LEAN PRINCIPLES REDUCES RESISTANCE TO CHANGE IN TRANSFORMING A SHIPYARD OPERATIONS

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ABSTRACT

A Shipyard is trying to change but facing employee Resistance to Change (RTC). Resistance is attributed to the dysfunctional organisational context in the form of technical and political/structural discourse giving rise to non-conformance behaviour. An action research was conducted to identify the hidden underlying behaviour of the employees causing RTC and to implement change. The research found that RTC is due to incoherency of a person's belief to establish standards, giving rise to cognitive dissonance. Lean production was used as an intervention to re-couple tasks to behavioural elements by reducing dissonance. Lean reduces dissonance, creates psychological flow, and momentum for change. As a result, the shipyard managed to recover the delay of a ship and delivered it on-time, with cost avoidance of millions of ringgits in liquidated damage. The Shipyard also managed to deliver subsequent ships on-time, compared to an average delay of 17 months, previously. The significance of this study is the realisation of how Lean principles challenge the underlying basic assumptions by creating self-awareness and improves self-efficacy. The study provides an exploratory model as to the workings of human behavioural elements in Lean production. The knowledge on how the researcher gained utility from resistance and mediate through the application of these techniques would be of considerable benefit to leaders of change management.

Keywords: Lean; Action Research, Resistance to Change, Theory of Cognitive Dissonance

1. INTRODUCTION

A shipyard is trying to improve its poor performance in terms of delivery delays, and cost overruns. Many efforts to change was made but to no avail, and management attributed this to employee Resistance to Change (RTC). An Action Research (AR) with the shipyard as the unit of analysis, was conducted with the purpose to: 1) identify the source of RTC by focusing on the context of the organisation, 2) in-depth analysis of the subjective change by exploring the relationship between contextual change and and its impact on behaviour and attitude using principles from Theory of Cognitive Dissonance and 3) investigate how Lean principles can be used as interventions to identify and resolve conflict for a successful change.

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Change management researchers stress that, reasons for failure of many change initiatives can be found in employees RTC (Hinz, 1998; Bovey and Hede, 2001a; Manuela and Fuentes, 2003; Vakil, 2006; Oreg, 2003; Kotter, 2007; Keller and Aiken, 2008; Pieterse, Caniels and Homan, 2012; Beal, Stavros and Cole, 2013; Burnes, 2015). The source of RTC is described by researchers as socially constructed realities (Ford, Ford and Mcnamara, 2002), culture (Zabid, Sambasivam, Rahman, 2004; Nordin, Md. Deros, Abdul Wahab, 2010; Zairi, 2005; Lawson and Price, 2003), or shadow organisation (Hinz, 1998), which is subjective (Vakil, 2006). Heracleous (2001) suggested that, for an effective change management, an in-depth appreciation of the human aspects of organisations, is required. Based on the subjective experience of change, researchers suggested that, change initiatives should focus on the context of the organisation (Mabin, Forgeson, Green, 2001; Oreg, 2003; Vakil, 2006; Skrudupaite and Jucevicius, 2011), or management systems (Ohno, 1988). Kotter (2007) further suggested that, attempts to shift culture, norms and values before creating the new way of operating, does not work. The source of RTC should be conceptualised as contextual discourse before proposing an initiative to realign the culture (Pieterse *et al*., 2012, Vakil, 2006; Heracleous, 2001; Braganza, 2009). Change management literature highlights vision, mission, culture, communication, strong leadership and participation as prerequisites for successful change, but not how there are achieved (Mabin *et al*., 2001), and has not provided a pragmatic framework and method for measuring the success of change (Todnem, 2005).

This research aims at contributing to the following:
1) to develop an exploratory model to conceptualise change as part of an ongoing organisational discourse based on the Theory of Cognitive Dissonance. This model would be useful for change managers as a communication strategy to identify contextual discourse embedded as institutionalised habits and to understand the conditions required for organisational change. These dissonances were then presented using Lewin's field theory as the 'Restraining Forces'.
2) to gain in-depth knowledge on how Shiprepair and Shipbuilding projects were successfully delivered by amalgamating the task-behaviour elements and demonstrating how Lean principles can be used as a control intervention responsible to create the conditon for contextual and behavioural change or as the 'Driving Forces'.

