CRANFIELD UNIVERSITY

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Drifting Away of Actions From Prescribed Procedures

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Supervisor: Professor David Denyer
Associate Supervisor: Dr Colin Pilbeam
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ABSTRACT

This research examines a particular kind of routine change where a decoupling of actions from the prescribed procedures is consciously and mindfully introduced to benefit the organisation and to make work easier, locally efficient, and more effective. I draw on Snook's (2002) conceptualisation of practical drift to define my phenomenon. When procedural demands do not fit the practical or situational demands, people adjust or alter the recommended procedures, routines, and workflows to better fit the local needs.

This research uses a case-based inquiry to examine 197 cases of drift happening within large multinational organisations from the Oil and Gas, Manufacturing, and Aerospace sectors to theories of why 'Practical drift' happens and what the impact of this on safety. Using a mixed-method data collection technique of Repertory Grids (RepGrid), 31 middle and senior managers were interviewed. It resulted in 262 RepGrid 'Constructs' related to the events of drift.

The data was firstly analysed qualitatively using a bootstrapping generic content analysis technique that pools construct into meaningful higher-order categories. Two quantitative analyses followed this: a RepGrid-specific statistical analysis, called the Average Normalised Variance (ANV), to identify key constructs and a Boolean minimisation-based Qualitative Comparative Analysis (QCA) to identify factor combinations associated with safety negative outcomes. This research finds that drifted actions happen because actors have an operational objective or 'Purpose' that triggers drift. Secondly, there exist some contextual conditions that facilitate replacing a recommended procedure with an alternate action. Safety findings reveal that some factors like 'Risk awareness' and 'Local decision flexibility' are more likely to deliver safety negative outcomes. In contrast, the factor 'save time' was found to be correlated to safety positive outcomes.

Building on these findings, I propose three theoretical models. First is a factor model that identifies a set of factors causing drift. These factors are ordered by their relative influence, extending our understanding of the purpose and contextual conditions associated with drift. The second and third models link

factors from the first model to different safety outcomes. These models add to the extant literature on practical drift and routine change by identifying (i) factors that link to safety positive, neutral and negative outcomes and (ii) the combination of key factors having more potency to deliver safety negative outcomes. The relevance of these findings for practice is that the research raises the issue of drift being an operational reality and motivates the organisations to address the drift causing factors. Furthermore, this study paves the pathway for future studies to establish causal relationships among the configuration of constructs discovered in this research.

Keywords:

Practical Drift, Safety, Organizational Routines, Repertory Grids

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LIST OF ABBREVIATIONS

SOP	Standard Operating Procedure
PD	Practical Drift
BSLR	Bounded systematic literature review
RepGrid	Repertory grid
QCA	Quantitative Comparative Analysis
PPE	Personal Protective Equipment
ANV	Average Normalized Variability
UV	Unique Frequency
PPE	Personal protective equipment

1 Introduction

The aim of this chapter is to introduce the research topic and provide an overview of this thesis structure. The first section, Section 1.1, presents an outline of the aim of this study, followed by a discussion of the research problem and my motivation to study it. Then, section 1.2 gives an overview of the study. Finally, the introduction chapter concludes with details about the structure of this thesis.

1.1 Aim of the Study

This doctoral research aims to empirically explore the decoupling or moving away of actions from the prescribed work procedures, script, or action templates. In this thesis, I refer to these as drifted actions. This research focuses explicitly on drifted actions that are neither performed with a malicious intention nor are a result of any form of slip, lapse or error. Instead, this research focuses on the grain of drift that closely aligns with Snook's (2002) conceptualisation of 'Practical drift'. It is a form of misalignment or decoupling of actions from the prescribed procedures that is consciously and mindfully introduced to benefit the organisation and make work easier, locally efficient, and more effective. Later in the thesis, I present a detailed discussion of practical drift and my phenomenon of interest. At the onset, I would like to posit that due to its conceptual similarity to the phenomenon of Practical Drift, for the rest of the thesis, I will also address my phenomenon of interest as 'Practical Drift' (PD).

The grain of drift that I investigate constitutes actions that are driven by a logic of practicality and necessity. An additional characteristic of these drifted actions is that they are not an isolated or one-off act of deviation; instead, they reflect a more general, repetitive, and widespread behavioural pathology.

With an intention to study the moving away of actions from formally established organisational action templates and procedural scripts, this study positions these actions in the context of large-scale organisations with a comparatively more challenging production and operational environment. The following section discusses my interest in the topic and establishes the landscape of the research problem.

1.1.1 Personal Motivation

My interest in the topic is driven by experience and observation of organisations I have worked for or associated with. I have experienced that in the practical day-to-day operations of an organisation, the organisational actors try to balance the inherent tension between what the procedure says and what is necessary to get the work done. I have also experienced circumstances where organisational stakeholders feel compelled or coerced to prioritise efficiency, cost, or productivity-related objectives over following procedures or working safely. Although this underlying tension to prioritise production over other competing organisational goals is not formally exerted by the organisation or managers, it surrounds the operations like an invisible force.

Being a part of multiple organisations, either as an employee or in any other capacity, such as a student, I have constantly experienced this tension between working by the rules and meeting organisational expectations. There have been many occasions when my line managers have informally advised me to prioritise getting the work done over following procedures. There have also been occasions where I learned some procedures on the job through observation and discussion with peers. I later realised that these learnt procedures were misaligned from the standard operating procedures. Despite my best intentions and motivation to work by rules, there were occasions where the prevailing conditions made it very difficult to comply with the rules and simultaneously accomplish organisational goals.

When I got a chance to pursue a research degree, I was excited to explore the factors and conditions connected to this pressing issue that I had known and experienced for several years.

1.1.2 The Research Problem

Every organisation has a repository of a repetitive and interdependent set of routinised activities and a recognisable pattern of actions carried out by multiple actors (Feldman and Pentland, 2003). Organisations typically formalise and codify these repeated activities into prescriptive templates and work scripts called

standard operating procedures (SOPs) and organisational routines (Pentland, Haerem and Hillison, 2010). These prescriptive templates and scripts are used as an instrument to ensure safe and efficient working, to achieve better coordination among connected actions and processes, to promote standardisation of human actions and to constrain variability in tasks (Heimeriks, Schijven and Gates, 2012). However, when organisational actors move away, deviate, drift away or get misaligned from these prescribed procedures and scripts, this could lead to negative organisational outcomes, both in terms of efficiency and safety (Ortmann, 2010).

The research on organisational safety and accidents has recognised the potential threat associated with this phenomenon of human actions drifting away, deviating, moving or getting misaligned from the prescribed standards and routines (Torp and Grøgaard, 2009; Vaughan, 2005). Numerous documented cases identify drifts and variations in routines as leading causes of accidents (for further reference, refer to Ortmann (2010)). Traditionally, in the safety and accident literature, it is considered that human actions are to be blamed for drifting, deviating or moving away from the prescribed procedures, standards and routines (Alper and Karsh, 2009; Reason, 1990). However, now an alternative perspective on the phenomenon is emerging. This alternative perspective does not view human actions as a cause; instead, it views human actions as indicators of issues and causes more profound to the system (Dekker, 2002). Dekker (2002) posits that this contemporary view on accidents seeks to answer *" why people did what they did"* (Dekker, 2002; pp 373). I agree with the argument of Dekker (2002) that it's essential to find the reasons leading to such human actions and behaviours. This area needs further research.

The term drift finds its root in the organisational routine literature and conveys an organisation's shift from alignment with its operating environment (Desai, 2010). Drift in routines typically conveys the act of moving away or getting misaligned from prescribed routines. Empirically it has been proven that misalignment or drift between routine as performed and routine as prescribed could result in the reduction of safety margins (Leach and Berman, 2012), creation of organisational

blind spots regarding safety hazards (Holtman, 2011) and an overall increase in the likelihood of accidents. The dangers associated with drift in organisational routines are strengthened by the highly acclaimed work of Snook, (2002). In his investigation about the case of a friendly fire incident that led to the shootdown of two US black hawk helicopters in Iraq, he found that misalignment or drift in local practices from the prescribed procedures had contributed to this accident.

Snook (2002) argues that pragmatic and knowledgeable organisational actors alter local workflows and procedures for aligning them with practical or contextual needs. This practical adaptation or change in routine is undertaken for the betterment of the organisation. According to Snook (2002), this drift from procedures was neither a result of malintent nor an error on the part of the participating stakeholders; rather, it was initiated to streamline workflows and meet complex operational demands. In the investigation of this friendly fire case, Snook (2002) observed that when rules do not match local or current task demands, pragmatic individuals develop locally efficient procedures to replace globally prescribed routines. However, in this process, the system slowly and incrementally starts to drift away from prescribed procedures and becomes susceptible to failure and accidents. This slow and gradual decline of rule compliance and the growing asymmetry between prescribed rules and practices is called ‘Practical Drift’ (Snook, 2002; Stolte, Vogt and Weber, 2010). The drift Snook (2002) studied closely resembles the phenomenon of my interest. Similar to Snook (2002), I also intend to investigate drifted actions driven by a logic of practicality and necessity.

From an organisational safety and routine standpoint, this phenomenon of practical drift is unique and highly relevant. The uniqueness of it is that at the onset, a deviation or misalignment from the prescribed routine is consciously and mindfully introduced to benefit the organisation and make work easier, locally efficient, and more effective (Stolte, Vogt and Weber, 2010). This intentionality of creating a locally relevant adaption of procedures sets it apart from other phenomena related to procedural violation or change. Practical drift is not the same as deviations undertaken for cutting corners or taking shortcuts (Reason,

Parker and Lawton, 1998); or violations originating from an organisational culture of having a lax attitude (Salge and Milling, 2006) towards following routines or breaking the rules. However, once triggered, practical drift becomes susceptible to a mindless following, causing the local practice to slowly and incrementally drift away from prescribed routines (Stolte, Vogt and Weber, 2010). The concerning dimension of practical drift is that people initiating alternate local variations of prescribed routines might fail to conceptualise the potential conflict these localised practices could have with other routines, processes and organisational subunits. In an effort to solve local issues with drifted routines, organisational actors could end up making the system unsafe and susceptible to accidents and failures (Maurino, 2017).

In the safety and accident literature, there is considerable literature on routine drifts associated with cutting corners or taking shortcuts (Reason, Parker and Lawton, 1998) and on routine drifts related to an ongoing organisational culture that promotes a lax attitude towards routine noncompliance. However, the kind of routine drift that I intend to investigate resembles Snook's (2002) conceptualisation of practical drift and is relatively unexplored. Thus, there is a scope to extend the theory of practical drift by investigating factors and contextual conditions associated with the phenomenon. With my research, I aim to investigate the phenomenon of practical drift further and explain why actions drift away from prescribed procedures and what impact this behaviour has on safety-related organisational outcomes.

Motivated by my interest and awareness about a possibility to contribute to the knowledge of the phenomenon, this research proposes the following two research questions:

Research Question 1: Why 'Practical Drift' happens?
Research Question 2: *What is the impact of* 'Practical Drift' *on safety?*

1.2 Overview of the Study

In the previous section, I introduced the aim of the study my motivation to undertake it and presented the research problem that this doctoral research aspires to address.

Table 1: Overview of the key research decisions of this study

Research Question
Research Question 1: *Why 'Practical Drift' happens?* • *Sub question (i): What are the factors that influence the purpose to drift away from prescribed procedures?* • *Sub question (ii): What factors assist in the act of successfully replacing a formal recommended procedure with an alternate action?* Research Question 2: *What is the impact of 'Practical Drift' on safety?* • *Sub question (i): How drift leads to safety negative outcomes?*
Key Definitions
• *Drift:* "We use the term 'drift' to denote the inherent tension of deviations and misalignment of practice in the very process of replication"(Friesl & Larty, 2013;pp:117) • *Practical Drift:* ''the slow, steady uncoupling of practice from written procedure'' (Snook, 2002; pp:194) • *Violation:* "voluntary and intentional departure of behaviour from rules governing how that behaviour should occur within organizations." (Desai, 2010; pp 185)
Philosophical Underpinning
• Research Paradigm : Interpretivism • Ontology : Critical Realism • Epistemology: Constructionist
Research Design
• *Research strategy:* An open-ended, exploratory, mixed-method research enquiry. • *Sampling logic:* Used relevance sampling logic to collect data from large scale manufacturing, oil and gas and aerospace organisations. The choice was motivated by the fact that these organisations are known to follow highly structured and well-defined operational procedures. They invest heavily in training and ensuring people follow the procedures, and safety is among the topmost priorities. Multiple respondents with varying degree of organisational experience and diverse business function were chosen for the study. • *Instrument of data collection:* A mixed-method, structured interview approach known as Repertory grid (RepGrid) (Jankowicz, 2005; Kelly, 1955) • *Total number of conducted interviews:* 31 interviews were conducted. • *Unit of analysis:* Actual cases of procedures or routines that are not performed as prescribed. • *Qualitative data analysis technique:* Bootstrapping Technique of generic content analysis (Jankowicz, 2005) • *Quantitative data analysis technique:* Statistical analysis for consolidating quantitative data from Multiple Rep Grids using a measure; '*Average Normalized Variance'* (ANV). (Goffin, 2002; Goffin, Lemke and Szwejczewski, 2006; Lemke, Goffin and Szwejczewski, 2003; Raja et al., 2013). Boolean Algebra based Quantitative Comparative Analysis (QCA) for identifying mechanisms related to safety negative outcomes (Ragin, 1987; Ragin, Strand and Rubinson, 2008).

In this section, I provide a short overview of key decisions taken for this study (see). This quick overview of the key decisions will give the reader valuable insights into this study and will help establish the link between the aims presented in Section 1.1 and the structure of this thesis document that is presented in Section 1.3.

I also present a short summary of my research contribution.

1.2.1 Summary of Research Contribution

***First contribution*:** This research empirically validates the widespread presence of a the phenomenon of 'Practical drift', which is a particular type of routine change.

Second contribution*:** Practical Drift is a particular kind of routine variation/drift. This purpose-driven decoupling of the performative aspect of routine from the prescribed procedures should be seen as a specific form of misalignment or decoupling between the actions and prescribed procedures that are consciously and mindfully introduced to benefit the organisation and to make work easier, locally efficient, and more effective (Snook, 2002; Stolte, Vogt and Weber, 2010). Routine literature has not yet focused on such a phenomenon about variations or changes in routines. My empirical proof about the existence of such type of routine change ***extends and revises our understanding of the phenomenon of routine change.

Third contribution: This research empirically identifies an ordered list of 'Purposes' that trigger routine change.

Fourth contribution: This research empirically identifies a set of factors under the category of 'Purpose' that trigger 'Practical drift'.

Fifth contribution: This research empirically identifies a set of salient or key conditions or contextual factors that support the act of disregarding prescribed procedures.

Sixth contribution: This research provides empirical evidence to support the view that drift/change in organisation routines could lead to negative potentiality.

This negative outcome need not be restricted to processes or activities related to safety or safe working. These negative outcomes also occur for mundane and non-critical organisational routines.

Seventh contribution: This research empirically proves that some key factors have more propensity to deliver safety negative outcomes than others. Further extending upon the findings of factors linked to safety outcomes, this research identifies a set of factor combinations that can be linked to safety negative outcomes if present or absent.

Eighth contribution: This study also makes a contingent contribution to the domain of rule, routine and drift research. For the study of routine change or drift, the preferred methodology is ethnography. With this study, I extend the set of methods available to the field of study of routine, rule and drift by demonstrating the value of using RepGrids and the theory of personal construct (Kelly, 1955) to study routine change or drift.

1.3 Thesis Outline

This thesis is structured in three parts.

Part I – Setting up the Study: Literature Review

Chapter 2 of this thesis reviews the relevant literature on the phenomenon of drift, rule compliance, violation, and routine change. The review explores these phenomena from the safety and accident literature, rule-following literature and from the literature of organisational routines. In this chapter, I review the key terms connected to my phenomenon of interest and their interpretation in context to my research enquiry. The chapter explores conceptual similarities and differences between drift, violations, workplace deviance, errors, slips and mistakes. These phenomena are then compared against Snook's (2002) conceptualisation of the phenomenon of practical drift. The chapter provides a detailed overview of Snook's (2002) theory of practical drift and discusses Snook's (2002) model on practical drift. The chapter then conducts a systematic literature review on routine change, safety and practical drift. This systematic

literature review is focused on the research published after 2010 and thus, it is named a bounded systematic literature review (BSLR)

The chapter concludes with a critique of the literature where theoretical explanations from rule, routine and safety literature are compared to the theory of practical drift and gaps in the theoretical explanation are highlighted.

Part II – Conducting the Study: Research Design and Results

Chapter 3 presents a detailed discussion about the research strategy adopted by this study. The chapter begins with a discussion of the ontological and epistemological considerations for this study. A discussion of the sampling strategy, sample, and the data collection instrument follows this. The instrument of data collection for this study is based upon a systematic interview technique known as Repertory grids that can simultaneously generate quantitative and qualitative data about the phenomenon under consideration. The chapter ends with a discussion of the analytical framework for the collected data. A detailed discussion of both the quantitative and qualitative data analysis methods is provided.

Chapter 4 of the thesis presents findings from the 197 cases of procedural drift investigated from 31 firms. The findings are broadly divided into two sections, qualitative findings and quantitative findings. The section of qualitative findings uses a bootstrapping generic content analysis approach (Jankowicz, 2005) to reduce the qualitative data into 20 thematic categories that explain why actors drift away from prescribed procedures. This is followed by a multigrid statistical analysis based upon the Average Normalized Variability (ANV) method to further reduce these 20 themes into *Six* key factors that are empirically ranked as per their order of influence on the drifting away of actions from prescribed procedures. This multigrid statistical analysis is repeated for safety negative, safety-neutral and safety-positive outcomes to identify eight key factors related to safety. These eight factors related to safety outcomes are subjected to Boolean algebra based approach, QCA (Quantitative Comparative Analysis), to arrive at a combination of factors contributing to safety negative outcomes.

