



A Survey of Benefit Approaches and a Human-Centred Innovation Loop embedded Benefit Realisation Framework

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ABSTRACT

There has been a surge in adopting Benefits Management approaches for Enterprise IT governance in recent years, particularly from many thought leaders including the White House, US Military, Australian Government and the like. This has led to the emergence of a new field of study academically: Benefits Management for IT Governance. Our study shows that there is a need for an academic formalisation and a systematic approach of benefits management for IT projects and programmes, especially to provide a decision-making framework for robust agility and innovation. This can be used across wider enterprise governance of IT, particularly for the public sector, where benefits such as revenue and cost can be compelling. We, therefore, propose an Innovation-led Benefits Realisation Framework for IT Governance, a method for identifying benefits and ensuring these benefits are realised. We offer proof-of-concept through case studies.

KEYWORDS: benefits identification, benefits realisation, benefits management, IT governance

INTRODUCTION

Ward, Taylor and Bond (1996) proposed the first 'Benefits Management' approach for project management in IT, aiming to help organisations manage their IT projects so that the potential benefits can be realised. In recent years, not only has there been an upsurge in adopting Benefits Management approaches for Enterprise IT governance but there has also been a growing demand in Benefits Management for Enterprise Governance of IT as a field of study. Young, Vodica and Bartholomeusz (2017) stated that while there are many world leaders in industry and public sectors that have adopted benefit approaches, there is a need for future research of Benefits Management at an enterprise-level, not just the IT project-level. Aubry, Sergi and El Boukris (2017) wrote that there is a lack of academic research on benefits management, and particularly on benefits measurement, benefits evaluation processes, organisational change and enterprise performance. Reviews by Joiner et al. (2018: submitted) highlight the deleterious effect of inadequate governance in ICT projects and the need for guidance from ICT governing practitioners and business academics working together. These literature statements underlie the context of this paper.

BENEFIT AND BENEFIT MANAGEMENT

Aubry, Sergi and El Boukris (2017) describe how Benefits Management is marked by a strong regime of formal thought which expresses itself through the application of tools and methods of control of project delivery. Benefits Management rests on the rationale that in order to accomplish planned benefits, one must manage them actively and include delivered values,

financial goals, cost, budget, performance, economics, and profit-loss benefits (Ashurst, 2008); financial and non-financial benefits of business, customers and society, with long-term and short-term benefits, future benefits, commercial and non-commercial benefits, stakeholders' benefits, tangible and intangible benefits and so forth for a given project (Ward et al., 1996). Bradley (2010) defined the supervision of profit through the codifying and overseeing of future profits, as a result of an investment. Benefits Management Approaches have evolved from the practitioners' world of IT investment and foundation under the Modern Portfolio Theory (MPT), Multi-Criteria Utility Theory (MCUT), organisational theory, system theory and complexity theory. Breese's (2012) study showed that Benefits Management can be guided using the scientific approach of seven supporting themes of logic, linear thinking, quantification, cause and effect, reductionism, split between thinking and doing, and control. However, the issues with the practical application of this scientific approach in the real world were observed to relate to defining benefits, collecting data, setting targets, attributing benefits, weighting both benefits and dis-benefits, and time periods during which the benefit was to be realised. Consequently, depending on the degree of power, influence, roles and responsibilities of the stakeholders, there will be ambiguity and contestability around benefits. In the following sections, we discuss other benefits management approaches and their limitations, the relationship between benefits and IT governance, and a proposal on an innovation-driven benefits approach to IT Governance.

CHALLENGES IN IT GOVERNANCE

One of the important factors in achieving market recognition IT-wise is through a business strategy. IT is among the six primary assets namely: ownership of private, tangible and intangible property, IT, and interrelations, which should be overseen to create value (Weill and Ross, 2005). A practical adequate IT management brings about a long-term inconsistency – that of encouraging and seeking to maximise the resourcefulness of working staff at a company amid implementing the firm's rules and regulations. (Weill and Ross, 2005). By implementing effective IT governance, top performing enterprises and organisations are able to succeed in obtaining value from IT where others fail. This IT governance helps them support their strategies and institutionalise good practice. IT governance makes important IT decisions accountable while also specifying decision rights. The goal is to foster 'acceptable behaviours' with regard to the information space. (Weill and Ross, 2005). The latter contains a few key areas that tie directly to the field for decision-making.

The fundamentals, which is the basis for decisions of critical importance to the vital part that IT plays within the company.

Information processing-assets, which refers to the general terms that aim at bringing the company's expectations to fulfilment.

The information components that are required to run the company effectively, which are parts of IT-enabled operations.

The company's platform of business regulations designed to address both acquired and carried out processes, activities, products, and/or services.

Lastly, prioritisation and the readiness to invest decisions are two elements that trigger action to spend funds in a particular area in IT, particularly with evidenced-based testing of four key types to enable trade-offs in security, usability, performance and integration (Joiner et al., 2018: submitted).

Published research in Australia illustrates major first principle reforms of public service organisations and their key investment governance initiatives that rely on IT and are related to IT governance (i.e. "First Principles Review of Defence – Creating One Defence" by the Minister of Defence on 1 April 2015) (Peever, 1 April 2015; Joiner et al., 2018: submitted).

The key issue observed in the literature is a lack of a practical framework to help define the commonly understood and agreed benefits and the provision of an implementation road map to help realise the benefits.

Our study showed that there is a lack of literature on benefits realisation and IT governance models in the state-owned enterprises. Extensive research among commercial organisations has shown how important appropriate IT Governance mechanisms on firm performance are. Limited studies suggest that some, but not all, of the same strategies can be applied to the 'not-for-profit' sector to achieve enhanced organisational performance.

Wu, Straub and Liang's (2015) research shows that comprehensive IT governance mechanisms lead to the better strategic alignment of information systems, which also boost organisational performance. According to Chen, Chiang and Storey (2012), there is a shortage of professionals who have deep knowledge for managing the amount, the measure and the different types of data. In the academic and commercial world, it is well understood that, in the near future, 5G networks are going to add to the complexity of data in terms of worth, amount, measure, types, uncertainty or imprecision as well as variability, leading to disruptive innovations that in turn lead to many more unknown disruptors. Porter and Heppelmann (2015) provide insight as far as the software is concerned, in which programming tools and frameworks cannot operate without the organisation providing the necessary backing for the entire infrastructure supporting the company. However, several US Defence ERP projects have been considered 'failures' (Chen et al., 2012; Andreu-Perez, Poon and Merrifield, 2015). One of the major reasons for ERP failures was insufficient attention to benefits realisation. Similarly, Standish-Group found that 63% of IT projects failed, while reviews cited by Joiner et al. (2018: submitted) found that those that fail, fail badly by comparison to non-IT projects. The lack of user input was identified as one of the most important project challenges. Therefore, building a new 'technology stack' in the public sector would require a different approach to the traditional project management approach where the governance focus may be limited to only budget, schedule and specifications.

