

## Understanding Servitization: A Resilience Perspective

Ditshegofatso Milanzi, Richard Weeks

Graduate School of Technology Management, University of Pretoria, South Africa

**Abstract**--The economic environment is consistently challenging the ability for organisations to see the future boldly. In addition, customer value has moved from a products specific requirement to a bundle of solutions inclusive of the product and the services associated therewith. Manufacturing companies not only need to adapt to the client pull effect but also require a sense of positive adaptation in the face of dynamic or significant change. The primary objective of this research study was to gain an understanding of the concept "servitization" from a resilience incorporation perspective. An additional aim of the research study was to gain an appreciation of the impact of resilience on a servitized organisation or the implementation of a servitization process. The research study suggests that T-shaped skills profile and relationship management are critical aspects of consideration in fostering ability for servitized organisations to adapt to adversity.

### I. INTRODUCTION

The South African economy is perceived by many people to be dependent on and dominated by the manufacturing and agricultural sectors. Weeks & Benade [32], however, mention that the 2010 CIA world fact book suggests that the South African economy is services dominant, trailed by the manufacturing sector. Agriculture constitutes a mere three percent fraction of the gross domestic product GDP, with services and industry constituting 65.8% and 31.2% respectively (Weeks & Benade [32]). From the statistics, it is evident that the services sector constitutes a considerable proportion of the economy. This construct further indicates that there is much value in the service domain and the manufacturing domain would find "competitive" growth and benefit to the "bottom line". Researchers Matthyssens and Vandenbempt [19] suggest the amalgamation of services and manufacturing does offer competitive benefit in constituting a customer offering by stating that *"business markets in general, the logic of transitioning from product solutions to solutions through adding services allows organisations to regain competition differentiation"*. One may assume the services sector is creating a market pull or market push dynamic in which the manufacturing sectors is driven to adopt services so as to maintain profitability thus in turn fostering a competitive edge through an evolution and amalgamation of a service component. This logic is in support of researchers such as VanderMerwe & Rada [29] and Weeks & Benade [32] who contest that manufacturing companies are attempting to add a service component to their products in order to potentially increase their income streams. Although not evident, the perception is supported by the notion that the service sector is both dominant and potentially increasing creating "untapped" revenue potentials. This

amalgamation and evolution of services within manufacturing is termed servitization, a term first coined by VanderMerwe and Rada [29].

Weeks and Benade [26] developed a servitization model in which the client or customer becomes the pivotal centre of success in the integration of a manufacturing and service value chain. They depict the service and product value as being derived and driven by an understanding of the customer's needs and expectations thus providing a bundled value offering consisting of goods, services, knowledge, cost optimisation and revenue creation. However, a manufacturing organisation adopting this integration is faced with key challenges as services are in essence intangible, simultaneously co-produced and consumed, are not able to be stored, and if not utilised are lost [10].

The service economy is highly competitive & turbulent in nature [31]. In a time of rapid change driven by technological, socio-cultural and client needs, a servitization model is subjected to "continuously" challenging requirements across the systems that collectively engender service delivery. One may presume that if the servitization model is "not well" implemented or understood, companies may find themselves investing substantial amounts of money without observing no solid revenues. [14]

#### A. Context as a determinant for institutional resiliency

Figure 1 seeks to illustrate the "forces" that impact a servitized organisations and how servitized organisations may maintain stability in this turbulent, rapidly changing service dominant world.

Organisations offering services or manufacturing products operate within a world that can be termed distinct and indistinct. The distinct world is the "known and knowable" world also referred to as the ordered world [33], [31]. It is a world compiled by ordered elements that have consistency and predictability. In the instance of a manufacturing line, these are systems that over "large" periods of time have continually provided the same outputs with the same inputs and therefore have shown causation and consequence. The predictable element is one in which cause and effect articulations are not clear cut & dry, however, offer the potential improvements available. These may be efficiency, effectiveness, quality improvements of machinery and products to cite a few. These predictable elements also include an analysis of market trends and financial trends, as well as customer feedback, which enable system improvement until it has reached a "new or heightened" state of order and consistency.

