

---

## **CHIEF PORTFOLIO OFFICER: THE INDUSTRY 4.0 VALUE CHAIN CHANGE AGENT<sup>1</sup>**

**Dr Julian Van den Berg (Australia), Prof Pieter Steyn (South Africa)  
and Prof Brane Semolic (Slovenia)**

### **Abstract**

The Fourth Industrial Revolution (Industry 4.0) is characterised by increasing digitisation and inter-connection of products, value chains and business models. Competitiveness is improved through collaboration by mustering inter-organisational resources in the form of virtual networks of partners. It leads to profound transformation and change in the paradigms and structuring of modern organisations, demanding the introduction of horizontal supply and value chains overseen by a Chief Portfolio Officer. This shapes organisations into strategic, collaborative, value driven entities where a competitive edge is gained by performing strategic activities more effectively and efficiently.

### **INTRODUCTION**

Petersen and Autry (2014), observe that supply chain management (SCM) scholars are truly at the crossroads of opportunity and stagnation. If integrative knowledge can be expanded and functional biases discarded, then stagnation will be circumvented. In their conclusion they point out that SCM as a new discipline is approaching theoretical, ontological, and methodological crossroads and is rich with opportunity at the same time. Decades ago Forrester (1958) proposed that after a period of research involving basic analytic techniques, pioneering management who are first to improve their understanding of the interrelationships and integration between separate organisation functions, will enjoy an economic advantage.

Steyn (July, 2010) alludes to the importance of a Chief Portfolio Officer (CPO) as a key member of executive leadership. The emergence of Industry 4.0 in 2011 accelerated the demise of bureaucracy and the creation of cross-functionally shaped knowledge-based learning organisation value chains. This transformation and change resulted in organisations structuring their supply chain- and project portfolios cross-functionally, profoundly stimulating the need for the introduction of a CPO. Moreover, it reinforced

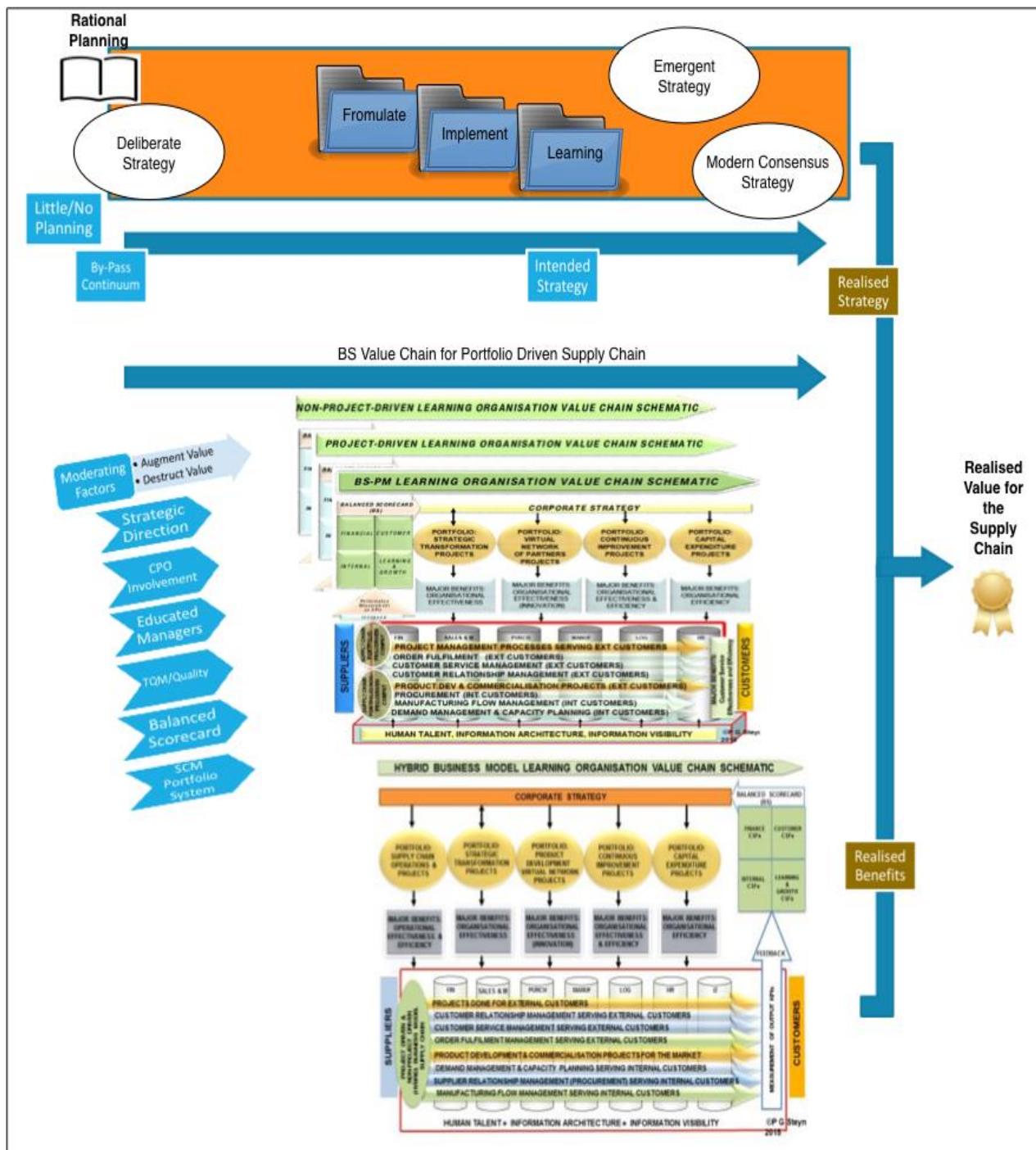
---

<sup>1</sup> How to cite this paper: Van den Berg, J., Steyn, P., Semolic, B. (2018). Chief Portfolio Officer: The Industry 4.0 Value Chain Change Agent, PM World Journal, Vol. VII, Issue VII – July.

the need for further research into building a management framework and model to advance the body of knowledge supporting the role of CPO.

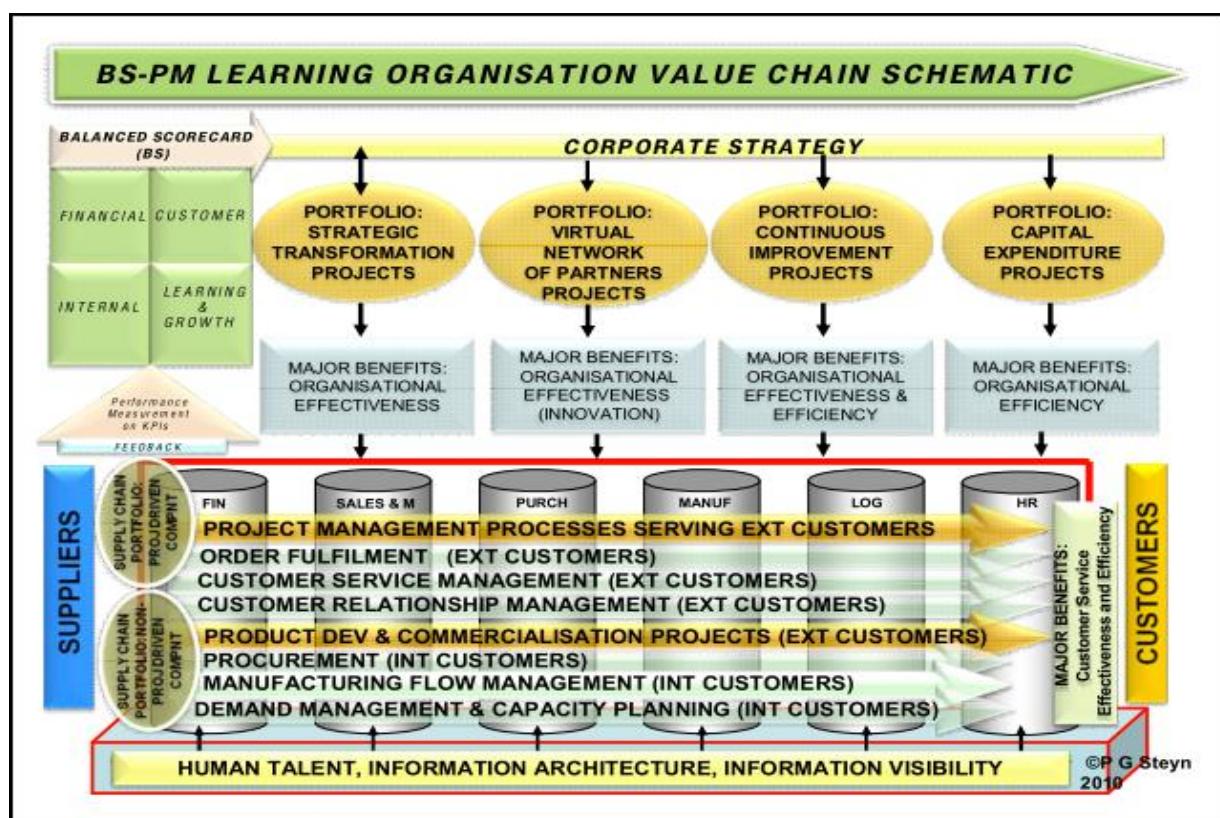
It became evident from the literature that the academic discourse on the process of strategy selection renders little agreement amongst various prominent authors in the field. The discourse on strategy implementation through projects, programmes and portfolios also render little agreement. Further investigation into the literature was performed with the intent of describing the dominant approaches to strategy and how these divergent approaches can be grouped and crystallised on a continuum of strategic approaches, as shown in Figure 1 (see more detail in Figures 2, 3, 4 and 5).

(see next page)



**Figure 1:** The Value Continuum of Portfolio Managed Supply Chain Management Strategy Options. (Adapted: Van den Berg, 2017).

The strategy value continuum describes various artefacts relating to the types of strategic options chosen by organisations. The strategy value continuum also illustrates the moderating factors (moderators) that are believed to be some of the mechanisms that form the main contributors to the cause-effect relationship that leads to many of the alleged organisational failures within the context of a multinational supply chain portfolio. These moderators also have an impact on the supply chain portfolio business models proposed by Steyn (2003, 2010, 2012 and 2013) and Steyn and Semolic (2016) illustrated in Figures 2, 3, 4 and 5.



**Figure 2:** The Balanced Scorecard-Programme Management Learning Organisation Value Chain Schematic. (**Source:** Steyn, 2010 and 2013).

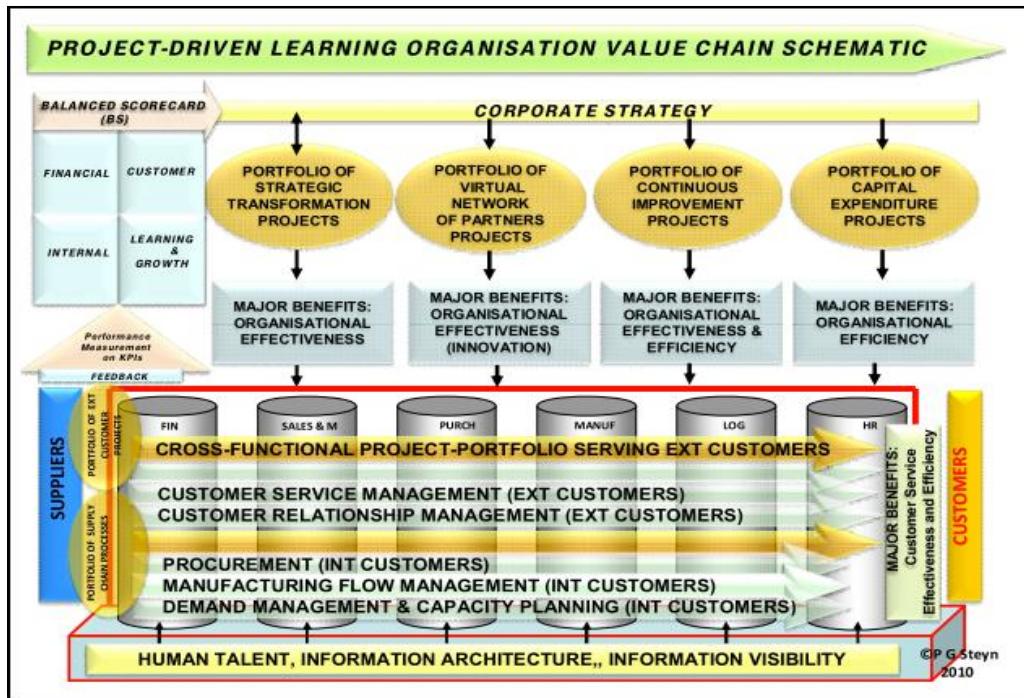


Figure 3: The Project-Driven Learning Organisation Value Chain Schematic. (Source: Steyn, 2013).