Putting all the aforementioned together, we can summarise that a benefit-driven IT strategy would require faster decision-making on investments concerning technological innovations that, whilst being disruptive, would need to be accepted by users into the organisation's technology stack to generate benefits in the future. Realising benefits would need an implementation plan that would rapidly adapt to further technological innovations. All of this under an environment where there is a shortage of professionals having deep knowledge and where the likelihood of IT project failure rate is high.

Weill and Ross's (2005) study of about 300 companies across the world finds that IT management is foreign to most individuals having to make decisions. The primary hint of assessing the performance of IT Governance is senior management awareness. With an effective governance of the data bank, businesses are able to generate benefits 20 percent above their counterparts who are intending to realise akin to this significant performance. These companies also manage to reclaim their net assets, investment's profitability, percentage

of the amount of profit made on selling goods, asset utilisation (ROA), and growth in market capitalisation (need reference here).

The key question is, what is the approach that will help with realisation of benefits through the EIM 2025 strategy? Besides, how will we know what benefits have been realised, especially those that address public-service operations and human performance needs? How do we access know-how when there is a lack of professionals with deep knowledge in subject matters such as data complexity and 5G connectivity, and particularly in the measurement of benefits arising from rapid technological uptake? Lastly, how do we align the benefits stated in investment decisions with the deliverables stipulated in key contracts, and, in continuation, how can we ensure that the key contracts realise all the benefits from these technology investments?

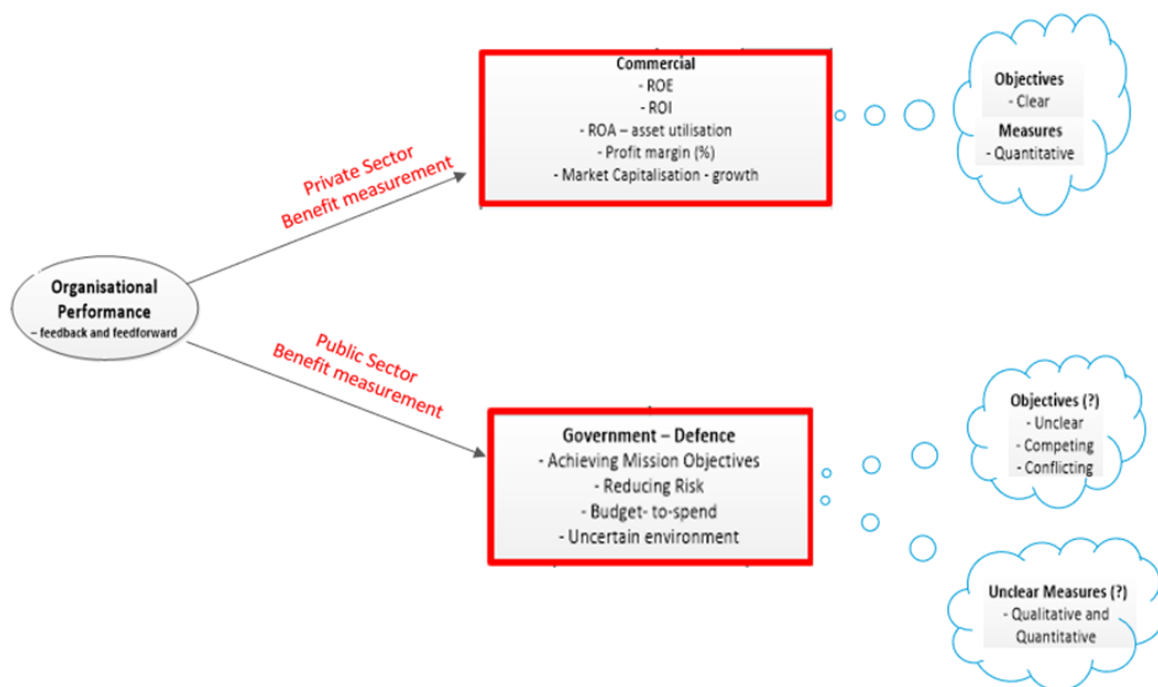


Figure 1: Challenges with Benefit Measures between Public and Private Sector

EXISTING IT GOVERNANCE APPROACHES

As illustrated in the red highlighting in Figure 1, we find that entities within the public sector often face a number of competing and sometimes conflicting objectives. Chan and Reich (2007) state that environmental instability (uncertainty) impacts the achievement of business objectives, the quick process responsible for their realisation, as well as the means implemented for the purpose of realising outcomes. They cite published research: *'In times of critical circumstantial uncertainty, the need for data and a database increases. Consequently, organisations are going to rely on their business objectives amid conjectural instability.'* (Chan and Reich, 2007).

Figure 1 shows there is a lack of clarity of objectives and performance measures due to poor IT alignment and IT governance. Unfortunately, the literature investigated did not provide any solutions or methods on how to define or re-define objectives that are clear and can form the foundation for developing performance measures. Domain knowledge is kept out of the reach of two entities, private enterprises and IT executives. Reich and Benbasat (2000) found that only domain knowledge that was available constituted the preliminary step to lasting adjustment within the corporate leadership. In addition, the existence of clear business plans influenced both short-term and long-term alignments.

Kettl (2011) has done some pioneering work in US Government procurement. He states that recognising *'that market methods raise new issues for governance; conducting the business of government in new ways brings new questions that the government must consider. Competitive outsourcing may lead to efficiencies but can also lead to uncertainties that can prove disruptive and costly.'* Kettl then coins the term 'Smart Buyer'. The *smart buyer* concept is based around the answers to three questions: what to buy, who to buy it from, and what it has brought (i.e. what the purchase has produced). Kettl states that the Government should be a Smart Buyer, only then should it outsource (Reich et al., 1997).

Proper networks combined with shared norms, values and understandings within an organisation allow for the development of the employees' knowledge, skills and business training which will ultimately benefit the company as the shared values bridge gaps between the working staff (Nahapiet and Ghoshal, 1998). Reich et al (2003) looked into an organisation selling insurance that designed new products that eased the business dynamics and drove profound change following a staff turnover in the corporate structure. However, this research comes from just one industry and one commercial organisation. Effective governance delivers on a long-time management paradox; encouraging and leveraging *the ingenuity of all the enterprise's people* while ensuring compliance with the overall enterprise vision and principles (Weill and Ross, 2005).

EXISTING BENEFIT MANAGEMENT METHODS AND THEIR CONTRIBUTIONS TO IT GOVERNANCE

IT governance enables corporate executives as well as those in the computer world to exercise their technical abilities towards maintaining the organisation's competitiveness and well-being through the financing of computing power. (Grembergen, 2014). Henderson and Venkatraman, (1993, 1999) in their ground-breaking work on business/IT strategic alignment, proposed an IT strategy aligned with a business strategy for conceptualising, adjusting the emerging field of continuous planning and monitoring necessary for a company to realise its set goals and objectives in the information space. The aforestated strategy encompasses four essential areas strategy-wise, namely: – business planning, computing policy, organisational framework, information technology infrastructure and processes – each with its own underlying dimensions.