The chapter ends by consolidating the results of quantitative and qualitative analysis.

Part III – What the Study Tells: Discussion, Conclusion and Limitations

The third part of the thesis aspires to answer what we have learned from the findings and what the findings convey regarding the existing body of knowledge. This part includes Chapter 5 of Discussion and Chapter 6 of Conclusion and Limitations.

Chapter 5 begins with a reintroduction of the factors model derived in the chapter of findings. The model is then discussed with regard to its positioning within the wider literature on rule, safety and organisational routines. The chapter's objective is to demonstrate the value of the research findings and establish the foundation for arguing the key contributions made by this study.

Chapter 6 presents a discussion of this doctoral research's theoretical and practical contributions and the limitations and future research opportunities. The conclusion chapter starts with a brief overview of the research summary where I restate the phenomenon under investigation, research question, research methodology and a summary of the findings. This is followed by the contributions made to the body of knowledge both from the academic and practitioners' perspectives. The chapter ends by stating the limitations associated with the research and the future research possibilities and directions.

1.4 Chapter Summary

This chapter of introduction presented the background and aim of the research. It discussed my motivation to undertake this study and presented the research problem and the research question. The chapter concluded by providing the outline and structure of this thesis and a summary of the content discussed in each chapter of the thesis.

Part I

Setting Up the Study: Literature Review

2 Literature Review

2.1 Introduction

This chapter aims to gain a holistic view of my phenomenon of drifting away actions from prescribed procedures and present an in-depth discussion of key constructs, definitions, debates, and relevant arguments. The findings from this chapter will help synthesise my research question that will guide my research enquiry.

The rest of the chapter is organised as follows. I begin the chapter by discussing my phenomenon of interest and the focus of my enquiry. A discussion of drift and decoupling follows this. The discussion of drift is used to set the scope of my research enquiry, which draws from three literature domains: (i) Safety and accident literature, (ii) Rule following literature, and (iii) Organisational routine literature.

Since drift relates to routine change, I present a bounded systematic literature review on routine change and use it to articulate my research questions and progress my research enquiry. The chapter ends with a discussion of the findings from the literature review and related implications for my research enquiry.

2.2 Phenomenon of Interest and the Literature Lens

This research explores the *'drift in actions from their established/prescribed work procedures, scripts, or action templates'*.

I draw upon the terms and constructs relevant to my phenomenon to understand the literature domains most likely to contribute to my research.

Two key constructs inform my phenomenon, 'Drift' and 'Actions'. The term 'action' represents the task performed by organisational actors governed by SOPs, scripts or action templates. While the construct 'Drift' conveys an eventuality where organisational actions or tasks go through a process of change from their original state. The change or drift leads to multiple variations and versions in how people dispense or perform organisational tasks. This growth of diversity in

performance and the gradual moving away of actions from the prescribed procedure is termed drift.

Guided by my research phenomenon, I argue that the *'Organisation Routines'* perspective is the best lens to study my phenomenon. This is because organisational actions governed by *work procedures, scripts, or action templates* fall under the taxonomy of organisational routines (Cohen and Bacdayan, 1994; Feldman, 2003; Feldman and Pentland, 2003; Nelson and Winter, 1982). Organisational routines represent work behaviours/ actions that are frequent or repetitive by design, and this is the kind of actions that I intend to study.
Another reason supporting my organisation's routine literature choice relates to the term 'Drift'. The literature on organisational routines uses the term 'drift' to convey an organisation's shift from alignment with the environment (Desai, 2010). In organisational routine literature, 'Drift' is conceptualised as a phenomenon where actions move away, get misaligned or become decoupled from the suggested procedural script, action template or work/procedural recommendations (Desai, 2010; Howard-Grenville, 2005).

Organisation routine literature has multiple empirical studies and papers that theorise the development of diversity and variation in the performance of organisational actions and 'Drift'. The literature uses a generative routine view (Becker, 2005; Howard-Grenville, 2005; Pentland and Rueter, 1994), and a process of variation, selection and retention (Miller, Pentland and Choi, 2012; Miner, 1991; Pentland, Hærem and Hillison, 2011) to argue the gradual misalignment of actions from recommended procedures.

Thus, organisation routines are a good lens for studying *drift in actions from their established/prescribed work procedures, scripts, or action templates.*

Leaning on my choice of theorising 'drift in actions' using an organisation routine perspective, I will now take this opportunity to define my use of the term 'Action'. For the rest of my thesis, the term 'Action' will be derived from the following definition of organisation routine.

"repetitive, recognisable patterns of interdependent actions, carried out by multiple actors" (Feldman and Pentland, 2003;pp:95).

Although, in general, I subscribe to the conceptualisation of 'Drift' from the routine literature, my study focuses on theorising about a particular kind of drift. The grain of drift that I am interested in studying is a specific form of misalignment or decoupling that is consciously and mindfully introduced to benefit the organisation and to make work easier, locally efficient and more effective (Snook, 2002; Stolte, Vogt and Weber, 2010). My conceptualisation of drifted actions is similar to the 'Practical Drift' phenomenon proposed by Snook (2002) in the safety and accident literature. According to Snook (2002), this form of drift from procedures is neither a result of malintent nor an error on the part of the participating stakeholders; instead, it is initiated to streamline workflows and meet complex operational demands. Snook (2002) argues that when rules do not match local or current task demands, pragmatic individuals develop locally efficient procedures to replace globally prescribed routines. However, in this process, the system slowly and incrementally drifts away from prescribed procedures and becomes susceptible to failure and accidents. 'Practical Drift' is a type of drifted action often discounted in the name of practical work demand and thus left uncorrected.

It is important to note that misalignment or decoupling actions from suggested procedural scripts, templates or recommendations is not a novel phenomenon. The phenomenon has gathered contributions from many organisational literature subdomains. These may include but are not restricted to taxonomical categories such as individual and one-off improvisations (Miner, Moorman and Bassoff, 2001; Vera and Crossan, 2005; Weick, 1998), rule-breaking (Borry et al., 2018; Bozeman, 2012) intentional deviations against norms of transparency, such as whistleblowing activities (Appelbaum, Iaconi and Matousek, 2007)(Appelbaum, Iaconi and Matousek, 2007), violating a rule for personal gain or for harming the organisation or its stakeholders, such as counterproductive workplace/ organisational behaviour (Bennett and Robinson, 2000; Robinson and Bennett, 1995)

However, my focus of study relates to none of the above taxonomical categorisations. A detailed discussion of these different taxonomical categories of drift and how these differ from my conceptualisation of drift is provided in the next section.

Thus, to summarise, the focus of my research is on the following;

(i) Actions routinised by *work procedures, scripts, or action templates.*

(ii) *Drifts that signify* actions that move away get misaligned or decoupled from procedural script/recommendation.

(iii) My conceptualisation of decoupling from work scripts or templates *does not relate to* the following taxonomical categorisation concerning the decoupling of actions from rules, such as violations, deviations, cutting corners, non-compliance, nonconfirmatory, errors, slips and mistakes.

(iv) Rather, I intend to investigate the kind of routine drift that resembles Snook's (2002) conceptualisation of 'Practical Drift'. These actions are initiated to streamline workflows and meet local practical work demands.

(v) The grain of drift in actions that I intend to study will be conceptualised using the lens of organisation routines literature.

2.2.1 Key Terms and Definitions

At the onset of empirical research, it is imperative to define key constructs and terms relevant to the phenomenon under investigation (Suddaby, 2010). This is because often, in science and humanities, similar ideas and constructs simultaneously evolve, independent of each other, in different domains of literature. The same can be said about terms connected to actions getting decoupled or misaligned from written procedures. Words like Non-compliance, rule-bending, violation, drift, deviance, error, slip and mistakes all represent some actions being performed contrary to the recommended procedure. Although these terms share a common ancestral root, backtracking to philosophical

discourse on processes of the human mind and action by prominent philosophers, such as Plato's notion of search paradox about lack of knowledge of where to look, or Freudian discussion of language and mistakes/slips. Yet, in the later literature, these terms have evolved, often discretely and independently of each other, within different sub-domains of organisational science literature.

Dating back to Freudian errors and slips (Freud, 1914), there have been numerous attempts to conceptualise, categorise and differentiate these terms from one another, refer to (Norman, 1981; Reason, 1990; Taxis and Barber, 2003). In this subsection, I present the definitions of non-compliance, rule-bending, violation, drift, deviance, error, slips and mistakes, and by comparing them, I narrow down to my selected conceptualisation of drift.

These terms come from different literature domains of the organisational science literature. The terms non-compliance and rule-bending find their lineage in the research on rule-following from the domain of public administration (Cialdini and Goldstein, 2004; Etienne, 2011; May, 2004; Meier and Morgan, 1982). This domain of rule literature favours the use of terms like non-compliance, rule-bending, deviance and rule-breaking to explain phenomena related to rules being broken or not followed (Borry, 2017; Borry et al., 2018; DeHart-Davis, 2007, 2009). At the same time, the term violations could be identified with the literature on organisational routines (Desai, 2010) that has evolved from research on social customs and habits of individuals and groups (March and Simon, 1958; Stene, 1940). While the terms drift, deviance, error, slip, and mistakes could be identified with the literature on safety, accident and human error (Reason, 1990).

Before I draw connections between these literature streams, defining the meaning of terms like Drift, Violation, Deviance, Error, Slips, and Mistakes would be worthwhile. A discussion of non-compliance and rule-bending will be presented later, with a discussion on organisational rules.

2.2.1.1 Drift

Articulating a definition of drift, Friesl and Larty (2013) define drift as;

"We use the term 'drift' to denote the inherent tension of deviations and misalignment of practice in the very process of replication".

(Friesl & Larty, 2013;pp:117)

Drift can be linked to routine change (Desai, 2010). Term drift is used in the routine literature to convey the eventuality when variance in the enactment of procedural script brings about misalignment or shift between the organisation and its environment (Desai, 2010). Here, procedural scripts are actions defined under the broad taxonomy of organisational routines governed by formal rules and accepted organisational norms.

The literature on organisational routines views routine change as a dynamic process and routines as dynamic entities bound to demonstrate variability, adaptation, deviation and change (Nelson and Winter, 1982). Change in routine could be either strategically introduced by the organisation (exogenous change) or could be induced by routine participants (endogenous change) (Feldman and Pentland, 2003; Pentland et al., 2012). Drift falls under the category of endogenous change. Organisations often resist endogenous change (Nelson and Winter, 1982) as participant-induced change might not benefit the organisation (Desai, 2010). This corroborates with the safety literature, which also views drift as a negative eventuality (Snook, 2002; Vaughan, 1996). This change is often accompanied by a variation of the routine from its original design and changes in the range of outcomes it can generate. In routine literature, this is termed drift, where the original routine shifts or moves towards another form and gets misaligned with the original design or environment, forming alternative routines.
Drift or change in routine can also be argued using the three layers/ aspects of organisational routines; 'Material', 'Ostensive' and 'Performative' (Pentland and Feldman, 2005; Volkoff, Strong and Elmes, 2007).The material aspect of routine represents the physical and technical artefacts which convey the procedural steps and enactment recommendations (Berente et al., 2016). These relate to the original routine design and may include; SOP manuals, display boards, electronic or manual forms and templates, clocks, documentation, measuring gauges and devices (Nelson and Winter, 1982). 'Ostensive aspect' of routine is

the abstract, generalised understanding or idea that the stakeholders have about what the routine and its constituting elements are (Desai, 2010; Howard-Grenville, 2005). At the same time, the 'Performative' dimension of a routine represents how the routine is enacted or performed (Feldman and Pentland, 2003).

What differentiates drift from violation is that drift is the outcome of the shift, conveying the existence of misalignment, while violations are those acts that bring about a drift. In the next section, I expand upon this distinction and present a comprehensive conceptualisation of 'Violation'.

2.2.1.2 Violation: An Intentional Departure

Based on an extensive review of the literature, Desai (2010) defines violations as;

"voluntary and intentional departure of behaviour from rules governing how that behaviour should occur within organizations." (Desai, 2010; pp 185)

The definition is consistent with the organisational deviance definition, which rules out acts that are either unintentional or coerced behaviours (Lawton, 1998; Robinson and Bennett, 1995).

Lawton (1998) defines a violation as *" deliberate departures from rules that describe the safe or approved method of performing a particular task or job"* (Lawton, 1998: pp 78). Often described as a socially constructed behaviour (Battmann and Klumb, 1993), violations vary according to intention and outcome (Reason,1990). Based upon the empirical work of Lawton (1998); Reason (1990), violations could be categorised into four categories;

(i) Exceptional violation: These are rare or low-frequency violations originating from unusual circumstances requiring a risky, unusual, or novel response (Hale and Borys, 2013).

(ii) Situational violations: Motivated by a need to meet localised or immediate work requirements to accomplish a job despite unfavourable or adverse circumstances. Often a result of situations where the possibility to follow the *"work to rule"* (Lawton, 1998: pp 88)

policy is impractical, and it becomes challenging to dispense a task in hand without breaking the boundaries of safe working.

(iii) Optimising Violations: The initial conceptualisation of optimising violations by Reason (1995) was that actors undertake these violations to pursue personal goals or pleasures (Reason, Parker and Lawton, 1998). It was proposed that the actors undertake these violations to make the job or task more exciting or interesting (Hudson et al., 1998). However, later, it was proposed that these actions are driven by trade-offs of violating a rule with a broader set of objectives like production pressure, efforts, testing safety boundaries of the system, and improving production (Hale and Borys, 2013; Hudson et al., 1998). These trade-offs are sometimes used to explore a system's operational boundaries or find new solutions.

(iv) Routine violations: When a risky behaviour or a shortcut to accomplish a task is undertaken regularly. Prompted by the belief that rules are inapplicable or obsolete and the skills of the doer are much superior, this kind of automated behaviour/violations are ignored or often go unpunished. This behaviour often becomes an accepted norm among peer groups and is taken by supervisors (Hale and Borys, 2013). These behaviours originate from a perception of rules being over restrictive or outdated and are accompanied by a lack of monitoring by the management or the organisation (Hale and Borys, 2013).

The taxonomy indicates when and why such types of violations will be encountered. Exceptional violations are a response to novel problems where the gravity of the situation compels the performer to adopt a knowledge-driven solution, which might not be a part of standard operating procedure. A lack of resource availability, such as the staffing level and availability of parts or equipment, causes situational violations. Optimising violations are said to occur in tasks that could have associated boredom, such as monitoring work or over-restrictive rules (Hudson et al., 1998).

Since my research focuses on routinised actions, it's worthwhile to discuss Routine violations at a more granular level.

2.2.1.2.1 Routine Violations

Within the accident and safety literature, violations of routines are a significant theme; see (Baysari, McIntosh and Wilson (2008); Chmiel, Laurent and Hansez (2017); Hobbs and Williamson (2002); Lawton (1998); Mathisen and Bergh (2016); Shi and Morozova (2012)). It has been credibly established that routine violation increases the likelihood of human errors, hazards and accidents (Barton and Sutcliffe, 2009), and there is sufficient merit in studying the factors that influence acts of routine violations and procedural non-compliance (Baysari, McIntosh and Wilson, 2008; Christian et al., 2009; Hofmann and Adam, 1996; Jiang et al., 2010; Weick, 1993).

Routines are actions that are designed, implemented and acted upon. However, one or more of these steps, design, implementation or action, could be at fault and potentially contribute to violations. The causal mechanisms relating to routine violations could be traced to the following three aspects; (i) attitudes and motivation of the organisational actors, (ii) situational factors resisting adherence to rules and (iii) the quality of the rule along with its monitoring and training to improve knowledge/ awareness among stakeholders (Lawton, 1998).

The attitudes and motivation for compliance are moderated by both the prevailing organisational culture and personality-related traits of individuals. Commenting on the individualistic dimension of violation, Chmiel, Laurent and Hansez (2017) argue that employees' perception of their discretionary safety citizenship behaviours in relation to their job role is a determinant of violations. Mathisen and Bergh (2016) also found in the offshore oil exploration sector that inspired, motivated, energetic and enthusiastic employees were less prone to violation, strengthening the view that violations have a personal dimension. The authors view emotional exhaustion as being contingent upon violations. Some personality traits like being introverted (rigid, pessimistic and reserved) or being extroverted (aggressive, impulsive and optimistic) were also found to be linked to behaviours instigating violation (Lawton, 1998).

Lawton (1998) also accepted that organisational culture plays a role in determining the attitude and perception of employees towards violation. The authors argue that perception about necessity, quality, suitability and parity of enforcement can significantly affect the overall mood and motivation towards compliance. Chmiel, Laurent and Hansez (2017) reiterate that perceived management commitment significantly influences compliance. The organisation's culture is also determined by prevailing group norms and team dynamics, which in turn has a defining role in instigating violations (Lawton, 1998). Baysari, McIntosh and Wilson (2008) found that an organisational culture tolerant of violations incites more violation. The authors argue that if acts of routine violations are tolerated or ignored by supervisors, the act lends acceptability and legitimacy to noncompliance in the existing organisational climate and processes. Presenting a similar argument, Lawton (1998) posits that an organisational culture that supports compliance and penalising violations could substantially reduce cases of routine violations. Authors further argued that an excess of rules and narrow scope of compliance could also promote instances of violations.

Extending the violation phenomenon to the context of organisation routines, Desai (2010) argues that when the ‘performative aspect’ of routine is purposefully and knowingly altered from the established ‘ostensive aspect’ of a routine, this act should be viewed as a routine violation. Ostensive is that repository of knowledge that organisational members use to make sense of an organisational routine (Feldman and Pentland, 2003). At the same time, the performative aspect of routines is how the routine is dispensed or performed (Feldman and Pentland, 2003).