The paper is divided into four areas: 1) RTC is discussed in three main areas: a. organisational culture, b. organisational context and c. both, 2) using theory of cognitive dissonance to identify the underlying and hidden link between attitude and behaviour, 3) the research method, and 4) the findings discussed as the 'Restraining Forces' and 'Driving Forces'.

2.   LITERATURE REVIEW ON RESISTANCE TO CHANGE

2.1 An overview of employee RTC

Literature on RTC is mainly discussed within three perpectives; 1) constructed reality or organisational culture (Zabid *et al.*, 2004; Nordin *et al.*, 2010; Zairi, 2005; Lawson and Price, 2003; Hinz, 1998; Blanford, 2002; Burnes and James, 1995; Heracleous, 2001; Barnard & Stoll, 2010; Goffee and Jones, 2003; Yahyagil, 2004; Oreg and Gerro, 2006; Graafland, Kaptein and Schouten, 2006), 2) organisational context (Kotter, 2007; Oreg, 2003; Mabin *et al*., 2001), management systems (Ohno, 1988) or techniques (Skrudupaite and Jucevicius, 2011) and 3) both, culture and context (Vakil, 2006; Bhasin and Burcher, 2006; Bovey and Hede, 2001a; Mdletye, Coetzee and

Ukpere, 2014; Burnes and James, 1995). Piderit (2000) forwarded Lewin's definitions of resistance as 'a restraining force moving in the direction of maintaining the status quo', giving rise to the force-field theory (Lewin, 1947).

2.1.1.   RTC in organisational culture

There are many arguments as to the causality of RTC. Ford *et al*. (2002) argued that RTC is not to be found 'in the individual', but in the constructed reality in which the individual operates or organisational culture (Skrudupaite and Jucevicius, 2011). Waddel and Sohal (1998) suggested that, people do not resist change; rather they resist the uncertainties and the potential outcome that is caused by change. Vakil (2006) forwarded that, RTC arises when organisations are divided between antecedent and subsequent organisational behaviour. Mdletye *et al*. (2014) suggested that RTC arises from the disequilibrium between forces that support and forces that oppose change. Hinz (1998) argued that RTC evolve from the gap between legitimate and shadow system of the organisation. Karube, Numugami and Kato (2009) argued that, conflict arising from difference in beliefs and standards creates organisational deadweight. There are different forms of organisational realities as described by researchers. However, researchers agrees that, these realities resides in the culture, values, norms and basic assumptions (Goffee and Jones, 2003; Chapell, Rhodes, Solomon, Tennant and Yates, 2003; Zabid *et al.*, 2004; Karube *et al*., 2009) and its effect on performance can only be inferred. Thus, the need to adopt a new perspective towards change by focusing on individuals' attitude and behaviour (Festinger, 1957; Meyer and Allen, 1991; Piderit, 2000; Burnes and James, 1995; Heracleous, 2001; Burnes, 2015; Zabid *et al*., 2004; Yahyagil, 2004; Jones, 2007).

2.1.2   RTC in organisational context

To understand the subjective experience of change, there is a need to focus on the context of the organisation in terms of its history and prevailing discourse (Ohno, 1998; Dent and Goldberg, 1999; Graves and Crute, 2000; Nelson, 2003; Brydon-Miller, Greenwood and Maguire, 2003; Oreg, 2003; Pieterse *et al*., 2012; Heracleous, 2001; Kotter, 2007; Mabin *et al.*, 2001; Skrudupaite and Jucevicius, 2011; Beal, 2009; Ogbonna and Wilkinson, 2003; McKay and Marshall, 2001). Mabin *et al.* (2001) emphasised the importance of understanding organisational context by quoting Pascale; 'to transform, an organisation need to tackle its very core - its context - the underlying assumptions and invisible premises on which its decisions and actions are based'. Stone (2010) forwarded that, 'Deming estimated 90 percent of the problems that might be blamed on individuals in the workplace were a result of having them working in bad processes or systems'. The predilection of choosing between focusing on organisational culture and context is further argued by Skrudupaite and Jucevicius (2011) by quoting Edgar E. Schein's emphasis to focus on business issues affecting culture:

