Experience	Industry Sector	Formal HR Designation	Logical Category
1. $P1.1_{35.03}^{Female}$	20+ years	Financial Services	Chief Information Officer	Chief Operations Officer

2.	$P1.2^{Male}_{51.37}$	20+ years	Financial Services	Chief Information Officer	Chief Business Systems Officer
3.	$P1.3^{Male}_{47.23}$	25+ years	Financial Services	Chief Information Officer	Chief Information Officer
4.	$P2.1^{Male}_{49.03}$	15+ years	Financial Services	Risk Manager	Head of Business Operations Management
5.	$P2.2^{Female}_{58.01}$	10+ years	Financial Services	Head of Special Projects	Head of Business Systems Management
6.	$P2.3^{Female}_{46.53}$	15+ years	Financial Services	Portfolio Manager	Head of Information Technology Management
7.	$P3.1^{Female}_{35.18}$	15+ years	Financial Services	Operations Manager	Business Operations Management
8.	$P3.2^{Male}_{57.49}$	05+ years	Financial Services	Product Manager	Business Systems Management
9.	$P3.3^{Male}_{50.29}$	10+ years	Financial Services	IT Delivery Manager	Information Technology Management
10.	$P1.4^{Male}_{56.46}$	15+ years	Entertainment and Media	Chief Information Officer	Chief Information Officer
11.	$P2.4^{Male}_{42.36}$	10+ years	Information Technology	Head of Analysis	Head of Business Systems Management
12.	$P3.4^{Male}_{40.38}$	10+ years	Energy and Mining	Project Manager	Business Operations Management

Realistic balance for ethical research is arguably a tug-of-war between deontology and teleology, where morality is justified within the bounds of duty as well as moral values of action consequence rather than questioning morality of performed action respectively (Polonsky and Waller, 2011:65-85). The interviews were thus governed by informed consent to encourage voluntary participation and maintain confidentiality since anonymity was compromised by the nature of the study. Harm potential, limited to career progression and reputational risks, was managed by deliberate data categorization whereas conflict of interest was managed by contextualising research before interviewing each participant. This infused research credibility and quality as described in table 10.

Table 10: Research Credibility and Quality Context (Gencel and Petersen, 2013)

Threat Factor	Credibility and Quality Threat Context	Researcher Intervention Strategy
Descriptive	Ability to present and interpret research events and interactions as they are.	Prevention of tangible constraints is enforced by time-stamped interview records.
Theoretical	Authentic interpretation and description of research concepts.	Data is subjected to textual and conceptual constructs to reinforce theory.
Interpretive	Research data limitations from drawing contextual research conclusions.	Deliberate data collection and categorisation promotes purposeful conclusions.
Generalisability	Ability to extend study authenticity to non-observed research contexts.	Limited generalisation of findings beyond observed phenomena.

Adherence to ethics affirms research credibility, imparting reliability and validity to the research findings. This research construed participants' rights from the premise of the participants' opinion regarding what participants perceived to be morally just and hence oscillates between deontology and teleology as demonstrated in the next section.

RESULTS AND ANALYSIS

Administrative

This section addressed the role of human perceptions in collaborative activities ensuing during sociotechnical system design, development and management as discussed in section 2.2.1.

$P1.2^{Male}_{51.37}$'s role in an IT activity involved doing a "… basic SWOT analysis…" which shows an abstract level of abstraction to harness the value of probable **conceptual objectives**. His efforts, from an institutional logic viewpoint, are complemented by $P2.1^{Male}_{49.03}$ and $P3.2^{Male}_{57.49}$ who ensure that "…processes, …people and …IT. …work together…" and define "…what IT needs to deliver…". Hence the conclusion that each of their respective roles involve contextualising strategy attainment from value embraced by probable **managerial** and **operational objectives** respectively. Again, from an institutional context perspective each of these views seem to be horizontally augmented and vertically complemented by opinions from $P1.4^{Male}_{56.46}$, $P2.4^{Male}_{42.36}$ and $P3.4^{Male}_{40.38}$. The same logic holds for other corresponding institutional logic views like $P1.1^{Female}_{35.03}$, $P1.3^{Male}_{47.23}$, $P2.2^{Female}_{58.01}$, $P2.3^{Female}_{46.53}$ and $P3.3^{Male}_{50.29}$.