It is essential to understand that the actors deliberately and intentionally disregard the established ostensive aspect of the routine. A deliberate act of abandoning the designed routine often indicates that the designed ostensive was no longer beneficial to the person or organisation (Desai, 2010). Reason (1995) suggests a list of violation-producing conditions, Table 2.

Table 2: Conditions Prompting Violation

Conditions prompting violation
Manifest lack of organisational safety culture
Conflict between management and staff
Poor morale
Poor supervision and checking
Group norms condoning violations
Misperception of hazards
Perceived lack of management care and concern
Little elan or pride in work
Culture that encourages taking risks
Beliefs that bad outcomes will not happen
Low self esteem
Learned helplessness
Perceived licence to bend rules
Ambiguous or apparently meaningless rules
Rules inapplicable due to local conditions
Inadequate tools and equipment
Inadequate training
Time pressure
Professional attitudes hostile to procedures

Adopted from (Reason, 1995; pp 86)

In his discussion of violation, Reason (1995) also restricts the definition of violation to deliberate acts of deviation from procedures, rules, standards or established practices. The author differentiates deliberate violations from acts of breaking the rule /routine where individuals might be unaware or ignorant about breaking the rule; the former act is defined as a violation while the latter is categorised under error.

2.2.1.2.2 Unintentional Routine Violations

Violation has been strictly defined as an intentional act of deviance from the prescribed or rule-determined behaviour (Desai, 2010; pp 185; Reason et al., 1998).However, some safety and accident literature authors have chosen the term ‘Violation’ to discuss accidental or erroneous acts of deviation from the prescribed behaviour.

These intentional violations could be caused by constraints in the physical work environment, such as team constitution or job ergonomics. Reinach and Viale (2006) found in railway-related accidents that events of violation, which the author chooses to call routine contraventions or rule-bending, were also supported by the physical environment, such as inappropriate lighting and poor crew pairing. It

is important to note that unintentional violations could be a more significant concern and more dangerous than intentional violations or non-compliance (Lawton, 1998). This argument is because when a violation is unintended, it is more about the automatic and mindless following of rules and involves skill-based processing (Shappell and Wiegmann, 1997). It can include misunderstanding of the rules, weak or poor monitoring system or even weak design of the system as a whole (Lawton, 1998). Thus, rules are inadvertently violated; rules need to be known or understood or could be forgotten with time as not reinforced through practice, with potential security implications (Kraemer and Carayon, 2007).

Since very few authors have discussed the term 'Violation' under an unintentional act, I will disregard the unintentional aspect of the construct and take forward only the intentional acts as 'violations'.

Thus, the term violation should be considered as an intentional act of departure from prescribed rules or recommended workplace behaviours. Among different forms of violations, the frequently violated actions, called the 'Routinised violations', are driven by the attitude and motivations of the organisational actors. The ongoing organisational culture, quality or the rule, and monitoring shape these attitudes and motivations.

2.2.1.3 Workplace Deviance

Workplace deviance is a technical terminology of the counterproductive workplace/ organisational behaviour literature. Rotundo and Sackett (2002) define counterproductive work behaviours as intentional attitudes to damage the organisation. This should not be confused with the word 'deviance' in the routine literature, where they use it in line with its dictionary meaning or in its literal sense, such as*; "Quality of not being usual"* (Cambridge Dictionary, n.d.). Workplace deviance is also different to the safety and accident literature use of deviance in its phenomenon 'Normalisation of Deviance' (Vaughan, 1999). A discussion of the normalisation of deviance is provided later in the chapter.

Workplace deviance can be taxonomically classified under a class of organisational behaviours related to counterproductive workplace/ organisational behaviour. Workplace deviance widely refers to intentional or voluntary acts of

aggression (Neuman and Baron, 1998; O'Leary-Kelly, Griffin and Glew, 1996), retaliation/revenge (Skarlicki and Folger, 1997) that may threaten the wellbeing of the organisation or its members (Bennett and Robinson, 2000; Robinson and Bennett, 1995).

My phenomenon of interest is not about intentional acts targeted to harm the organisation or organisational stakeholders, as conveyed by the term workplace deviance (Spector, Bauer and Fox, 2010). Thus, the conceptual arguments of workplace deviance are outside my research. Although deviance literature does not align with my investigated phenomenon, yet I am open to the possibility that deviance literature could have some shared or common causal factors to my conceptualisation of drift. These shared factors could particularly relate to the motivations and contextual conditions that lead to deviant behaviours.

2.2.1.4 Errors, Slips and Mistakes

In a work setting, error is an outcome that needs to be evaluated beyond the mere occurrence of it. In the safety context, the term error relates to the cognitive failure of human actions and can be taxonomically categorised as slips, lapses and mistakes committed by participating humans (Norman, 1981) . Cognitive failure or human error can happen in two ways, the first being events where humans fail to carry out an intended action; this results in slips and lapses. Second is an event where a person can dispense an action as intended, but due to erroneous thinking, the chosen action is incorrect; this is termed a mistake (Norman, 1981). The dimension of intention differentiates a mistake from unintended errors, slips and lapses. However, it is important to note that despite being an intentional act, mistakes differ from violations regarding the cognitive process that supports the action. Mistakes are a failure of cognition, while violations are not. Violations are deliberate deviations from safe operating procedures and do not entail a burden of cognitive failure.

2.2.1.5 Summary of the Key Term Discussion

From the above discussion, it is evident that the actions that bring about a drift can be expressed in various conceptualisations. However, the definition of drift that I intend to take forward aligns with the conceptualisation of drift in the routine literature.

Table 3: Positioning my phenomena of interest among other key terms

Focus of my Research	What is my Phenomenon			What is NOT my Phenomenon		
	Routinised action	Initiated to meet practical work demand	Actions performed as intended	One-off Violation	'Workplace deviance'	Slips, lapses, errors & mistakes
Drift in actions from their established/prescribed work procedures, scripts, or action templates	✓	✓	✓	×	×	×
Explanation	Actions that I study are repetitive, recognisable actions that are not one offs tasks or actions.	Drift from procedures is initiated making the work easier, locally efficient and more effective	Actions that I study are actions that actors are able to perform as intended.	One-off violations are actions that are not routinised. However, actions that I study are routinised.	Because 'Workplace deviance' are counterproductive workplace behaviour, often done with malicious intent, while actions that I study are not intended at harming the organization.	Because 'Slips, lapses, errors & mistakes' are associated with cognitive failure. While actions that I study are not related to cognitive failure.

For my research, I proceed with the definition of Friesl and Larty (2013) to define drift. The authors quote;

"We use the term 'drift' to denote the inherent tension of deviations and misalignment of practice in the very process of replication" (Friesl and Larty, 2013;pp:117)

The Table 3 positions my conceptualisation of drift.

As I mentioned earlier, the grain of drift I am interested in studying is closely aligned with Snook's (2002) conceptualisation of 'Practical drift'. It is a form of misalignment or decoupling that is consciously and mindfully introduced to benefit the organisation and make work easier, locally efficient, and more effective. Although this form of drifted action has not been extensively studied in the extant literature, I still believe that a review of drift from other literature domains can inform my research enquiry.

In the following subsection, I present a comprehensive discussion of drift from other domains of organisational studies.

2.2.1 Positioning Drifting Away of Actions in the Extant Literature

In more recent times, the credit of coining and theorising the term 'drift' could be given to routine literature. The literature on organisational routines uses the term 'drift' to convey an organization's shift from alignment with the environment (Desai, 2010). Despite being a key concept of the routine literature, the roots of the phenomenon of drift can be traced back to work on social theory by eminent social theorists like Blau P.(1955); Gouldner (1954); Merton (1940); Selznick (1949); Weber (1947).

Commenting upon the organizational aspect of drifted action, Weber (1947) saw drift from recommendations as an unwanted behaviour and recommended that these behaviours should be constrained. Whereas, Merton (1940) argues that excessive rigidity in constraining drift could also be bad. Gouldner, (1954); Selznick (1949) extend the theory on drifted behaviours by theorising that drifted behaviours are selectively demonstrated as some rules may be broken by some organisational stakeholders while other rules may not be broken. (Blau P., 1955)

could be accredited for pointing out that alternative routines/procedures could exist for special or novel circumstances.

Weber (1947) suggests creating a rational organisation by constraining drifted behaviours through formal structures and normative rules. In Weber's view, these rules are to be carefully installed in the system design, diffused by instructions, reinforced through training, and complied through mechanism of reward and punishment (Rasmussen, 1997). A counter argument to Weber's idea of rational organisation is provided by Merton (1940). Merton saw rules as bureaucratic rigidity and considered it not a desired condition. In Merton's view, formal structures and normative rules lead to excessive rigidity, and such a rigid adherence to rule could be detrimental for the organisation. Thompson (1977) proposition of "bureaupathology" also closely resonates with Merton's viewpoint. The proponents of Merton's thought argue that rigidity towards rule-following is not always considered as the most favoured behaviour (Bozeman and Scott, 1996). Merton (1940) conceptualisation of "bureaucratic personality," and Thompson (1977) proposition of "bureaupathology" support the view that rigid enforcement of burdensome, duplicative and excessive procedures could result in goal displacement and produce consequences that are counter to the desired organisational objectives. Later studies in accident and safety literature also acknowledged that rigidity in enforcing and following rules, in some systems, could turn into "extreme rule- mindedness" (Vaughan, 1999; pp 281), a situation that prevents people from taking actions beneficial to the organisation.

Selznick (1949) discusses selectivity in routine non-conformity driven by competing group interests and power struggles. In his classic study of Tennessee Valley Authority, Selznick (1949) posits routine decoupling to be an unintended consequence of group-level tensions and struggles that promote a collectively sanctioned, group-level rule-breaking. In the rule-breaking, non-compliance and drift literature, the work of Gouldner (1954) is often accredited for being the first to offer a nascent theory of rule-breaking. Criticising Weber's rational organisation assumption, Gouldner (1954) argued that rule-following or breaking behaviour is collectively organised/ permitted within organisational

groups/subunits. These behaviours are often driven by a host of factors, such as divergent interest of various organisational stakeholders. It has also been established that a complete breakdown of a well-established organisational process or routine could occur due overloading the process either with information or with service request exceeding process capacity (Meier, 1962).

Based on the above discussion of seminal and initial contributions in the field of rule-following, rule-breaking and routine non-conformity; one could conclude that the idea of drifted actions is strongly rooted in the domain of social theory. However, beyond the seminal contributions, particularly post 1970s, the thoughts and arguments around drifting of actions got concentrated under much more focused and refined sub-domains of organisational theory. To bolster this idea, I present a co-citation map Figure 1 of a selected group of seminal and most influential papers relevant to the study of drifted actions. This co-citation map was created using the Gephi visualisation software. To produce this map, I chose prominent papers from the domain of safety, rule-following and organisational routine, that were connected to the phenomenon of my interest. Co-citation link of these papers was coded in an excel file which served as an input for the visualisation software.

Looking at the co-citation (Figure 1) map of these papers, one could infer that contributions around rule-breaking, nonconformity and routine non-compliance have been independently being investigated in the Rule following/ breaking literature from public administration domain, organisational routine literature from organisational science and also in safety and accident literature.

One could summarise the arguments from seminal contributions into two opposing perspectives; a Weberian perspective of ‘Rational Organisation’ that supports rigid following of formal rules and structures and a Merton’s “bureaucratic personality” or Thompson's (1977) “bureaupathology” conceptualisation that exposes that dark side of rule rigidity. Later studies that built upon these differencing perspectives investigated both the behaviours, rigidity and flexibility in rule-following, linked these to the drifting away of actions from prescribed procedures.

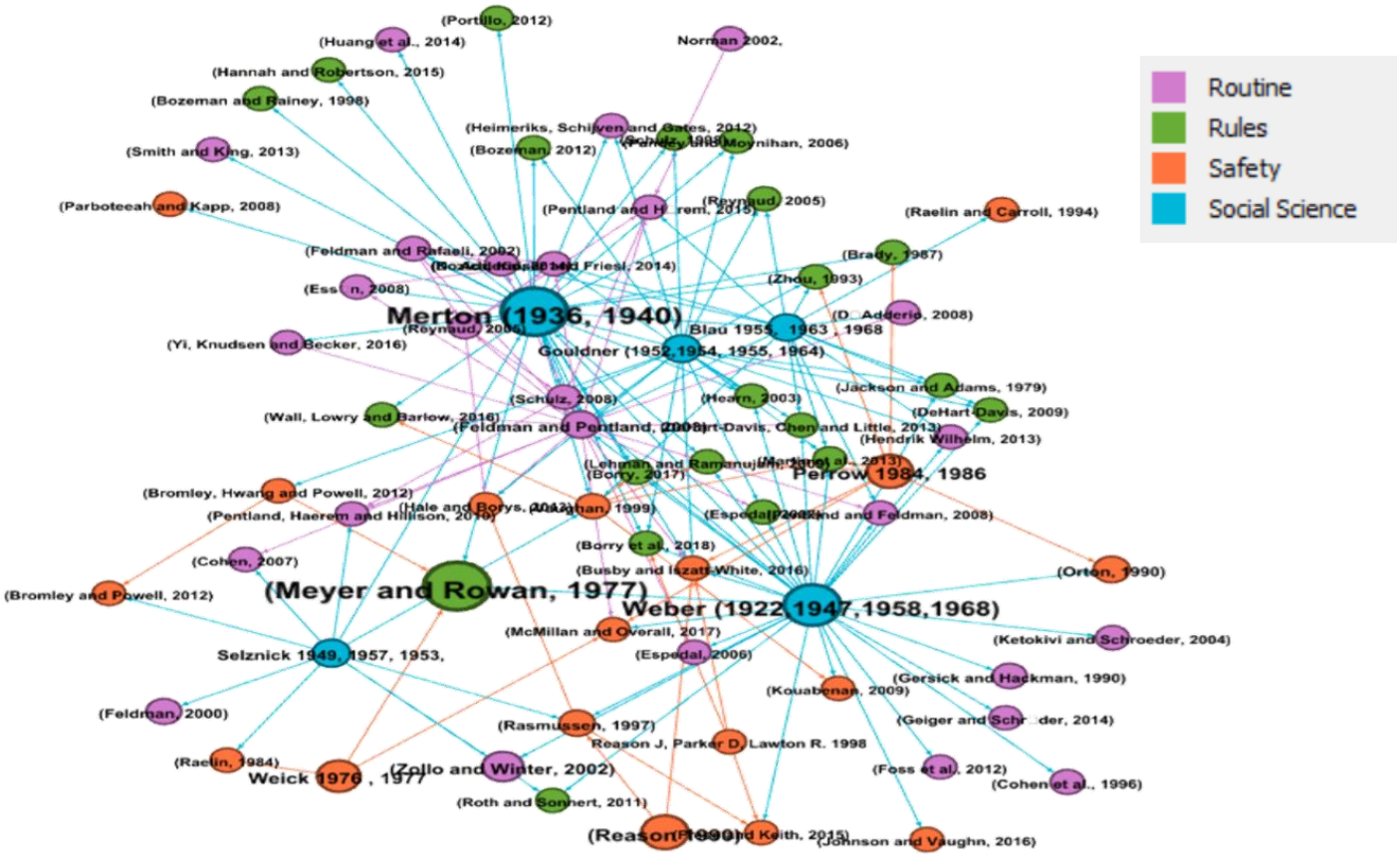

Figure 1: Co-citation map of some selected reference from literature on Drift

The co-citation map of selected papers (Figure 1) is indicative that the routine and rule literature has also made significant contributions to the field. Discussing this eventuality where the enactment of routines gets decoupled from the prescribed script (Dionysiou and Tsoukas, 2013), routine literature provides explanations for why organisational actors either violate the routines or experience a gradual drift in routines, resulting in contamination, change or evolution of the routines from their original design (Feldman and Pentland, 2003). These arguments find mention in the routine replication literature (Busby and Iszatt-White, 2016). The routine literature also acknowledges that routines can slowly and incrementally drift away from procedures. Variations in routines might lead to continuous drift in the pattern of actions (Pentland et al., 2012).

This finding from the routine literature resonates with the phenomenon of Practical Drift (Snook, 2002) from the safety and accident literature. 'Practical drift also theorises the slow, steady, gradual and incremental away movement of actions from prescribed procedures. (Bisbey, 2014; Harvey and Sotardi, 2017; Holtman, 2011; Johnston, 2003; Leemann, 2011; Maurino, 2017; Snook, 2002; Stolte, Vogt and Weber, 2010). Similarly, routine non-compliance from the rule-following literature has conceptual similarity to the phenomenon of normalisation of deviance from the safety and accident literature. The theoretical overlap of these domains in explaining similar phenomena prompts for a closer evaluation of these literature domains.

To summarise the above discussion, it is evident that the 'Organisation Routine' perspective will be the most suitable lens to study drift in actions from prescribed procedures. This is because the grain of routinised drift I am interested in studying has gathered the most contribution in the organisational routine literature. Another reason for 'Organisation Routine' being the best lens for my study is that my phenomenon has conceptual similarity to 'Practical Drift', and the theory of 'Practical Drift' explains incremental changes that occur in dispensing prescribed routines.

Besides organisational routine literature, this phenomenon also overlaps with similar phenomena from the rule-following, safety, and accident literature. Thus, to progress my understanding of the phenomenon, I propose to review organisational routine, rule-following and safety and accident literature. I present the focus of my study using a Venn diagram (Figure 2).

My research aims to explain drift, and since drift is a routine change, I will undertake a thorough and bounded systematic review of the routine change literature. This focused review of routine change will help me identify the gaps and theoretical aspects requiring further investigation.