> 'Never start with the idea of changing culture. Always ***start with the issue of organisation culture***, only when ***those business issues are clear,*** should you ask yourself, where the culture aids or hinders resolving the issues. Always think of the culture as your source of strength'.

Kotter (2007) reiterated that, trying to shift the norms and values before creating the new way of operating does not work. He further suggested that, a culture truly change when a new way of operating has been shown to suceed over some minimum period of time. However, traditional companies which recognised the gap between current and a later culture, which promotes Lean

thinking and continuous improvement may still choose to focus on culture change rather than the context (Graves and Crute, 2000). In other words, change drivers tend to focus on individual's reaction to change rather than how context provoked or shaped that reaction (Mabin *et al.*, 2001; McKay, Kuntz and Naswall, 2013; Mdletye *et al.*, 2014).

2.1.3. RTC in both culture and context

The third perspective of RTC argues that, resistance occurs at two levels simultaneously, context and culture (Vakil, 2006; Braganza, 2009; Bhasin and Burcher, 2006, Bovey and Hede, 2001a). Mdletye *et al.* (2014) surmised that, 1) systemic resistance emanates from the lack of relevant knowledge, information, skills, competencies and managerial capacity; whilst, 2) behavioural resistance originates from perceptions, reactions and assumptions of individuals or groups of people within the organisation. It is critical for change drivers to understand, how human elements influence change (Bovey and Hede, 2001a), how employees feel about change Vakil (2006) and how employees are evaluated as the prime source of RTC (Mdletye *et al.*, 2014). There is a need to discuss link between culture, attitude and behaviour within the dynamic process of organisational context. Burnes and James (1995) suggested that, this is done by evaluating the context of the cultural disruption and cognitive dissonance generated.

2.2. The Theory of Cognitive Dissonance

The relationship between organisational culture and individual attitudes and behaviour is clearly linked, and it is important to understand what this link is and how it affects the change process (Burnes and James, 1995). When individuals demonstrate symptoms of resistance, it is important to distinguish the symptoms and the causes behind it (Bovey and Hede, 2001b), attributed either by cultural or contextual discourse. Canning and Found (2015) provided an example of dissonance, where a survey shows respondents support change, however, in reality there exist a weak relationship between involvement and support. Thereby, an intention to engage in a behaviour may not be sufficient for the behaviour to occur and intentions may turn out to be poor predictors of behaviour (Ajzen, 2002), thus, giving rise to cognitive dissonance. Dissonance also occurs when organisation talks about process change but has difficulties changing norms. Examples of dissonances from the literature are as follows: 1) focus on results-only biased type of model rather than process (Karube *et al.*, 2009). Thereby promoting a maverick type culture where, 'if it works use it', or 'ends justify the means' as standard behaviour (Robbins and Judge, 2011), and 2) existence of a shadow organisation that promotes result-oriented culture (Hinz, 1998), compromising processes, resulting in organisation deterioration (Karube *et al.*, 2009). These systemic contradiction (Luscher and Lewis, 2008) give rise to complacency, resignation and cynicism which are realities to which people are blind (Ford *et al.*, 2002).

For managers who want to manage and support employees who are affected by the change (Mdletye *et al.*, 2014), contention should not be mistaken as an indicator of mismanagement and the theory of cognitive dissonance proves extremely influential to understand the largely invisible patterns of thinking and behaviour (Mabin *et al.*, 2001). Therefore, there is a need to understand the Theory of Cognitive Dissonance, to explore how psychologist attempt to understand and explain human behaviour (Burnes and James, 1995; Heracleous, 2001; Harmon-Jones *et al.*, 2007; Beal, 2009; Smollan, 2009; Robbins and Judge, 2011; Burnes, 2015).