Kohli and Grover (2008) examined a company's relationship with its business goals and its use of information technology based on the results of multiple scientific studies for over 30 years. They found that alignment should spark individuals' enthusiasm and bring them to fulfilment.

Time-series literature on the matter reviewed so far states that IT governance affects the approach implemented to support business strategy and these two affect the end-users, employees, partners or shareholders as they can perceive differently the company's prospects and the impacts of the latter or organisational performance. Research published by Wu et al. (2015) came with a scientific explanation that demonstrates that the organisational culture is shaped by effective relationships and processes that are aimed at meeting present and future demands of business. They have created this model by lining up the enterprise's staff members with the enterprise's planned objectives. This proposal is supported by empirical evidence following a field study. Figure 2 shows the algorithm used to explain the correlation that exists between causal effect bringing about a positive impact of well-designed a framework that ensures that the business objectives are addressed through IS strategic alignment, consecutively, increase organisational performance, especially operational excellence and customer attentiveness. According to Wu et al., such conclusions are of great importance for

organisations utilising processes designed to provide IT infrastructure support while enabling the achievement of the set goals of the enterprise (Wu et al 2015, Henderson and Venkatraman, 1999).

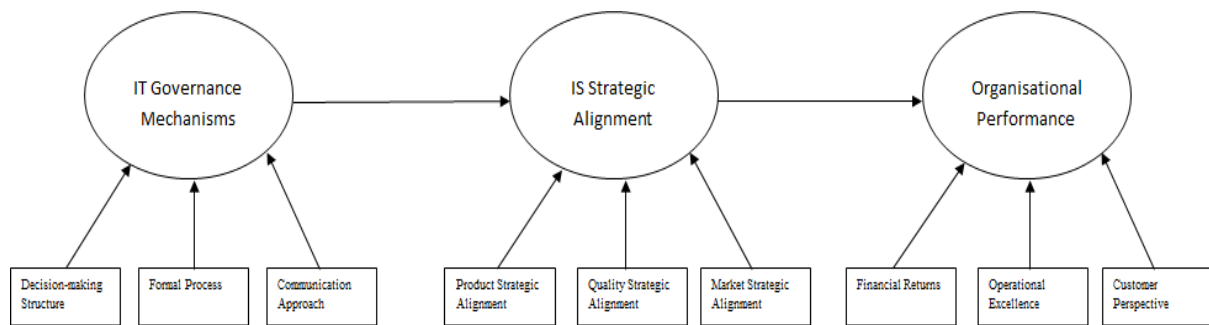


Figure 2. Structural Model developed by Wu et al. (2015); shows the link between structure, resources, strategy leading to organisational achievement

While all these aspects of organisational performance can be measured in commercial organisations and focusing on these will lead to more effective and efficient organisations, it is not clear how these aspects of organisational performance may be measured or applied in a public-service context like Defence. Note that the Australian Defence review stated: ‘...for Defence the objective is to function in a unified manner in delivering products and services that are beneficial to both the public and the private sector while seeking to meet the various demands. This review unfortunately did not provide details about these objectives and measures for ‘the said products and services’ as well as proves to be vague on the said demands.

One must see the importance to understand that investment in information systems is not bound to bring about gain by itself, just like it’s not bound to add essential monetary worth. Worth depends on the organisation’s ability to convert and use the IT resource. Researchers call this ‘benefits realisation’. Firms pursue information systems in order to generate profits following the application of the system (Gerow, Grover, Thatcher and Roth, 2008).

The realisation of benefits leads to ‘interventions’, that is, it changes how the activity keeps going as well as ‘individuals’ way of working. There are two types of interventions: problem-based and innovation-based. In problem-based interventions, improvement targets such as ROI (Return on Investment) make the convincing proposition to the decision-maker. ERP is a pattern-based intervention. In the case of innovation-based interventions, it is difficult to specify the end targets because there is uncertainty about its implementation success. This unpredictability leads to potential change as far as goals and opportunities are concerned causing the organisation to apprehend its environment as well as the evolving technology.

Understanding how to estimate and then realise profit via IT goals is still effortful as a part of the multi-layered information systems domain (Gerow et al., 2008). A number of companies would rather endeavor to apply scientific know-how instead of achieving the determined yield. In fact, many CIOs have reported that their investments IT-wise didn’t yield a substantial return. Generally, success of an IT project depends on the delivery time specifications and the budget. Many benefits in the business case are overstated in order to get the project approved, leading to the benefits not being completely realised (Gerow et al., 2008). One should note again that many US Defence ERP projects (Enterprise Resource Planning System) have had implementation ‘failures’ (Chen et al., 2012; Andreu-Perez, Poon and Merrifield, 2015). Additionally, as per Standish-group (Downes, 2015), 63% of IT projects failed or were challenged and only 37% of projects were successful. It was reported that 20% of features are

used often and 50% are hardly ever used or never used. The most interesting part is that the average cost overrun is more than 178% for large companies and even larger for medium and smaller companies. Recognising these challenges, how can the public sector organisations plan for benefits and then realise these benefits for any given IT investment?

Ward et al. (1996) have proposed best-practice guidelines on benefits management. Their validated model is shown in Figure 3.

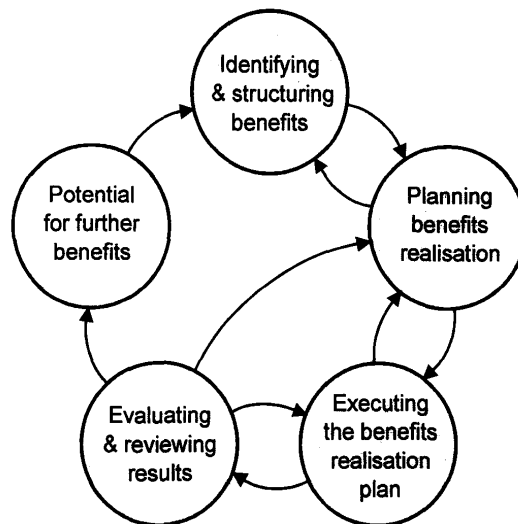


Figure 3. Operations of business benefits
Reproduced from Ward, Taylor and Bond (1996)

Remenyi and Sherwood-Smith (1998) describe active benefits realisation (ABR) as the course of action for governing the improvement of information systems' via regular assessments; Figure 4. Information systems development follows an interative developmental proceeding.