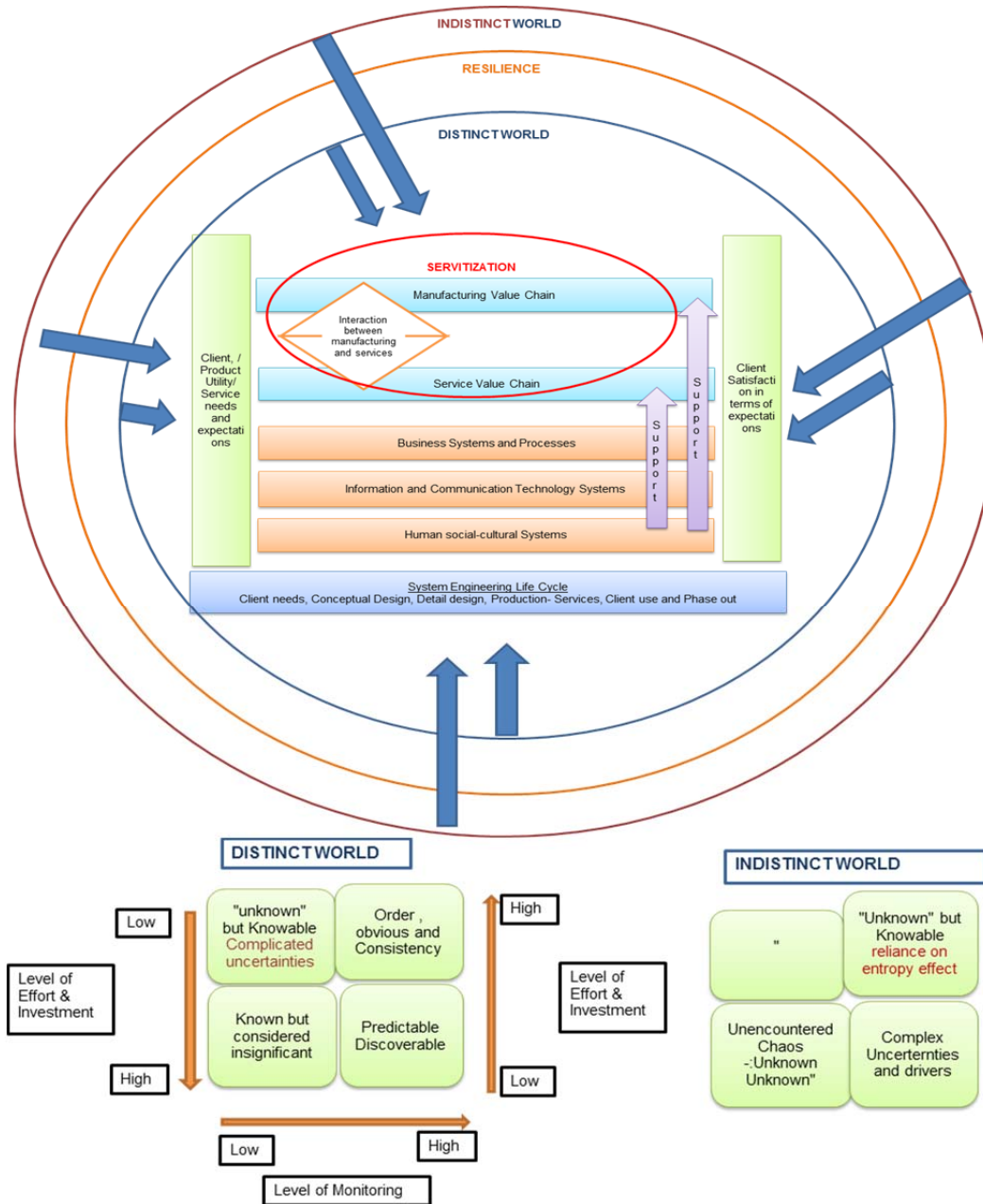


Figure1. Servitization Model

The indistinct world also referred to as the un-ordered world [33], [31] to an extent, overlaps with the distinct world in the realm of the “unknown but knowable”. In the distinct world, the unknown but knowable territory encompasses a world where constituents can be monitored and measured, however, based on decision criteria they becomes high effort-little significance outputs. The indistinct world, the unknown but knowable territory is riddled with “unidentified” constituents, multiple root causes, indefinite interactions between constituents and unknown compound consequences [33], [31].

The distinct world contains “complicated” uncertainties, uncertainties that have some form of prior historical evidence and require diverse amounts of data or complex calculations which in completion are “summarised” or approximated to fit certain patterns of behaviour or consistencies. The indistinct world is driven by a reliance of an entropy effect or the inherit ability for elements to self-organise and develop patterns of behaviour that are only understood after the fact. In both worlds the unknown but knowable is seldom evaluated over short periods of time or seldom evaluated without “merit” thus becoming territories of emergent circumstances. Taleb [23] terms these expressions as being

“black swans” events which are beneficial or detrimental outliers from expectation derived “from our misunderstanding of the likelihood of surprises, those unread books, because we take what we know a little too seriously”

The indistinct world also contains the un-encountered “chaos”. These are elements that are best explained as a “complete surprise” for example the inhabitancy of a new viral disease immune to all current strains of medication such as the H1N1 virus. This is a domain where changes happen quickly and appear to come out of nowhere. Behavioural patterns are difficult to determine and may be continuously shifting creating a sense of instability as a derivative of “the nature-society interaction” [1]. Weeks [33], argues both worlds are impacted by a domain of disorder. A territory whose changes are unknowable, unforeseeable, unexpected, unpredictable, sudden, discontinuous, where no patterns exist extending to cumulative effect of multiple factors differentiated by scale and type.

The manufacturing component within servitization cannot handle large variations in short periods of time. Manufacturing lines cannot be changed every day or overnight due to a change in the “service market”, if they did, one can only imagine the amount of havoc and mayhem. The world as an entity of both distinct and indistinct is continually changing therefore “servitized” organisations or organisation undergoing servitization need an ability of “anchoring” in the rough seas. This engenders the ensuing questions that require answers.

How do organisations maintain stability in this turbulent, aggressively competitive, rapid changing service context? How do they “buffer” the fluctuations of the world as an entity? How do they become resilient? Resiliency is defined by the oxford dictionary [20] as “the ability to recoil, spring back to resume a former size and shape”. Within the context of servitization, the oxford definition can be moulded as the ability of an organisation to maintain its technical, operational, financial functions and their competitive edge under the influence of the change, turmoil and uncertainty of the world. Which leads into the primary research objective, understanding, as to what extent does resiliency protect the organisation from an ever changing business environment.

From the preceding discussion, the presumption made is that the servitization model provides manufacturing organisation avenues to increase the value proposition made to clients thus generate revenue. However, in this ever changing turbulent world, the question posed is if the servitization model translates into business continuity and business success, or does an element of resiliency add to the realisation of these elusive pieces of the servitization puzzle. Alternatively is it “simply” an element ignored, as a function of conditional constraints such as paradigm change [14]; [5].