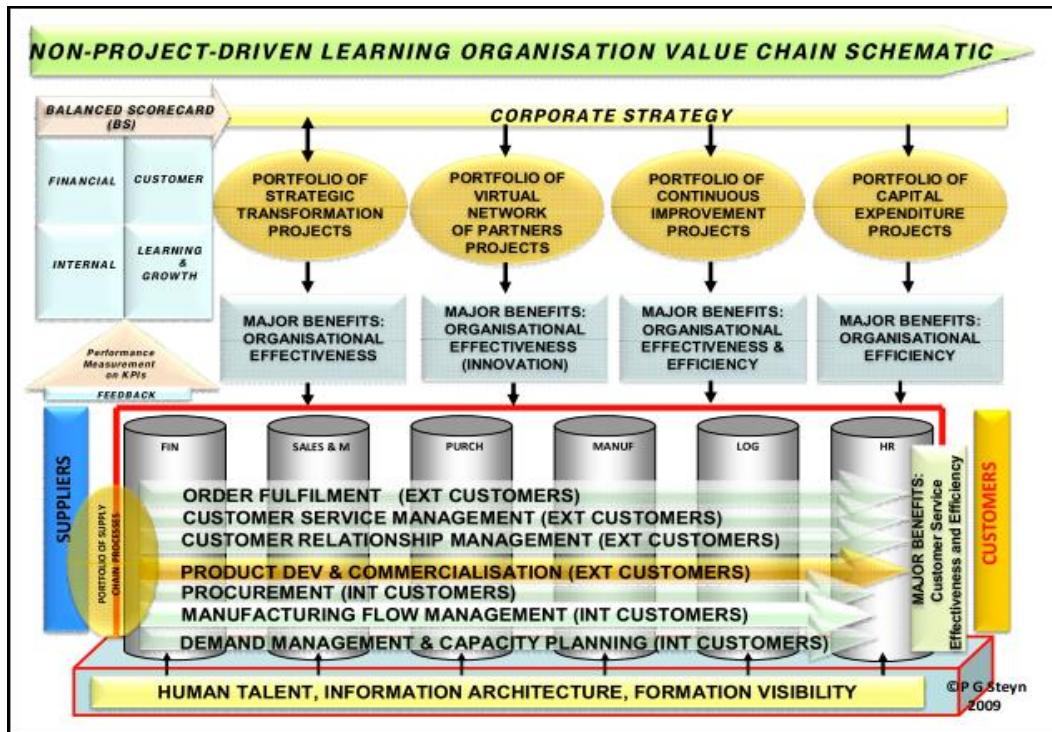
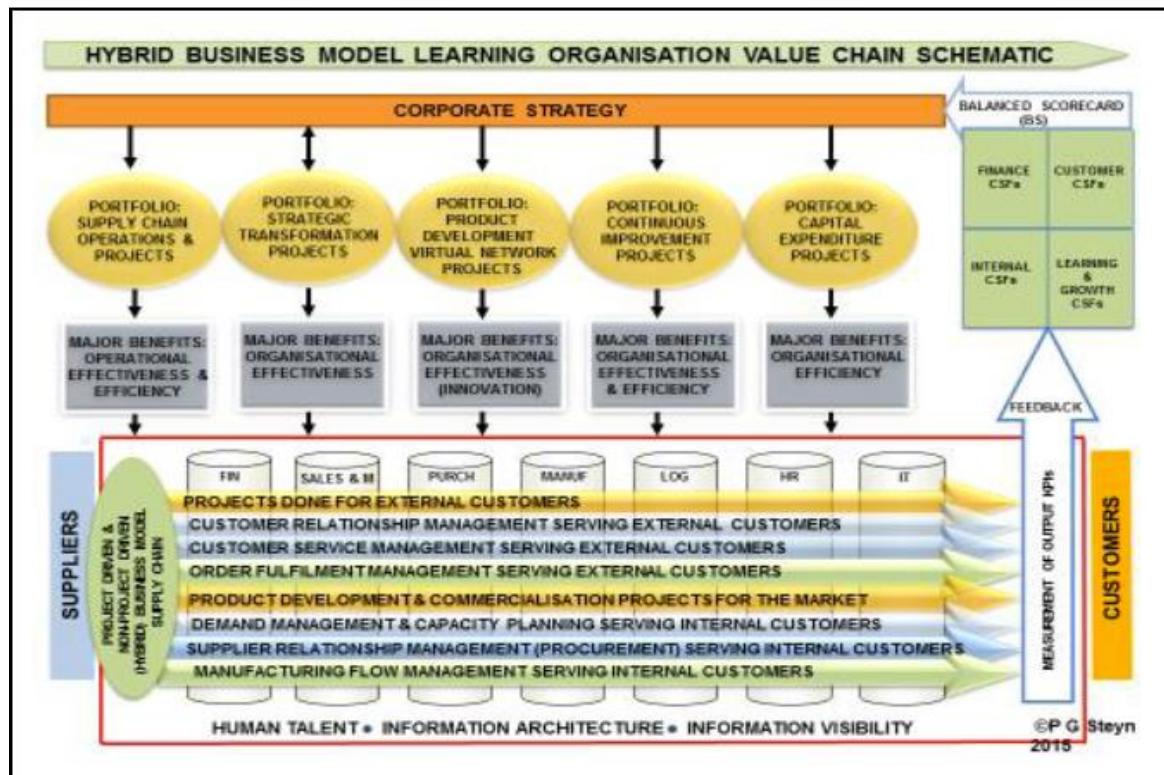


Figure 4: The Non-Project-Driven Learning Organisation Value Chain Schematic. (Source: Steyn, 2013).



**Figure 5:** The Hybrid Business Model Learning Organisation Value Chain Schematic. (**Source:** Steyn and Semolic, 2016).

The supply chain portfolio business models illustrated above are not mutually exclusive. Steyn and Semolic (2016), point out that these support each other through integration and coordination in the internal and external environments, and have a further advantage of linking an organisation's strategic vision and mission systemically. Moreover, the four programme configurations can be suited to both public and private sector organisations.

In support of today's Industry 4.0 philosophy Semolic (2010) purports that a further initiative, the project portfolio for specialised product development organised as a virtual network of partners be added to the model. He stresses that specialised product development cannot always be successfully accomplished in the cross-functional product development and commercialisation process of the supply chain. Often an organisation experiences a dearth of resources that others can provide through partnering. Semolic (2010) avers that partnering for product development amongst organisations prompts the creation of a project portfolio constituting a virtual network of partners that serve to stimulate innovations and improved competitiveness.

The strategy value continuum is one of the pillars used to crystallise the CPO Model for Managing Supply Chain Programmes and Portfolios across the Balanced Scorecard Programme Managed Learning Organisation (Van den Berg, 2017). The CPO Model endeavours to create dynamic capabilities by incorporating other components such as the supply chain portfolio business models (Steyn, 2003, 2010, 2013; Steyn and Semolic, 2016), the programme office structures guided by a CPO to direct these portfolios (Steyn, 2010, 2013; Steyn and Semolic, 2016), and the Balanced Scorecard Strategic Realisation Framework (BSSR framework) illustrated in Figure 8. In turn, the BSSR framework incorporates the different frameworks for benefits management, benefits realisation, business process management, governance, risk and compliance, quality management, Six Sigma and Lean Management, master data management, and reporting with measurable KPIs.

## THE AMBITIOUS REALITY OF STRATEGY IMPLEMENTATION

If implementing strategy were only that simple as Louis Alvarez, Nobel Laureate once quoted: “*This is the course in advanced physics. That means the instructor finds the subject confusing. If he didn't, the course would be called elementary physics*” (Mintzberg, Ahlstrand and Lampel, 2005). The same sentiment is relevant to strategy as one soon finds out that implementing the strategy is often different than what is formally taught. Reporting lines, responsibilities and accountability are mostly unclear to the observer. Most often strategy is only for the eyes of top management and employees just do as told yet never knowing how their actions make any significant contribution to strategy. Some organisations often observe that finding the right strategy is a case of trial and error when dealing with customers and their industry.

Often, the right strategy is disguised as a form of formal prediction and hopefully a very accurate one at that. Weeks (2007) and Davenport, Leibold and Voelpel (2006) suggest, at the very core of strategy implementation lie the notion of prediction, which is derived from analysis, experience and insight. This prediction is an attempt to formulate and implement strategies to optimally position the organisation within its future environmental context. In this sense, the future is predicted and acted upon regarding implementing the strategy.

Unfortunately, this prediction may be flawed or inaccurate because decision makers' rationality is confined by limitations in computing capabilities, information gathering and a limited memory (Arrow, 1986; Kaufmann, Michel and Carter, 2009). Also, mistakes can occur when it comes to making predictions, judging probabilities, or otherwise attempting to contend with decision-making environments that are uncertain and unstable (Arrow, 1986; Kaufmann *et al.*, 2009; Thaler, 2000).

Irrespective of the outlook or approach, pondering on strategy presents one with the inescapable observation that strategy is not as simple and straightforward as one is taught. Mintzberg (2007) observes, that: “*...practice is always more complicated - and more interesting - than theory*”, summing up the implementation of strategy somewhat accurately. Mintzberg argues that in the creation of strategy failure is almost always associated with implementation (Mintzberg, 2007; Mintzberg *et al.*, 2005).

Some organisations struggle so much with strategy that it is seldom implemented successfully. Mankins and Steele (2005), present the question, “*Is strategic planning completely useless?*” According to the authors, the process contains serious flaws to such an extent that: “*Most executives view traditional strategic planning as worthless*” (Mankins *et al.*, 2005).

The rationale for this viewpoint is that failure of most strategic planning is at the hand of two factors: It is an annual process and is most often focused on individual business units (Mankins *et al.*, 2005). First, the limitations of an annual process indispose executives from being able to deal swiftly with any threats or opportunities presented throughout the year. Second, visiting one unit at a time lacks worthwhile information to be combined into a holistic approach and removes executives from urgent business issues. Mankins *et al.* (2005), imply that: “*as such, the process is completely at odds with the way executives actually make important strategy decisions, which are neither constrained by the calendar nor defined by unit boundaries. Not surprisingly, then, senior executives routinely sidestep the planning process*”.