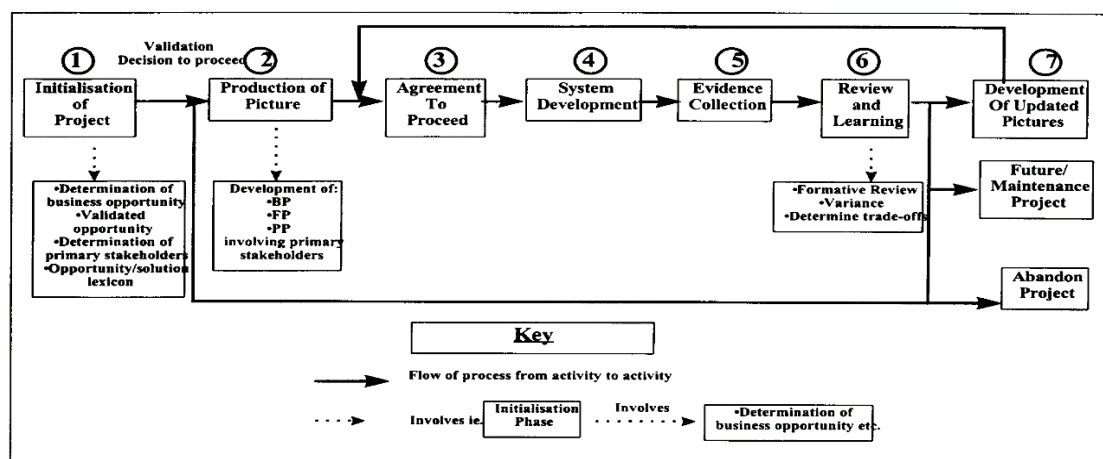


Figure 4. The progression of the benefits in the business case for active benefits realisation (ABR)

Reproduced from Remenyi and Sherwood-Smith (1998)

The Victorian State Government in Australia has developed an Investment Management Standard (IMS). The IMS provides an Investment Logic Map, Figure 5, wherein understanding benefit leads to a strategic response and solution definition to the problem; an explanation as to why the investment was made to start with.

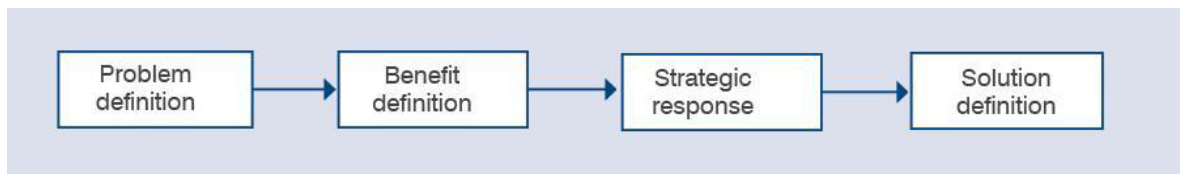


Figure 5. The 'benefits' approach to shaping a new investment
Reproduced from 'Investment Management Standard A guide for Victorian government departments and agencies'

This is a linear model and does not have an iterative approach. In other words, benefits need to be clearly defined before investment review. (Peppard, Ward and Daniel, 2007) proposes a benefits management approach and states that most organisations focus on implementing the technology rather than realising the expected business benefits. Consequently, despite a project's success, the benefits are somewhat self-fulfillingly not realised. There are five fundamentals to achieving benefits using IT. One should note that IT in itself has no worth whatsoever that individuals can benefit from, that only corporate leadership is instrumental in making benefits, that outcomes are inherent to IT projects but the other way around is not always true, and that it takes good management to achieve benefits. Problem-based and innovation-based 'interventions' are the two distinct types of IT-led changes that need to be understood for benefits realisation. They have proposed a list of seven questions that will help assist in developing the benefits realisation plan. This plan can be used to develop the business case. Their Benefits Dependency Network (BDN) provides the framework for explicitly linking the overall investment objectives and required benefits (the end) with the business changes (the ways) necessary to deliver those benefits and the essential IT capabilities (the means) that enable these changes.

Kunal, Frederik and Braun (2016) have investigated the relationship between benefits management constructs and practices, and benefits realisation success. They have developed a model – the estimated benefits realisation model. Their findings show that certain projects in the field of communication, their very characteristics in terms of quality and frequency make the crucial element of bringing about benefits successfully. Their interesting finding is that there is a close relationship between making successful benefits and the managing of benefits realisation in any project. The assumption here is that the constituent methods are enhanced by the resourcefulness of organisational employees.

CHALLENGES IN THE EXISTING BENEFIT MANAGEMENT APPROACHES

Ward (2007) found that despite the increase in the adoption of Benefits Management, most organisations still have a need for a more formalised framework to guide governance. Cozzain's (2006) study showed that there is a lack of collegiate unanimity about benefits identification, regardless of the nature of the benefit, as well as their measurement and implementation in practice. Braun, Ahlemann and Riempp (2009) indicated that there are limited studies on a thorough administration designed to manage the expected profit following investments IT-wise and to assure it is actually realised. Martinsuo and Killen (2014) pointed out that there is no unanimity when it comes to measuring constant worth of projects, programmes and portfolios. Aubry, Sergi and El Boukri (2017) stated that while there is a lot of practitioner literature on Benefits Management, there is a lack of academic research on Benefits Management, and particularly in measurement, evaluation process, organisational change and performance.

Hubbard (2010) questioned that even though the premise of all the approaches on the idea is that benefits can be measured, yet, the question emerges if such an ambition is always possible: are all benefits eliciting from projects certainly tangible?

Tanner (2012) stated that Benefits Management is an ambitious development in the context of Enterprise IT Governance beyond IT project.

In this research, we intend to develop answers from the following questions:

- 1) What is a benefit?
- 2) How can we define the benefits that are aligning with Enterprise strategic objectives, value and enterprise performance?
- 3) Can we have a unified standard framework for Benefits Management and Benefits Realisation?
- 4) How can Benefits Management be practically implemented with innovation?
- 5) How can we develop a unified measurement of the benefits that realise the enterprise strategic objectives, value, performance, sustainability, capability and preparedness?

Ongoing research aimed to address the above questions by developing, trialling and benchmarking a Unified Innovation-led Benefits Realisation Framework for Enterprise IT Governance.

AN INNOVATION LOOP BASED FRAMEWORK FOR BENEFIT MANAGEMENT

To address the above challenges, we have proposed a conceptual model (framework) for realising benefits which is shown in Figure 6. To put it simply, the agreement is between two parts of the organisations or between the two organisations, namely the customer or user and the service provider. The service provider provides goods and services to the customer in accordance with the contract. In the proposed benefits framework, this contract is extended to include three stakeholders – the beneficiary or the user, otherwise known as the procuring organisation. The user generally has a good idea of what he or she wants (example, a faster response time of the system) and so states the high level benefits targets. The second party is the provider of the goods and services. The provider has a good understanding of realising benefits through experience in implementing similar IT systems for other clients. The first party sets up a contract with the second party for the provision of IT goods and services. The third party is external to the contract between the first two parties. The third party comes from either the academic world or industry crowdsourcing. The third party has specific knowledge-base and can provide best-practice advice based on research or industry expertise. The third party can be a source for reference class forecasting as shown in Table 1 and also explained more fully later in this paper. By collaborating, they can share their expertise.