### B. The concept of Resilience

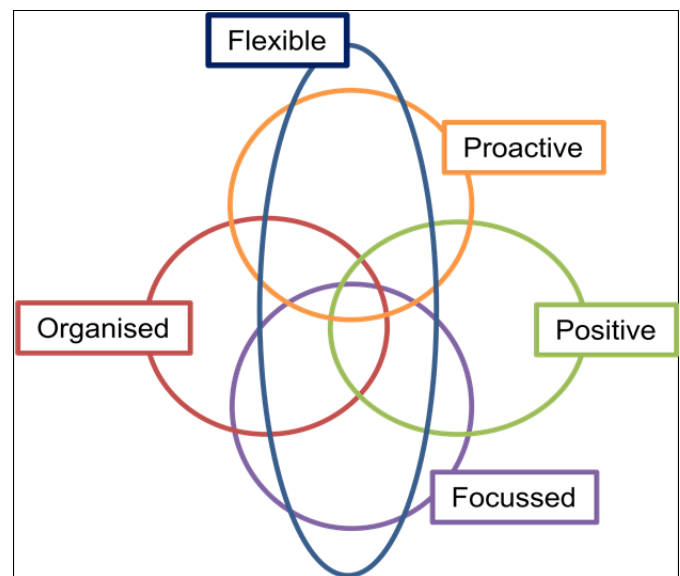
Hamel and Valikangas [12] state an intriguing, exciting contextual introduction in saying that “A company that fails to adjust to its changing environment soon loses its

relevance, its customers and ultimately the support of its stakeholders”, “the best way of honouring an institution’s legacy is to extend it and the best way to extend it is to improve the organisation’s capacity for continual renewal”

Holling [13] one of the early researchers into resilience in ecological systems adopts a slightly different stance in defining resilience as:

“the measure of persistence of systems and their ability to absorb change & disturbances and still maintain the same relationship between populations” which he further refines to “resilience determines the persistence of relationships within a system and a measure of the ability of these systems to change state variables, driving variables & parameters and still persist”.

There is a theme of resilience resonates with recovery from failure, the ability to bounce back however, Holling’s definition adds on a notion of resilience going beyond the ability to recover from a failure but rather the ability to recover from all forms disruptions and discontinuities that result due to the effect of the contextual environment. Bryan [5] states that “there is usually not enough time to use proven problem solving approaches to making decisions under uncertainty, breaking big decisions into smaller well sequenced ones helps organisations move forward without taking excessive risk”. The implied notion is a resilient approach assumes some form of cause-effect sense making articulation. Researchers Weeks and Benade evolve the concept of causation may interpret resilience as: “having its origins in complex adaptive systems theory, Determining the flow and convergence of possible cause-effect relationships stemming from the numerous systematic interactions taking place within a chaotic and extensively interconnected environment”. (Weeks & Benade [31])



(Source: Adaptation of Barrette [6])

Figure2. Resilience characteristics Model

Coutu [6], Barrette [6] outline the critical factors required to facilitate resilience as accepting reality, possessing strong held values and the ability to innovate. Asgary, Kong and Lery [3] in support argue that resiliency centres on leadership, culture, people, systems and contextual settings influenced by technology. Weeks & Weeks [34] argue that resiliency in adaptive or learning environments holds strong elements of curiosity, courage and an ability to explore and investigate which is are illustrated in figure 2.

Weeks & Benade [31] in their literature review of resilience argue that resilience encompasses concepts of human interjection, culture and risk management ability. The characteristics encompass the paradox of resilience being reactive and pro-active with a “complex yet adaptive” feature.

The positive characteristic embraces the ability to accept reality and observing failure as an opportunity for something new which relates directly to the characteristic of being innovative [34]. The focussed characteristic resonates with the anchor of a ship analogy. The anchor is considered as the vision of an organisation where an organisation with vision will use this vision as a sense of purpose and need thus as guidance under complexity and disorientation [35]. The organised characteristic adopts the ability of an organisation to monitor their contextual / operational environment. This notion surrounds monitoring the indistinct world and the changes that are derived. Barrette [6] suggests that not only is it critical for an organisation to monitor their environment and collect data but it is also critical that this data is converted into information which will lead to the development of forward looking plans therefore resulting in the organisation taking a proactive stance. The characteristic of being flexible appears to bear its “roots” within the four characteristics mentioned as the ability to possess the courage to construct action and pursue diverse innovative ideas. However “primitive” these characteristics may appear, they address the basic mental approach required for scenario mapping, cause-effect determinations and complex-adaptive features [2]; [18].

Weick and Sutcliffe [36] define learning resiliency as: “*A combination of on-going scrutiny of existing expectations, continuous refinement and differentiation of expectations based on newer experiences, willingness and capability to invent new expectations that make sense of unprecedented events, more nuanced appreciation of context and ways to deal it, and identification of new dimensions of context that improve foresight and current functioning*”. This inevitably suggests that in the midst of all, one still needs to juggle the human to human interaction capability. Weeks & Benade [32] argue that a T-shaped skills profile is required to facilitate this aspect of adaptive capability as T-shaped skilled employees have core in-depth speciality whilst simultaneously having a wide range of experience and understanding of other disciplines associated with the service requirements and thus are able to think outside silo limitations.