Thus these integrated participants' perspectives, regarding strategy comprehension contextualised from each participant's respective experience, aggregated to contextual objectives comprising of conceptual, managerial and operational objectives. The essence, of the ensuing interview related data relationships, is encapsulated in figure 5. The model lends itself for examining complexities inherent in the advent of the 4IR that could compromise intent and therefore strategic success of IT initiatives.

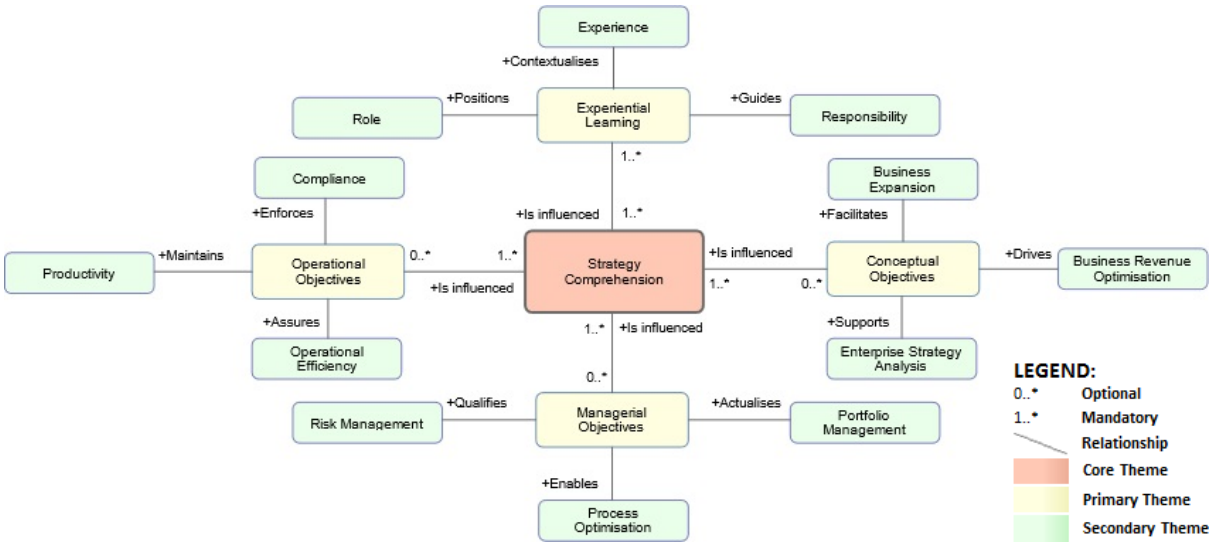


Figure 5: Abstract Model for Contextual Strategy Comprehension

It can thus be inferred that perceptions influence strategy comprehension to the extent dependent on business and IT stakeholders' experiences and contextual objectives. However, $P1.1^{Female}_{35.03}$ specified that one of her objectives is ensuring "…that the bank can facilitate payments across Africa"; which according to $P1.3^{Male}_{47.23}$ corresponds to the business strategy articulated as "…connecting the rest of the world to Africa…".

These conflicting views regarding what the exact strategy is prove, to a certain extent, that stakeholders do not necessarily abide by the inexplicit rules governing their respective levels of abstraction.

Investment Management

The investment management section sought to confirm apparent factors inhibiting optimal business IT investment and hence compromise the success of enterprise-wide IT activities. The increasing complexity of IT projects demands purposeful business cases to optimise business and strategic successes underlined by criteria such as process, product and project management successes.

Table 11 shows enterprise-wide and project-centric supporting processes that emerged during the course of the interview sessions. The participants were each answering questions on the extent of business case usage and the business case's management during and after an IT project delivery.