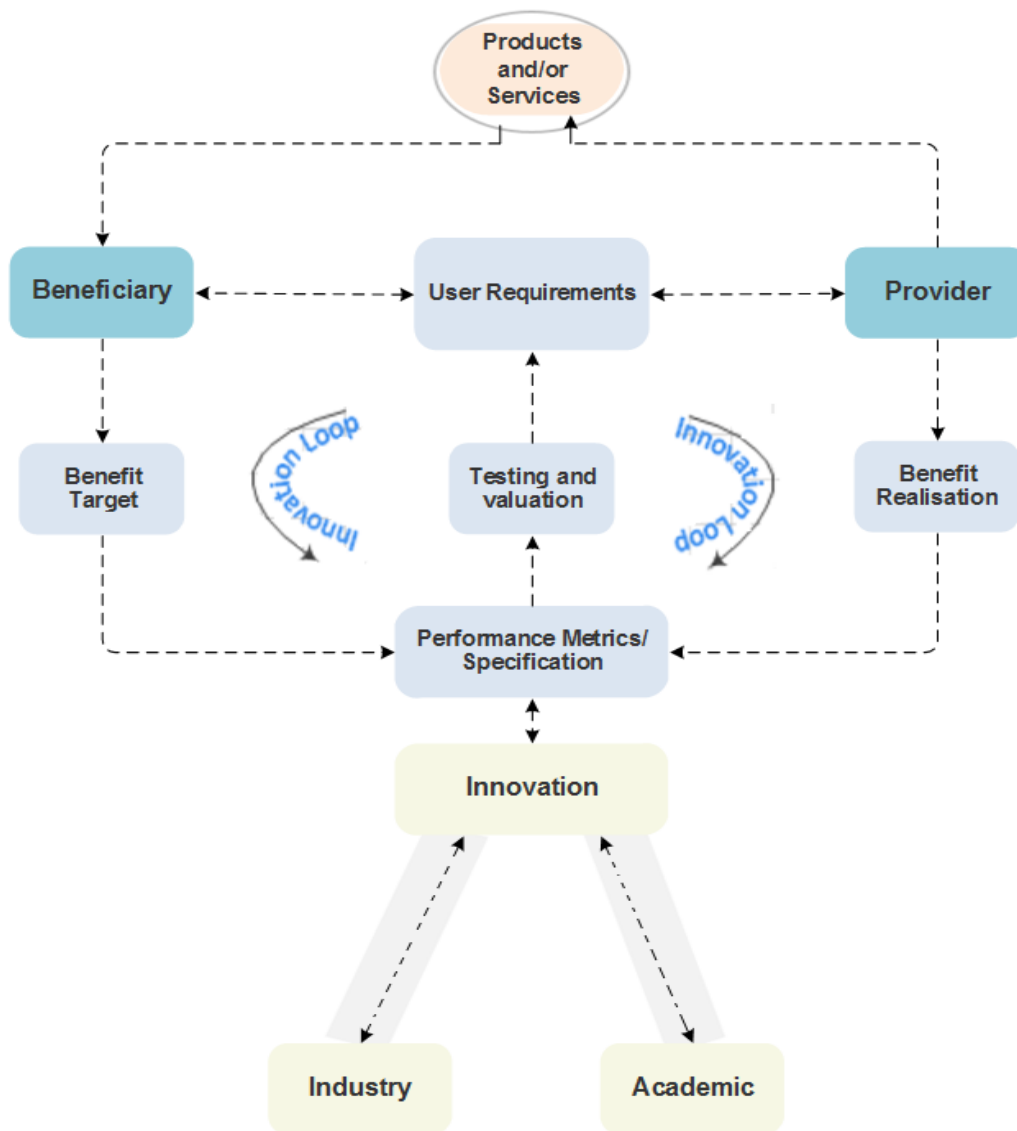


Figure 6. A Human-Centred Innovation Loop embedded Benefit Realisation Framework

<i>User/Client</i>	<i>Provider</i>	<i>External Stakeholder</i>
<i>Benefit identification and Measurement</i>	<i>Realising benefits for end-user or client</i>	<i>Peer review for benefit realisation and support innovation and continuing improvement</i>

Table 1: Stakeholders and their Domain Expertise

While the procuring organisation (the ‘Beneficiary’ as shown in Figure 6) has a limited idea of benefits, perhaps gained from previous projects, the expertise on identifying, proposing and supporting the realisation of the benefits rests with the IT provider (the ‘Provider’). Therefore, the important consideration here is to align the expertise (that is, understanding the organisational goals, problems) of the IT procuring organisation with the expertise (that is, understanding benefits and its realisation) of the IT provider organisation. When this alignment occurs, it realises highly desirable multiple aims through ongoing innovative solutions and through the development of performance metrics, specifications, and user requirements - iteratively. The alignment occurs in a closed continuous ‘innovation’ loop until the project reaches the ‘disposal’ stage.

This framework initiates the following best-practice arrangements:

Access to best practices and innovation through external agencies. The internal 'innovation' loops are coupled to external 'innovation' programmes of research centres such as academic centres of excellence, industry R&D, and crowdsourcing. The external research centres trigger further innovative solutions, for example, using forecasting techniques such as 'reference class forecasting' (Gerow et al., 2014). These forecasting techniques also address the issues arising out of situations where many benefits in the business case are overstated in order to get the project approved, leading to the benefits not being completely realised (Ping-Ju Wu, Straub & Liang, 2015). The use of techniques such as 'incremental enlargement principle' (Zadeh, 2016) coupled with reference class forecasting would assist with identifying realistic benefits targets prior to investment review.

Best practice contracting arrangement. According to Williamson (2008), governance structures in a commercial environment will benefit from being an ongoing kind. Additional gains can be realised if the parties preserve cooperation during contract execution. Williamson (2008) quotes Karl Llewellyn - '*contract as framework*' - and contrasts it with the more familiar concept of '*contract as legal rules*'. In the conceptual framework in Figure 6, the contract is a flexible arrangement and not a rigid contract and preserves ongoing cooperation between all parties. The contract in Figure 6 can be viewed as a flexible framework and not a rigid contract that serves as a legal weapon or protective device. The flexible framework allows collaboration and sharing of information leading to reduction in governance arrangements.

Collaboration between three groups. In this framework, we bring about a partnership of three groups – the organisation that desires IT-led change, IT industry (includes the provider), and IT academic research organisation and/or other expertise using crowdsourcing. This collaboration is critical for implementing the framework.

The framework provides four unique steps for Benefits Management. First, noting the simplicity of the conceptual framework coupled with the fact that there is a lack of understanding on how large public-sector organisations will develop the respective engagement infrastructure, further research is required to understand this fundamental shift in managing and realising benefits. Second, the rapidly emerging technologies and innovations will generate benefits as well as 'dis-benefits', both direct and indirect, not previously understood and envisaged. Further research will be required on the managing and realising of benefits in the public sector in this agile and rapidly changing technology environment. Third, human factors will play a critical role during the entire process. A diverse range of skills will be required, some highly specialised. Understanding the challenges associated with not only retaining these skilled staff but also optimising the team performance in a rapidly transformative technological environment will be critical. Fourth and finally, evidence-based evaluation of usability, security, integration and system performance against the business performance metrics are key to the framework delivering rigour to Benefits Realisation from information systems (Joiner et al., 2018: submitted).