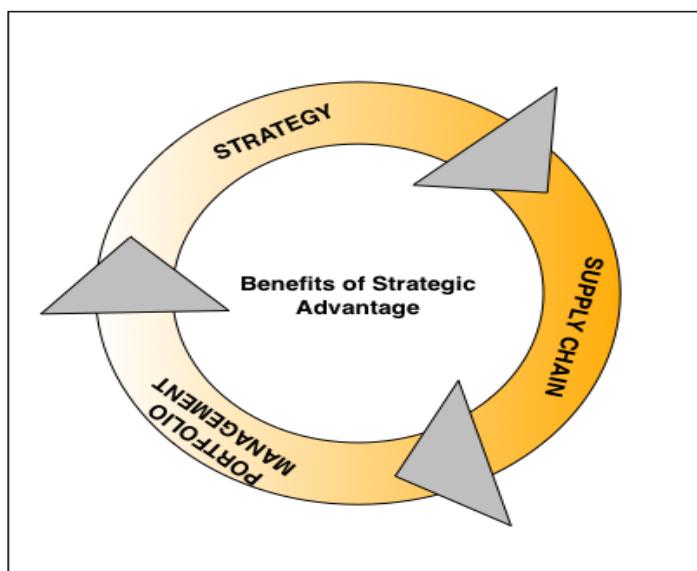
The concept of an organisation not having a strategy is almost unthinkable, yet Inkpen and Choudhury (1995), suggest: “*...strategy absence need not be associated with organisational failure*”, and the deliberate absence of strategy: “*...may promote flexibility in an organisation*”. The authors further suggest that as strategy becomes embedded in the mindsets of the employees: “*...organisations with tight controls, high reliance on formalised procedures, and passion for consistency may lose the ability to experiment and innovate*”.

Veldsman (2007), submits that there is a strategic fatigue observable in organisations alluding to the notion: “*...that strategising itself has not kept pace with the accelerating changes which necessitate a reinvention of strategising itself*”. Veldsman (2007), also contends that organisations often find themselves paralysed by strategic fatigue and: “*relapse into an exclusively sole focus on tactical-operational decisions and actions*”. The author suggests that organisations must be willing to reinvent their strategy to be propitious to hyper-turbulence and hyper-fluidity enabling them to cope with unpredictability and ambiguity.

## A PORTFOLIO-MANAGED VALUE CHAIN LEARNING ORGANISATION BUSINESS FRAMEWORK

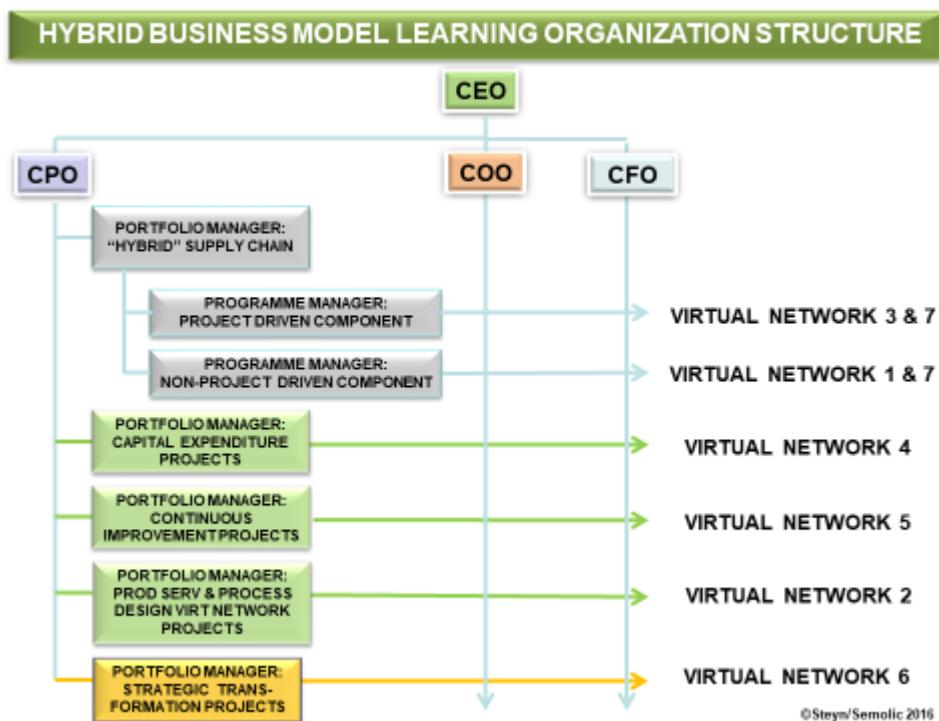
No matter how brilliant a strategy has been designed, without implementing the strategy it only remains a planning exercise (Hrebiniaik, 2006; Mankins *et al.*, 2005; Meskendahl, 2010). Sehgal (2011), avers that possessing a strategic direction is only the beginning of the journey. Strategy requires a plan of execution to realise the potential benefits for which it has been designed. Therefore, the strategy remains a little more than intent until it is backed up by allocating resources such as money, people, and equipment to mention a few.

Portfolio management of the project groupings and supply chain as integral components of the organisational value chain provides a critical link between strategy and resource allocation. The project and supply chain portfolios must support strategy and strategy must support them along with the allocation of resources. Supporting this view, Hitt (2011), purports that research indicates that strategic management and supply chain management are complementary, and both fields could benefit from more integration. Figure 6 provides a visual explanation of this key concept in that the supply chain must be backed up with the correct strategy and appropriate resources, especially in the Industry 4.0 economic dispensation of today. Moreover, the strategy must, in turn, be backed up with the correct resources and appropriate supply chain portfolio and programmes.



**Figure 6:** The Strategy and Supply Chain enabled Portfolio. (**Source:** Van den Berg, 2017).

As illustrated in Figure 1, Steyn (2013), avers that the: "...Supply Chain Portfolio is an integral part of the cross-functional programme structures of learning organisations". However, the programme structures are not mutually exclusive but do support each other in an integrated manner. Steyn (2013), also suggests supply chain portfolios may be arranged into different programme structures with each reporting to its own portfolio manager as illustrated in Figure 7. Importantly, the inclusion of a CPO at the executive level of the knowledge-based learning organisation to enhance cross-functional leadership and management is paramount to success.



**Figure 7:** The Emergent Role of Chief Portfolio Officer. (**Source:** Steyn and Semolic, 2016 as adapted from Steyn, 2013)

Note: Virtual networks 1 and 2 are created for product, service and process design and development. Virtual network 3 for external customer projects. Virtual network 7 for manufacturing flow management (see Steyn and Semolic, 2018).

Many authors discuss linkages between different management constructs. Rodrigues, Stank and Lynch (2004), discuss the linkage between strategy, process, structure and logistics. Camerinelli (2009), suggests linkages between SCM and financial performance asserting that SCM performance is directly connected to financial decisions in the organisation (Camerinelli, 2009). Kaplan and Norton (1996), link the

Balanced Scorecard (BS) to strategy (Butler, Letza and Neale, 1997). The current authors agree with Lin (2015) who links the BS to knowledge management. The current authors base their agreement on the integration of systems thinking with knowledge management brought about by the Balanced Scorecard-Programme Management (BS-PM) learning organisation system so vital to achieving Industry 4.0 success.

Gligor and Holcomb (2012), suggest that supply chain agility is linked to organisational performance. Discussing the importance of TQM and organisational culture, Sinha, Garg, Dhingra and Dhall (2016), argue the importance of linking TQM to organisational culture. Dietrich and Lehtonen (2005), point out the linkage between strategy and project management. Balachandran and Faff (2015), report that research indicates a linkage between corporate governance and risk. Henri (2006), argues that there is a linkage between strategy and management control systems. Green, McGaughey and Casey (2006), identified a linkage between SCM and organisational performance.

The literature is prevalent with research performed across many management theories and constructs, and various linkages are proposed. Importantly, Steyn (2013), is one of the few authors that has identified the links between SCM, Strategy and Project Portfolio Management (PPM). Many authors have discussed the links between PPM and strategy (de Souza, Carneiro and Bandeira-de-Mello 2015; Meskendahl, 2010; Perks, 2007), and other have discussed the links between SCM and strategy (Cousins, 2005; Gardner and Cooper, 2003).

Some authors have also discussed the links between SCM, programme and project management. However, Steyn (2013), suggests a link that goes beyond the current discussion prevailing in contemporary literature. Moreover, Van den Berg (2017), is the first author to suggest that these three components are to be implemented and supported within a specifically designed strategic framework (namely, the BSSR framework) that links these disparate and other management concepts. Furthermore, Steyn (2013), suggests that there is a direct linkage between the organisation's strategy, PPM and SCM. This has significant consequences for strategy, SCM, and Project Portfolio Management (PPM). It must be noted that PPM includes project and programme management since both are integral components of the management of project portfolios.

## **THE BALANCED SCORECARD STRATEGIC REALISATION FRAMEWORK (BSSR FRAMEWORK).**

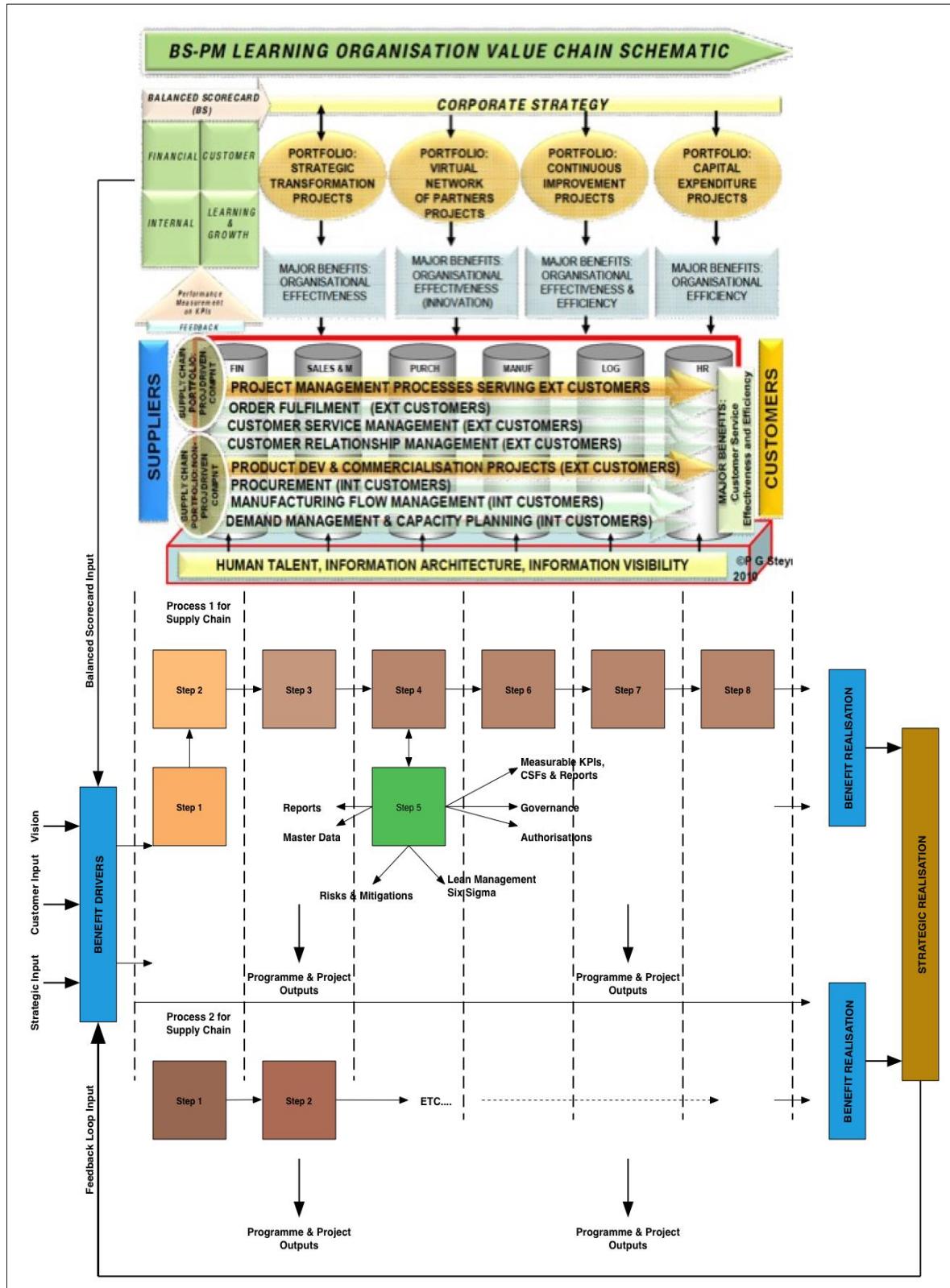
One of the hallmarks of a programme is to identify its strategic purpose based on strategic themes chosen by executive leadership. This purpose, in turn, links up with the balanced scorecard approach that is fed with information from critical success

factors and KPIs, together with their relative priorities. Moreover, portfolio management provides the energy required to plan the execution of programmes and projects required to achieve and maintain benefits of strategic importance. Figure 8 illustrates the Balanced Scorecard Strategic Realisation framework (BSSR framework) that provides the foundation for the CPO driven model for managing supply chain portfolios across the balanced scorecard programme managed learning organisation illustrated in Figure 12.