Table 11: Principal Stakeholders IT Investment Processes

	$ParticipantID$	Participant Response	Implied Process
Investment Board	$P2.2^{Female}_{58.01}$	"The business case is reviewed all the time. We have our programme meetings, …weekly …all… decisions that are made…"	Evaluate business case
	$P2.2^{Female}_{58.01}$	"…First how we do the prioritisation and we then fund those priorities. …impact that it's going to have on the business case…"	Prioritise business case
	$P2.2^{Female}_{58.01}$	"…Those decisions may be around, uh, how we do the funding! First how we do the prioritisation…"	Fund purposeful initiative
Business Unit	$P1.4^{Male}_{56.46}$	"…So the business case is very often defined by the business as to whether it will achieve the business objectives…"	Establish business needs
	$P3.4^{Male}_{40.38}$	"…At every key stage we would review the business case in terms of the cost and benefits…"	Determine related costs
	$P2.3^{Female}_{46.53}$	"So business case – We usually create the business case when we need strategic funding…"	Define business case
	$P2.3^{Female}_{46.53}$	"...We will go to the committee, present what we are 'changing'. What's the benefit…? And how much funding we require…"	Present business case
	$P2.1^{Male}_{49.03}$	"…It's bigger projects that require… a business case. But for small projects I think there is a user requirements document only… "	Define pertinent requirements
	$P3.3^{Male}_{50.29}$	"…You need to have a PM capacity…, some analysis, development. …in line with uh the… PMO processes…"	Establish apposite team
	$P3.4^{Male}_{40.38}$	"…We had… key stage-gates... …move from design into… implementation and …to testing and then handover…"	Implement business requirements
	$P3.3^{Male}_{50.29}$	"…To resource that piece of work. …You need… a PM…, some analysis, development. …in line with… PMO processes…"	Establish initiative's team
	$P2.1^{Male}_{49.03}$	"…Whatever requirement… a business analyst… takes to a project sponsor who determines if there is a need for the requirement…"	Sponsor project initiative
	$P3.2^{Male}_{57.49}$	"…And after implementation; there is a process that tracks, uh, the realisation of the benefits that were put in the business case."	Close initiative and review benefits
Project Team	$P2.3^{Female}_{46.53}$	"…Throughout the project lifecycle, once we initiate it, once we create the business case and business requirements document..."	Initiate approved initiative
	$P1.2^{Male}_{51.37}$	"…I'm seeing practices like agile… When we scrum as a team… We have product, we have operations, we have technology…"	Execute and manage initiative

The investment board, with an enterprise-wide view, is responsible for optimising the business case's potential business and subsequent strategic successes grounded on process, product and project management successes (Bannerman, 2008).

The business unit, with a business segment view, is responsible for assembling the business case to ensure that its value proposition and process success are fulfilled. The project team, with a business requirements view, is responsible for bringing the anticipated product or service to fruition and thus ensures product and project management successes.

Figure 6 illustrates the resultant comprehensive sociotechnical system at play.