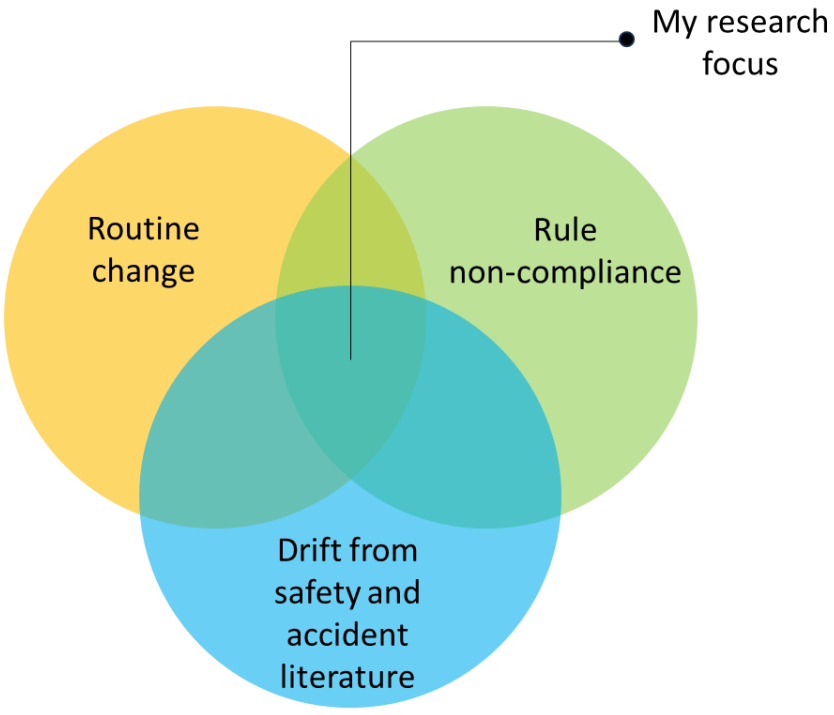

Figure 2: Focus of the review

2.3 Rules

The literature on rule-following theorises the act of conscious and deliberate deviation from set rules and procedures, a phenomenon that can be linked to the initiation of drifted practices. Drift has been empirically proven to be initiated by knowledgeable agents to negotiate novel and uncertain situations using a logic

of task instead of a logic driven by rules (Snook, 2002; Stolte, Vogt and Weber, 2010). This conscious and mindful departure from standard practices could be viewed as a necessary non-compliance. Any act of non-compliance needs to be theorised on the dimensions of rule design, implementation and compliance, thus necessitating a discussion of rules and non-compliance for theorising the phenomenon of actions drifting away from prescribed procedures.

To understand the theory behind rule-breaking and non-compliance, we begin with an explanation of what rules are in an organisational context. We further look into how rules differ from norms and then discuss how the literature on rules theorises the act of non-compliance.

2.3.1 What are Rules

Schulz (1998) defines rules as *"written organizational document [(s) that specify] who should do what, when, and under which conditions"* (Schulz, 1998;pp:847). However, a much more recent definition of rules by Brewer and Walker (2010) finds merit in the inclusion of intangible constructs like norms and expectations within the rule definition. Brewer & Walker (2010) argue that rules are *"norms, regulations, procedures and expectations that regulate individual behaviour in organizations which help 'to ensure accountability, equity, and ethical behaviour"* (Brewer and Walker, 2010;pp:418). Rules are undoubtedly necessary (Jackson and Adams, 1979), yet subscribing to them has drawbacks. Rules promote bureaucratic rigidity, disrupt innovation, promote mindless following and reduce flexibility (Adler and Borys, 1996); organisations are still constantly aspiring to keep rule violation or bending to a minimum (Borry, 2017).

Early organisational theorists saw rules as monolithic organisational structures. However, recent studies have started to view rules as distinguishable entities with varying attributes and characters (Borry et al., 2018). Adler and Borys (1996) argued that in the development process of rules, the rule content and the circumstances governing its implementation could lead to the rules being perceived as enabling or coercive. A stream of literature on organisational rules, the green tape theory (DeHart-Davis, 2009; DeHart-Davis, Chen and Little,

2013), argues that specific rule attributes influence the rule's effectiveness (DeHart-Davis, 2009).

Rule effectiveness is argued to have two dimensions; firstly, the quality of rule design called technical proficiency, and secondly, the degree of support organisational stakeholders provides in the implementation of the rule (DeHart-Davis, 2009). These stakeholders are the ones who will *"explain, enforce, or comply with rule requirements"* (DeHart-Davis, 2009;pp:902). The rule attributes that influence rule effectiveness are; *"rule formalization, rule logic, rule consistency, optimal control, and understood rule purposes"* (Borry et al., 2018;pp:370).

Among these attributes, formalisation and consistency reflect the bureaucratic structure of the organisation (Borry et al., 2018). Here, rule formalisation indicates the written quality of a rule, such as the extent to which a rule is written. At the same time, consistency reflects the reliability of the rule being universally applied within the organisation (Borry et al., 2018). Formalization helps focus the attention of individual effort and time by restricting or bounding the information of the behaviour within the written rule.

Formalization also helps define the legitimacy of action by defining what is *'appropriate, proper, and just'* (Tyler, 2006;pp:375). Consistency and parity in rule application across the organisation sends a positive signal and create a positive support for the rule, which in turn is expected to increase rule-following. It has been argued elsewhere in the organisational theory literature that the consistency of a policy leads to a perception of procedural justice and translates into increased stakeholder support (Leventhal, 1980). Optimal control indicates the approach the organisation takes towards rule implementation and monitoring. A control approach that is neither excessive nor inadequate would encourage stakeholders' trust, responsiveness, sincerity and cooperation (DeHart-Davis, 2009). While the dimension of rule logic reflects the quality of rule design that considers the behavioural forecast of the humans following the rule and succeeds in constructing organisational learning by diffusing existing knowledge that might not be consistent with the rule. It is, however, important to note that the step of

writing a rule, also called formalisation, does not ensure logic. The logic of rule is a result of thoughtful and careful design.

2.3.2 Rules Vs Norms

The degree of rule formalisation is argued to be a continuum extending from written to completely unwritten rules. It's important to note that, despite being verbally disseminated and stored in the organisational memory, unwritten rule is still a rule (DeHart-Davis, Chen and Little, 2013). In literature, procedures relating to the governance of overtime pay (DeHart-Davis, 2009) and promotion appraisal (Roth and Sonnert, 2011) have been suggested to be sometimes unwritten rules. However, a norm is not the same as rule in terms of its behavioural specificity and contextual triggers (DeHart-Davis, Chen and Little, 2013). A norm is neither very prescriptive nor triggered for a well-defined set of circumstances; despite being unwritten, a rule remains prescriptive and gets triggered with associated contexts. Norms are more like acceptable standards of appropriate behaviours (DeHart-Davis, Chen and Little, 2013).

For my research, it was necessary to distinguish between rules and norms. As my research focuses on prescribed procedures and expected behaviours, I chose to focus only on rules, both written and unwritten, and would not include norms and expectations in the purview of my research enquiry.

2.3.1 Rule Non-Compliance

It is widely accepted that illegitimate, burdensome or illogical rules can disrupt organisational functioning and adversely affect rule compliance (Borry et al., 2018; Bozeman, 2012). However, multiple other factors espouse the act of compliance or non-compliance. To build a theoretical explanation for drift, I would need to understand the existing theory on why people choose to either comply or not comply with set rules and procedures. In this section, I revisit this aspect from the literature on rule-following.

Table 4: Factors Influencing rules compliance/non-compliance

S.no.	Citation	Factors influencing compliance/ noncompliance Why rules are not followed or followed??	Method (Empirical / Theoretical)
1.	(DeHart-Davis, 2009)	• attributes of rules themselves- Risk propensity, written rules, valid-means-ends relationships, optimal control (as absence of overcontrol), and understood rule purposes, formalized workplace rules • green tape expectation- where particular rules attributes shall increase rule abidance within the organization.	Empirical Surveys: In Midwestern state, a mail survey done of 4 cities. Personal interview with 90 employees.
2.	(Friedland, Thibaut and Walker, 1973)	• degree of outcome correspondence- comparison between subjects as non-correspondent and the ones attempting to increase the outcome without deviating from the rules.	Empirical Simulation with a management game.
3.	(Veiga, Golden and Dechant, 2004)	• performance-based judgment calls: bending rules to enhance performance of individual or company. • faulty rules / ambiguous or not up-to-date, or the ones do not correct from the manager's point of view, all these causes rule bending and bending of norms in the organization as employees do not respect strict rules.	Empirical Participation in interview done by total of 111 diverse national and multinational corporations. The respondents shared their views what risk do the managers take in bending rules and why they do so.
4.	(DeHart-Davis, Chen and Little, 2013)	• written rules are said to be more focused in improving rule compliance. The rule formalization and logical rule design are effective in achieving the intended purpose. • There exist and positive co-relation between prescribed rules and rule compliance and rule logic. These in turn are positively related to the rule effectiveness.	Empirical Statistical modelling and surveys: In midwestern state, surveys of workplace rules done for 1198 employees. Another survey of 58 practitioners in country health department done for organizational rules.
5.	(Tyler and Blader, 2005)	• command-and-control approach, where self-motivated employees take interest in the resource and outcome. • self-regulatory approach: an alternate approach that focuses on employee's intrinsic desire to follow the rules and norms. The factors shaping rule adherence by the employees were the social value judgements and perceived congruence of employee's personal values.	Empirical Survey: questionnaire send to 1350 employees of multinational financial company in U.S via interoffice mail.
6.	(Terman, 2017)	• written and unwritten rules • rule reliance: The degree to which the rules were referenced or relied upon by the implementers while taking implementing decisions. • Intent of implementation	Empirical In Florida, 24 interview and archival data collected from administrative agencies.
7.	(Borry, 2017)	• Rules bending can be related with ethics as it violates the abidance principle of the standard in the organization. • Explored the impact of ethical climate on rule bending and its influence on organisational norms.	Empirical Survey: Analysis done from the employees of a large local government in America.
8.	(Tyler, 1997)	• Variety of rewards or punishments for compliance and non-compliance of rules respectively, plays a role in rules being followed by the group members. • Rules are obeyed as internal motive system of the employees guides them to follow rules, even when the authorities are not looking.	Empirical 1.Questionnaires given to undergraduates in University of California, Berkeley, 2. All college respondents from U.S and Japan respondents (n = 346) were asked about a their personal recent disagreement with any professor.
9.	(Jackson and Adams, 1979)	• The pressure of getting the job done and the situation's routines governs the deviation, by the participation, of rules. • The inaccurate assumption of rules also causes rule deviance • When there is a change in conditions and given rule is a hindrance in the job to be done, then the inevitable drift from rule happens. • If convenient, rules are then followed. • inappropriate communication impacts rule following.	Theoretical 3 questions identifying the role of rules in the organisations were discussed in the paper ; Why have rules? Why are rules observed? Why are rules ignored?

10.	(Borry et al., 2018)	• rule formalization, describing the quality of written rules, enhances rule following by its legitimacy and attention focusing • the consistency in the application of rules also increases rule following in the organization by giving cues about rule requirements.	Empirical Experiment and a survey of 2 local government organization. Experiment done on 75 masters students of MPA from U.S. Here rule formalization was the variable and rule following was the outcome of interest. Survey conducted in medium size college in state of U.S.
11.	(Desai, 2010)	• Rules are bended or drifted when organization misaligns with its environment. • The competitive environment and the characteristics of the organization forces induvial to drift away from rules.	Theoretical Propositions is developed regarding how organisational process is impacted by rule violation and it motivates the search for new routines
12.	(Sekerka and Zolin, 2007)	• For better performance and result, rules were bent. • Rules were also bent when they were considered faulty, or norms were prevalent to disrespect the rules. • Different motives for bending rules, example meeting customer's need or meeting delays in schedule.	Empirical Questions for the government officials to study their experience with rule bending.
13.	(Hannah and Robertson, 2015)	• obstructions of work, disruptions of knowledge networks, and threats to employees' identities.	Empirical 55 semi-structured interviews
14.	(Baiche, Walliman and Ogden, 2006)	• workmanship's shortcomings. • Not of "flouting of the rules to take short cuts (p. 282). • "Omissions caused by failures in site organization" (p. 282) • Due to the lack of training, the details were ignored.	Empirical 3 research method: A questionnaire survey with 2000 questions in 8 housing developments. Series of observation in 11 housing projects (in Oxfordshire and Gloucestershire). And third method was semi structured interviews.
15.	(Beatty and Beatty, 2004)	• Perceived behavioural intention • Habit	Empirical Questionnaire
16.	(Espin, 2006)	• Work pressures, time pressures, and conflicting demands were identified the reasons by the author.	Empirical Mixed method interview study of 28 members.
17.	(Laurence, 2005)	• problems with rules and regulations • rules drifted to save time • Manager commitment was lacking	Empirical Survey was conducted at 33 mines throughout NSW.
18.	(Lawton, 1998)	• time pressure to meet the deadline • Work-load too high. • Quicker , faster way to work • Outdated rules (not up -to date) • Rule impossible to work • Blind eye by the management • Poor understanding of the rules	Empirical Questionnaire survey
19.	(Taxis and Barber, 2003)	• perceived low risk • Poor supervision	Empirical During the IV rounds of 10 wards in 2 hospitals, a trained and experienced observer accompanied the nurses in UK. Observation and Informal talks with staff.
20.	(Lehman and Ramanujam, 2009)	• characteristics of rules (e.g., enforceability, procedural emphasis, and connectedness)	Theoretical Why some rules are violated and other do not drifts away. There exist a selectivity in violations of the rules.

Non-compliance is an umbrella term that includes a range of stakeholder behaviours, such as bending the rules, not honouring the rule's spirit, and completely disregarding rules (DeHart-Davis, 2009). Similarly, compliance to a rule has been argued to have distinguishable forms: (i) compliance or conformity to rules and (ii) voluntary deference to policies (Tyler and Blader, 2005). Here, voluntary deference indicates a discretionary acceptance of rules, while compliance indicates willing obedience to rules. The literature suggests multiple explanations for non-compliance, such as pressure to perform (Sandfort, 2000; Sekerka and Zolin, 2007; Tummers et al., 2015), prevailing organisational culture (Borry, 2017; Pandey and Moynihan, 2006), individual personality (Bozeman and Rainey, 1998; DeHart-Davis, 2007) or effect of benefits in following rules (Battmann and Klumb, 1993). Table 4 summarises other factors cited in the literature for rules compliance/non-compliance.

Some other factors that are considered to influence compliance and non-compliance are the likelihood of detection, perception of rule legitimacy, value congruence with the rule interaction (Tyler and Blader, 2005), degree of rule formalisation, parity of rule application, and peer-to-peer interaction (Borry et al., 2018).

Among these, from an individual member’s standpoint, the peer-to-peer interaction is an important one because, for rules or norms that are either unclear, complex or burdensome to apply for situations where there are multiple behavioural options, individuals approach this uncertainty by emulating their peer behaviours (Festinger, 1954). In Snook's (2002) phenomenon of drift, it is often quoted that the rules are perceived to be burdensome or insufficient; thus, the installation and perpetuation of drifted processes or routines under such conditions could influence peer-to-peer interaction or the rule characteristics that may alter the perception of the actors.

2.4 Safety and Accident Literature

In the safety and accident literature, there is considerable literature on routine drifts associated with cutting corners or taking shortcuts (Reason, Parker and Lawton, 1998) and on routine drifts related to an ongoing organisational culture

that promotes a lax attitude towards routine noncompliance. The principle thesis of this literature is that organisational routines could lead to human error either due to drifts, variations, deviations or contaminations in routines or due to mindless following of prescribed codes, rules or templates (Baden Fuller and Winter, 2005; Cohen and Bacdayan, 1994; Geiger and Schröder, 2014).

The safety and accident literature explains why people drift or get misaligned from prescribed procedures (Lawton, 1998; Vaughan, 2005). Among these explanations, the theory of Practical drift (Snook, 2002) and the theory of normalisation of deviance (Vaughan, 1999) are widely recognised to be effective in conceptualising why actions drift away from prescribed procedures.

In the next section, I discuss the theory of practical drift and the normalisation of deviance. I also discuss some selected debates, arguments and explanations for drift from organisational safety-accident, routine and rule literature.

2.4.1 Theory of Practical Drift

Practical drift is a theory that explains the slow, steady, gradual and incremental away movement of actions from prescribed procedures. (Bisbey, 2014; Harvey and Sotardi, 2017; Holtman, 2011; Johnston, 2003; Leemann, 2011; Maurino, 2017; Snook, 2002; Stolte, Vogt and Weber, 2010) . Authors have explored the notion of drift in different contexts. Johnston (2003) discusses the deviations in commercial aviation, while (Holtman, 2011) relates professionalism in organisations with an increasing likelihood of procedural rules being deviated. Drift was also studied with safety management systems (SMS) Maurino's, (2017) high-reliability organisation Stolte, Vogt and Weber (2010), in teams Bisbey (2014), in writing safety rules Leemann (2011) and in its relation to normalisation of deviance by Harvey and Sotardi (2017).

The theory argues that for situations where procedural demands do not fit the practical or situational demands, the front-line workers, professionals, and experts adjust or alter the recommended procedures, routines and workflows to make them better fit the local needs (Stolte, Vogt and Weber, 2010). The

underlying intention for these consciously introduced variations or alterations in prescribed routines is mainly for the betterment of the organisation.