To achieve benefits realisation that eventually leads to strategic realisation the organisation must understand what the benefits drivers are. The benefits drivers, in turn, are motivated by the requirements and wants of the customer. Figure 8 illustrates details on how, *inter alia*, SCM processes that can be used to differentiate an organisation from its competitors are also the link between benefits drivers and benefits realisation. These benefits processes are what drive strategic decisions and provide input to the balanced scorecard that creates a learning organisation supply chain and value chain.

The benefits drivers are the associated artefacts that are the entry point to the framework after strategy implementation has begun. The strategic direction will more than likely be a combination of deliberate and emergent strategic options selected. There are numerous benefits drivers that will be implemented to achieve the associated strategic benefits to be realised. The benefits realised will, in turn, accomplish the strategic intent of the organisation, so profoundly important in the Industry 4.0 economy.

Moreover, the framework is adaptive and not prescriptive in nature as the framework must be adaptable to the organisation's existing PPM selection criteria, governance, human resources, financial controlling, and innovation and optimisation processes. However, the framework is meant to provide input to the organisations' existing structures and controls where necessary in order to counter any draconian and bureaucratic methods. Moreover, the Industry 4.0 economy is about abolishing bureaucracy and adopting knowledge-based learning organisation paradigms and practises supported by programme-managed cross-functional processes and virtual networks of partners.



**Figure 8:** The Balanced Scorecard Strategic Realisation Framework. (Source: Van den Berg, 2017).

---

The Balanced Scorecard Strategic Realisation Framework comprises of various artefacts that work in tandem and in parallel, namely:

- Benefit Drivers and Benefit Realisation.
- Business Process Management.
  - Business Process Activities
  - Lean Management and Six Sigma.
  - Governance.
  - Risks, Mitigations, and Authorisations (GRC).
  - Reporting and Measurable KPIs.
  - Master Data.
- Strategic Realisation.

The framework should, however, start with defining the benefit drivers and strategic realisation objectives. These two components are the driving force to the framework and the eventual operating of the CPO Driven Model for Managing Value Chain Programmes and Portfolios.

## **Benefit Drivers and Benefit Realisation**

Strategic benefits lie at the heart of programme management (OGC, 1999) as programmes should be designed to deliver benefits and only that. Benefits should not be designed to deliver a programme, and a programme should not deliver benefits that do not provide any substantial strategic value. Delivering these benefits should come about through projects that create outputs, which in turn transition into benefits through the application of programmes and portfolios (Serra and Kunc, 2015).

These programmes then transition into strategic change and goals through the application of portfolio management. There are two very important concepts to consider when implementing benefits through PPM. Those concepts relate to running the organisation and changing the organisation (Bradley, 2010). Those two settings in the organisation either realise benefits or realise dis-benefits. The Industry 4.0 economy accelerates both concepts and demands heightened transformation and change.

## **The Strategic Input of the Organisation**

The selection of a particular strategic method will have obvious implication for how the organisation sets out to achieve value and strategic realisation. The choice of strategy should have little implications on a well-designed framework. A well-designed framework is dynamic and will function with both intended and emergent strategies. This is an important concept already recognised by Hart and Banbury (1994), who

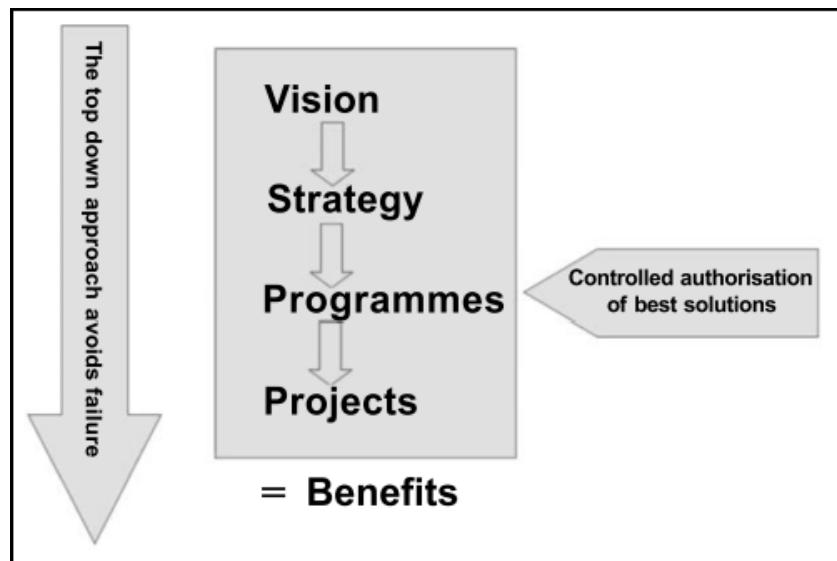
demonstrate through empirical research that the dichotomous views of intended and emergent strategy reflect real practice behaviours. Their empirical findings suggest that individual firms that move beyond a single strategic mode are outperformed by firms that employ multiple strategy-making modes.

Supporting this viewpoint, Crossan (1997), points out that organisations are ultimately a blend of intended and emergent strategies. Mintzberg, Ahlstrand and Lampel (1998), agree that all real-world strategies require a mix of the two methods in some way. The one exercises control while the other exercises learning. Strategies have to form as well as to be formulated to provide the required input to deliver meaningful benefits drivers. Mintzberg (1991), postulates that the organisation will more than likely stagnate without emergent learning alongside deliberate planning.

### The Vision of the Organisation

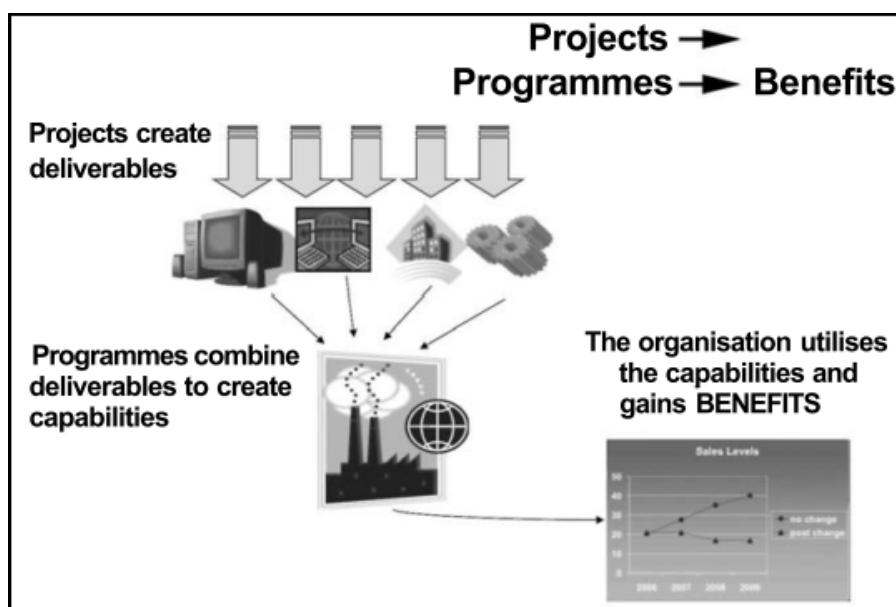
The vision of the organisation provides the organisation with a compelling idea of the beneficial future that can be communicated to all stakeholder to inspire them to achieve that beneficial future state. Campbell and Craig (2005), predicate that the organisation's vision is in effect a statement of strategic intent. It serves to focus the energies of the organisation management towards the setting and accomplishment of specific goals and objectives. The vision should inspire a degree of transformational change and be verifiable without too many complicated details.

Moreover, Rajegopal, McGuin and Waller (2007), aver that programme management needs to agree with the corporate vision (Rayner and Reiss, 2013). However, when the vision is not clear or visible, then this leads to scope creep, lack of accountability, poor definition of expectation, and project problems which will also be exasperated by the absence of a formal implementation framework. Rayner *et al.* (2013), are of the opinion that a clear vision delivered through a set of carefully selected programmes leads to benefits as illustrated in Figure 9.



**Figure 9:** From Vision to Benefits. (Source: Rayner et al., 2013).

Once the vision and strategy have been determined, they serve as the input triggers (Bradley, 2010) and these requirements are then transferred into programmes and projects that attempt to deliver the future state benefits and strategic realisation according to Figure 10. Serrador and Pinto (2015), contend that the quality of the vision and the goals can serve as a significant moderator to project success. This ultimately determines the quality of the benefits realised and in turn, affects the quality of the strategic realisation.



**Figure 10:** Projects, Programmes and Benefits. (Source: Rayner et al., 2013).

Thiry (2002), advocates that a vision includes the mechanisms to identify and manage emergent change. Mintzberg *et al.* (1998), suggest that strategy as such is viewed as a personalised vision. A personalised vision implies that senior management is responsible for the vision, and senior management commitment should ensure that the necessary quality mechanisms and quality management processes are enabled to deliver a quality vision.

Madu and Kuei (1995), affirm that senior management's commitment to the vision and quality management establishes a direct link between TQM and the vision of the organisation. A commitment to TQM will also ensure that the customer's requirements are important to the organisation and its benefits realisation processes. The current authors stress the importance of including TQM principles in the organisational value system in order for it to become part of the preferred organisational culture.

### **The Customer Input**

The concept of a customer has changed dramatically over the past decade. Yi (2014), observes that the world currently resides in a service-based economy, and the role of customers has shifted from passive buyers or recipients to active value creators. Customer value creation behaviour has now become an essential phenomenon due to customers actively engaging in the value creation process (Nguyen and Mutum, 2012). Many companies are exploiting this competitive advantage by transforming their organisations from exclusive service providers to value facilitators instead.

This phenomenon is changing organisations' perspectives of viewing customers as mere buyers or consumers into viewing customers as value creators. Boone, Craighead, Hanna and Nair (2013), provide empirical research to demonstrate how the United States Air Force (USAF) is changing its supply chain practices, especially regarding inventory control, in order to improve continuity and resiliency thus enhancing their service-based strategies. In this case, the USAF's value proposition and benefits realisation are the ability to be mission-capable and to be value creators.

The Industry 4.0 learning organisation views the customer's needs, desires and wants not as a mere set of requirements but as a process of benefits realisation that can generate long-term relationships, collaboration, and value for both actors (Payne, Storbacka and Frow, 2008; Verstrepen, Deschoolmeester and Van den Berg, 1999). Some authors even propose that the customer is in charge of the entire process of creating value because they are the ones that perform the main value creation and the firm merely acts as a value facilitator (Yi, 2014). Grönroos (2011), critiques this concept and considers the customer as a co-producer of value (Grönroos and Ravid, 2011; Vargo and Lusch, 2008).