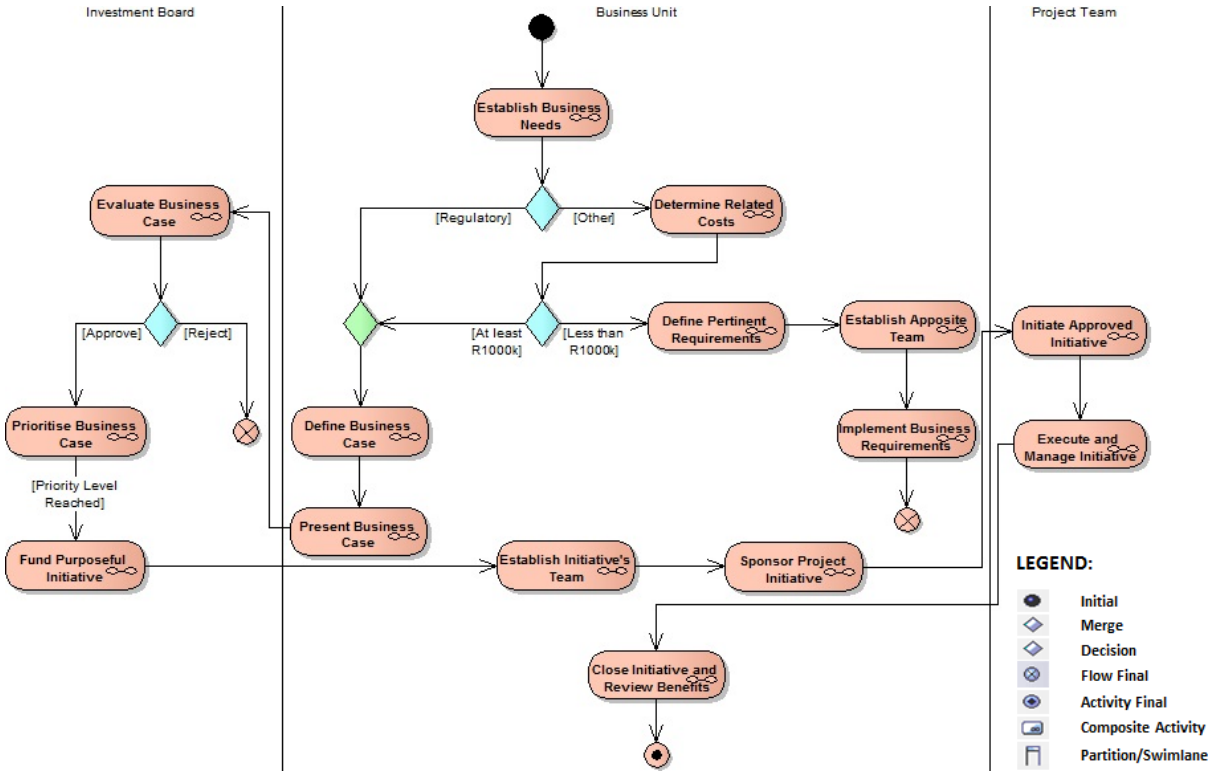


Figure 6: Overview of Business Case Driven Investment Management Activity

The question "What are some of the factors that compromise enterprise-wide IT activities success?" compared global and South African views regarding threat factors. Table 12 was the outcome.

Table 12: Percentage Distribution of Underlying IT Project Cancellation Factors

Underlying Threat Factor	Standish Group 2014 Global Findings	Research Findings 2016 South Africa (SA)	Absolute Difference
Technology Illiteracy	4.3	6.8	2.5
Lack of IT Management	6.2	4.1	2.1
Didn't Need Any Longer	7.5	4.1	3.4
Lack of Planning	8.1	12.9	4.8
Changing Requirements and Specifications	8.7	14.9	6.2
Lack of Executive Support	9.3	10.8	1.5
Other	9.9	6.8	3.1
Unrealistic Expectations	9.9	10.8	0.9
Lack of Resources	10.6	8.1	2.5
Lack of User Involvement	12.4	9.5	2.9
Incomplete Requirements	13.1	12.2	0.9

Changing requirements and specifications scored 14.9% with the biggest absolute difference, 6.2%, that is 3.5% higher than the average absolute difference of 2.7%.

Nevertheless, these research findings are hardly sufficient to realistically qualify the SA perspective with regards to the effect of the underlying threat factors. This is due to a lack of statistical significance.

The last two questions compared factors presumed to have been regarded throughout the initiatives lifecycle and the respective initiatives' performance against those factors.

Figure 7 illustrates the summary of the resultant superimposed view.

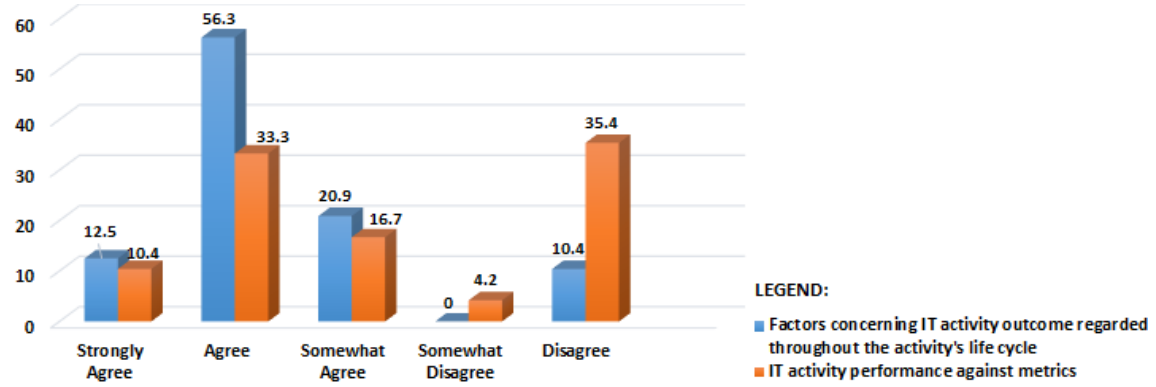


Figure 7: Business Value Based on IT Factors and Outcome

The aggregates of the positive responses, for each of the two superimposed central questions (each combining somewhat agree, agree and strongly agree), i.e. 89.7% and 60.4%, show a feeble degree of association between the factors identified and activity performance. Their 29.3% absolute difference suggests a need for stringent regard of factors likely to compromise IT activities, since the subsequent performance of each of those IT activities is severely compromised. Again, statistical significance would have facilitated application of rigorous statistical methods for a meaningful argument. However, the aggregate effort delicately proved that the lack of stringent business case methods loosens the grip on factors compromising enterprise-wide IT activity success.