INNOVATION LOOP POWERED BY STRATIFICATION AND INCREMENTAL ENLARGEMENT

The principle of subordinating additional growth (Zadeh, 2016) combines granulation and/or measurement in an attempt to seize the original profits through the classification of goals that are to be considered realistically. The process is explained below. In computational systems, the two variables are determined respectively as: 'profit' being the expected result, and 'profit achievement' as the objective. The objective being the Target' is viewed as 'a group of targets', as well as 'target reachability' being the active proceeding that sees the shift from 'current state

pressure' to the further stage, being 'the Future State' the quickest way. Refer to Figure 7a. 'Strata' is viewed over 'Target set'. A Strata is rooted in a common target set or a particular batch, a block, or a hierarchical framework with a stratified structure.



Figure 7a. Conceptual view of Stratification, Target and Incremental Enlargement

We gradually reach the Target or we progressively augment the Stratum (for instance) using graining and/or calculating the 'Benefit' in order to attain a finite volume. We determine the Benefits using stratification, in a multi-layered view within an inner-view of a compound infrastructure which is analogous to a compound whole structure or structures-of-structures, for which several two structural views are applied, settled in Stratum:

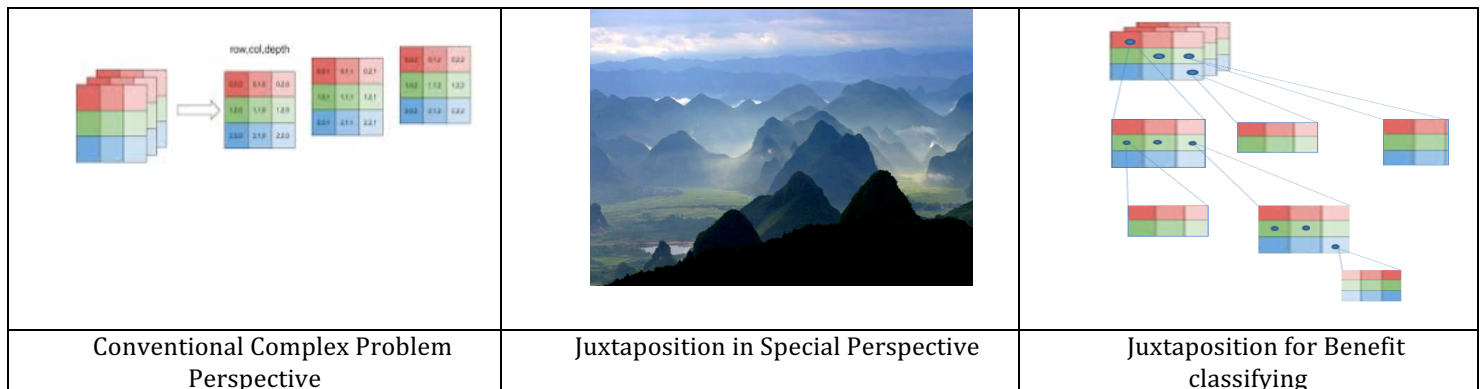


Figure 8. Speculative depiction of juxtaposition

This method is particularly useful in defining a target when the target is intangible, and it gives us a tool to move forward from granulation to stratification, using the concepts of target and incremental enlargement in a large complex system. Figure 7b demonstrates it through a military logistics example.

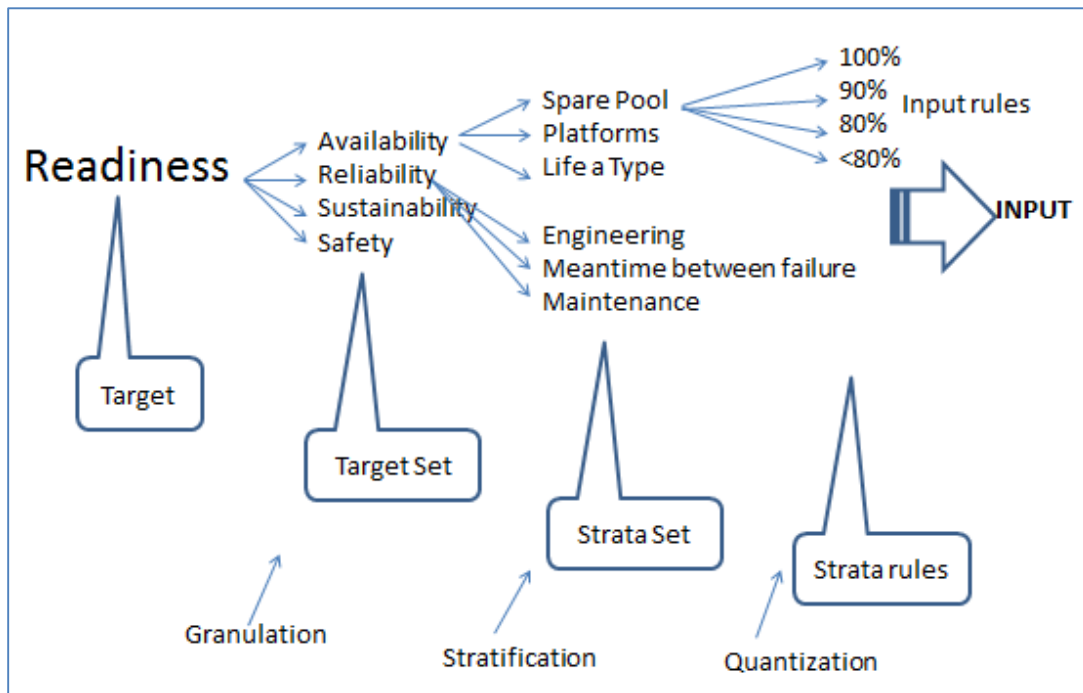


Figure 7b. An example of Stratification, Target and Incremental towards the Target

The concept of stratification (CST) is extended here particularly for the modeling of large complex problem domains and systems. It allows one to model the dynamic nature of complex systems in spatial space. It is conceptually easy to be transformed into a blueprint for developing mathematical programs, Artificial Intelligence algorithms and Natural Language Processing (NLP).