Grönroos (2011), points out that the organisation's role in the value-creating process is also said to be that of a value co-creator (Vargo and Lusch, 2011). Vargo *et al.* (2011), assert that actors cannot create value alone. Actors, both suppliers and recipients, can propose offers that have potential, and this is done through value propositions (Edvardsson and Enquist, 2009; Vargo, Maglio and Akaka, 2008). Therefore, organisations and their customers are seen as co-creators of value (Fawcett and Waller, 2012; Woodburn and Wilson, 2014) as one cannot exist without the other in determining value and benefits. Lusch, Vargo and Wessels (2008), aver that importantly organisations should not only concentrate on the production of its offerings and be understood regarding outputs with value, but also as resource inputs for continuing value-creation processes.

### The Balanced Scorecard

Establishing trust and confidence between the organisation and the customer are more than likely to be one of the more difficult challenges. Designing benefits should be performed with value in mind but also with trust and confidence. Benefits without value are not effective benefits per se. The processes and information acquired and utilised during these processes establish how successful this trust and the confidence levels will be. The best-designed BS is not an effective BS without the customer's trust. Using the BS effectively can aid to improve on customer trust and confidence.

However, this requires accurate information. The information received from the BS can also be used to design new benefit drivers and provide input to existing benefit drivers. It is imperative that organisations use technology to collect the right data and employ the appropriate forms of measurements with this data. Therefore, the BS not only measures the customer's perspective but also becomes one of the significant inputs to the benefits drivers. Wiersma (2009), reports that an empirical study across nineteen firms using two hundred and twenty-four surveys reveals that organisations typically have three purposes for the balanced scorecard. These purposes would include:

- Decision-making and decision-rationalising.
- Coordination of activities within the organisational unit.
- Self-monitoring purposes.

Improving value and the realisation of benefits requires active organisation management. Merely changing the business without customer value consideration is irresponsible, as Bradley (2010) postulates that attempting to align and consider the contribution of changes to business priorities, the direction and targets for the organisation need to be known and understood. Only then is it possible to examine how

and to what degree a programme will contribute to these benefit realisation goals. This evaluation of alignment and contribution may be associated to:

- Statements of strategic direction.
- KPIs.
- Specified benefit categories.
- Balanced Scorecard indicators.

Providing the many uses of the BS alluded to through empirical investigations, it is evident that the BS not only assists management with strategy achievement, business objectives, and information dissemination, but it assists considerably with decision making. To concur, Smith (2007), avers the BS provides up-to-date information regarding these trends and places management in the position to ascertain how to effectively address them.

Input from the BS informs the strategy and performance management teams on the outcomes of initiatives using the appropriate management control systems (Cugueró-Escofet and Rosanas, 2013). The results, in turn, inform the teams involved with benefits management and who are responsible for designing the benefits management inputs. Designing the correct inputs and benefits requirements, with their associated quality measures, for SCM is essential to achieving strategic realisation, and the BS provides valuable data to successfully perform this task. The BS will provide the gap between the current state and intended future state of the desired benefits and strategic realisation (Morris and Pinto, 2007). Accordingly, Basu (2011), proposes that a good reference line of key performance indicators of a supply chain is the BS, which in turn also provides the underpinnings of a good quality management system (Basu, 2011; Vukomanovic and Radujkovic, 2013).

## The Feedback and Double-Loop

Smith (2007), warns that the BS should not replace all other management systems. In other words, the BS was not designed to be an 'end-all' management tool. Using the BS does not mean that the organisation must not consider other data in its analysis. The proposed BSSR framework illustrates the feedback loop or double loop at the strategic realisation phase. This does not imply that measurement only occurs at the final phase but is merely an indication of the importance of ensuring the framework employs a feedback mechanism to inform benefits management.

Feedback should occur at any stage that the organisation deems necessary. Receiving too much feedback could be counter-productive and should only be used when it will add value. Feedback is also received from other sources such as the BS, performance

management, the supplier's reporting systems, and the customer and benefits management should ensure that there is no double counting of benefits. In other words, data for inputs should not be replicated and lead to duplicate benefits initiatives (OGC, 1999). The double-counting of benefits will lead to inaccurate strategic achievements.

Heracleous (1998), contends that the various views found in the literature suggest that there is a need to clarify the nature of strategic thinking and strategic planning and to position them in the appropriate context. This can be done by suggesting a dual analogy: strategic thinking can be seen as double-loop learning and strategic planning as single-loop learning. This analogy is helpful in clarifying the nature of strategic thinking and strategic planning, confirming that they are different, but ultimately both necessary and complementary. Steyn (2003), points out that double-loop learning in a team context promotes innovative continuous improvement actions which are critical for success in corporate and operations strategy implementation. Moreover, in strategy implementation, double-loop learning enables quick response handling of emergent strategies within high-performance teams.

## **Business Process Management**

The benefits drivers for supply chain and the links to the organisations value chain drive the design of the many processes within SCM. These processes are often not limited to an intra-organisational processing but may include inter-organisational processing to complete the chain of activities to deliver a benefit and eventually aggregate the list of benefits to achieve strategic realisation.

Business process management (BPM) has become big business over the past few decades. For example, software vendors like SAP are often known for their ERP type of software packages that somehow provide a company with an economic advantage through standardised modules that integrate all the divisions of an organisation (Sankar and Rau, 2006). However, Harmon (2007), argues that SAP is in the business of selling standardised processes or components across various industry sectors. However, there's nothing wrong with utilising standard modules, but any business manager or organisation should realise that certain competitors are also using the same SAP modules. Thus, using a SAP process does not guarantee the organisation a competitive edge. It merely provides the organisation with a clean and modern implementation of a software process.

Stressing the importance of BPM, Rosemann and vom Brocke (2015), aver that the high demand for BPM has encouraged many authors to contribute toward the discipline of BPM. BPM is now recommended as the spanning specialist subject that principally integrates and completes what previous management disciplines have achieved.

Hence, it generates a foundational BPM capability in organisations and consolidates how to best manage the (re-)design of individual business processes catering for a variety of purposes and contexts. This is of great importance in the Industry 4.0 economic dispensation.

As such, an organisation's value can be increased in different ways, which would include supply chain capabilities which are an important link between supply chain process integration and superior performance (Chen, Daugherty and Landry, 2009). Moreover, when an organisation is more proficient with its process management than its rivals through process integration, this can represent a distinctive capability which can lead to superior profitability. Harmon (2007), also points out that companies who want to achieve a competitive advantage strive for well-integrated processes as it is these business processes that work together to drive value.

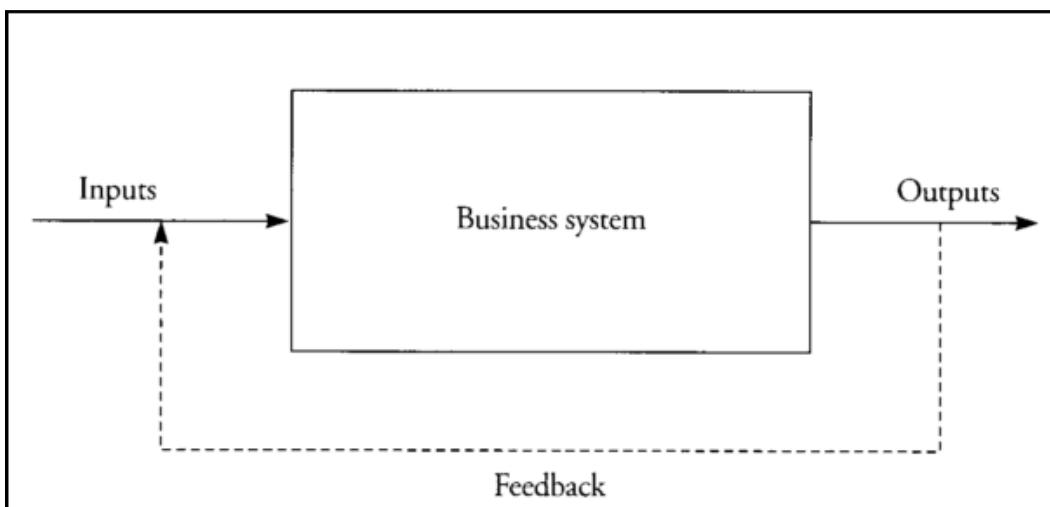
Designing effective and innovative SCM processes requires knowledge and learning. It is this knowledge process that exploits an integration mechanism that dynamically integrates diverse core knowledge inside and outside the organisation through these business activities (Kodama, 2011). Moreover, the organisation's strategic innovation capability in the form of these accumulated, updated and evolved intangible assets produces strategic innovations. Effective management and governance of these activities are what drives value within the processes and the organisation's supply chain and value chain.

According to Harmon (2007), maintaining activities is a full-time process. This requires maintaining and improvement on an on-going basis. Considering that process with their activities are strategic assets this makes sense. Moreover, maintaining these assets requires governance and control. When activities are 'broken' or fail to meet their requirement, then the output is affected. Individuals cannot perform their tasks properly and often processes take much longer to complete. This also creates other issues such as benefits drivers being ignored because the process cannot deliver the required output. Benefits and strategic realisation are then ultimately affected, and this represents a management failure (Harmon, 2007).

Understandably, all activities in a process consist of an input, an action, and an output illustrated in Figure 11. Most actions are delivered on business systems unless they are manual actions. This suggests that many of the business system action are configurable objects that require strict governance and control as the wrong variables or configuration can effectively render the activity unusable.

As such, these activities also become a part of the Configuration Management (CM) process and the Application Life-Cycle Management (ALM) processes. Many such

activities require certain system configurations to be applied for them to work. For example, to create a purchase order requires various configurable system objects such as Purchase Order Types, Vendor Types, Units of Measure, Payment Terms, Pricing Procedures and a number of other objects to be configured before the create purchase order activity can be executed.



**Figure 11:** A Business Activity as a System. (Source: Harmon, 2007).

These activities also form the bases for many of the WBS elements within projects against which time, cost and quality are tracked. Also, these activities form the basis for delivering the value chain (that embeds the supply chain) and SCM objectives. There are costs, time management, and human resource components such as training associated with each activity. It is therefore evident that these strategic assets require management. The BSSR framework provides the following attributes to manage these strategic assets, as illustrated in Figure 8, namely:

- Lean Management and Six Sigma.
- Governance.
- Reporting.
- Authorisation.
- Measurable KPIs.
- Master Data.
- Risks and Mitigation.
- Project and Programme Outputs with Stage Gates.

## Strategic Realisation

The BSSR framework proposes that all the components in the framework work together to build a stable environment in which the organisation is able to select and execute its strategic initiatives. The BSSR framework also warrants the inclusion of existing frameworks and governance requirements so that the organisation can limit its risks and remain legally compliant, thus protecting its reputation in the global market.

One of the main value drivers that compel organisations to adopt a framework such as the BSSR framework is to allow SCM to develop into a strategic tool that is not overly complicated and difficult to manage. The framework endeavours to point out the areas that require improvement, show non-compliance of governance, and keep processes lean and cost effective. The Rosetta Stone for each organisation is to keep its costs as low as possible yet maintain an excellent level of quality and service. This poses a dilemma if the organisation has no formal mechanisms or framework that is used to track which SCM processes and activities are failing and what solutions to propose. When processes fail, they generate unwanted costs, which left unattended, reduces the strategic advantage that SCM creates. Therefore, if the SCM activities are regarded as strategic assets and provide strategic competencies, then these assets require governance and active management to protect their value proposition.