2.2.1   *Understanding Organisational Realities*

Kotter, (2007) argued that the core problems in implementing change is 'changing people's behaviour'. What people do are surface manifestation of the deep level values they hold, and much of it is tacit. It reflects general habits and strategic orientation coming from past organisational realities (Duhigg, 2012). To understand how actions can be improved, we need to tap on our deep tacit knowledge of the organisational realities and raise it to an explicit level of awareness (McNiff and Whitehead, 2000).

Figure 1: Behavioural Perspective Model Using Lean Principles to Reduce RTC
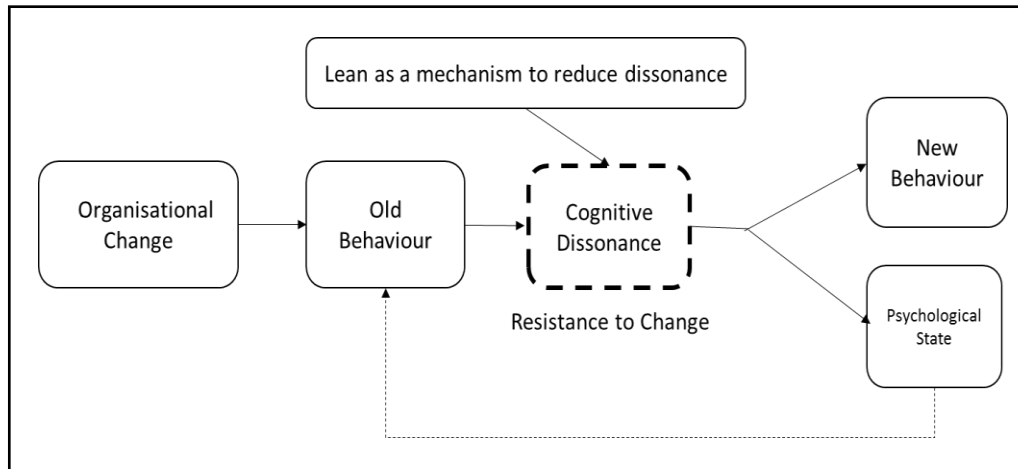
An exploratory model adopting Lean Principles as an intervention to solicit change is provided at Figure 1. The model was adapted from Meyer and Allen (1991) to; 1) understand the tacit nature and governing assumptions of RTC, 2) conceptualise intervention strategies using Lean Principles to reduce the level of dissonance caused by the change, 3) understand the effects of the intervention on behaviour, 4) ensure that the new behaviours, values, and beliefs are not in conflict with the final process (Heracleous, 2001) and, 5) the critical success factor of any change initiatives depends on the ability to change the psychological state for behavioural change. The behavioural perspective model using Lean Principles to reduce RTC provides a deeper level of understanding of the effects of the intervention and identifying conditions under which a behaviour, once exhibited tends to be repeated (Meyer and Allen, 1991; Ajzen, 2002).

2.2.2   *Identifying the source of resistance*

The relationship between external stimulation and internal psychological experience of individuals is known as psychophysics. It is a fundamental psychological approach, whereby the external world is represented in the mind as a process (Hunt, 1975). To identify the source of RTC hidden beneath the norm, organisations need to learn to disagree without being disagreeable and channel contentions as a self-questioning organisation (Mabin *et al.*, 2001), giving rise to the term 'let's celebrate the problem'. For successful behaviour change (Burnes, 1995; Kotter, 2007), management need to implement intervention strategies and techniques that firstly create self-

awareness and secondly develop process to eliminate irrational thoughts (Bovey and Hede, 2001a), or 'fat behaviour'.