These alternative procedures and workflows grow organically over time, are locally efficient, driven by the logic of the task and diffused through practice. Snook (2002) calls these alternative procedures 'Practical Actions', defined as *"behaviour that is locally efficient, acquired through practice, anchored in the logic of the task, and legitimised through unremarkable repetition"* (Snook, 2002; pp182).

If these practical actions survive, without any conflict, for a sufficient duration, they result in the creation of justifiable, locally acceptable practices and alternative routines (Snook, 2002). However, under some organisational conditions or situations, these local practices might contradict or conflict with global standards, resulting in accidents.

It is argued that practical drift develops over time and that people slowly and incrementally move away from a rule-based logic (the prescribed routine) to a task-based logic (the locally efficient alternate routine). Snook (2002) presented a 2x2 model (Figure 3) to represent the stages associated with this slow and incremental movement of actions from prescribed procedures. This model represents a relationship between three dimensions relevant to the phenomenon of practical drift: (i) 'Situational Coupling', (ii) 'Logic of Action' and (iii) Time.

In the model, 'Situational Coupling' indicates the nature and strength of interdependence among subunits within the organisation. It could be loosely or tightly coupled. Loosely coupled situations show organisational conditions where the action of one subunit would have an insignificant impact on others; insignificance could be either in strength or in frequency. While for tightly coupled situations, the actions of subunits will have far-reaching consequences. The model depicts situational coupling in the vertical axis.

The 'Logic of Action' construct is proposed to depict individuals' context-driven behaviours that may shift between rule-based and task-based actions. The horizontal axis is used to describe the two possibilities of logic-driven actions. The

third dimension of time is depicted in the model by arrows representing a typical sequence of transition from one set of conditions to another.

The model presents different combinations of situational coupling and practical actions distributed in different quadrants of the 2x2 matrix. The first quadrant (Designed) represents tightly coupled situations with a clear set of adequate and sufficiently defined rules and procedures. The logic of action for this quadrant is rule-based as organisational actors understand that, due to tight coupling, breaking the rules will have serious consequences. The 2nd quadrant (Engineered) combines a loosely coupled situation with rule-based action. When faced with loosely coupled situations needing more rules or procedures to tackle real-world constraints, the organisational actors find themselves in an unstable condition where they feel committed to following the rules but cannot implement them as designed. These engineered situations contradict the individuals' established belief systems that prompt them to adhere to rules. This unstable implementation of rules to engineered practical situations prevails until the accumulated experience of repetitive localised practices offsets the risk of breaking the rules.

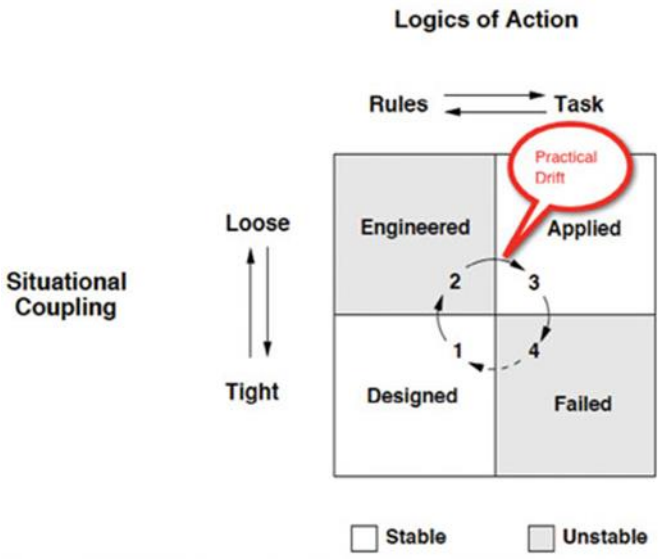

Figure 3:Model of Practical Drift

Adopted from (Snook, 2002; pp 186)

Snook (2002) argued that organisational actors find innovative and novel ways to pursue and efficiently accomplish the tasks at hand in these unstable circumstances. Often, this requires going beyond the boundaries defined by written rules and procedures. Choosing locally efficient practices over insufficient or inadequate global rules or procedures initiates “practical drift”. This is represented by the transition to quadrant 3 (Applied). The fourth quadrant (Failed) represents the scenario where after a substantial length of time and multiple iterations of drifted routines, suddenly, the organizational actors encounter an organisational task that requires very strongly coupled rule-following. On undertaking such a task with established drifted routines, the organisational actors err, resulting in the failure of the task. It is important to note that although the transition from the 2nd to 3rd quadrant is representative of practical drift, a negative outcome is only delivered when the combination of practical action and tight situational coupling occurs in the 4th quadrant.

The phenomenon of Practical drift brings forward the dangers associated with abandoning global routines for locally optimal or task-based logic-driven local actions. A similar argument is made in the body of work done by Dekker and associates in the field of aviation accidents and safety (Dekker, 2011, 2002, 2003; Dekker and Pruchnicki, 2014; Singer and Dekker, 2000). This work on aviation accidents suggests that decisions and beliefs based upon locally optimal practices can be detrimental to safety and thus need a closer evaluation.

Aviation accident research sometimes addresses practical drift with another name, “Procedural drift” (Bisbey, 2014; Johnston, 2003; Lintern, 2003). Aviation research acknowledges that following procedures in aviation is critical (Bisbey, 2014), and drift from procedures is much easier to associate with the term “Procedural drift” rather than “ Practical Drift”. However, avoiding the trap of taxonomies, it can be stated that aviation research also acknowledges the dangers associated with pursuing drifted routines. These misaligned routines organically grow over time and are used as alternatives to negotiate situations where procedural demand does not continuously match situational demands (Johnston, Ronan and Standring, 2014). As people start indulging with these

alternative local variations of the prescribed procedures, many written procedures go unused, and gradually and incrementally, these not-so-commonly used written procedures start to get eliminated from everyday routines (Bisbey, 2014).

One can conclude that practical drift represents the ultimate reality faced in every operation about procedural insufficiency and the need to adapt to such situations creatively. Thus, to get the work done, it might be all right (Maurino, 2017). However, the gradual, slow and incremental decoupling of actions from procedures could be dangerous.

2.4.2 Normalization of Deviance

The concept of drifting away from actions is similar to another term Vaughan (1996, 1999) called a “normalisation of deviance.” The normalisation of deviance is said to occur when with time, the deviation or drift goes unnoticed or persists despite the signals of potential risk or danger (Dekker and Pruchnicki, 2014). As nothing untoward happens, thus, due to the absence of immediate incidents, the situation is deemed to be under control (Starbuck, and Milliken, 1988). Every little departure from the defined procedure contributes to normalisation (Dekker, 2011). The drift, with time, gets institutionalised in the system of the organisation (Ashforth and Anand, 2003), and people get accustomed to the deviated practice.

The scholars Ashforth and Anand (2003) posit stages of normalisation. First is the stage where drifted acts are ingrained in the existing procedure of the organisation. Then, the drifted actions enter the permissible stage even if not desired, while the prescribed procedures grow dim in the background of the deviated version of routines. The exception to rules gets routinised and accepted as normal norms (Bromley and Powell, 2012). The practice of normalisation permeates the organisational environment with structural secrecy (Vaughan, 1996).

Structural secrecy means the segregation of knowledge about goals and tasks. This segregated knowledge reduces the ability to detect activities deviating from prescribed procedures, normative standards, and organisational expectations (Vaughan, 1999). It also suggests the information and knowledge to be partial

and incomplete. With secrecy, the potential for things to go wrong is more. Further, the decision-making process is influenced by structural secrecy, thereby making deviant behaviour more common (Lehman and Ramanujam, 2009). Normalisations of deviance are also said to occur when organisational members become insensitive towards the prevailing deviant practices and do not consider them worth correcting (Price and Williams, 2018). As disaster is not the immediate outcome, the actions are thus routinised and deviations are accepted as normal (Ramanujam and Goodman, 2003).

It has been argued that when deviations fit in the existing label of norms and routines in the organisation, it converts anomalies into acceptable risks (Weick and Sutcliffe, 2006), and thus, slowly and steadily, actions get drift away from the process standard (Bogard et al., 2015) and normalisation drives the path for practical drift in the organisation. Snook (2002) wrote, *"…'normalisation of deviance' and 'practical drift' have much in common",* as in both cases, the actors are convinced that they are working in the organisation's best interest and develop locally efficient practices. Thus, drift and normalisation go hand in hand. NOD is like that sticky corner door you encounter every time you pass by, and one has made their way of living with it. But if someday a new employee, who isn't familiar with the local ways or has a routine of opening that door, needs to open it in an emergency, it may cause harm.

Thus, a drift is said to become normalised with time when actors continue with practical actions (Snook, 2002) and accept local working ways.

However, there is a difference between NOD and PD when we look through the sensemaking process. When false assumptions exist and thrive longer (Turner and Pidgeon, 1997), where organisational members are often unaware of their actions being drifted from the prescribed procedures or believe they are following the correct procedure, this may account for practical drift. When factors like the 'fallacy of centrality' (Westrum, 1982), where novices and experts are overconfident about their ability of decision making, distort the sensemaking, that is referred to as the normalisation of deviance as in the case of the Challenger disaster (Denyer, Tranfield and Van Aken, 2008).

2.4.3 Human Error

Safety is among the topmost organizational priorities (HSE, 2016; Reason, 1997). Considering the severity of impact associated with an accident or safety-compromising event, both for the exposed humans and the concerned organisation, the phenomenon has evoked a widespread interest in the organisational science literature (Clarke, 1999; Katz-Navon, Naveh and Stern, 2005; Lawton, 1998; Perrow, 1984; Pilbeam et al., 2016; Reason, 1990). Within the safety and accident literature, an evolving body of research is concerned with human error (Hollnagel, 1993; Reason, 1997; Wiegmann and Shappell, 2003).

The term human error in organizational studies was initially conceived for taxonomically categorising events that may be caused by the occurrence of slips, lapses and mistakes committed by participating humans (Norman, 1981). Dhillon (1986) suggested that humans can err while undertaking the following six types of organisational tasks; (1) operating, (2) assembly, (3) design, (4) inspection, (5) installation, and (6) maintenance. Reason (1990) argued for looking beyond the task on which error was committed and into the underlying intention of the participating individuals. He viewed slips and lapses as unintentional errors and suggested another kind of human error that originated out of intentional acts of rule or procedure violations.

Reason (1990) proposed two distinguishing forms of human errors: Action errors and Latent errors. According to the author's classification, action errors are the errors that immediately impact the outcome and are often committed by front-line workers. At the same time, latent errors are the errors that may not be immediately evident or may remain dormant for a long time until they combine with other contextual and resident conditions to expel disastrous consequences. Latent errors are embedded in an organisation's systems and routines and are generated by higher-level decision-makers such as managers, designers,, etc. Reason argues that latent errors are the greatest threat to the organisation.

If I position my research phenomenon from a human error and accident perspective, it can be argued that drifting away from actions is a form of dormant or latent error. Drifted actions are variations installed into routines and result in a

slow, gradual and incremental drift from prescribed procedures. Latent errors are also claimed to be uncorrected or leftover errors from processes such as testing, calibration or maintenance (Rasmussen, 1997), a conceptualization that aligns with my research context of aerospace, oil and gas and large scale manufacturing organisations. Thus, there is merit in further elaborating on latent errors.

2.4.3.1 Latent Errors

Dictionary meaning of latent is

"present but needing particular conditions to become active, obvious, or completely developed" (Cambridge Dictionary, n.d.)

In line with the literal meaning of the word latent, Reason (1990) conceptualized latent errors. The author quotes;

" latent errors whose adverse consequences may lie dormant within the system for a long time, only becoming evident when they combine with other factors to breach the system's defences" (Reason, 1990; chapter 7)

These refer to a class of human errors and actions that deviate from the original script or prescriptive template but do not result in an immediate adverse outcome (Ramanujam and Goodman, 2003). Its only when these latent actions combine with several enabling and contextual process/environmental conditions, they result in unexpected outcomes. One of the most significant elements of latent error is deviation from organisational scripts/ routines. It has been argued that routinised activities are more susceptible to latent errors (Ramanujam and Goodman, 2003). It would be worthwhile to comment here that not all latent actions or deviations result in negative consequences. There are situations, such as when rules are inadequate, insufficient or unspecified, often such deviations may lead to positive outcomes (Reason, 1997). From routine perspective these are routine mutations that may trigger further evaluation of the appropriateness of the rule/routine and lead to organisational improvement. However, this is not the focus of my research. I intend to limit my engagement with drifted actions and latent errors that relate to rules/procedures/routines that are both well-defined and well understood.

Classification of Latent Errors

Within themselves, latent errors are not a necessary or a sufficient condition /action to produce unexpected organisational outcomes (Ramanujam, 2003). Despite this, latent errors have been found to be one of the most significant underlying causes of major accidents and disasters (Vaughan, 1999). One of the most accepted approaches of latent error categorisation is to identify them with the different organisational function and transformational processes (Aini and Fakhru'l-Razi, 2013; Ramanujam, 2003; Ramanujam and Goodman, 2003). One could visualise an organisation to be constituted of four basic functions/ transformational processes; (i) Day to day operational routines and processes, (ii) Supervisory and control processes, (iii) regulatory organisational processes and (iv) the formal organisational structure, process design, technology and infrastructure that is needed by the first three processes. Latent error could be identified by these four organisational processes/locations where these errors can potentially occur. In terms of actions that breed latent errors could be classified as execution centric latent error, monitoring centric latent error and infrastructure centric latent errors.

Why Latent Errors Occur

One of the most noted reasons for latent errors is the "failure of foresight" (Ramanujam, 2003). Laden with their myopic view on deviant latent actions, organisations tend to ignore or fail to trigger any corrective actions against these latent errors (Turner and Pidgeon, 1997). Table 5 presents the factors that cause latent errors.

To summarise, latent errors are uncorrected deviations that may propel disastrous consequences if they combine with other organisational and contextual factors. It has been widely observed that latent errors often precede disasters and accidents (Turner and Pidgeon, 1997; Vaughan, 1999). They permeate into organisational actions and routines and continue unchecked and uncorrected as they do not pose any immediate or imminent threat.

Table 5:Latent errors

Type	Category	Sub-Category	Properties
Latent Error	Organisational	Procedural	Rules and Regulations
			Operating procedures and manual
			Administrative control
			Documentation
			Communication
		Training	Competency
			Inadequate knowledge
		Management	Leadership
			Policy
			Resources
		Safety Specific	Safety Policy
			Emergency planning
			Maintenance
			Inadequate design
			Monitoring/auditing
			Lack of corrective action
			Poor accident reporting
			Detection and alarm facilities
		Failure to Learn	Cover up accident
			Fail to learn from previous accidents
	Supervisory		Fail to recognise unsafe operation
			Lack of professionalism
			Disregard for higher authority
			Not adhering to rules and regulations
			Apathy attitude
			Failed to correct problems
	Operator		Incompetence
			Sub-standard practices
			Violation of rules and regulations
			Ignorance
			Ineffective monitoring by regulator
			Outdated laws and regulations
			Poor inter-agency co-ordination
	Regulatory		Inadequate resources of regulators
			Complacency of regulator
			Ineffective communication between agencies

Adapted from (Aini and Fakhru'l-Razi, 2013;pp:286)

In the safety and accident literature, many similar and overlapping ideas to latent errors have been discussed, like unintended drift from planned action

(Rasmussen, 1983), or organisational deviance (Vaughan, 1999). Latent errors have been widely studied from the perspective of; errors in high-reliability organisation (Ramanujam and Goodman, 2003), technology (Pidgeon and O'Leary, 2000), socio-technical disaster (Aini and Fakhru'l-Razi, 2013) and rule violation (Mathisen and Bergh, 2016).

2.5 Routines

The domain of organizational behaviour deals with the study of work related behaviours of teams and individuals and the cognitive activities influencing it (Weiss, 1985). There are many aspects of work behaviour that are frequent or routinized either by design or by habitual patterns of individuals and groups. The literature dealing with the research of such behaviours falls under the taxonomy of organizational routines (Cohen and Bacdayan, 1994; Feldman, 2003; Feldman and Pentland, 2003; Nelson and Winter, 1982). Stene (1940) was the first to recognize the presence of autonomous and 'unconscious' behaviour in an organizational setting and named it to be *'Organizational Routines'*. The phenomenon was found to be closely aligned with existing knowledge of social customs and habits of individuals and groups that had been extensively studied by early social scientists like Weber (1922) and pragmatists like Dewey (1922). The early contributors to the domain of organizational routines conceptualized it as programs (March and Simon, 1958) standard operating procedures (Cyert and March, 1963), genes (Nelson and Winter, 1982) and a repetitive behaviour in the absence of explicit consideration of alternatives (Weiss, 1985). A growing recognition of the construct gathered multiple contributions and diverse conceptualizations of its definition and formative elements. Table 6 presents popular definitions of organizational routines in chronological order. It can be noted from the table that the definition and conceptualization of routines has evolved over the years with the use of diverse set of terms and ideas, summarized in the column of key points (Table 6).

With the growing contribution, slowly, a conceptual agreement on its formative elements and definition started to emerge; succinctly expressed in one of the most noticeable and influential works on organizational routines, a book, An

Evolutionary Theory of Economic Change by Nelson and Winter (1982). Presently, the most 'widely accepted' (Felin et al., 2012;pp:1355) definition of organizational routines, a definition that presents an inclusive conceptualization of all the previous definitions, is from Feldman and Pentland (2003) that defines routines as "repetitive, recognizable patterns of interdependent actions, carried out by multiple actors." Feldman and Pentland (2003;pp:95).