In summary, Taleb [23] argues that we are scheduled to learn from repetitive events and deductive knowledge inference based on the past which works well in the ordered space of the distinct world however, we just do not know how much information there is in the past [23]. Organisations operate in an ever changing environment that is driven by competitors, suppliers, customer’s needs and climate changes. Where, climate changes may be meteorological changes, economical changes, political changes or changes in legalities and enforcements of corporate citizenship. The changes may be embedded in the ordered world where they can be noticed through cause-effect determinations or embedded in the complex world where they can impose pressure on varied proximities simultaneously or in sequence in such a way that they are noticed in retrospect forcing an organisation to adopt and at worse fail [2]; [18]. The impact of the distinct and indistinct world are constantly changing, if a servitized organisation or one undergoing the servitization was to continually recover from these changes, the change management stress would be beyond constructive and the organisation would experience fatigue thus lose its ability to cope and function [15]. To maintain operational continuity, it is necessary to operate within a world of consistency and order however the influence of non-repetitive, complex, non-linear and chaotic natural or man-made events [26]. Contingency measures are no longer sufficient in cost-benefit-risk occurrence trade-offs as they focus on damage limitation as opposed to crisis prevention where a crisis is a set of conditions that generate task demands on an organisation that exceeds , or comes close to exceeding, an organisation’s ability to cope [26].

Resilience thus enables an organisation to buffer out any fluctuations experienced. It is the ability to absorb the impact incurred under disruptions by situational awareness, an ability to recognise what you do not know but keeping an eye, ear & feel on what may emerge from the unknown and un-encountered [23]. An ability to probe, sense the existence of silent evidence and attract them to manifest in positive outputs rather than detrimental outputs. It encourages tolerating the effects but not focussing on them by thinking outside the box as opposed to exceeding inside the box of conditions. From an organisational perspective, Resilience is takes a voice of resistance management, the ability to respond to pressure with minimal resistance, engaging conflict and developing critical thinking. Resilience is an ability to not be narrow minded but to probe how the unknown might affect you in a world riddled in blind spots of the past and the future, the past has its blindness in the ability to determine cause-effect certainties in retrospect whilst the future is uncertain and illusive to cause-effect prediction, it increases our vulnerability to dying when the unexpected happens. Weick & Sutcliffe [36]; Taleb [23]

### C. Research Objectives

The research study is derived within the context of South Africa. The primary objective of the research study is to

establish and gain a better understanding of the concept “resilience” in servitization. An associated objective is to gain an appreciation for its impact on servitized organisations and the servitization process.

To achieve the primary objective formulated, the following subsidiary objectives are also formulated:

- To determine if resilience can in fact be managed in practice? If so, what methodologies exist and are in practice?
- The implications of engendering resilience in a dual manufacturing-services context.

## II. PROPOSED MODEL OR CONCEPTUAL METHOD

The overall objective of the research study is to assess the role and practicality that resilience plays in servitized operations or the servitization process. The conceptual model for this research study is reflected in the ensuing hypotheses:

### Null Hypothesis

An organisation with a strategy of resilience management that maintains innovative flexibility will have a greater degree of persistence thus the ability to maintain its competitive edge.

This postulates that organisations [26]; [36]:

- move beyond a contingency focus in decision making,
- assume a more holistic system and domain context perspective on the nature of the threat,
- ensure that multi-disciplinary teams engage in complex, ill-defined problems, recognise the limitations of expertise when dealing with low probability – high consequence events or discrete incidents,
- use innovative analysis, technology and technological innovation,
- use diversification and integration as buffer tools, and
- are in constant dialogue with the expectations and experiences of their value chain and environment, thus keeping their ears to the ground.

To understand the null hypothesis derived for this research study, subsidiary hypotheses are also taken into consideration, namely:

### Hypothesis 1

In the servitization model, a move to commit to dual manufacturing-service philosophy has associated cost and revenues implications [14]; [30], possibly higher than when compared to individually operated pillars. This would imply an organisation that “fully” understands its market needs, intermediary departmental needs, individual customer needs, and the relationship management between their internal capacity, suppliers and customers, and continually assess these needs, will possess a higher ability of resilience. Furthermore, an organisation with a “relatively distinctive” cyclical effort versus output frequency will have a higher

ability of resilience where Cyclical effort versus output frequency refers to the realisation of potential emergent threats/problems/issues determining the barriers to learning from the emergent threat, thus, subjected to organisational learning, resistance management, business crisis management and operational crisis management in a cyclical/iterative process [26]; [3].

The hypothesis seeks to establish an element of vulnerability in organisations [26], where vulnerability is the existence of internal stresses or rather internal residual elements not addressed which limit the degree of buoyancy and elasticity of an organisation.

Smith [26] exposes the pitfall of most organisations by stating that:

*“In some cases, these latent errors remain hidden until such a time that the gaps are exposed. While other gaps in defence might be recognised, it is often the case that a series of assumptions are made by decision makers around the probability of an event occurring that will expose these weaknesses. These assumptions allow fractures to remain in place until emergent conditions expose the weaknesses and ultimately result in the generation of a crisis. Once such emergent are generated and controls are bypassed, there is then a requirement for operators and managers to make sense of what is happening to bring the system back into control boundaries”.*

The researcher evokes that resilience does not suggest that the whole cycle of effort versus output should be done as a costly exercise, but rather being engaged in the basics frequently that it encourages increased levels of engagement thereby decreasing the “latent “effects of the “big bang”.

### Hypothesis 2

An organisation operating in a “homogenous” environment is likely to experience low degrees of fluctuations thus experiencing a greater degree engendering a lower level of resilience. Smith [26] mentions that “*the apparent reluctance of organisations to learn lessons from their own and other organisations’ crises remains a significant barrier to the development of such resilience*” therefore suggesting that the perception of stability is expected to reduce the ability to learn. The ability to learn is the cornerstone in fostering resilience hence a reduction in learning is a reduction in the primary defence against the creation of vulnerability.