Fat behaviour (the opposite of Lean) is behaviour that adds no value or 'waste' (Emiliani, 1998). These self-defeating behaviours impedes flow between people because its primary operating mechanisms include deception, gossip, innuendo, half-truths, lying, revenge, and destructive political behaviours driven by high ego (Emiliani and Stec, 2004). Fat behaviours are recognisable as lots of talk where nothing has actually been said, or indirect words whose meanings are subject to interpretations (Emiliani, 1998). Emiliani (1998) further suggests that, companies generally tolerate disruptive personalities found in the workplace due to their technical, historical or functional knowledge, disregarding the enormous negative impact that such behaviours have on organisations. These dysfunctional and non-conformance practices consume psychological (Emiliani, 1998) and management resources (Karube *et al*., 2009). It is nearly impossible for most people to see the destructiveness of fat behaviours because their mindset constitutes the form and substance of this mental model (Emiliani, 1998). Therefore, businesses that fail to realise and change their behaviour will risk the future existence of their entire enterprise (Karube *et al*., 2009). Jimmieson, Peach and White (2008) suggested that, strategies should focus on changing the more personal factors underlying behavioural decision-making. These are underlying assumptions and invisible premises on which decisions and actions are based (Mabin *et al.*, 2001). There is little empirical attention given to the cognitive processes underlying habitual behaviours (Aarts, Verplanken, and Knippenberg, 1998). A well develop study is required to empirically explore past behaviour, to identify underlying factors and non-conscious habits giving rise to RTC.

3. RESEARCH METHOD

The identification of the underlying factors attributing to RTC was guided by Festinger's Theory of Cognitive Dissonance and presented using Lewin's Field Theory. Action Research was employed to solicit change and create knowledge with regards to change. Lean principles was used as the theoretical proposition to rationalise what constitute as valid knowledge about task-behaviour elements and its effect to the social world, thus contributing towards the epistemology of the research.

3.1. *Action Research*

The research was built around a project team that was formed to address the issues confronting the organisation and work in an action learning mode (Coghlan and Shani, 2013). A single longitudinal study (Styhre, 2002) of the Shipyard was undertaken from November 2013 to September 2016, involving two cycles, three shiprepair and one shipbuilding projects. This enabled a thorough and in-depth understanding of the change processes and events that unfolded over time. The researcher who is also the participant member, was involved in the inquiry process itself (Coghlan and Shani, 2013; Coghlan and Brannick, 2014; Brydon-Miller *et al*., 2003; Dent, 1999; Zuber-Skeritt and Perry, 2002) contributing to organisational change by taking an active role in the operation and studying the process (Avison, Baskersville and Myers, 2001; Styhre 2002). The search for alternative change methods, documenting techniques applied and how managers gained utility from resistance through in depth action research was invaluable (Waddel & Sohal, 1998)**.** The distinct feature of action research is that, it generates insight not only to explain but also to change (Coghlan and Brannick, 2014).

3.2.   *Data Collection and Analysis*

Primary data was collected from observations, interviews and outcome of twenty-seven recursive AR projects. The interpretation and findings were triangulated, challenged, supported or disconfirmed based on findings from survey, interviews, and archaic documentation. A survey using Oreg (2003) RTC Scale, was conducted for the population of the Shipyard (900 employees) to gauge their disposition with regards to RTC. This data was invaluable in identifying target segment and outlook towards change. Secondary data based on documentation review was conducted to position the research in its historical and cultural context. Data collected from archaic analysis of documents such as progress and audit reports, minute of meetings, notes of discussions, schedules, reviews, and AR findings (Coghlan and Brannick, 2014) was analysed using ATLAS.ti 7. In-depth face-to-face interviews with selected key personnel comprising of middle managers and supervisors, using open-ended questions were conducted for in-depth qualitative study (Daymon and Holloway, 2002; Yin, 2009). Middle managers were identified as individuals who can purposefully inform and understand the research problem and central phenomenon in the study. The managers' experiences and responses (Costley, 2010; Cassel and Symon, 2004; Drew, Hardman, and Hart, 1996) on planned cultural changed was critical for the study (Ogbonna and Wilkinson, 2003). Validation was through the learning-action process itself and, through co-interpretation of outcomes with the participants (Cassel and Symon, 2004).