Management and Technology Practices

Respondents seem to feel that strategic success is attributed to informed appreciation of level of abstraction intertwined with management and technology (best) practices. A quantitised view contrasting personal preference to perceived organisational application is presented in table 13.

Table 13: Adapting Management Practice(s) to align IT activities with Business Strategy

Likert Scale Options	Participant's Preference	Organisational Practice	Absolute Difference	Potential Organisational Implication
Strongly Agree	50%	33.3%	16.7%	Inconsistent, inconsonant and incoherent perspective
Agree	25%	33.3%	8.3%	Inconsistent, inconsonant and incoherent perspective
Somewhat Agree	16.7%	16.7%	0.%	Consistent, consonant and coherent perspective
Somewhat Disagree	0%	16.7%	16.7%	Inconsistent, inconsonant and incoherent perspective
Disagree	8.3%	0%	8.3%	Inconsistent, incoherent and inconsonant perspective
Strongly Disagree	0%	0%	0%	No potential organisational implication perspective

Table 3.3 compares the Likert scales' underlying attributes that received a 'Strongly Agree' preference of 50% corresponding to 33.3% perception of organisational practice. The prevailing view is that respondents did not believe that their respective organisations applied management and technology practices in the way they should. This resulted in a misalignment between the scrutinised constructs indirectly proving an incoherent risk management policy and hence the termination of IT initiatives. Adequate risk management is a consequence of a mature ESA which encapsulates constructs of a sociotechnical system likely to compromise enterprise-wide IT initiatives and hence strategy efficacy.

For instance, $P3.1_{35.18}^{Female}$ stressed that "…risk is a high priority for top-management, tactical and operational management" – an opinion that was echoed by $P2.3_{46.53}^{Female}$ who confirmed that "…we all have to create… risk control matrix…". $P3.1_{35.18}^{Female}$ went on to augment these views by highlighting that once "…we identify… the risks within each business unit; …any project or initiative that we initiate – …need to get risk approval…", insinuating that enterprise risk optimisation involves high-level stakeholders at investment board level, as shown in figure 3.4. The role of these stakeholders include analysing risk identified at a business case or requirements definition level, as alluded to by $P2.3_{46.53}^{Female}$ who confirmed that "…throughout the project lifecycle... …we create the business case and business requirements document – risk needs to sign it off". This view confirms that risk is indeed contextual from conceptual (business case) to logical (requirements) and physical (project) management. Thus management and technology practices are intangible strategic enterprise assets that influence an effective strategy and risk management. However, their potency is dependent on business and IT professionals' comprehension of their inherent worth which seems to be misaligned with their values.

Closing Perspective

This section established that respondents tend to tap into experience to contextualise challenges spanning governance, architectural and managerial sets of values. Their actions are intrinsically supported by one or a combination of management and technology practices as shown in figure 84.