## CRYSTALLISING THE CPO MODEL FOR MANAGING VALUE CHAIN PORTFOLIOS AND PROGRAMMES

A brilliant strategy that is not implemented essentially remains nothing short of a mere planning activity or a little more than an intended exercise (Hrebiniak, 2006; Mankins *et al.*, 2005; Meskendahl, 2010). Unless the strategy has a direction and a plan that is backup up with adequate resources the organisation will struggle to implement the intended strategy and most likely not achieve its desired future end-state. However, as Sehgal (2011) warns, having a strategic direction is just the beginning of the journey to strategic fulfilment.

The value chain embeds the supply chain. Aboutalebi (2016), postulates that having the right strategy is one of the key contributors to the success and effectiveness of supply chain management (SCM). Despite the organisation implementing the strategy after successful planning, it is difficult to ascertain at the early stages if the strategic choice will be effective or successful. As obvious as this seems, Aboutalebi (2016), warns that after studying hundreds of papers and books, research revealed that SCM suffers from a lack of strategies for many aspects of real-world supply chain activity.

As a result, many organisations often find themselves at opposite ends of the continuum between deliberate strategy and intended strategy. Since the contemporary market conditions have become hyper-turbulent so has the need for strategic adaptation. In the Industry 4.0 economy many organisations, in an attempt to sustain competitiveness, are pursuing more emergent strategies or a combination of deliberate and emergent strategies in the form of a modern consensus scenario. Creating virtual networks of inter-organisational partners is a good example.

However, Veldsman (2007), critiques organisations that find themselves paralysed by strategic fatigue and lapse into a focus on tactical-operational decisions and actions to survive. Instead, organisations must be willing to reinvent their strategy to be propitious to hyper-turbulence and hyper-fluidity enabling them to cope with unpredictability and ambiguity.

The modern day organisation is no longer able to sustain competitiveness by managing tangible assets alone. Intangible assets such as knowledge-based strategies are required for the organisation to succeed in today's Industry 4.0 economic environment (Steyn, 2010). Accordingly, Steyn (2010), describes these intangible assets to include a healthy organisational climate with strategy-focussed leadership that embraces employee knowledge and competency, innovative products and processes, and excellent customer relationships and service.

Research suggests, according to Aboutalebi (2016:9), that real-world activities, which are one of the components to competitive advantage, in modern supply chains are complicated and multidimensional. Consequently, supply chain strategies need to reflect and manage these realities. Organisations must be willing to reinvent their strategies using their intangible assets in a complicated and multidimensional business environment.

The CPO Model for Managing Value Chain Portfolios and Programmes across the Balanced Scorecard Programme Managed Learning Organisation, depicted in Figure 12, endeavours to aid the organisation in achieving this strategic end-state. It is important to stress the CPO Model is not the organisation's strategy but an integrated method of delivering the various complicated systems, management philosophies, resources and capabilities used by the organisation to achieve its strategic goals (DaSilva and Trkman, 2014).

Importantly, a management philosophy is seldom used in isolation, yet many organisations have functional silos that operate in isolation. According to Smith (2007), this is a profound concept because it often results in leaders not understanding the organisation's vision. The same applies to SCM in that it does not operate in isolation.

Sehgal (2011), purports that SCM operates in larger system landscapes interacting with many other corporate systems by exchanging data and information. SCM also affects other processes through accepting inputs and providing outputs to support multifunctional processes that cut across departmental and organisational boundaries. This proposes that supply chains cannot be developed in isolation, but must be recognised as an integral component of other corporate systems. Incidentally, there is no regard for the whole when each functional part of the organisation plans for its own department.

Steyn (2010), contends that: “*...the organisation of the future will be compelled to shed old ways of leading and managing in favour of a knowledge-based approach that embraces innovation and learning*”. Walker *et al.* (2015), aver that the intention to engage in innovation is to help the organisation cope with emerging external or internal contingencies by responding to the competitive or institutional environment. The CPO Model operates in conjunction with the BSSR framework, illustrated in Figure 8. The CPO Model also employs the programme office structures presented in Figure 7 to provide the organisation with a holistic approach to embracing innovation and learning across the supply chain of the organisation.

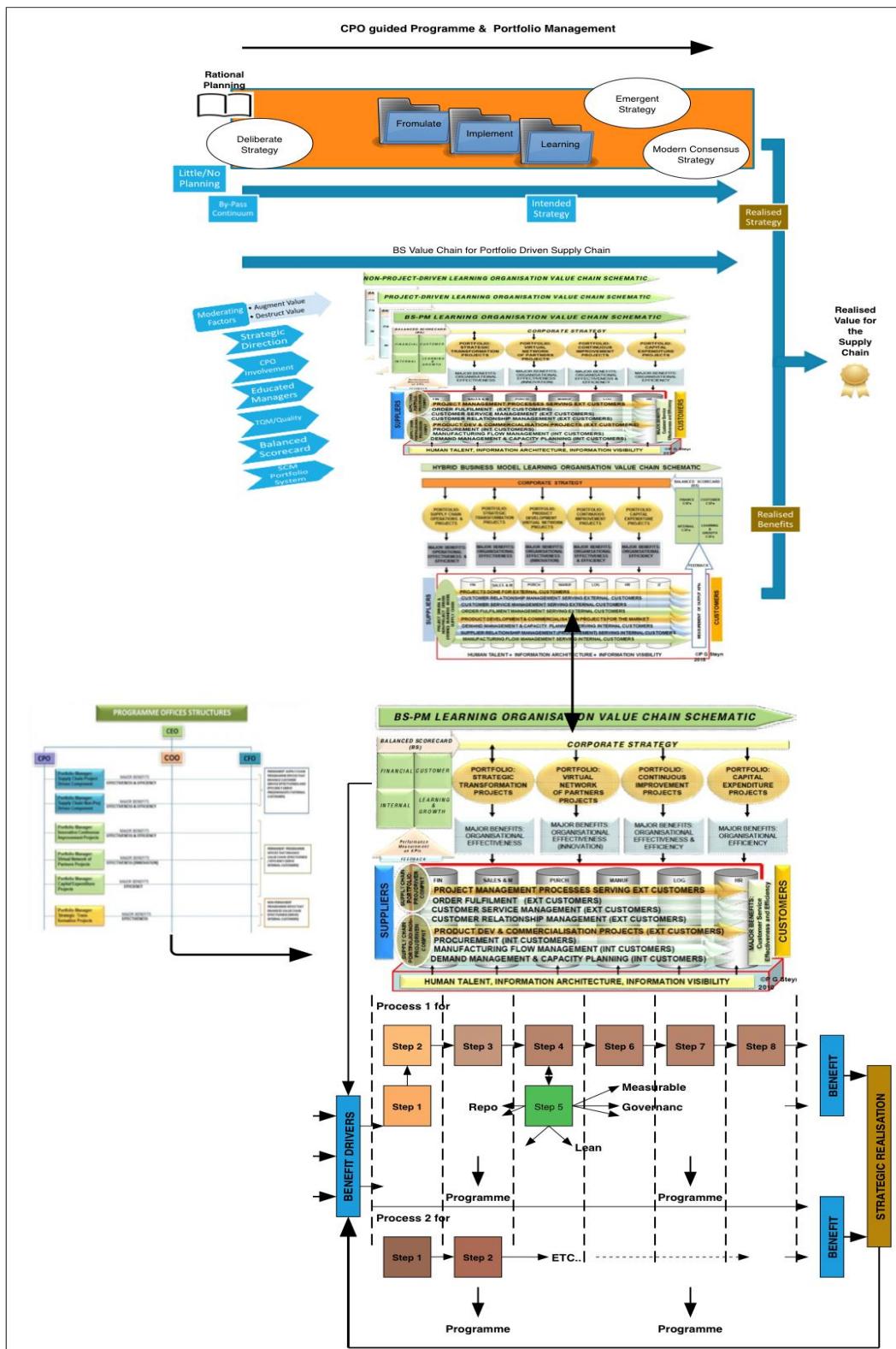
The CPO Model endeavours to link the organisation's innovation to benefits drivers and strategic realisation to provide excellent customer relationships and service while enabling strategy-focussed leadership that embraces employee knowledge and competency (Steyn, 2010). The ultimate goal of the CPO Model is, therefore, to provide value to the organisation. Hence, the CPO Model relies on valuable input provided to the benefits drivers by receiving the following information:

- **The Customer Input:** Refers to the voice of the customer's needs and wants. This is where the ultimate value proposition is found.
- **The Strategic Input:** The organisation receives strategic input in the form of deliberate, emergent, or modern consensus strategy intention.
- **Vision:** Refers to where the organisation wants to be in the future.
- **BS Input:** The organisation collects information based on its performance and feeds information back into the benefits drivers. The information updates critical information that may be used to improve the value proposition of the benefits.
- **Feedback Loop Input:** Refers to the data collected from all the process activities and cross-functional activities in the organisation. The feedback loop is designed to

inform strategy and aid the strategic teams to improve on the firm's strategic planning and implementation. The data also impacts the benefits drivers.

The benefits drivers are meant to translate the voice of the customer into data that is fed into the supply chain portfolio business models of project driven, non-project driven, or hybrid types of organisations illustrated in Figures 2, 3, 4 and 5. (Steyn, 2003; 2010; 2012 and 2013; Steyn and Semolic, 2016). The business model to select depends on the organisation and the industry in which it operates. Once the organisation understands the requirements of the benefits drivers after a thorough analysis of the data, it will develop or enhance existing processes with their associated activities within one or more of the cross-functional processes illustrated in Figures 2, 3, 4 and 5.

(See next page)



**Figure 12:** The CPO Model for Managing Value Chain Portfolios and Programmes across the Balanced Scorecard Programme Managed Learning Organisation. (**Source:** Van den Berg, 2017).

As the organisation uses its cross-functional processes to develop value across the value chain, all the cross-functional activities will be subject to the BSSR framework. The BSSR framework will ensure that the processes and activities are aligned with auditable regulations and requirements. Any cross-functional activity operating outside of the BSSR framework will be deemed to be out of control and flagged as a violation during the reporting mechanisms attached to that activity and the process to which it belongs. Additionally, any access or governance violation must be attended to in order to mitigate the risk or eliminate the risk completely.

Moreover, the CPO Model ensures that the correct organisational structures are used to support the value chain (including the supply chain) projects, programmes, and portfolios. Steyn (2013), suggests that the organisation's portfolios, including the supply chain portfolios, are arranged into different programme structures each with its own portfolio manager and support staff (Steyn, 2010), as illustrated in Figure 7. It is essential that the structure includes a CPO at the executive level of the organisation to supplement cross-functional leadership and management of the knowledge-based learning organisation.

Furthermore, the CPO Model ensures proper quality management is followed (Dow, Samson and Ford, 1999; Forker, Mendez and Hershauer, 1997; Madu *et al.*, 1995; Naidu, Babu and Rajendra, 2006; Oakland, 2004; Peris-Ortiz, Álvarez-García and Rueda-Armengot, 2015) and employs the reporting systems linked to the organisation's quality initiatives. As the reports from TQM, Six Sigma, etc., quality management systems feed data back to the BSC and the benefits drivers, vital information can be used to create new innovative products, services, and infrastructure enablement. Improvements can also be submitted which further updates the benefits drivers and also assists the strategy team with the organisation's strategy planning and implementation.

The reporting function in the BSSR framework continually plays a vital role beyond just measuring quality information. The reports can be utilised for a magnitude of activities and processes that measure process performance, activity compliance, manufacturing time, inventory levels, material lead times, management control reports, human capital reports, financial reports, integrated reporting, customer satisfaction, benefits realisation, strategic realisation, and overall organisation value propositions to mention a few.