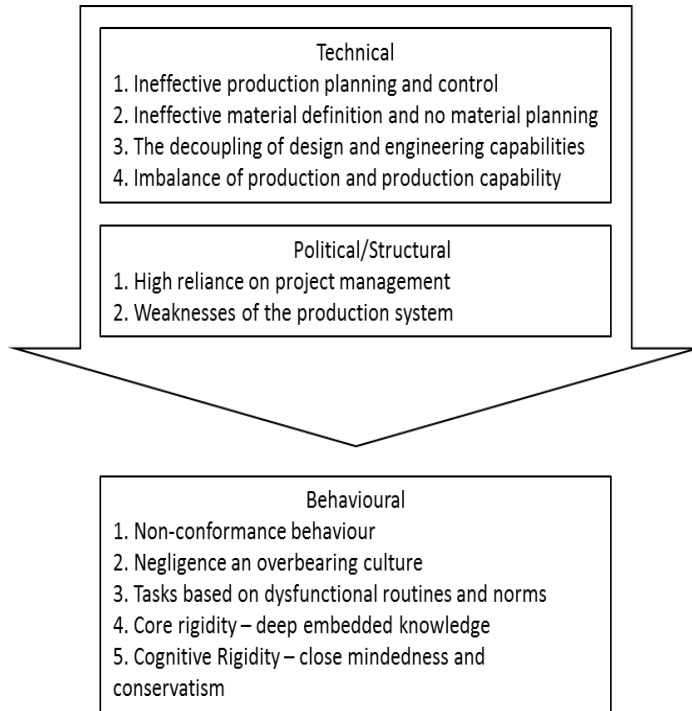## 4.   FINDINGS

4.1.   *Source of RTC – The Restraining Forces*

An analysis of the root cause and symptoms for the eleven restraining factors in Figure 2, shows that, by measurement, the number of problems or issues identified under technical and political resistance precedes behavioural resistance, thereby, influencing it. This supports the theory that, people are generally not the root of the problem (Burnes, 2015; Heath and Heath, 2010; Lewin, 1947b). The source of RTC was found in the constructed reality in which the individual operates (Ford *et al*., 2002) or organisational context (Kotter, 2007; Oreg, 2003; Mabin *et al.,* 2001). Based on the findings, it is suggested that the dysfunctional (Fat) behaviour caused by the contextual discourse, is institutionalised in the Shipyard's values and norms. These bad habits which give rise to thoughtlessness and neglect, was caused by the decoupling of tasks from its technical and structural core. The values and norms were based on fallacies (mistaken belief based on unsound argument) or rationalised myth. Some of the rationalised myth identified through the findings of this research were: 1) urgent or unplanned work, cannot be planned due to its urgency, 2) it is a crisis thus requiring emergency action, 3) acceleration or ramification of plan required by the customer or management, 4) delay does not affect the Shipyard (profit/loss), 5) the importance of result rather than process, 6) the problem is with the people, and their personality, 7) failure of a project, put blame on the project management, a failure attribution error. These rationalised myths are symptoms of an organisation with a high degree of 'state capture', a typical systemic political corruption in which private interests significantly influence an organisation's decision-making process to their own advantage, creating a psychological force which influences the state (Hellman and Schankerman, 2000).

The AR project was successful in implementing change for the Shiprepair business. The best practice could not be implemented in the Shipbuilding environment due to conflicting interpretive

scheme. The psychological and social influence on resistance could not be removed due to the technological boycott of the best practice.

Figure 2: Source of resistance to change

Technical
1. Ineffective production planning and control
2. Ineffective material definition and no material planning
3. The decoupling of design and engineering capabilities
4. Imbalance of production and production capability

Political/Structural
1. High reliance on project management
2. Weaknesses of the production system

Behavioural
1. Non-conformance behaviour
2. Negligence an overbearing culture
3. Tasks based on dysfunctional routines and norms
4. Core rigidity – deep embedded knowledge
5. Cognitive Rigidity – close mindedness and conservatism

4.2.   *Lean Principles Reduces RTC – The Driving Forces*

The researcher and the organisation developed action plan (Cassel and Symon, 2004) based on best practices to address the source of RTC. They evaluate the outcomes of the actions, both intended and the unintended through review meetings. This evaluation led to further cycles of examining issues, planning action, taking action and evaluation through active participation. Lean principles applied in the AR projects was implemented through work-out groups to help establish a state of psychological disconfirmation to generate dissonance. The AR projects investigates and document how, Lean principles was able to amalgamate the task-behaviour elements in the Production Planning and Control function, that was successfully implemented.