Practical Example:

Juxtaposition Level 1: A Company Benefit follows the below classification into Tactical Objectives, Prospective or Statement of Purpose

Company	Objective 1 Value	Objective 2 Achievement	Objective 3 Services	Objective 4 Impact
Goods				
Utility				
Capacity				

Table 2: Stratification level 1 - Enterprise-wide Benefits identification

An Education Organisation:

- 1) First ranking Research Centre
- 2) Distinguished in Education and Training
- 3) Assistance to Community, Market and Society
- 4) Global Commitments

A Manufacturing Organisation:

- 1) To develop a happy workforce and a vibrant working environment
- 2) To render first-grade quality products and services
- 3) To preserve client experience at 90%
- 4) To grow profit at 6% annually

Stratification Level 2: A Company may follow the below classification by Domains (vertical) and Models (Horizontal) for Portfolio, Programmes and Projects

An example: Portfolio level

Portfolios	Finance	HR	Operation	IT	Logistics	Admin
CASG	●					
Army						
Navy						
Airforce						
CIOG						

An example: Program Level (Program could be SPO, or CoE, or groups or structure of Human Division)

Programs	Acquisition	Procurement	Capability	Sustainment	Information
Program 1	●				
Program 2					
Program 3					
Program 4					
Program 5					

An example: Project Level (A Project could be international and extremal Projects with deliverables)

Projects	Deliver 1	Deliver 2	Deliver 3	Deliver 4
Project 1	●			
Project 2				
Project 3				
Project 4				
Project 5				

Each dot is targeted Objectives that is aligned with the enterprise Objectives and that is used to define the Benefit, and this is used to develop Measurement

Table 3: Juxtaposition level 2- Benefits Classification at Portfolio, Program and Project levels

Juxtaposition Level 3: Benefit through Juxtaposition is matched with Objectives and Sub-objectives, these two being substantial and unsubstantial

Enterprise										Objective 1	Objective 2	Objective 3
Portfolio								Objective 1	Objective 2			
Programme					Objective 1	Objective 2	Objective 3					
Project	Objective 1	Objective 2	Objective 3	Objective 4								
	Benefit 1	Benefit 2	Benefit 3	Benefit 4	Benefit 5	Benefit 6	Benefit 7	Benefit 8	Benefit 9	Benefit 10	Benefit 11	Benefit 12

Cost oriented	Financial Goals	●	●	●				●	●			●	
	Cost Saving		●		●	●							
	Profit loss					●						●	
	Performance	●				●	●	●	●				
	Time	●				●						●	
	Human Resource			●		●				●			
	Capability				●			●					
	Op Automation					●							●
	Customer							●			●		
	RoI											●	
	Value for Money	●	●	●		●	●	●	●				
	Stakeholders		●			●					●	●	

Table 4: Juxtaposition level 3 - All substantial and unsubstantial benefits classification

The juxtaposition defines benefit (vertical) as being aligned with the company’s general goals meaning portfolio, programmes and plans, and with a possible device development, which can generate the benefits metrics and reports, including the business case. The stratification forms the foundation to help benefit definitions by taking into consideration the enterprise-wide business objectives and is in the interest of division/portfolio/programme/project business values, enterprise performance, operation, change-management, external outsourcing, products and services, that are rendered to the different areas of graining, and encompass span, distance, allowance, staffing resources stratums in multiple two-layered perspectives. This makes it easier for the development of measurement and gives a blueprint for benefits management and benefits realisation.

INNOVATION LOOP NEEDS TO BE POWERED BY TRANSACTION COST ECONOMICS

The transaction economic cost theory (TEC) helps understand the measures to effectively and efficiently manage and realise the defined benefits. TEC is an inter- and multi-disciplinary approach to benefits identification and is informed by economics, organisational theory and law.

When a project, a programme or a portfolio is initiated within the enterprise, there are transaction costs involved. We use TEC theory to hold the transactions between the

project/programme/portfolio benefits against the cost, in the two-dimensional view of Benefits Stratification, which is shown in Table 1-4 which also includes external and internal projects.

When the outcomes of a project are delivered from the provider or the organisational project initiator, to the beneficiaries, there is a transaction cost transferred between the parties.

In reference to our conceptual framework for IT governance (Fig. 6), we see this is an iterative process, and in each recursion, there are transaction costs that can be defined and then measured and each measure is distinguished based on the stratification of the enterprise (Ghildyal & Chang, 2018) or they can be distinguished based on the organisation in an organic setting (Williamson, 1989). We adopt Medema's (1995) method to develop a detailed measurement against frequency, uncertainty, and asset specificity for each given transaction. In the context of benefit through stratification, TEC holds valid project benefits because these three characteristics are part of any project's transaction costs (Aubry et al., 2017). With a fully integrated organisational stratification blueprint, the project's benefit and costs are described at different layers and levels of granulation. For example, if a project is an internal project, project-based transactions occur within an organisation and the costs include managing and monitoring personnel and procuring inputs and capital equipment among other things (Williamson, 1981). On the other hand, if the project is externally outsourced, when goods are purchased or services are provided from an external provider or an outsourced agent, the costs include source selections, contract management, performance management and dispute resolution among others (Williamson, 1998). The success, failure or even partial realisation of benefits at project, programme or portfolio level could be anticipated. Overall, from an economic perspective, the organisation of project transactions will help elicit internal and external transaction costs.

The TEC theory also provides a legal framework for contract management, which is used to predict transaction cost in projects. Large and long-term contracts may not always be initially clear in their scope and benefit, which then requires incremental improvement. We define this process as the Innovation loop in our model (Figure 6). The innovation loop helps improve the contract and benefit clauses to respond to contingencies which are based on the project's scope for a very large complex project arrangement. This innovation loop allows the contracts to be incrementally renegotiated when required based on the providers and beneficiaries.

INNOVATION LOOP NEEDS TO BE POWERED BY REFERENCE CLASS FORECASTING

We adopt Reference Class Forecasting for the benefits management framework. Reference Class Forecasting considers an 'outside view' on planned actions. The 'Outside view' is measured based on knowledge about the actual performance in a reference class of comparable projects. It acts like case-based reasoning methods by which the future is predicted by using similar past situations and their outcomes.

According to Flyvbjerg (2006), Nobel Laureate Kahnemann along with Tversky found that humans make generally optimistic judgement. This is because of the fact that their consideration of distributed information about outcomes is mixed with overconfidence. Usually, individuals tend to underestimate factors such as: funds, time frame, and the uncertainty inherent to any certain action with regard to their future, on the other hand, they don't make the same analysis when it comes to the benefits that are tied to those incidents. A "narrow view", which is the chosen approach by some in the profession. In fact there is a greater emphasis on the specifics of a future event. As a result, from their findings, distributional information is to be taken into account. Risk, is perhaps the main forecasting

error. Such behaviours are manifest in systemic project-over-optimisation and underestimation of risk noted in two very large and comprehensive Australian Government reviews of acquisition and policy (Australian Senate, 2012; Shergold, 2015). Flyvbjerg (2006) recommends that forecasters should utilise all the distributional information that is available to them. Using distributional information from previous ventures similar to the one being forecast is called an 'outside view' and is also supported by the major reviews cited.

The 'outside view' is more likely to produce a realistic estimate because it bypasses cognitive and political biases, such as optimism bias and strategic misrepresentations, and cuts directly to outcomes.