The CPO Model attempts to deliver value, and this value is a measurement of the benefits realisation and strategic realisation of the organisation. The CPO Model strives to align the organisation, in a responsible and governed manner, to achieve its strategic intent and to reach the desired future end-state of the organisation's vision and mission.

In other words, the CPO Model is a vision, mission, and strategy enabler and embodies the key artefacts of disciplined project, programme, portfolio management, and operational methods to achieve strategic benefits.

## CONCLUSION

The research determined that an array of strategy making approaches are used and these, in turn, determine how the strategy is implemented. It was observed that the implementation of strategy is influenced by complexity, confusion and misapplication of management concepts. There is also insufficient integration between the business concepts and philosophies. Moreover, the value chain (embedding the supply chain) consequently suffers substandard functionality. The research highlighted the necessity for an integrative CPO Model to align strategy choice with strategy implementation and the proper functioning of the value chain (embedding the supply chain).

The research conveyed the importance of portfolio management of the supply chain to provide a critical link between strategy and resource allocation. Research purports that strategic management and supply chain management (SCM) are complementary and may benefit from further integration (Hitt, 2011:9). The CPO Model, through facilitating portfolio and programme management of the supply chain, enables a high level of integration to establish a strong linkage between SCM and strategy. Without this critical linkage, it remains a difficult task for organisations to realise its strategic goals, especially in the Industry 4.0 ‘collaboratist’ economy with its many challenges (see Steyn and Semolic, 2017).

Furthermore, the research explains the importance of benefits management that supports the benefits drivers and benefits realisation to accomplish the eventual strategic realisation. The benefits drivers are the initial artefacts that drive value for the organisation. Once the benefits drivers have been established from the various input mechanisms displayed in Figure 8, they proceed through the value chain portfolios towards their eventual goal of benefits realisation. The sum of the benefits realisation ultimately fulfils the organisation's strategic realisation.

The CPO Model is designed to provide the organisation with a holistic approach to implementing an integrative strategy embracing innovation and learning across the organisational value chain. Moreover, the CPO Model endeavours to link the organisation's innovation to benefits drivers and strategic realisation to provide excellent customer relationships and service while enabling strategy-focussed leadership that embraces employee knowledge, competency and learning.

---

## BIBLIOGRAPHY

Arrow, K.J. 1986. Rationality of Self and Others in an Economic System. *The Journal of Business*, 59(4): 385-399, October.

Balachandran, B. & Faff, R. 2015. Corporate Governance, Firm Value and Risk: Past, Present, and Future. *Pacific-Basin Finance Journal*, 35(A): 1-12, November.

Basu, R. 2011. *Managing Project Supply Chains*. Surrey, England: Gower Publishing Limited.

Boone, C.A., Craighead, C.W., Hanna, J.B. & Nair, A. 2013. Implementation of a System Approach for Enhanced Supply Chain Continuity and Resiliency. *A Longitudinal Study*, 34(3): 222-235, September.

Bradley, G. 2010. *Benefit Realisation Management: A Practical Guide to Achieving Benefits through Change*. Second Edition. England: Gower Publishing Limited.

Butler, A., Letza, S.R. & Neale, B. 1997. Linking the Balanced Scorecard to Strategy. *Long Range Planning*, 30(2): 242-253, April.

Camerinelli, E. 2009. *Measuring the Value of the Supply Chain: Linking Financial Performance and Supply Chain Decisions*. England: Gower Publishing Limited.

Campbell, D. & Craig, T. 2005. *Organisations and the Business Environment*. Second Edition. Oxford, England: Elsevier Butterworth-Heinemann.

Chen, H., Daugherty, P.J. & Landry, T.D. 2009. Supply Chain Process Integration: A Theoretical Framework. *Journal of Business Logistics*, 30(2): 27-46, Autumn.

Cousins, P.D. 2005. The Alignment of Appropriate Firm and Supply Strategies for Competitive Advantage. *International Journal of Operations & Production Management*, 25(5): 403-428.

Crossan, M.M. 1997. Improvise to Innovate. *Ivey Business Quarterly*, 62(1): 36-42, Autumn.

Cugueró-Escofet, N. & Rosanas, J.M. 2013. The Just Design and Use of Management Control Systems as Requirements for Goal Congruence. *Management Accounting Research*, 24(1): 23-40.

Davenport, T.H., Leibold, M. & Voelpel, S. 2006. *Strategic Management in the Innovation Economy: Strategy Approaches and Tools for Dynamic Innovation Capabilities*. Germany: Wiley.

de Souza, P.B., Carneiro, J. & Bandeira-de-Mello, R. 2015. Inquiry into the Conceptual Dimensions of Project Portfolio Management. *Brazilian Business Review (English Edition)*, Special Issue: 118-148.

Dietrich, P. & Lehtonen, P. 2005. Successful Management of Strategic Intentions through Multiple Projects - Reflections from Empirical Study. *International Journal of Project Management*, 23(5): 386-391, July.

Dow, D., Samson, D. & Ford, S. 1999. Exploding the Myth: Do all Quality Management Practices Contribute to Superior Quality Performance? *Production and Operations Management*, 8(1): 1-27, Spring.

Edvardsson, B. & Enquist, B. 2009. *Values-Based Service for Sustainable Business: Lessons from IKEA*. New York: Routledge, Taylor & Francis Group.

Fawcett, S.E. & Waller, M.A. 2012. Mitigating the Myopia of Dominant Logics: on Differential Performance and Strategic Supply Chain Research. *Journal of Business Logistics*, 33(3): 173-180, September.

Forker, L.B., Mendez, D. & Hershauer, J.C. 1997. Total Quality Management in the Supply Chain: What is its Impact on Performance? *International Journal of Production Research*, 35(6): 1681-1701.

Forrester, J.W. 1958. Industrial Dynamics: A Major Breakthrough for Decision Makers. *Harvard Business Review*, 38(1): 37-66, July-August.

Gardner, J.T. & Cooper, M.C. 2003. Strategic Supply Chain Mapping Approaches. *Journal of Business Logistics*, 24(2): 37-64, Autumn.

Gligor, D.M. & Holcomb, M.C. 2012. Antecedents and Consequences of Supply Chain Agility: Establishing the Link to Firm Performance. *Journal of Business Logistics*, 33(4): 295-308, December.

Green, K.W. Jr., McGaughey, R. & Casey, K.M. 2006. Does Supply Chain Management Strategy Mediate the Association between Market Orientation and Organizational Performance? *Supply Chain Management: An International Journal*, 11(5): 407–414.

Grönroos, C. 2011. Value Co-Creation in Service Logic: A Critical Analysis. *Marketing Theory*, 11(3): 279-301, September.

Grönroos, C. & Ravid, A. 2011. Service as Business Logic: Implications for Value Creation and Marketing. *Journal of Service Management*, 22(1): 5-22.

Harmon, P. 2007. *Business Process Change: A Guide for Business Managers and BPM and Six Sigma Professionals. Second Edition*. Burlington, MA: Elsevier.

Hart, S. & Banbury, C. 1994. How Strategy-Making Processes can make a Difference. *Strategic Management Journal*, 15(4): 251-269, May.

Henri, J. 2006. Management Control Systems and Strategy: A Resource-Based Perspective. *Accounting, Organizations and Society*, 31(6): 529-558, August.

Heracleous, L. 1998. Strategic Thinking or Strategic Planning? *Long Range Planning*, 31(3): 481-487.

Hitt, M.A. 2011. Relevance of Strategic Management Theory and Research for Supply Chain Management. *Journal of Supply Chain Management*, 47(1): 9-13, January.

Hrebiniak, L.G. 2006. Obstacles to Effective Strategy Implementation. *Organizational Dynamics*, 35(1): 12-31.

Inkpen, A. & Choudhury, N. 1995. The Seeking of Strategy Where it is Not: Towards a Theory of Strategy Absence. *Strategic Management Journal*, 16(4), 313-323, May.

Kaplan, R.S. & Norton, D.P. 1996. *Translating Strategy into Action - The Balanced Scorecard*. Boston, Massachusetts: Harvard Business Press.

Kaufmann, L., Michel, A. & Carter, C.R. 2009. Debiasing Strategies in Supply Management Decision-Making. *Journal of Business Logistics*, 30(1): 85-106, Spring.

Kodama, M. 2011. *Knowledge Integration Dynamics: Developing Strategic Innovation Capability*. Singapore: World Scientific Publishing Co. Pte. Ltd.

Lin, H. 2015. Linking Knowledge Management Orientation to Balanced Scorecard Outcomes. *Journal of Knowledge Management*, 19(6): 1224-1249.

Lusch, R.F., Vargo, S.L. & Wessels, G. 2008. Toward a Conceptual Foundation for Service Science: Contributions from Service-Dominant Logic. *IBM Systems Journal*, 47(1): 5-14, January-March.

Madu, C.N. & Kuei, C. 1995. *Strategic Total Quality Management: Corporate Performance and Product Quality*. Connecticut: Quorum Books.

Mankins, M.C., & Steele, R. 2005. Turning Great Strategy into Great Performance. *Harvard Business Review*, 83 (7): 64-72.

McNally, R.C., Durmusoglu, S.S., Calantone, R.J. & Harmancioglu, N. 2009. Exploring New Product Portfolio Management Decisions: The Role of Managers' Dispositional Traits. *Industrial Marketing Management*, 38(1): 127-143, January.

Meskendahl, S. 2010. The Influence of Business Strategy on Project Portfolio Management and its Success - A Conceptual Framework. *International Journal of Project Management*, 28(8): 807–817, December.

Mintzberg, H. 1991. Learning 1, planning 0: Reply to Igor Ansoff. *Strategic Management Journal*, (12)6: 463-466, September.

Mintzberg, H. 2007. *Tracking Strategies: Toward a General Theory*. Oxford: Oxford University Press.

Mintzberg, H., Ahlstrand, B. & Lampel, J. 1998. *Strategy Safari: The Complete Guide through the Wilds of Strategic Management*. London: FT Prentice Hall.

Mintzberg, H., Ahlstrand, B. & Lampel, J. 2005. *Strategy Bites Back: It is far More, and Less, than you ever Imagined*. Upper Saddle River, NJ: Pearson Education, Inc.

Morris, P.W.G. & Pinto, J.K. 2007. *The Wiley Guide to Project, Program & Portfolio Management*. Hoboken, New Jersey: Wiley.

Naidu, N.V.R., Babu, K.M. & Rajendra, G. 2006. *Total Quality Management*. New Delhi, India: New Age International (P) Ltd., Publishers.

Nguyen, B. & Mutum, D.S. 2012. A Review of Customer Relationship Management: Successes, Advances, Pitfalls and Futures. *Business Process Management Journal*, 18(3): 400-419.

Oakland, J.S. 2004. *Oakland on Quality Management*. Burlington, MA: Elsevier Butterworth-Heinemann.

Office of Government Commerce (OGC). 1999. *Managing Successful Programmes*. London, UK: The Stationery Office.

Payne, A.F., Storbacka, K. & Frow, P. 2008. Managing the Co-Creation of Value. *Journal of the Academy of Marketing Science*, 36(1): 83-96, Spring.

Peris-Ortiz, M., Álvarez-García, J. & Rueda-Armengot, C. 2015. *Achieving Competitive Advantage through Quality Management*. Switzerland: Springer International Publishing.

Perks, H. 2007. Inter-Functional Integration and Industrial New Product Portfolio Decision Making: Exploring and Articulating the Linkages. *Creativity and Innovation Management*, 16(2): 152-164, June.

Petersen, K.J. & Autry, C.W. 2014. Supply Chain Management at the Crossroads: Divergent Views, Potential Impacts, and Suggested Paths Forward. *Journal of Business Logistics*, 35(1): 36-43, March.