Figure 3 illustrates how Lean principles facilitate the tasks and behaviour elements, by reducing the psychological discomfort when one embraces a new cognition and behave in a conflicting manner with his or other people's cognition or behaviour. The psychological discomfort or paradox of organisational change (Luscher and Lewis, 2008) were caused by cognitive legitimacy to rationalise myth. Lean self-efficacy reduces the distressing mental state when people's beliefs are inconsistent with their action causing dissonance. When people believed that, they have control over a positive outcome, it creates a 'psychological flow', reduce the psychological discomfort or

paradox, and, they will be happy to change their behaviour to serve that purpose. The new behavioural belief will in turn change the psychological state, thus creating a new social norm.

Figure 3: Lean facilitate tasks and behavioural elements
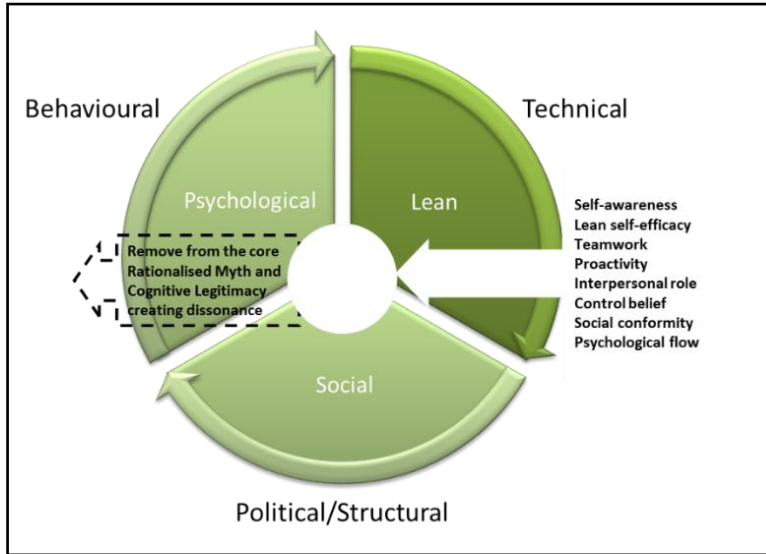
5. CONCLUSION

This research was a collaboration between the employees and researcher to identify the source of RTC. The outcome is both, insights to create change and knowledge. The respect the researcher has for the complexity of the Shipyard and the knowledge gained through the process was an impetus to understand how the person thinks and want, creating praxis of relational participation; a quality unique to AR (Coughlan and Coghlan 2002). The research draws power from the promise of pragmatism, i.e., beliefs we can know only through doing (Brydon-Miller *et al.,* 2003), and from the knowledge of individuals and group behaviours (Emiliani 1998). Employees will most likely be more supportive with change projects that are aligned with individual and organisational beliefs and behaviour. Therefore, meaningful context driven actions such as Lean and AR, is useful to encourage the more reticent employees to embrace change, and happily change their individual behaviour. The struggle for congruency between espoused and enacted values can only be achieved when dissonance is clearly identified and mediated. Otherwise, the organisation will suffer the effects from its non-conscious habits and subconciously slip into organisational deterioration. The significance of this study is the realisation of how individual and group past behaviour can subconciously challenge the existence of the organisation and that better methods live within the study of subject such as Psychology, Lean, Action Research and Resistance to Change. The knowledge on how the researcher gained utility from resistance and mediate through the application of these techniques would be of considerable benefit to leaders of change management.

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