Damage has a compounding effect, disruptions to organisations are likely to be transcended and compounded to downstream and upstream dependencies and relations. Understanding the aspect of resilience as the “radar” link in the servitization process is vital in ensuring organisations stay afloat and ahead in their turbulent environments. To gain an appreciation for resilience, it is crucial to grasp whether resilience increases the crisis response ability of an

organisation, serve as a buffering aspect and increase reserves against fluctuations or limit dependencies. (Green, King& Miller-Dawkins [11])

### III. RESEARCH METHODOLOGY

The research study constitutes an insight study focussed at gaining an understanding of the translation of resiliency in servitization. Holling [13] states that *“resilience management is rather a qualitative approach to assess the ability to absorb future deviations whether planned, expected or unexpected”*, as such, the study is considered to be analytically-descriptive in nature thereby implying it to be a qualitative study that seeks not to separate the “person” experiencing the change, challenge and adaptation of servitization. A qualitative “anti-positivist” approach allows for more information with regards to the challenges encountered in practice through the use of insights gained from practitioners. Welman *et al* [37] asserts that stated in layman terms *“the primary task of qualitative research, essentially a descriptive design, is to uncover and explicate the ways in which people in a particular setting come to understand, account for, take caution and manage their situations as well as the problems and difficulties they encounter. These are evaluated analytically to guide the researcher to the next stage of investigation”*. The researcher apparently agrees with the connotation that a qualitative approach is analytical-descriptive rooted in narratives and observation of experience.

#### A. Research Process

The research study will encompass a narrative enquiry, based on semi-structured interviews through the use of open ended questions as a primary data collection method. Open ended questions limit the degree of bias from the researcher leading and directing the participant into a perceived outcome. Open ended questions also allow the researcher the ability to learn from the organisation’s first-hand experience in implementing resiliency in a servitization strategy.

Although hypotheses were derived and defined in section two, hypothesis testing is “predominately” a quantitative research approach in which generalised deductions are the product. For the purposes of this research process, the hypotheses derived will be specific to the case study examined with the intention of understanding the uniqueness of the complexities of the case.

#### B. Research Sample

Respondents from various management backgrounds with work execution experience were interviewed through the narrative enquiry. All the interviewees are from an institution with a global footprint that had implemented a servitization strategy/process and consequently are still learning and, have experience in dealing with the associated challenges encompassed. Due to the time consuming nature of an interview approach, only one company was considered

making the empirical study a restricted and limited sample size study. The selection of respondents was from executive management level, middle management level and a group of product & service engineers with no less than 10years industrial experience. The respondents were selected on the basis of creating diversity with regards to functional responsibility and execution. The narratives collected were analysed for anecdotes, common trends and patterns that reflected collective experiences of the respondents as well as insight and any hidden meaning from their diversified experiences when dealing with uncertainty, environmental fluctuations and emergent positive or hostile contextual conditions that could disrupt the organisation. Five respondents in total were permitted by the Chief Executive Officer to partake in the study making the empirical study a limited sample size study with a probable limited sample size analysis. The interviews predominantly occurred as one on one semi-structured interviews. The research questions are designed in a broad fashion due to the objectives set. The intent is to create a platform of inception in the sphere of resiliency in servitization.

### IV. RESULTS

#### A. Question 1:

What has been the greatest challenge experienced by you or the organisation in offering this bundle of solutions?

#### Research Findings:

The executive management group Respondent A [21] as a founder of the institution, claimed that manufacturing and services infrastructure was not a challenge. The respondent indicated that the biggest challenges could be encapsulated within two key themes, namely, internal organisational and external organisational challenge. An important internal challenge constituted a lack in skills where the organisation suffered from skills leaving the organisation as the organisation moved to incorporate a service delivery infrastructure. This skills loss led to the organisation recruiting young individuals that required further training and education in their specialist fields. The second internal challenge suggested by the respondent, related to educating personnel on the service-manufacturing structure, in defining new roles, responsibilities, support protocols and encouraging cross-functional understanding and knowledge transfer.

The external challenges, according to Respondent A [21] encompassed establishing a connection with the customer by illustrating knowledge ability as a service provider, creating trust and transferring knowledge to the customer. This challenge is heightened by the need to move services closer to the customer. With the move, identifying the best channel of communication proved to be challenging. The Middle management group, Respondent B [22] mentioned that in his experience, people where his greatest challenge, in that, internally people failed to create and build relationships amongst departments and functions which compromised the

ability to communicate with clients. Respondent C's [23] comments resonated with that of Respondent B, while adding that in his experience people (company resources), management (leadership), time and clients need to be educated on the service philosophy and "the way of doing things" were key challenges. It was noted by Respondent C [23] that people's lack of emotional intelligence hampered the ability to better communicate, which hampered the internal effectiveness of the company. The respondent further indicated that leadership was a challenge, due to knowledgeable people being promoted to positions of incompetency. Time also, according to the respondent, became a challenge in that the organisation started to focus on irrelevant activities which in turn decreased the motivation and sense of purpose in employees. Respondent C [23] suggested that a decrease in employee motivation compromised the standard of service provision. The need to educate the client is also seen as constituting a challenge by the respondent. The respondent further indicated that the client has a sense of arrogance, which could be explained through an analogy of "in the land of the blind, the one eyed man is king". Clients tend to know or have a small amount of know-how and become clouded by arrogance, which limits the potential value of solution offerings between the client and the service provider.