Rajegopal, S., McGuin, P. & Waller, J. 2007. *Project Portfolio Management: Leading the Corporate Vision*. Basingstoke: Palgrave Macmillan.

Rayner, P. & Reiss, G. 2013. Portfolio and Programme Management Demystified: Managing Multiple Projects Successfully. UK: Routledge.

Rodrigues, A.M., Stank, T.P. & Lynch, D.F. 2004. Linking Strategy, Structure, Process, and Performance in Integrated Logistics. *Journal of Business Logistics*, 25(2): 65-94, Autumn.

Rosemann, M. & vom Brocke, J. 2015. *Handbook on Business Process Management 2: Strategic Alignment, Governance, People and Culture. Second Edition*. Berlin, Heidelberg: Springer-Verlag.

Sankar, C.S. & Rau, K. 2006. *Implementation Strategies for SAP R/3 in a Multinational Organization: Lessons from a Real-World Case Study*. United Kingdom: CyberTech Publishing.

Sehgal, V. 2011. *Supply Chain as Strategic Asset: The Key to Reaching Business Goals*. New Jersey: John Wiley & Sons, Inc.

Semolic, B. 2010. Governance of virtual collaborative project based networks. *Proceedings of the IPMA Research Expert Seminar*, held in Cape Town, South Africa. South Africa: IPMA (International Project Management Association), p1-39.

Serra, C.E.M. & Kunc, M. 2015. Benefits Realisation Management and its Influence on Project Success and on the Execution of Business Strategies. *International Journal of Project Management*, 33(1): 53-66, January.

Serrador, P. & Pinto, J.K. 2015. Does Agile Work? — A Quantitative Analysis of Agile Project Success. *International Journal of Project Management*, 33(5): 1040-1051, July.

Sinha, N., Garg, A.K., Dhingra, S. & Dhall, N. 2016. Mapping the Linkage between Organizational Culture and TQM: The case of Indian Auto Component Industry. *Benchmarking: An International Journal*, 23(1): 208-235.

Smith, R.F. 2007. *Business Process Management and the Balanced Scorecard: Using Processes as Strategic Drivers*. Hoboken, New Jersey: Wiley.

Steyn, Pieter. 2003. The Balanced Scorecard Programme Management System. *Proceedings of the 17th IPMA Global Congress on Project Management*, Berlin, Germany.

Steyn, Pieter. 2010. The Need for a Chief Portfolio Officer (CPO) in Organisations. *PM World Today*, 12(7): 1-14, July.

Steyn, Pieter. 2012. Sustainable Strategic Supply Chain Leadership & Management. *PM World Journal*, 1(5): 1-18, December.

Steyn, Pieter. 2013. A Business Model for Programme Managing the Supply Chain Portfolio. *PM World Today*, 2(3): 1-9, March.

Steyn, Pieter & Semolic, Brane. 2016. The Critical Role of Chief Portfolio Officer in the Emerging ‘Collaboratist Economy’. *PM World Journal*, v(2): 1-20, February.

Steyn, Pieter & Semolic, Brane. 2017. Collaboration: A Solution to Declining Globalisation and Rising Protectionism. *PM World Journal*, vi(3), March. (A PMWJ Award Winning article in 2017).

Steyn, Pieter & Semolic, Brane. 2018. Designing Industry 4.0 Virtual Networks of Partners Value Chains. *PM World Journal*, vii(5), May.

Thaler, R.H. 2000. From Homo Economicus to Homo Sapiens. *Journal of Economic Perspectives*, 14(1), 133-141, Winter.

Thiry, M. 2002. Combining Value and Project Management into an Effective Programme Management Model. *International Journal of Project Management*, 20(3): 221-227, April.

Van den Berg, C.J. 2017. *The Emergent Role of Chief Portfolio Officer: An Introduction to the Agent of Change within the Supply Chain*. A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy in Commerce and Administration at Cranefield College of Project and Programme Management, Pretoria, South Africa.

Vargo, S.L. & Lusch, R.F. 2008. Service-Dominant Logic: Continuing the Evolution. *Journal of the Academy of Marketing Science*, 36(1): 1-10, Spring.

Vargo, S.L. & Lusch, R.F. 2011. It's all B2B...and Beyond: Toward a Systems Perspective of the Market. *Industrial Marketing Management*, 40(2): 181-187, February.

Vargo, S.L., Maglio, P.P. & Akaka, M.A. 2008. On Value and Value Co-Creation: A Service Systems and Service Logic Perspective. *European Management Journal*, 26(3): 145-152.

Veldsman, T.H. 2007. Strategising in a Hyperturbulent and Hyperfluid World: A Lost Cause? *Acta Commercii*, 7:40-53.

Verstrepen, S., Deschoolmeester, D., & Van den Berg, R. 1999. *Servitization in the Auto-Motive Sector: Creating Value and Competitive Advantage Through Service After Sales*. In: *Global Production Management*, Eds. K. Mertens. London: Kluwer Publishers.

Vukomanovic, M. & Radujkovic, M. 2013. The Balanced Scorecard and EFQM Working Together in a Performance Management Framework in Construction Industry. *Journal of Civil Engineering and Management*, 19(5): 683-695, October.

Weeks, R.V. 2007. Context: The Strategic Management Rosetta Stone. *Acta Commercii*, 7(1), 294-306, December.

Wiersma, E. 2009. For which Purposes do Managers use Balanced Scorecards? An Empirical Study. *Management Accounting Research*, 20(4): 239-251.

Woodburn, D. & Wilson, W. 2014. *Handbook of Strategic Account Management: A Comprehensive Resource*. Chichester, West Sussex: Wiley.

---

## About the Authors



### **Dr Julian Van den Berg**

Executive Consultant, Global IT Manager  
and SCM Researcher



**Dr Julian Van den Berg** has experience working in various IT capacities, supply chain management (SCM), consulting and general management stretching across diverse sectors such as mining, manufacturing, warehousing, retail, banking, pharmaceuticals and education.

Dr Van den Berg began his career in electrical engineering working in an electronics design laboratory developing high-current testing equipment. He changed the focus of his career towards IT and began working as a COBOL programmer. He later moved into the ERP space and worked as an SAP ABAP programmer and later as an SAP functional consultant focussing on SCM applications.

Julian has worked as an upper-level manager in global management capacities for some of the largest multinational organisations in the world directing teams and virtual team structures across numerous countries. His portfolio of employment also includes working for some of the big 5 consulting firms such as Accenture and Deloitte.

Over the years, Julian has focussed on developing a solid understanding of the supply chain and the various best practices, frameworks, corporate governance and management techniques to ensure business success. His industry exposure, IT and business experience and academic pursuits have provided him with valuable competencies and insights to how different industries function, the interlocking complexities they face, and the team dynamics required to get the job done.

Dr Van den Berg can be contacted at [julianvandenberg@yahoo.com](mailto:julianvandenberg@yahoo.com) or you are welcome to connect on <https://www.linkedin.com/in/julianvandenberg>



## **Prof Dr Pieter Steyn**

Founder, Director, Principal  
Cranefield College of Project and Programme Management  
Pretoria & Western Cape, South Africa



**Dr Pieter Steyn** is Founder and Principal of Cranefield College of Project and Programme Management, a South African Council on Higher Education / Department of Education accredited and registered Private Higher Education Institution. The Institution offers an Advanced Certificate, Advanced Diploma, Postgraduate Diploma, Master's degree, and PhD in project and programme-based leadership and management. Professor Steyn holds the degrees BSc (Eng), MBA, and PhD in management, and is a registered Professional Engineer.

He was formerly professor in the Department of Management, University of South Africa and Pretoria University Business School. He founded the Production Management Institute of South Africa, and in 1979 pioneered Project Management as a university subject at the post-graduate level at the University of South Africa.

Dr Steyn founded consulting engineering firm Steyn & Van Rensburg (SVR). Projects by SVR include First National Bank Head Office (Bank City), Standard Bank Head Office, Mandela Square Shopping Centre (in Johannesburg) as also, Game City- and The Wheel Shopping Centres (in Durban). He, *inter alia*, chaired the Commission of Enquiry into the Swaziland Civil Service; and acted as Programme Manager for the Strategic Transformation of the Gauteng Government's Welfare Department and Corporate Core.

Pieter co-authored the “*International Handbook of Production and Operations Management*,” (Cassell, London, 1989, ed. Ray Wild) and is the author of many articles and papers on leadership and management. He is a member of the Association of Business Leadership, Industrial Engineering Institute, Engineering Association of South Africa, and Project Management South Africa (PMSA); and a former member of the Research Management Board of IPMA. He serves on the Editorial Board of the PM World Journal. Pieter is also Director of the De Doornkraal Wine Estate in Riversdale, Western Cape.

Professor Steyn can be contacted at [cranefield1@cranefield.ac.za](mailto:cranefield1@cranefield.ac.za). For information about Cranefield College, visit [www.cranefield.ac.za](http://www.cranefield.ac.za).

*To view other works by Prof Steyn, visit his author showcase in the PM World Library at* <https://pmworldlibrary.net/authors/dr-pieter-steyn/>



## **Prof Dr Brane Semolic**

Founder and Head of LENS Living Lab -  
International living laboratory

Celje, Slovenia



**Brane Semolic** studied mechanical engineering, engineering economics, and informatics; he holds a scientific master degree and doctorate in business informatics. His focus of professional interest is industrial and system engineering, innovation and technology management, virtual organizations and systems, project and knowledge management. He has 40 years of working experiences in different industries (industrial engineering, IT, chemicals, household appliances, government, and education), as an expert, researcher, manager, entrepreneur, counselor to the Slovenian government and professor. He operates as head of the open research and innovation organization LENS Living Lab. LENS Living Lab is an international industry-driven virtual living laboratory. He is acting as initiator and coordinator of various research and innovation collaboration platforms, programs and projects for the needs of different industries (ICT, robotics, laser additive manufacturing, logistics, education). He was co-founder and the first director of the TCS - Toolmakers Cluster of Slovenia (EU automotive industry suppliers). Since 2004 he is serving as the president of the TCS council of experts. Besides this, he is operating as a part-time professor at the Cranfield College.

He was head of project and information systems laboratory at the Faculty of Mechanical Engineering, Head of the Project & Technology Management Institute at the Faculty of Logistics, University of Maribor and professor of project and technology management at the graduate and postgraduate level. He acted as a trainer at the International »European Project Manager« post-graduated program, organized jointly by the University of Bremen.

He was the co-founder and president of the Project Management Association of Slovenia (ZPM), vice president of IPMA (International Project Management Association), chairman of the IPMA Research Management Board (2005-2012), and technical vice-chairman of ICEC (International Cost Engineering Council). Now he is serving as a director of the IPMA & ICEC strategic alliance. He actively participated in the development of the IPMA 4-level project managers' certification program. He introduced and was the first director of the IPMA certification program in Slovenia. He has been serving as the assessor in this certification program since 1997. He performed as assessor in the IPMA International PM Excellence Award Program in China, India, and Slovenia.

He is a registered assessor for the accreditation of education programs and education organizations by the EU-Slovenian Quality Assurance Agency for Higher Education.

He was a Member of Strategic Advisory Board of European Competitiveness and Innovation, as well as the president of the Slovenian Chamber of Business Services.

He got the award as ICEC Distinguished International Fellow in 2008. He received the »Silver Sign« for his achievements in research, education, and collaboration with the industry from the University of Maribor in 2015.

Professor Semolic is also an academic advisor for the **PM World Journal**. He can be contacted at [brane.semolic@3-lab.eu](mailto:brane.semolic@3-lab.eu). Additional information about the LENS Living Lab can be found at <http://www.3-lab.eu/>.

*To view other works by Dr. Semolic, visit his author showcase in the PM World Library at <https://pmworldlibrary.net/authors/brane-semolic/>*