Table 6: Some selected definition of routines

Authors	Definition	Key Points
(Stene, 1940,p 1129)	"Organization routine is that part of any organization's activities which has become habitual because of repetition and which is followed regularly without specific directions or detailed supervision by any member if the organization"	Habitual Repetition Without specific directions or detailed supervision
(Winter, 1964 :263)	Defined a routine as "pattern of behaviour that is followed repeatedly, but is subject to change if conditions change"	Repetitive pattern Possibility to change with conditions
(Nelson and S. G. Winter, 1982:14)	"regular and predictable behaviour patterns of firms"	regular and predictable behaviour
(Dosi, Teece and Winter, 1992)	consider routines as "patterns of interactions which represent efficient solutions to particular problems "	Focus is more on the final risk
(Teece and Pisano, 1994: 545)	routines are "patterns of interactions that represent successful solutions to particular problems"	Pattern of interaction
(Cohen and Bacdayan, 1994, p.555)	defines routines as "patterned sequence of learned behaviour"	Learned behaviour
(Cohen *et al.*, 1996 :684)	have defined an organizational routine as "an executable capability for repeated performance in some context that has been learned by an organization in response to selective pressures"	Selective pressure referring to environmental interventions
(Feldman and Pentland, 2003, p.96)	Define routines as "repetitive, recognizable pattern of interdependent actions. Involving multiple actors"	Presents terse summary of previous definitions.

Close to the beginning of the 21st century, organizational routine scholars directed their attention to aspects of intentions shaping routines, asymmetry in enactment, design (Feldman and Pentland, 2003), stability (Nelson and Winter, 1982) and on aspects of change (Feldman and Pentland, 2003). The academicians also started to interrogate the phenomena from different theoretical perspectives such as capabilities (Abell, Felin and Foss, 2008; Dosi, Faillo and Marengo, 2008), practice (Feldman, 2000a; Feldman and Orlikowski, 2011) and structuration (Feldman, 2003; Giddens, 1984). The capability perspective of

routines engages with the role of routines in the accomplishment and fulfilment of organizational goals, while the practice viewpoint is focused upon the internal dynamics of routines, with a particular emphasis on day to day consequences of routine (Parmigiani and Howard-Grenville, 2011).

The structuration view on routines is interested in understanding the difference between dualistic quality of routines and reflection of this on a firm's performance (Feldman and Pentland, 2003).

There exist two views on routines; routines are dynamic, and routines are stable. The dynamic vs stability debate represents two schools of thought, one that subscribes to the evolutionary and dynamic nature of routines that are flexible and adjustable over time (Adler, Goldoftas and Levine, 1999; Knott, 2001; Zollo and Winter, 2002) while the other that proposes routines to be sticky, rigid and resisting change (Szulanski, 1996). Change perspective of routine (Feldman, 2003; Howard-Grenville, 2005) approaches routines at an endogenous level and views routine participants as the source of change. Popular conceptualizations of routine change include; adaption (Cyert and March, 1963), mutation (Nelson and Winter, 1982), innovation (Miner, 1990), flexibility (Adler, Goldoftas and Levine, 1999; Pentland and Rueter, 1994), improvisation (Moorman and Miner, 1998) and learning (Cohen and Bacdayan, 1994; Feldman, 2000a; Levitt and March, 1988; Miner, 1990)On the other hand, the concept of stability (lack of change) in routines has been traditionally seen as a provider of generalized solutions to recurring problems, where recurring tasks are performed in predefined ways. However, with time authors like Parmigiani and Howard-Grenville (2011) and Salvato and Rerup (2011) presented steady evidence (both qualitative and quantitative) that shows that organizational routines provide the potential to generate both stability and change (Feldman (2003); Howard-Grenville (2005); Feldman and Pentland (2008); Pentland, Haerem and Hillison (2010). Empirically it has now been established that change is endogenous to routines and is brought about by the act of routine replication (Becker, 2004).

The literature on compliance and enactment of routines presents the behavioural dimension of routines and its impact on organizational performance (Knott, 2001).

Authors have long debated the existence of a dichotomy of intentionality in routine enactment. One stream favouring mindlessness of the behavioural pattern, (Gersick and Hackman, 1990; Louis and Sutton, 1991), while other focusing on mindful enactment of routines governed by the idea of collective minds (Weick and Roberts, 1993). However, the issue of intentionality and compliance only arises once there are a set of alternative routines or behaviours available to enact. Pentland and Rueter (1994); Pentland (1995) proposed this set of available routines to be a rigid repository of actions requiring an effortful enactment. Challenging the notion of a rigid repository, (Feldman, 2003) argued that organizations learn through observation, innovation and invention, making this repository an evolving and ever expanding set of routines. Feldman (2000) ; Feldman (2003); Feldman and Pentland (2003) also argued that there can exist an asymmetry between the routines in the repository and its real enactment. The authors viewed this asymmetry as ostensive and performative aspect of routine. The ostensive aspect refers to specific organizational routines that can *'be thought of as a narrative, or a script'* (Pentland and Feldman, 2005;pp:796); while the performative aspect includes real enactment of organizational routines by human agents at a certain time and space. The authors further argued that routine evolution could be brought about by the interaction of these two recursive and mutually constitutive aspects. Practice theory considers the ostensive and performative aspect of routines as design version of routines and the agent's version of routines, respectively.

The empirical side of the literature is still evolving, though relatively small (Parmigiani and Howard-Grenville, 2011) and inadequately examined (Loch, Sengupta and Ahmad, 2013). Although limited, yet the empirical research has contributed and enhanced our understanding of routines as a concept. The empirical research supports the idea that routines; are transferable (Cohen and Bacdayan, 1994), are path-dependent (Costello, 1996), contain knowledge (Costello, 2000), are patterned (Pentland and Rueter, 1994) and are underlying components of capabilities (Dutta, Zbaracki and Bergen, 2003). Scholars have also empirically studied routines in a broad spectrum of frequency and complexity of tasks like in municipal solid-waste collection (Turner and Fern, 2012; Turner

and Rindova, 2012), medical-service units (Edmondson, Bohmer and Pisano, 2001) and university housing (Feldman, 2000a, 2003).

More recent work on routines include discussion of constructs like replication of routines by (Friesl and Larty, 2013), path dependence (Garud, Kumaraswamy and Karnøe, 2010; Rerup and Feldman, 2011), organizational performance (Pavlov and Bourne, 2011), organizational learning (Miller, Pentland and Choi, 2012), organizational capabilities literature in strategic management (Felin and Foss, 2005) and learning literature (Espedal, 2006), rule violation (Geiger and Schröder, 2014) and sensemaking (Rouleau, 2005) .

Drawing a parallel with the structuration theory's conceptualization of social system into social practices and social structures (Giddens, 1984), the contemporary routines literature stratifies routines into two recursively related layers or dimensions; an 'Ostensive aspect' that conveys the espoused component of a routine and a 'Performative aspect' the relates to the enactment dimension of a routine (Pentland et al., 2012; Salvato and Rerup, 2011). The ostensive and performative distinction in routine has evolved from Latour (1986) conceptualization of power. Latour (1986) suggested that power exists in principle and practice; calling them ostensive power and performative power respectively. Feldman and Pentland (2003) extended Latour (1986) conceptualization into the organizational routine literature. Routine literature also talks about the third component of routine, the 'Artefacts' which are supporting objects that are purposefully tied up with a routine to direct and monitor the people engaged with the routines (Pentland and Feldman, 2005).

2.5.1 Ostensive Routines

For accomplishing routine organizational tasks', organizational participants constantly draw on their understanding of a routine to plan their actions, guide others and appraise their acts against the expectations (Feldman and Pentland, 2003). This abstract understanding of the routine, that organisational actors have, is called its ostensive dimension and it can be seen as a repository of knowledge

about what the routine is and what are its constituting elements (Pentland and Feldman, 2007).

Ostensive dimension of routine conveys the traditional view on routines as a structure or an abstract idea (Felin et al., 2012). It should not be mistaken to be the written or codified part of a procedure, rather it is the tacit component of procedures that helps shape the perception of the stakeholders regarding what the routine actually is (Feldman and Pentland, 2003). Organisations use written rules or standard operating procedures as instruments, addressed in routine literature as ‘Artefacts’, to convey the meaning of a procedure and to help organisational members arrive at a consistent understanding of the procedure (D’Adderio, 2014). Organisations use artefacts to codify, prescribe and constraint the ostensive aspect of routine (Pentland and Feldman, 2005). The organisational expectation from using artefacts is that these artefacts will succeed in converging/ aligning the organisational members abstract understanding of the procedure to the original design of the procedure.

However, this is not a guaranteed outcome. Over here, it will be worthwhile to note that organizational actor’s understanding of a routine could be misaligned from the way the routine is inscribed in the associated artefacts (Essén, 2008). If one juxtaposes the scenario of people’s abstract understanding of a procedure, or their ostensive, in the 3rd quadrant of the practical drift model (Figure 3) then one would arrive at a conclusion that this 3rd quadrant conveys the eventuality where actor’s understanding of the procedures is completely decoupled from the written procedure. Expressing this in theory if routines, the ostensive has decoupled from the artefacts, yet the performative is aligned with the incorrect and flawed ostensive of the actors. Thus, the actors are often unaware that they have decoupled from the written procedures, and they are performing a drifted version of the original design.

Thus, one may conclude that, it would be rather incorrect to perceive ostensive aspect of a routine as a monolithic, single and unified artefact or object, like a standard operating procedure. In a most general sense, ostensive is a distributed stock of subjective knowledge of diverse participants, which serves as a template

or a guide that helps individuals and groups to generalise their understanding (Pentland and Feldman, 2007) and use the understanding to direct their actions (Feldman and Pentland, 2003). Ostensive part of routine acts as a coherent model to express task that may be temporally and ergonomically distributed over space and time.

2.5.2 Performative Aspect of Routines

In the theory of practice, it is often argued that people who enact rules and routines are expected to improvise to a certain extent (Bourdieu, 1977, 1990). Despite having a very tightly defined routine or rule, with a significant degree of detailing about the expected sequence of actions, participants might still introduce variability (Narduzzo, Rocco and Warglien, 2001; Victor, Boynton and Stephens-Jahng, 2000). To account for how people enact routines, the routine literature subscribes to the practice-based perspective of organizational rules and proposes a performative aspect of routine. In the words of Feldman and Pentland (2003) *"The performative aspect of the routine consists of specific actions, by specific people, in specific places and times. It is the routine in practice"* (Feldman and Pentland, 2003; pp 101) .

The performative aspect of routines links recognizable actions of specific actors with identifiable place and time (Feldman and Pentland, 2003). Leaning on the influence of agency on routines, the performative aspect may account for a routine's capability to create both stability or change (Dionysiou and Tsoukas, 2013). When performed mindlessly, the performative aspect resists change but if dispensed mindfully, the participants can introduce changes through improvisation and adaptation (Pentland and Feldman, 2008). Considering the performative as "effortful accomplishments" (Pentland and Rueter, 1994: pp 488), allows using the performative aspect to the study variability, contamination, drift or change in routines (Dionysiou and Tsoukas, 2013).

2.5.3 Artefacts

Organizations are known to use a plethora of artefacts with organizational routines. D'adderio (2010) uses text from the oxford dictionary to define artefacts as objects created by human art and workmanship for a given purpose. In case of routines, artefacts are used to convey the meaning of the routine, monitor the compliance or act as a guide for organizational members to benchmark their

performance (D'adderio, 2010). Artefacts may include SOP manuals, display boards, electronic or manual forms and templates, clocks, documentations, measuring gauges and devices (Nelson and Winter, 1982). It can be argued that cognitive or representational artefacts like written rules and standard operating procedures, act as prescriptive proxies of the ostensive aspect of routines; while other form of artefacts such as reports, graphs could be used more as mechanisms of control. Thus, to summarise, artefacts are set of objects that are attached to routines to prescribe the ostensive and control or evaluate the performative.

Artefacts are organizational instruments to control the meaning people draw from the ostensive and to influence the way people dispose a given routine (D'adderio, 2010). Any mismatch in the organization's intended ostensive and peoples perceived ostensive could be a result of associated artefacts failing to convey the desired meaning, while a mismatch in ostensive and performative could be influenced by the capacity or incapacity of the control aspect of the associated artefact. It can be argued that in course of forming a theoretical explanation for a routine getting drifted from its original design, the possibility of an artefact failing both in capacity and principal also needs to be factored into the explanation.

Change in organisational routines is a key element of my phenomenon of interest. For theorising my grain of drift, I would require to build upon the existing knowledge and theory related to the literature on routine change. I undertake a bounded systematic review of the routine change literature. This literature review is bounded by time and looks at contributions made after the year 2010. I am particularly interested in why and how routines change. An answer to this question will help me theorise the grain of drift I am interested in studying.

The following section provides a broad overview of the routine change literature. This will help set the scope of the literature review.

3 Routines Change: A Bounded Systematic Literature Review (BSLR)

Routines are a repository of embodied organisational memory that helps organisational actors coordinate and dispense independent activities, actions, and tasks (Feldman and Pentland, 2003). Routines are designed to deliver stability over multiple replications yet are susceptible to generative changes that evolve over numerous performances (Turner and Rindova, 2012).

This duality in routines, regarding stability and change, gives rise to two streams of thoughts. A conventional view that considers routines to be mundane, rigid and mindless (Cohen, 2007) and a contemporary viewpoint that considers routines to be everchanging, generative (Becker, 2005; Howard-Grenville, 2005; Pentland and Rueter, 1994), evolutionary and a source of continuous change in the organisation (Feldman, 2000b).

The phenomenon of routine change is at the centre of the generative and ever-changing routine debate. The current literature on routine change often conceptualises change using a dualistic complementary taxonomy, such as exogenous vs. endogenous change, adaptive vs. generative change, and individual variation vs. retained enactments (Berente et al., 2016).

When, in response to external/ environmental factors, an organisation is forced to adapt or improvise its routines (Berente et al., 2016; Pentland, Hærem and Hillison, 2011), it is called an exogenous routine change (Cacciatori, 2012; Nigam, Huising and Golden, 2016). Whereas, if the actions of organisational actors bring about the change, we can term it as an endogenous routine change. Commenting upon actor-induced changes, Pentland and Feldman (2005) argue that organisational actors are thinking, feeling, and caring individuals capable of reflecting upon their actions. This process of thinking and reflecting upon the existing organisational routines may sometime trigger "*creative and idiosyncratic enactments"* (Berente et al., 2016;pp:3), leading to endogenous routine change.

Endogenous routine changes follow an evolutionary process of variation, selection, and retention (Miner, 1991; Pentland, Hærem and Hillison, 2011). This argument suggests that actors exercise a degree of adaptation or flexibility over enactments leading to variations among individual performances. However, over multiple performances, some variations are retained and embedded into the organisational memory (Dittrich, Guérard and Seidl, 2016), leading to evolutionary routine changes. This kind of endogenous change is deliberately initiated to make work processes easier. This conscious strive for other objectives results in uncoupling the performative from the ostensive.

There is also a second kind of endogenous routine change where a lack of understanding about the ostensive results in the growth of variations in the performative. In some situations, the actors need a clearer conceptualisation of the routine or need more information about the routines. In such cases, unknowingly, actors could introduce various endogenous changes in the performative and bring about a permanent change in the routine (Cyert and March, 1963; Gavetti, 2005). This eventuality occurs when the actors drive their performative based upon incomplete information, differing assumptions and subjective interpretations about the prescribed routine (Cyert and March, 1963; Gavetti, 2005). Here, the actors understanding of ostensive decouples from the prescribed routine. Such eventualities are often associated with complex procedures and routines (Cyert and March, 1963; Gavetti, 2005). A similar condition existed in the Black Hawk shoot-down case (Snook, 2002), where the involved actors did not understand the prescribed procedure. Snook (2002) quotes, *" Subsequent investigation into the sequence of events revealed a considerable amount of confusion within AWCS mission crew regarding tracking responsibility for helicopters"* (Snook, 2002; pp 102).

One may agree that some degree of variability in individual routine performance is expected and permissible (Reason, Parker and Lawton, 1998), yet selective retention of a routine variation needs careful examination. Understanding the pathology of routine change might benefit some contexts or situations, for e.g. Safety. From a safety and accident standpoint, routine evolution could be

considered harmful and undesired as it may lead to new risks (Bruns, 2009). There are numerous examples cited in the safety and accident literature where drifted actions and procedures led to accidents and safety negative outcomes (Goodman et al., 2011; Ramanujam and Goodman, 2003; Rasmussen, 1997; Reason, 1990; Turner and Pidgeon, 1997; Vaughan, 1999, 2005).

The argument could also be extended to the rule compliance literature (Borry et al., 2018; Bozeman, 2012), which, too views the introduction of a routine variation as undesired, irrespective of the fact that the variation was introduced knowingly or unknowingly. Thus, organisations must cautiously approach the phenomenon of routine evolution or selective retention of variation.

Literature suggests various factors and theoretical explanations for the change in routines. Discussing endogenous or participant induced change, Cohen & Bacdayan (1994) suggest that knowledge or understanding of a routine is linked with an actor's propensity to bring about a change in the routine. The authors argue that during the initial phase of routine enactment when actors lack a clear understanding of a routine, they approach the routine with deliberation and care. Thus actors are cautious towards meeting the set standards. However, after multiple successful replications, the knowledge required to execute the routine becomes implicit, and the actors could deviate from the desired template. This change is deliberate and should be viewed as uncoupling of the performative from the prescribed and understood ostensive. Contrary to this, if the actors lack a clear conceptualisation of the routine or have insufficient information about the routine, they could also end up changing the routine (Cyert and March, 1963; Gavetti, 2005). This eventuality occurs when the actors drive their performative based upon incomplete information, differing assumptions and subjective interpretations about the prescribed routine (Cyert and March, 1963; Gavetti, 2005). Here actors understanding of ostensive decouples from the prescribed routine. Such eventualities are often associated with complex procedures and routines (Cyert and March, 1963; Gavetti, 2005). Table 7 presents a list of factors that triggers routine variation or change.