In practice, project benefits forecasting is commonly produced by one group of agents ('project contractors') and consumed by a different group ('beneficiary' or 'client') and the desires of the two groups generally do not interact. Project delays and cost overruns are usually consequences of optimism bias (Flyvbjerg, 2006) and strategic misrepresentations (Brezilius et al., 2002) where forecasters would over-optimistically overestimate project benefits and underestimate error costs in optimism bias. The 'inside-view' of organisations alone fails to account the risks and uncertainties in the cost estimates. In response, project decision-makers and forecasters began considering the 'outside view', which commonly stems from the impact that past data has had and the concerned parties who hardly commit themselves in designing and building the project (Kahneman and Lovallo, 1993).

We use Reference Class Forecasting (RCF) as a cost estimation technique for similar projects. Two dimensions, namely, the estimation error and the degree of dispersion in the sample around the mean measure of the cost estimation. The estimation error is the difference between the detailed estimate and the actual cost. This is useful and a good variable for measuring the accuracy of the cost estimation method over the specific project. In justifying benefits realisation, the second dimension of cost estimation accuracy is measured by variance of the sample.

CASE STUDY

The Enterprise Information Management (EIM) 2025 Strategy

The EIM 2015 blueprint is a published plan for the Australian Defence Force and is referred to as 'trusted and accurate information services [are] delivered to the point of need to enhance military and business operations.

The EIM 2025 blueprint supports benefits and addresses the below five benefits:

- 1) Capability
- 2) Responsiveness
- 3) Competence
- 4) Law-abiding framework
- 5) Ability to exchange and use information

The proposed plan aiming at responding to the challenges inherent to benefits realisation are [[3], p8-10]:

- 1) Create a unique trustworthy source of enterprise data
- 2) Raise common battlespace awareness
- 3) Respond to business performance using quality information
- 4) Inform, prepare and provide staff with current information management methods

- 5) Manage Information Management (IM) solutions in terms of records management, search and teamwork
- 6) Align business and information processes
- 7) Announce accountabilities for information management clearly
- 8) Associate information with Asset, and adopt agile delivery methods

The EIM 2025 blueprint states five essentials (Gerow et al., 2014):

- 1) Business-led
- 2) Secure and trustworthy
- 3) Standardised, integrated and interoperable,
- 4) Intelligent, agile and innovative
- 5) Classified information

The above initiatives and imperatives are yet to find their way in the One Defence vision by 2025 along a large number of the current 2,500 systems to allow Defence to access a more singular source of truth. The legitimate question to ask targets the type of framework that Defence can use to accomplish those benefits.

Innovation Loop led Benefit Identification

The benefits-driven strategy for delivering Defence EIM is a sound approach, however, anything to do with IT has a poor reputation and IT is viewed as failing to deliver 'value for money'.

Our field studies show that the benefits approach of the EIM 2025 Strategy appears to be sound at the policy level, however, there is a need to build an implementation and evaluation framework to help govern realisation of benefits and that of the vision. This is critical because benefits are generally realised after the successful implementation of IT projects. The benefits range from 'problem-based solutions', which help achieve business objectives and prevent performance deterioration, to 'innovation-based solutions' enabling a competitive advantage, which is very desirable in the Defence environment.

The EIM 2025 Strategy also states that managing the volume and complexity of data would be a key consideration which reflects the urgent need noted earlier (Chen, Chiang & Storey, 2012).

The EIM 2025 Strategy targets outcomes for the War-fighter domain underpinned by the next generation of Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR). The future Defence Force environment will be driven by information technology that will need to establish a seamless networked environment linking sensors, weapon systems, commanders and their personnel (Ping-Ju Wu et al., 2015). This strategy aligns with the next generation technology foreseen by Porter and Heppelmann (2015) and outlined earlier.

Taken with earlier literature on IT failures, the above strongly suggests that realisation of benefits with EIM 2025 strategy would require a detailed Benefits identification and measurement plan that would enable operational benefits and human performance benefits, and would support adaptation to a continuum of rapid technology innovations. This plan, when implemented would lead towards enterprise benefits. The literature reviewed above also suggests that the environment will be challenging, an environment where knowledgeable experts are few and where seeing an IT project fail becomes more frequent.

Extensive research in the commercial sector has shown the importance of appropriate IT Governance mechanisms on firm performance. Limited studies suggest that some but not all of the same strategies can be applied to the not-for-profit sector to achieve enhanced organisational performance. However, there is scarce research about such mechanisms in the public sector such as in the Defence context. In the next section, we discuss the literature on governance issues and challenges with benefits approach.

Below we provide Level 3 Juxtaposition to classify the Benefits (Table 5)

EIM – A Single Platform from SAP ERP Benefit Objectives, Initiation and Imperatives Statements		Strategic Managed Information	Intelligent and Innovative	Trust and Protected	Business-led	Agile Approach	Clear Accountability	Standardised Business Process	Key Information Management	Education and Training Staff	Enterprise Performance	Battle Space Awareness	Trusted Single Source	Interoperability	Compliance	Efficiency	Responsiveness	Effectiveness	
Benefits Identification																			
Financial Goals																			
Cost Saving																			
Profit loss																			
Staff Performance																			
Time																			
Human Resource Cost																			
Capability																			
Operation Automation																			
Customer																			
RoI																			
Value for Money																			
Stakeholders																			

Table 5: Example of Juxtaposition level 3 - Classification of Substantial and Unsubstantial Benefits

Using this genuine, authentic case study, the great number of Benefit definitions was overwhelming and difficult to address thoroughly. The stratification approach was the chosen one and opened our understanding of EIM. Still, it remains difficult to classify substantial benefits along with the many unsubstantial benefits which fall in the same category of benefits whose measurement is also problematic. At the time of this research, the EIM 2025 Strategy is to be achieved by One-Defence System, known as SAP ERP, for the entire Defence Logistics Management. It has a 5-year plan 2015-2020. We believe the benefits realisation can be considered and can be measured from 2020 when the SAP ERP implementation is completed and in operation. We also need to consider the time allowance for the period of deployment, testing, and user training, and we believe that the best benefit realisation approach is through crowdsourcing within the entire enterprise or the organisation.

CONCLUSIONS AND FUTURE RESEARCH

The proposed Benefits Management for IT Governance enforces the accountability of benefits at the different levels of the enterprise stratification. The enterprise objectives, operation and functions, business values, customer or societal impact, investment and payoffs are normative measures of projects (Gypton, 2002). We use these principles and theories to justify the realisation of the project benefits, both tangible and intangible depicting the project success or failure. This research has broad applicability to any IT governance particularly in public sector

organisations and large complex businesses. The framework continues to be trialled in local IT development and is simultaneously being benchmarked internationally with other IT governance initiatives both large and small, public and private.

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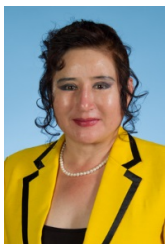
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