The Engineers group, the respondents indicated that frequently clients tend to not have "buy-in" into solutions that they derive; this in-turn makes them be less inclined to share their expertise with the client.

The common theme emanating across all respondents' answers is the need to build strong relationships between services and manufacturing departments, which allows the organisation to build more effective relationships with the client. The flow of information is not only critical but also challenged by the type of channels used to communicate, such as mail, phone, and person to person communication. Impersonal communication channels are seen as channels that mislead areas of focus, which, compromise the quality of value in solution offering to the client. This theme resonates with researchers Coughlan, Lycett & Macerdi [17] who argue that in a knowledge economy, the "culture" of resiliency is fostered by the investment into communication. They argue that this communication approach is driven by responsibility domain, the ability to take ownership of ideas and their implementation; the power domain, the ability to influence and the knowledge domain which is the ability to possess task knowledge, skill and competency.

#### *B. Question 2:*

Can you recall an occasion where there was emergent deviation to day to day deliverables that could have caused disruption to the organization?

#### *Research Findings:*

The executive manager, Respondent A [21] mentioned that by nature, the services end is closer to the customer. It

was noted by the respondent that this proximity to the customer drove the organisation to use communication modes such as client enquiries and feedback as avenues to sense subtle and arising deviations in the industry.

The Middle management group Respondent B [22] and Respondent C [23] indicated, as training managers and business development managers, that the organisation went into an era where skills were leaving the company and the country. As leadership, they quickly realised that even their clients were suffering from the same dynamic. This led them to re-create maintenance strategies that could be packaged as service deliveries which made an impact on their survival and allowed them to offer value to clients as clients too had lost the capability and competence. The Engineers group, Respondent D [24] indicated that the organisation monitors feedback from clients and, encourages clients to monitor the service quality; the organisation is unable to always recognise emergent disruptions to clients, however, the strongest value from the organisation is to never withdraw from disruptions or failures that occur in the client's space. Respondent E [25] emphasised that the client and service provider need to both focus on creating and optimising value addition "when this happens, you are rarely going to be caught by surprise".

All respondents were of the view that the organisation utilises the customer's feedback as a way of determining what deviations exist that may result in disruptions. With the service function being closer to the customer, the service engineers encourage vivid and clear feedback from the customer, which is then utilised by the company to sense emerging trends and arising deviations. This view resonates with strategic entrepreneurial thinking by researchers Dhliwayo & Van Vuuren [8] who argue that organisations that continuously focus on finding better solutions for clients maintain a competitive advantage and therefore cultivate adaptive strategic thinking in relation to their environment and competitor and thus have a greater propensity to stay ahead.

#### *C. Question 3, 4:*

What do you consider to be the most and least critical threat to the organisation?

How do you as an organisation identify techniques that add resilience to the business?

#### *Research Findings*

The executive manager, Respondent A [21], indicated that the lack of knowledge of the industries was the most critical challenge to the business. The least important threat, the respondent argued should be seen from the eyes and needs of the customer. What the customer views as least critical to his business continuity should become the organisation's least focus. The Middle management group, Respondent B [22] felt that India and China's industrial drive and, their ability to duplicate products was a critical threat. The respondent indicated that the organisation's service offering enabled differentiation in solutions offered. The respondent further



suggested that the benefit of the organisation's value offering is that it is not easily able to be duplicated. It is unlikely for a competitor to duplicate their bundle of products and services, which made servitization duplication the least critical threat to the organisation. Respondent C [23] added that, customers weighing value, based on price competition, was a critical threat to their organisation, as it limited the value creation and actualisation to the client as well as limiting the ability for the organisation to be unique.

Du Plessis [9] quotes Watson in correlating the value preposition to the servitization model per organisation as: *"the value perceived by the customer, relative to the value offered by competitors, drives purchase decisions and therefore drives market share"*, he further quotes Watson in that *"the value contributed by the employees determines the value perceived by the customer which is the value realised by the owners"*. The latter quotation implies that the "concept" of value preposition lies between the realisation and leverage in operational value, customer value and stakeholder value. As such, the path in uncovering this realisation and leverage is neither facile nor effortless, as all the value pillars may buckle under a holistic approach as a result formulating focus silos.

The concept alluded to by the respondents is that the most critical threat to a servitized approach, is towards the manufacturing pillar, which is easily able to be duplicated. The service approach may also be duplicated, however, it is suggested that the amalgamation of products and services coupled with value sharing/ buy-in from clients is difficult to duplicate, which makes servitization duplication the least critical threat provided the client and service provider co-create the value towards the solution. All respondents expressed the view that technology added a sense of robustness and resilience to the business. They, however, stressed "the customer is king" analogy, indicating that the technology applied to the organisation should add value to the customer and offer uniqueness. If the technology applied failed to provide such value, the technology would be in actual fact meaningless.

Technology interpretation by the respondents seems to reflect a holistic view, as a bundle of solutions encompassing both products and service. For these bundles to offer resiliency, the client should see value from them thus the client's value preposition defines the organisation's value preposition. In this regard it may be noted that Hamel and Valikangas [12] suggest that *"If you can retrieve, interpret and act upon battlefield intelligence faster than your adversary, you will be perpetually on the offensive acting rather than reacting thus any company that can make sense of its environment, generate strategic options and realign its resources faster than its rivals will enjoy a decisive advantage"*, which is in support of the view that the more value an organisation is able to offer clients, the more resilient they become.

#### D. Question 5, 6:

Can you recall an occasion where being resilient showed a strategic advantage or disadvantage?

What are the costs and risks of building resiliency into these technologies?