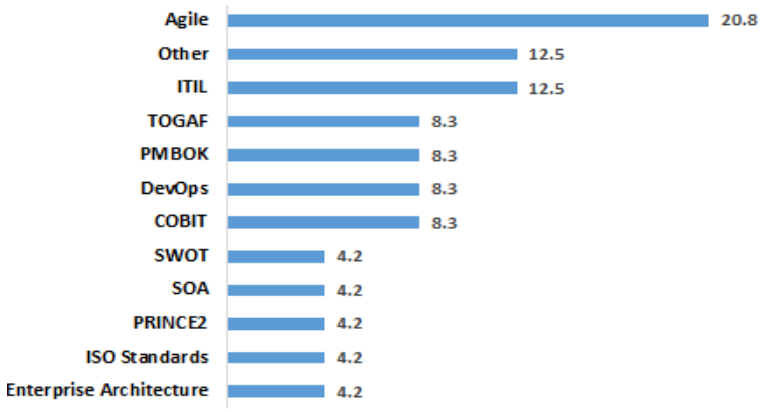


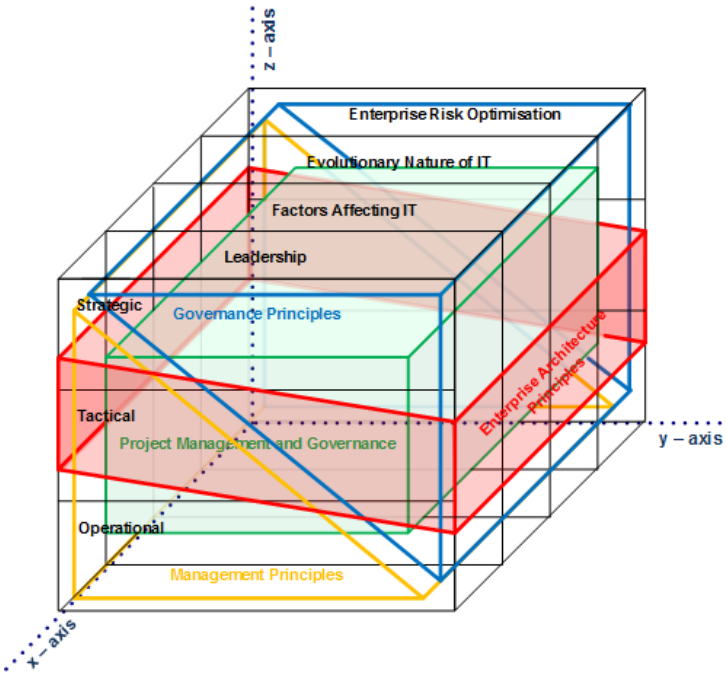
Figure 8: Preferred Management and Technology Best Practices

Accordingly, optimal IT outcome should be driven by problem context and corresponding level of abstraction. Thus strategic, tactical and operational levels should focus respectively on enterprise-wide value sustenance, business and IT alignment and innovative IT exploitation. However, this must be explicitly integrated into organisational processes to control lack of consistency between IT and organisational strategies as contextualised by the overall meaning of these result in the next section.

Results Context

The results navigate chiefly intangible intricacies involved in the IT domain, contextualising ITM within an integrated set of components for gathering, keeping and handling digital data. The focus is localised to understanding the resultant sociotechnical system responsible for driving initiatives that serve the business society to create, visualise, convey, retrieve, warehouse and contextualise data/information to derive respective underlying insight and/or knowledge.

The context of ITM with regards to these intricacies was deciphered from four related and interlinked themes, viz. administrative, investment management, management and technology practices and closing perspective. The aggregate outcomes of these perspectives did not only demonstrate the interdisciplinary and multidisciplinary nature of ITM; they also showed that the contribution of ITM research serves as a catalyst for understanding business value generation through initiatives fortified by practices built on management and technology principles. The business value can thus be optimised by three arbitrary variables, viz. IT resources; the window of opportunity (time), and expected financial obligation (cost) integrated to optimise business intent (Radner, 1959). Hence the resultant 3D Euclidean perspective meant to scrutinise homogeneous properties corresponding to resources, time and cost governed by levels of abstraction and corresponding constituents as shown in figure 9.



Where the Cartesian product $\mathbb{R} \times \mathbb{R} \times \mathbb{R}$: $\mathbb{R}^3 = \{(x, y, z) | x, y, z \in \mathbb{R}\}$ *represents a 3D coordinate system.*

Figure 9: Value-Driven Information Technology Management

The value-driven information technology management perspective inherently demonstrates that collaborative activities, serving to optimise business intent, are based on the ethos that a sociotechnical system is discovered, constructed, governed and managed. This is supported by an adaptive architecture to maintain contextual socioeconomic relevance. Hence the abstraction model, conceptualising theoretical sociotechnical system's constituents, as illustrated by figure 10.