Table 7:Factors triggering routine variation

S.no.	Citation	Factors influencing variation in Routine	Methods (Theoretical/ Empirical)
1.	(Vaughan, 1999)	• Characteristics of the system • Organisational characteristics • cognition	Theoretical Review literatures: theories and concepts— explanation of nonconformity of routines in setting that are socially organised. Further review of literatures on mistakes, disaster and misconduct also included.
2.	(Pentland, Hærem and Hillison, 2011)	• endogenous and exogenous factors: • experience: less experienced actors produce variated patterns. • automation	Empirical Invoice management system data from 4 organisations – construction company , meat packing plant, public stats research institute and labour union.
3.	(Pentland et al., 2012)	• VSR (variation, selection and retention) plays major role in changes in routines	Empirical Describing formal model, implemented in Matlab.. Data analysed, on real routines, using two history matrices.
4.	(Bromley, Hwang and Powell, 2012)	• strategic planning prevalent • micro-processes of institutionalization	Empirical People in non-profit organization interviewed to investigate about practices altering mode of operations and its consequences.
5.	(Meyer and Rowan, 1977)	• The logic of confidence and good faith • Ceremonial inspection and evaluation	Theoretical Discussion on prevailing theories and their problems in the field and about alternative / variated source of given structures. Arguments on gap existing between the working/ enacting activities and prescribed structure.
6.	(Hedgecoe, 2014)	• organizational deviance - social relations between researchers and those regulating them • regulatory practices	Empirical comparative ethnography and interview data with researchers
7.	(Earle, Spicer and Peter, 2010)	• Managers rely on past organizational decisions. Past deviant routines, successfully adapted, work as a guide to validate the actions.	Empirical Longitudinal Monitoring Survey (RLMS).2: When drifted actions persist, are not monitored or checked, such actions are likely to be well stablished and become difficult to reverse with time.

8.	(Moorman and Miner, 1998)	• Different and varied levels of novelty in action can be the result of improvisation.	Theoretical Cross disciplinary aggregation of research on the impact of organisational memory on improvisation.
9.	(Yi, Knudsen and Becker, 2016)	• choice–action divergence • variation is generated by routine-level inertia • Planning local improvements • Variations Triggered by Reordering	Empirical Examining dual nature of routines influencing organizational adaption that involves the changes in the routines.
10.	(Hobbs and Williamson, 2002)	• Supervisory position • Demographic variables	Empirical Maintenance Behaviour Questionnaire (MBQ) in aircraft maintenance
11.	(Feldman and Pentland, 2003)	• relationship between ostensive and performative aspects of routines – makes room for VSR, variation, selection, and retention	Theoretical Revisiting the organizational routines – ostensive and performative in study of the academic "hiring" routine.
12.	(Betsch et al., 2004)	• time pressure • deliberative control	Empirical Experiments – 80 undergraduate students in. Participants were tested in small groups (2–4)
13.	(Banja, 2010)	• Considering rules to be inefficient and rule compliance as irrational • Knowledge is imperfect and uneven • Complex work environments • Leadership withholding or diluting findings on system problems	Empirical Case study Context: deviant practices in healthcare Consider
14.	(Essén, 2008)	• difference in workers' personal values • Technology artefacts • workers' emotional-ethical principles	Empirical longitudinal research programme sources of variability in workers' execution of routine in elderly home care setting
15.	(Pentland and Feldman, 2005)	• knowledge about how routines should be performed becomes more and more tacit, which might result in deviations between performances and ostensive understandings. •	Theoretical To study change and flexibility in routines, importance of internal structure in routines are discussed.

16.	(Dionysiou and Tsoukas, 2013)	• multiplicity of the ostensive aspect • loosely shared individual schemata	Theoretical Studied re-creation of routines from within and ostensive aspects as both being multiple or singular
17.	(D'Adderio, 2014)	• Role of artefacts and communities	Empirical Ethnography and semi-structured interviews: In the context of replication and routine transfer, looking into the multiplicity of two aspects in routines: performative and ostensive.
18.	(Anand, Gray and Siemsen, 2012)	• mergers and acquisitions to cause decline in following the routines	Empirical Secondary data related to pharmaceutical manufacturing plants
19.	(Chmiel, Laurent and Hansez, 2017)	• individual's available cognitive energy or 'effort • Work Engagement	Empirical In a UK chemical manufacturing plant, employees were given a self-report questionnaire.
20.	(Reinach and Viale, 2006)	• the organizational process and resource management	Empirical 3 sets of interview questionnaires for operators, local officers (supervisors) and upper management levels. Context: railroad accidents/incidents.
21.	(Feldman, 2000a)	• Internal dynamics of routine that promotes change • Notion of agency	Empirical Unstructured interviews and longitudinal observations study in housing organization
22.	(Dittrich and Seidl, 2018)	• Intentionality and sense of purpose as important source of routine change	Empirical Ethnographic longitudinal study in pharmaceutical
23.	(Howard-Grenville, 2005)	• Habitual enactment- actors orientation and intention • Pragmatically adapt	Empirical Ethnographic study in manufacturing organisation.
24.	(Martin et al., 2013)	• ambiguity of rules • The Indulgency Pattern • to achieve organizational goals of maintaining production that	Theoretical Research on routine replication and changes in routine process during the replication.

While discussing change in routines, it would be worthwhile to note that routine literature does not always view change as a negative outcome. Change in routine is argued to be also linked to organizational improvements and innovation (Desai, 2010). However, from a safety and accident literature, any change occurring in safety routines needs a closer evaluation. Regarding safety violations, Pilbeam et al., (2016) argue that even a modest recognition of safety violation at the organisational level is indicative that the actors are aware of their actions. The authors quote;

"Recognizing safety violations necessarily indicates that the observer has been taught and has learnt the required procedures that govern safe behaviours and actions" (Pilbeam et al., 2016; pp 65)

Based upon my cursory review of the routine change literature, it is evident that routine change is a mature domain of literature that is still expanding. To the best of my knowledge, there has yet to be an attempt to synthesise and consolidate the learnings relevant to the literature on routine change. This provides an opportunity to systematically evaluate and appraise this literature domain's findings and theoretical contributions.

In the next subsection I provide the objective of this review.

3.1 The Objective of the BSLR

Aligned with my research interest and the practical importance of routine change, I propose undertaking a systematic literature review to unpack the pathology of routine change.

Literature on organisation routines cites the factors that bring about a variation or deviation in routines as; unforeseen organisational contingencies (Gersick and Hackman, 1990; Pentland, 1992), the presence of multiple members that may be enacting the routine, routine awareness, familiarity to the process, the experience of actors (Pentland, Hærem and Hillison, 2011), and factors connected with individual choices or preferences (Feldman and Pentland, 2003). More recent literature on routine change looks beyond individualistic factors and into more

organisational-level constructs. For instance, Dittrich and colleagues leaned on aspects of collective and individual reflection (Dittrich, Guérard and Seidl, 2016; Dittrich and Seidl, 2018) to argue the selection, variation and retention of a routine change.

The continuous growth and expansion of scholarly contributions to the routine change literature calls for a systematic assessment of the state of knowledge and begs a systematic summarising of this literature domain. Appraising why and how routine changes can help thematically categorise scholarly contributions. This will help the domain or organisational routine literature highlight areas that have yet to gather more attention and propose future research directions.

Since most of the literature on routine change is recent, dating back to the previous decade, I intend to conduct a time-bound systematic literature review. This bounded systematic literature review (BSLR) will employ the systematic literature review methodology process (Tranfield, Denyer and Smart, 2003) to review scholarly contributions to the routine change literature since the year 2010.

My BSLR focuses on discovering the pathology of routine change using the following review questions.

Review Question

Review Question 1: How and why do routines change?

Review Question 2: How do routine changes impact safety?

Review Question 3: How are the aspects of routine change addressed in the Aerospace, oil and gas, and manufacturing sectors?

Review Question 4: How and why does practical drift happen?

The rest of the BSLR is structured as follows. In the next section, I introduce my methodology for conducting this BSLR. A descriptive and thematic appraisal of the reviewed articles follows this. The BSLR ends with a discussion of the findings and a discussion of the contributions and limitations of this BSLR.

3.2 Methodology of BSLR

About a research question or enquiry, literature review or research synthesis is a process of synthesising, summarising, integrating, consolidating and aggregating findings and debates from different research and scholarly contributions (Tranfield, Denyer and Smart, 2003).

Among the various methods available to conduct a literature review, the prominent ones are Narrative review, Meta-analysis review, and systematic literature review (SLR). The narrative and meta-review methodologies have significant drawbacks when synthesising and consolidating knowledge relevant to a given review question. Where narrative review methodology needs to improve its ability to generalise or aggregate knowledge, the pooling mechanism of meta-analysis-based review is rendered inapplicable to management research due to the wide heterogeneity of studies in the management literature (Tranfield, Denyer and Smart, 2003).

The advantage of adopting an SLR review methodology is that it provides a rigorous and thorough scientific approach for selecting, evaluating, synthesising, and systematically reporting the results. Unlike a narrative review, which relies upon the experience and knowledge of the reviewer, the SLR approach uses a well-defined, structured search and selection protocol. Each stage of an SLR review process documents the rationales for the decisions taken by the reviewer. This makes it easier for the readers to verify, validate, follow, interpret, and, if required, replicate or reproduce every stage of the process (Tranfield, Denyer and Smart, 2003).

The SLR method has four phases: planning, selecting, appraising, and reporting. Figure 4 presents the order of these phases.

3.2.1 Search Strategy

The search for this BSLR begins with identifying the keywords and setting the search strings. The scope of this search is restricted by a selected (papers published since the year 2010). The search was conducted on EBSCO Business Source Complete and ABI Pro Quest electronic databases. These databases

represent an extensive coverage of scholarly publications from organisational studies.

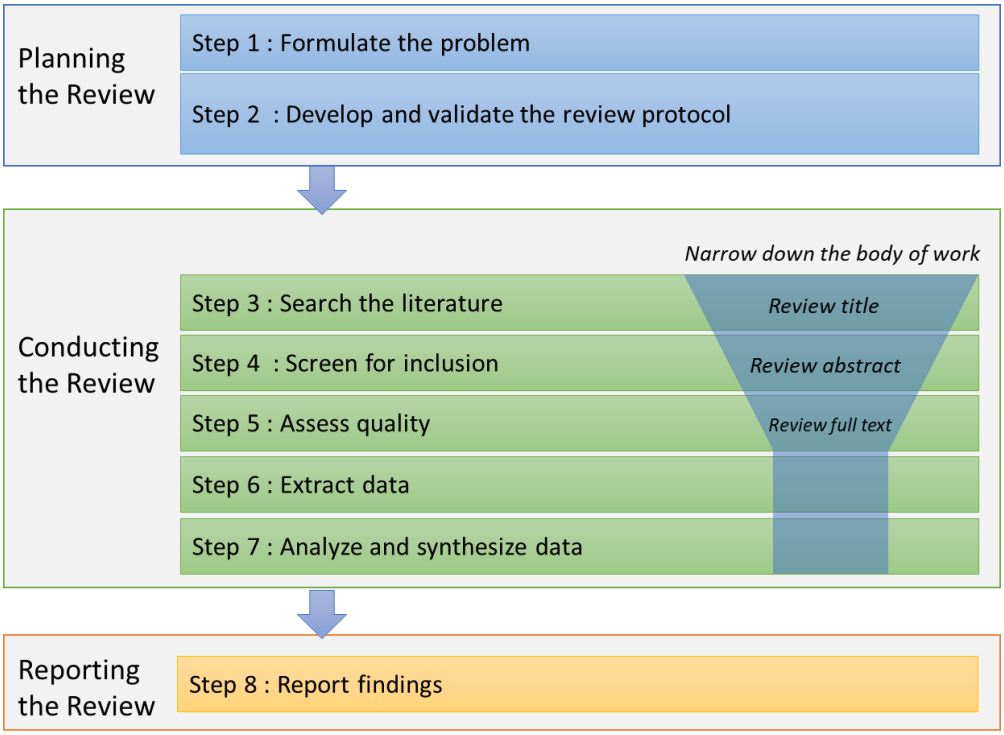

Figure 4: Steps for conducting an SLR

3.2.2 Keyword

The review question defines the key constructs and keywords of the search string. Table 8 presents the keywords and constructs adopted for this BSLR.

3.2.3 Search String Limiters

The search results were limited using the following criteria;

(i) Date of Publication: Published after 1st January 2010.

(ii) Language: Published in English.

(iii) Source Type: Scholarly peer review academic articles.

(iv) Search String C1 and C5 were limited to Titles only.

(v) Search strings C2 and C3 were limited to Abstract and author-provided keywords.

(vi) Limiter of search string C4 was extended to full text as using any other, more restrictive limiter, returned none at all.

Table 8: Keywords and constructs

Construct	C1 Routine	C2 Change	C3 safety	C4 Practical drift	C5 Aerospace, oil and gas and manufacturing
Keywords	Routine, Procedure, SOP	Change, mutation, evolution, drift, transformation, alteration, unfolding, more*, modification, revision	Safety, safe, accident, Security, Protection, Mishap, Disaster, Casualty, contingency	'Practical drift', 'procedural drift',	Manufacturing, aerospace, oil and gas, petrochemicals
	"routine*" OR "procedure*" OR "SOP*"	"chang*" OR "mutation*" OR "evolution" OR "drift*" OR "Transformation*" OR "alteration" OR "unfolding" OR " morp*" OR "modification*" OR "revision*"	"safe*" OR "accident*" OR "Security", OR "Protection", OR "Mishap*", OR "Disaster*", OR "Casualt*", OR "contingenc*"	"practical drift" OR "procedural drift"	"manufacturing" OR "aerospace" OR "oil" OR "gas" OR "petrochemical*"

The decision to widen the scope of the limiter used for search strings C2, C3, and C4 was taken because a scoping search of search strings revealed that with titles only as a limiter, it yielded very few results.

The search results were downloaded as ".ris" files and uploaded to referencing and citation software Mendeley for further analysis.

3.2.4 Search string Combination

(i) Search Focus: Routine/ Change/Safety

Group 1: C 1 (Title) + C2 (Title + Abstract/ keyword)

Group 2: C1(Title) + C3 (Title + Abstract/ keyword)

(ii) Search Focus: Practical Drift

Group 3: C4 (Title + Abstract/ keyword)

(iii) Search Focus: Routine/ Sector

Group 4: C1 (Title)+ C5 (Title)

3.2.5 Inclusion and Exclusion Criterion

The titles and abstract were read and sorted according to an inclusion and exclusion criterion. Details of this are provided in the appendix.

3.2.6 Quality Appraisal

The full text of the selected articles was read to ensure the quality of the contribution. This was done using a standard template. An example of the template is provided in Table 9.

Table 9: Example of a completed quality appraisal template

	SNo.						
	Citation: (Bygballe et al., 2021) Title: A Routine Dynamics Lens on the Stability-Change Dilemma in Project-Based Organizations						
		Level (1 lowest to 5 highest)					
	Criterion	1	2	3	4	5	N/A
1	Is the Research question clearly and explicitly stated and does it aligns with the objective of this review?		X				
2	Does the paper summarise the relevant literature well?				X		
3	Does the paper presents a robust research design?		X				
4	Are the findings clearly reported?			X			
5	Does the section of discussion present arguments that will progress or contribute to the outcomes of the SLR?		X				
6	What is the quality of the contribution to theory and is it clearly mentioned?			X			
	Total Score: 2+4+2+3+2+3 = 16						
	Result: Rejected as lower than 18 (average being three or more)						

The reasoning for above scores in Table 9 is as follows.

Criterion 1 (Score 2): Is the Research question clearly and explicitly stated and does it align with the objective of this review?

Argument:

The research question of this paper is;

"how PBOs (Project-based organisations) balance stability and change and how they build capabilities and cope with the integration and knowledge/ learning dilemmas" (Bygballe et al., 2021)

The focus of this research question is on managing change. It must clearly align with my research question.

Criterion 2 (Score 4): Does the paper summarise the relevant literature well?

Argument:

The paper presents a good discussion on routine dynamism.

Criterion 3 (Score 2): Does the paper presents a robust research design?
Argument:

This paper presents a discussion of the relevance of routine dynamism in projects. The discussion is based on the author's synthesis and understanding of the literature. The discussion is not directed with any focused literature search approach or any form of primary or secondary industrial/ case study data. This is a theoretical piece driven by the author's experience and knowledge of the field.

Criterion 4 (Score 3): Are the findings clearly reported?
Argument:

The paper presents a good discussion of the field, with sections dedicated to ontological, theoretical and methodological choices available to the field.

Criterion 5 (Score 2): Does the section of discussion present arguments that will progress or contribute to the outcomes of the
Argument:

The arguments and discussions presented in the paper need to be sufficiently aligned with my BSLR.

Criterion 6 (Score 3): What is the quality of the contribution to theory, and is it clearly mentioned
Argument

Yes, the paper's contribution to the theory of routines is satisfactory.

The sum of all the criteria for this paper adds to a score of 16. The paper is not included in the BSLR as it is lower than our set limit of the score 18 (representing an average score of Three for the six criteria)

3.2.7 Selected Articles

The initial keyword search returned 2588 articles. The number was reduced to 1087 after the removal of duplicates. These articles were subjected to a process of title screening, abstract screening, full-text screening and selecting a final list using a quality appraisal process.