#### Research Findings

The executive manager, Respondent A [21] indicated that the ability to be resilient has allowed them to expand and push out opposition by offering the service-product bundle under a single cost/ overhead charge. The respondent further headed caution in that, the cost and risk evaluation of building resiliency require a clinical system of evaluation that is not subjective to the influence and perception of the service executor. The respondent emphasised that the end objective should be to relate the costs and risks exposure to the impact on customer management and customer relationship. The respondent indicated that their system of continuous improvement created simplicity in evaluating cost and risk by allowing the organisation to measure and quantify the benefit on earnings for implementing innovation where earnings are defined as an increase in value addition to the customer and the bottom line.

The middle management group, Respondent B [23] and Respondent C [24] indicated, as training managers and business development managers, that their current journey to resiliency was rooted in research and development and continuous improvement. It was contended that it offered strategic benefit in three ways. Primarily, it allowed their employees to be passionate about what they execute. It also allowed the business to be closer to the customer, which in turn, has stimulated the business to align and segment their bundle offering according to specific commodities, and industrial environments. This in-turn has encouraged the organisation to build good networks, which allow the organisation to sense contextual issues. The middle managers further expressed that ideally one should spend five percent of revenue on product development. However, the biggest challenge for the organisation was a loss in engineering skills that were overcome by the establishment of training, research and development departments, which have allowed them to stay ahead. The engineers group indicated that research and development added to the resiliency of the organization, as it allowed the organization a sense of uniqueness. Respondent C [23] further indicated that the organization is continuously investing in being system driven to streamline the business; however, this reduces the response ability of the organization which, in-turn creates narrow mindedness and rigidity in finding solutions outside the box. The respondent further suggested this rigidity exposes the organisation negatively due to the risk of people having the inability to see the bigger picture which leads key decision makers taking a little bit of information and implementing changes that may adapt in the wrong direction.

It would seem that the focus of the organisation's resiliency strategy is to add value to both the customer and



the bottom line. This resonates with a servitization strategy [30]; [4]; [9]. Knowledge sharing amongst social and industrial networks allows the organisation the ability to sense changes with a contextual environment. Respondent B [22] claimed that the use of Mission Directed Work has allowed them to respond to issues/ crisis before they became catastrophic. Central to all respondents is the connotation alluded is that research and development with its associated costs adds to the resiliency of an organisation however the overall purpose of any R&D activities is to support and maximise the customer relationship ability.

#### *E. Research Objective: Key Research Findings*

##### 1. Subsidiary Objective 1.

- **Is there a difference and if so, what is the difference between a predominately manufacturing-orientated resilience and a service-orientated resilience?**

The literature argues that there is an inherent difference between manufacturing and service provision as functional silos. Manufacturing has a focus on the product transaction with the customer. Services have a focus on the customer, the utility of the product and the establishment of relationships. This inherent difference implies that, when adopting a servitization model, there could be a “civil war” between managers in manufacturing and service functions as alluded by the respondents. The literature study further argued that an organisation embarking on a servitization strategy should create commonality by asking where the customer perceives value [30]; [19].

According to the research results the organisation went through a phase of teething/ civil war when the organisation coupled services to an existing manufacturing leg. This was defined as an inability to communicate based on a range of aspects, such as people and time, which, made the service function non-profitable. This led the organisation into a phase of redefining how they perceived their contextual environment and, to acknowledge that their ability was in manufacturing, however, the customer is king and, customer value defines the organisation’s value. It is eluded that when dealing with servitization, the amalgamation of services and manufacturing is greater than the sum of services and manufacturing coupled together. This was prominent with regards to customer value.

The narratives from the respondents further suggest that the same philosophy applies to resiliency. Neither, the resiliency of manufacturing tasks and efficiencies, nor the resiliency of service relationships is sufficient in a servitized structure. It is the total amalgamated value, the total solutions to the client that needs to be resilient, which in-turn filters into the resiliency of the organisation.

##### 2. Subsidiary Objective 2.

- **If resilience can in fact be managed in practice? What methodologies exist and are in practice?**

According to the literature study, there is a sense that resilience can be fostered and managed. Resilience is suggested to encompass an element of risk management and strategy management. Wood, Dannatt and Marshall [38] define a resilience management approach as exercising “health checks” or “walk through audits” that “strive to eliminate the workplace and organisational factors likely to provoke errors; brainstorm new scenarios for failure and conduct regular health checks on the organisational process known to contribute to mishaps”

The interviews revealed that the organisation has created a way to manage resilience in the servitized structure. The organisation has two pillars R&D and Continuous Improvement system on which everything resides. R&D fosters the ability to be resilient within product knowledge and delivery. It allows the organisation to evolve as leaders of the industry and offer the client the comfort of know how. The continuous improvement provides the total system focus, not as service or manufacturing pillars but as an amalgamation of a total solution. There is an anecdote of assessing feedback from knowledge networks of suppliers, operators, and operatives in other global parts. All the feedback feeds into one system, which serve two benefits. It allows the two functional departments, being services and manufacturing to interact and share experiences that relate to the organisation and client exposure. It also allows the organisation to sense changing tides within their contextual environments.