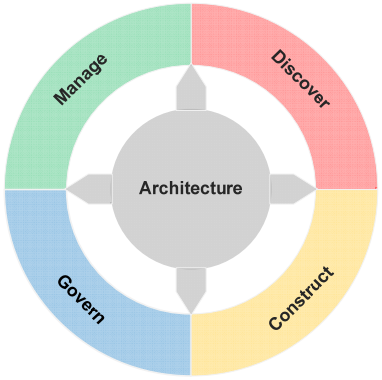


Figure 10: Integrated Sociotechnical System ITM Philosophy

The abstraction model facilitates a continuous symbiosis between levels of abstraction to ensure enterprise-wide strategy appreciation as illustrated by concrete lower-level detail of figure 11. This symbiosis, starting and stopping at any designated green play buttons and designated red stop buttons respectively, is orchestrated by adaptive enterprise-wide standard architecture. This ensures an integrated sociotechnical system capable of regulating current and future IT risks permeating an organisation. Again, it ensures that the sociotechnical system supports the envisaged business strategy articulated through a mission, with objectives based on the board's directives. The directives, linked to policies and organisational procedures, are realisable through projects within programmes.

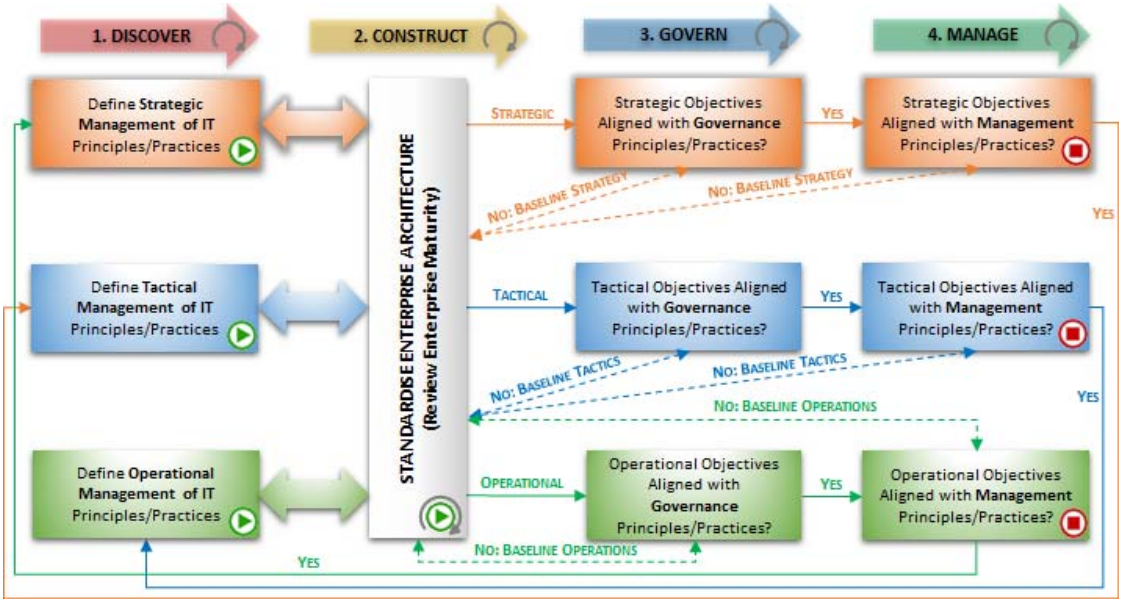


Figure 11: Adaptive ITM Process Model

The adaptive ITM process model shows how conceptual (strategic), logical (tactical) and physical business (operational) perspectives are integrated to deliver authentic value. This corroborates the general definition of ITM as the art, philosophy and science of orchestrating strategic management principles to enliven the value of IT in pursuit of an optimum strategic intent in a continuum.

CONCLUSION

Research findings are built on rigorous and dependable systemic data examination, counterbalancing the outlying philosophical perspectives of interpretivism and positivism and hence are contextually reliable and valid. They aggregate to an adaptable model that configures inherent sociotechnical system settings. Thus the adaptive ITM process model should benefit both academics and practitioners in their respective quests to contextualise philosophies and concretise processes sustaining purposeful sociotechnical system design, development and management. Hence the research lays the foundation to further research the principles of adaptive systems engineering. It would however, at least for the qualitative parts of this research, be almost impossible to replicate the results. Although the quantitative aspects of the research can be replicated, their independent outcomes bear no significance without being correlated to the prevalent set of circumstances ensuing from qualitative environmental settings. Notwithstanding contextual limitations, this academic expedition has made a significant step towards the essential and ambitious goal of developing a consolidated general theory of collaboration for purposeful ITM in a given socioeconomic context.

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