- **The implications of resilience in a dual manufacturing-services process**

With the limited sample size, it is rather difficult to conclusively analyse what impact resilience has on a dual manufacturing-service process. The implications suggest a risk management, strategy management and business survival paradigm. The respondent anecdotes suggest that resilience in a dual manufacturing-services fosters a competitive advantage, with middle management and engineers expressing the view that “*China and India are our biggest threat, anybody can duplicate, they (Chinese and Indian manufacturers) squander the customers we are trying to cherish, however, we are still the leaders as we can illustrate our product technology, we have superior service offering*”. Resilience in this dual setting limits the ease of duplication to the bundle of value offering. As one engineer expressed “*competitor A or B can duplicate product A or B, but only on those products are they able to duplicate but can they offer you a total solutions offering, a one stop shop to all your problems*”

In the theoretical derivation, it is queried if there are resilience elements that render an organisation dysfunctional or are the elements supportive to the servitization strategy. From the organisation’s history, the servitization process started over a decade ago with a seven year focus on making

it a success. It is difficult to draw a conclusion regarding the dysfunctional impact of resilience or the dysfunctional impact of two different mind-sets being manufacturing resilience being task, productivity and efficiency and; service resilience being service recovery [10]. Supportive to servitization, the anecdote from the service founder phrases “*well, we first had to acknowledge that we are a manufacturing company however that services are closer to the customer and the customer is key*”, the focus connotation is to create resilience that creates customer value.

## V. CLOSING AND RECOMMENDATIONS

It would seem that the organisation places emphasis in their technical ability as a manufacturing capable company as the pivot of establishing relationships with clients. The pillars of resiliency seem to be a T - shaped skills profile and Relationship management. Itabash-Campbell, Perelli & Gluesing [27] argue that people and organisations predominantly learn by solidifying patterns of experiences in their minds as well as through story telling & sharing thus sociality & networking in people allows for the creation of knowledge, build innovative capacity and capacity for resilience. Weeks & Benade [31] contest that this ability to learn by pattern solidification requires a multi-disciplinary profile. The researchers argue that T-shaped people have an enabled ability to explore and analyse service-manufacturing issues from different disciplinary perspectives and probe issues of interest with the diverse disciplines concerned.

For the case study, T –shaped skills appears to have been a pushing force requirement due to loss in skills as the organisation embarked on a servitization strategy. This meant transferring know-how knowledge to young engineers, fostering training on communication and emotional intelligence to allow these highly technically minded people, the ability to foster relationships with clients, who too to an extent, are technically minded. This intuitive approach is supported by Weick & Sutcliffe [36] who contest that communication internally and externally across all stakeholders as “organisational inputs and outputs” creates T-shaped individual skill mastery and team learning. The researchers further contest that people are the living threads sustaining organisations thus when they have well developed situational awareness, they are enabled to make continuous adjustments that prevent errors from cumulating, they are empowered to speak out without fear, ignorance or indifference thus notice anomalies, anecdotes, emerging patterns that may be harmful or beneficial.

The relationship management pillar appears to evolve around acknowledging that knowing the client intimately in his environment is vital and that, transferring know-how to the client strengthens trust, which has allowed the organisation to focus on feedback from clients, their service providers and specific commodities, to develop and manage a resilience model that is driven by client value and, enabled by R&D and continuous improvement system. The notion is

supported by Kull & Tullari [16] who contest that from a product supply paradigm, research and development provides risk mitigation in the delivery, cost, and quality and flexibility sustainability. However, the researchers contest that R&D is not the Holy Grail “*as general confidence failures are difficult to assess under certain conditions as conditions that make confidence failures more likely could also make other failures more likely (e.g., poor information systems may lead to quality problems and delivery problems)*”.

By nature, issues in the complex domain are emergent without pattern. It would seem that the resilience model of Research & development and Continuous improvement may focus in the ordered domain. Kull & Tullari [16] suggest that in the paradigm of R&D, one needs to include multi-failure conditions as sub-criteria parameters in relation to the failure. This would seem to resonate with the analogy of the frog in hot water, where the organisation may sense the wrong conclusion to data and adapt in the wrong direction or adapt to an environment that may lead to their demise. It is commended that the organisation further develop this continuous improvement system to go beyond prioritising events with legible cause and effect patterns (multi-failure conditions in sub-criteria) but to derive a pattern sensing methodology that takes advantage of the knowledge of a group as supported by Itabash-Campbell, Perelli & Gluesing [27]. The organisation should as an example encourage sessions between commodity managers to sense changes in global environments and determine methods of stifling negative patterns and encouraging positive patterns.

In support, although managing an organisation by expectation is a necessary evil, as discussed in Weeks & Benade [30], it is not the complete grail nor holistic as it increases our vulnerability to dying when the unexpected happens [36], it is essential to manage the natural system, being the distinct and indistinct world in a servitized organisation holistically in terms of a “business model” , “organisational structure” and “skills” that encompasses resilience predominately as a consequence of the operational paradoxes involved between manufacturing and services where, one services a product whilst the other services a client. A holistic perspective diminutions the silo effect in the servitization value chain.

The research theme is very much at the start of exploration. The cognisance of the research alludes that for resilience sustenance, organisations through the use of diversity in people and expertise need to establish doubt in assumptions, value concerns, establish knowledge sharing, establish context and attract events into the domain of order. To foster resilience beyond recovery requires organisations to diverge from the philosophy of being good and great in the distinct ordered domain into the indistinct domain. Organisations can recover and survive by sensing, categorising, analysing and responding to changes however to be truly resilient requires a sense of flexibility, ingenuity to probe into environments, sense emergent patterns and

respond by creating attractors to certain patterns and stifle negative derivatives. Future research work may focus on developing the green field area of resiliency into a model in practice. The risk mitigating effects of ordered domain cause-effect articulation versus a resilience framework of probing should be explored. The resilience framework is a useful tool to build on for helping organisations secure their purpose in an ever uncertain world where change is the only constant.

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