Table 10: Selected articles

Screening Criterion adopted on	Number of articles screened							
	Group1(C1+C2)		Group 2(C1+C3)		Group 3(C4)		Group 4 (C1+C5)	
	EBSCO	ABI Pro Q	EBSCO	ABI Pro Q	EBSCO	ABI Pro Q	EBSCO	ABI Pro Q
Search string results (In Titles)	589	296	265	300	25	1	39	117
After duplicate removal		607		269		25		144
Title		51		182		11		34
Abstracts		44		17		3		25
Full-Text Quality Appraisal		25		12		3		3
Selected for inclusion		25		12		3		3
Selected from Cross reference		3		0				0
Total articles reviewed : 48		**28**		**12**		**5**		**3**

Table 11: Data extraction template

Search Group Theme (C1+C2):
Reference Number
Citation :
Title:
Google Scholar cited:
Journal:
Year:
Keywords:
Study Background :
Research Question(s)/Objectives:
Primary Research Focus:
Grounding Literature:
Research Design and Methodology
Research Design: **Method:**
Data Description:
Data collection instrument:
Sector:
Unit of analysis: Organisational routines
Unit of Data Collection: Individual
Analytical approach:
Contribution
Key Findings: **Why Routine Change?** **How routines change?**
Key propositions and arguments: **Why Routine Change? N/A** **How routines change?**
Limitations and Scope for further research:
Comments/Synthesis/ Key contribution to review question

The final list of selected articles was read, and arguments relevant to answering the question “Why and how routines change” were extracted. Some additional papers were added using the snowball sampling technique at this stage. Table 10 gives details of the number of articles for each stage.

3.2.8 Data Extraction For Selected Articles

Tranfield, Denyer and Smart (2003) and Denyer, Tranfield and Van Aken (2008) recommend using a data extraction form to reduce human errors and avoid selection biases. Based upon the recommendations of Denyer, Tranfield and Van Aken (2008), the following data extraction template was used (Table 11).

3.2.9 Thematic Categorisation of the Extracted Findings

A descriptive and thematic categorisation of the extracted text followed the data extraction step. Figure 5 presents a schematic diagram of the thematic categorisation process.

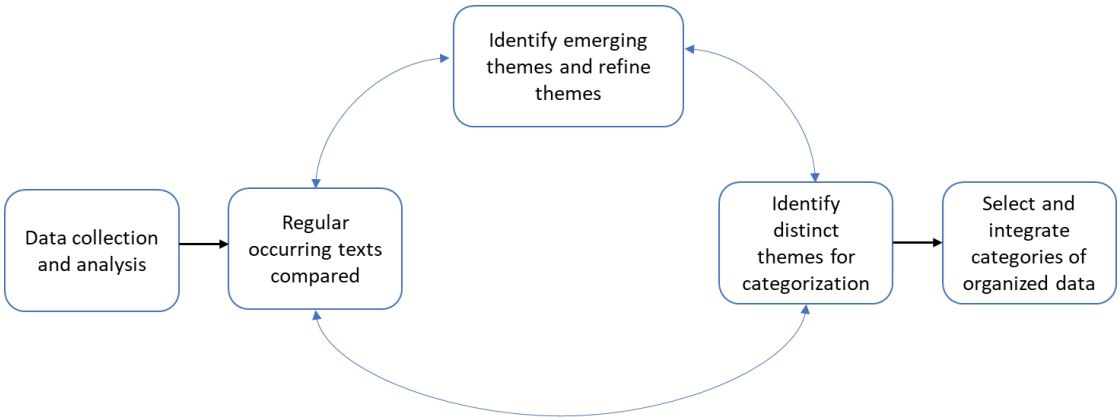

Figure 5: Process of thematic categorisation.

For the stage of thematic categorisation, I adopted the three stages of open, axial and selective coding, a process recommended by Miles and Huberman (1984), Strauss and Corbin (1990), and Yin (2009). The overall process was further guided by the steps followed in some recently published SLRs (Seth et al., 2020; Talwar et al., 2021). Guided by the recommendations of Seth et al. (2020), I used a content analysis process to describe critical themes. The first stage adopted an open coding approach to synthesise relevant findings from an extensive collection of selected scholarly articles—this step of open coding synthesised arguments and conclusions pertinent to answering questions about why and how routines change. Constant comparison was made for regularly occurring texts. The ongoing themes were always compared to the previously indicated text coded similarly. This was followed by a deductive and inductive approach to establishing relationships among the open codes. This resulted in the formulation of higher-order axial codes and selective codes.

3.3 Descriptive Findings of BSLR

3.3.1 Chronological Distribution of Articles

Figure 6 presents the distribution of the final selected articles by their year of publication. The years 2016, 2012, and 2017 contributed the most papers.

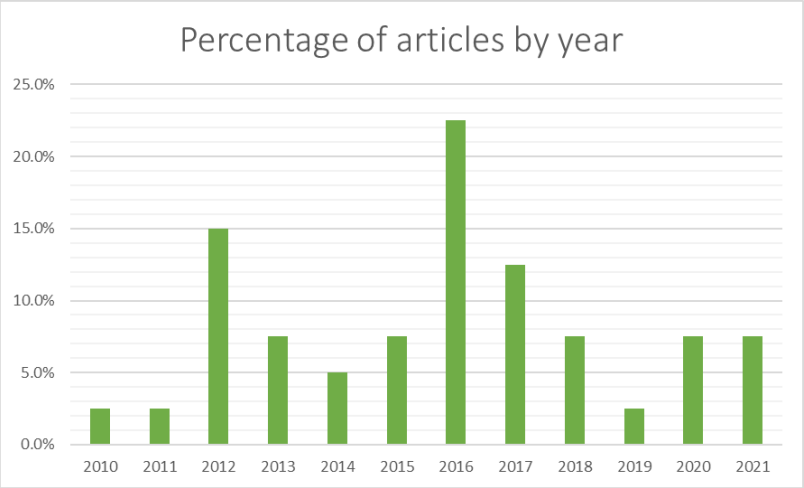

Figure 6: Percentage distribution by the year of publication

3.3.2 First Author's academic affiliation by Country

Figure 7 represents a bar chart of the country of academic affiliation of the first author. It can be seen that a high percentage of the selected articles originated from academic institutions in the USA and the United Kingdom.

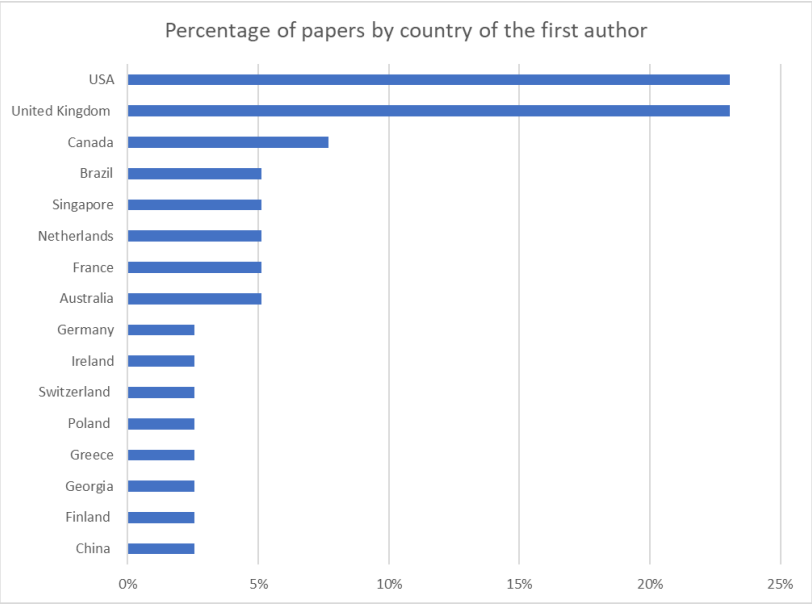

Figure 7: First author's academic affiliation by county

3.3.3 Ranking of the Journal

Figure 8 represents a bar chart of the ranking of the journal. It can be seen that a high percentage of papers were published in highly-ranked academic journals. The ranking is based upon the academic journal ranking proposed by Charted Association of Business School Journal ranking (CABS, 2021).

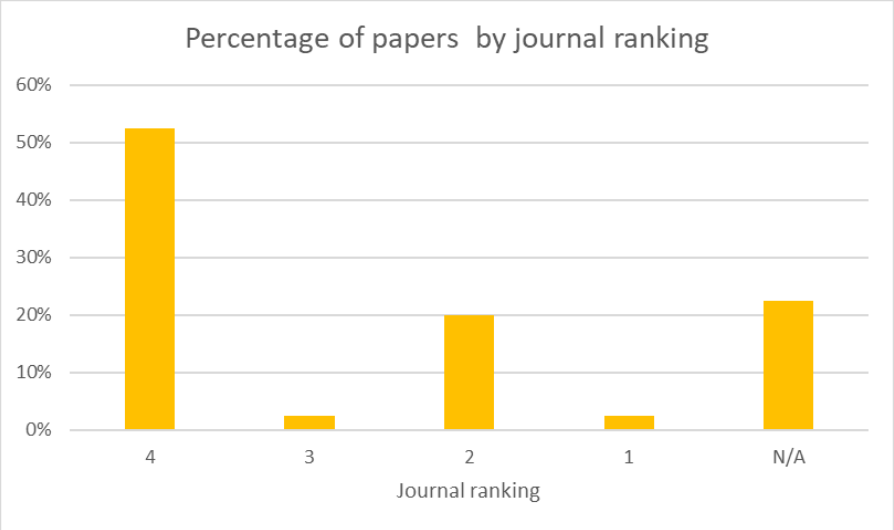

Figure 8: Percentage of papers by their journal ranking

3.3.4 Methodology Of The Selected Articles

Figure 9 presents the percentage breakup of the methods employed by the selected articles. A qualitative study was found to be the preferred choice of methodology.

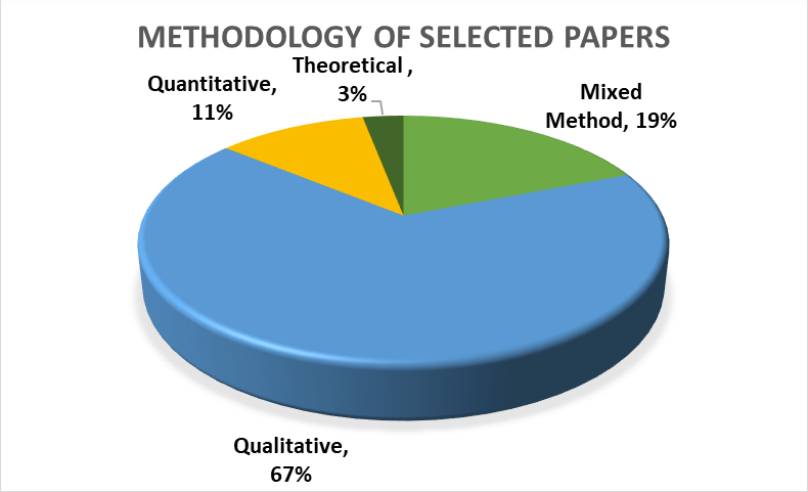

Figure 9: Percentage of papers by their methodologies

3.4 Thematic Findings of BSLR

3.4.1 How and Why Do Routines Change

Discussion of routine change needs to answer the why and how questions (Becker, 2005). The why questions should identify the variables and factors that become the reasons or motivation to change. I list these reasons and motivations under the term factors associated with routine change. The how questions should detail the pathways and dynamism of the change.

Table 12: Thematic categorisations of findings from routine change theme

Why routines change …….because		
Selective Code	Axial Code	Open Code
Actors Had a Purpose	To remove operational hurdles	To honour other organisational priorities
		To tackle complex coordination issues and day-to-day challenges
	To correct design issue	To correct misalignment with the written procedures
		To resolve a conflict with other routines
		To safeguard against a potentially harsh impact
		To address scepticism about the routine's design
	To gain benefits	To innovate or improve the existing processes
		To achieve economic benefit
		To exploit ambiguity in the routine template
Conducive conditions	Skills and Knowledge	Change in the knowledge or experience of the actors
		Insufficient skills/training/experience
	Process ownership	People with authority over a given routine support change
	Specification Clarity	Due to imprecise routine templates

Within the discussion of change pathways and dynamism, one could also discuss why a change perpetuates or continues to exist and does not get rectified; or why a changed routine remains decoupled from the original routine (Deng and Robinson, 2021). The idea of inertia, continuation or the permanence of a routine change is fundamental to my research enquiry. The phenomenon of drifting away of actions from prescribed procedures focuses on routine changes that stay

decoupled or continue to drift away from the prescribed routine template/s. The findings from the routine change group of papers were thematically organised to answer review question 1 (Table 12);

Review Question 1: How and why do routines change?

3.4.1.1 Actors Had a Purpose

When discussing routine change, one needs to acknowledge that change could be either intentional or unintentional.

Organisational actors' intentions to change a routine are likely driven by an underlying purpose or need to accomplish a certain goal or outcome. Feldman (2000) believes these changes happen because organisational actors are thinking, feeling, and caring individuals embedded in a social context that influences their intentions and motivations to perform a routine.

Feldman (2000) comments;

"Routines are performed by people who think and feel and care. Their reactions are situated in institutional, organisational and personal contexts. Their actions are motivated by will and intention" (Feldman, 2000; pp:614)

The key argument in the above quotation of Feldman (2000) is that the social embeddedness of actors shapes their will and intentionality to change organisational routines. Dittrich and her colleagues (Dittrich, Guérard and Seidl, 2016; Dittrich and Seidl, 2018) looked further into the intention and routine change debate. Dittrich and Seidl (2018) found empirical evidence that pursuing an underlying motive or purpose drives the actor's intention to change a routine. Dittrich and Seidl (2018) quote,

"pursuit of a particular purpose—as a key aspect of agency that can explain both stability and change in routines over time" (Dittrich and Seidl, 2018;pp:113)

The authors use the common English expression of "Means to an End" to express how the pursuit of a 'Purpose' shapes routine changes. The online Cambridge Dictionary explains this expression "Means to an End" as particular actions are done because these actions will help you achieve a particular outcome

(Cambridge Dictionary, n.d.). Thus, one can argue that routines change – because people want to achieve a particular objective or end, and this change in routine serves the 'Purpose' or the means to achieving the desired objective or a favourable ending.

The qualitative coding of my selected papers also finds 'Purpose' as the underlying reason for a routine change. The qualitative codes that emerged from my selected papers indicate that themes related to why routine change questions can be bundled under a broad taxonomical category of 'Purpose' driven routine change. The second-order themes that constitute this category of 'Purpose' driven routine change are: (i) To remove operational hurdles, (ii) To correct design issues (iii) To gain benefits.

In the following section, I further elaborate on the different aspects of this motivation/ purpose to trigger a routine change.

3.4.1.1.1 To Remove Operational Hurdles

There are situations where the organisational actors judge that, in its current form, the routine will be a hurdle in accomplishing organisational objectives. The conflict between the existing routine and the desired organisational objectives prompts the actors to act evasive. Routines seen as barriers to achieving the organisational goal will likely be changed or discontinued (Oehler, Stumpf-Wollersheim and Welpe, 2019).

The BSLR findings for organisational objective-driven routine change are further classified into (i) To honour other organisational priorities and (ii) To tackle day-to-day challenges, including complex coordination issues.

3.4.1.1.2 To Honour Other Organisational Priorities

Routines and standard operating procedures aim to ensure safe and efficient working, promote standardisation, and achieve better coordination among connected actions and processes (Heimeriks, Schijven and Gates, 2012). However, if following a given routine undermines other organisational priorities, worsens the coordination among connected actions, or results in lower efficiency, performance or output, then there is a high likelihood of the routine being either

changed or completely ignored (Aroles and McLean, 2016; Nigam, Huising and Golden, 2016; Turner and Rindova, 2012).

In their ethnographic study of newspaper print room scenario, (Aroles and McLean, 2016) found that routines related to the dilution of ink were disregarded as other priorities, like *"getting the paper out the door, ensuring good quality adverts, maintaining damp levels"* (Aroles and McLean, 2016;pp:24), took precedence. Resonating a similar viewpoint, (Bresman, 2013) argues that teams would often change the performative aspect of a drug's medical feasibility assessment routine from its ostensive aspect in pursuit of improvements. The author quotes;

"the way it is performed (the performative aspect) often changes as a team strives to improve its execution." (Bresman, 2013;pp:37)

Nigam, Huising and Golden (2016) also cited a routine losing to other organisational priorities. In their study of medical practices in a hospital setting, discussing a case of conflict between local routines and the long-term strategic goals of the leaders, the authors quote;

"Elites supported selecting a routine for change if they considered the existing routine to have a negative effect on their goals" (Nigam, Huising and Golden, 2016;pp:561)

Oehler, Stumpf-Wollersheim and Welpe (2019) empirically demonstrated using a lab experiment that fear of adverse performance feedback is a big motivation to change. Berente et al. (2016) also found that in an ERP implementation, necessary routine changes were made by managers to avoid performance shortfall. In their study, (Vough, Bindl and Parker, 2017) also found that when employees recognise that following the current ostensive aspect of a process/ routine would fail to deliver the desirable outcomes, the employees took proactive ownership of the situation and initiated a change in the performative aspect of the routines.

Thus, among various competing routine requirements, the most critical and necessary script will likely take precedence over any other. Employees will be

inclined to change or abandon the conflicting routines to avoid defaulting on the critical process requirement.

3.4.1.1.3 To tackle day-to-day challenges, including complex coordination issues

Adaptations and changes in a routine are sometimes necessary to handle dynamic and complex operational requirements. Discussing day-to-day operational complexities and challenges surrounding competing performance requirements, Aroles and McLean (2016) quote;

"Things are much more complex and challenging than the early notion of standard routine" (Aroles and McLean, 2016;pp:24)

In a study of urban waste management routines, Turner and Rindova (2012) found that day-to-day variations and challenges often compel the organisational members to introduce routine changes. These authors quote;

"Across organisations and hierarchical levels, our informants described a host of everyday challenges…….. that interfered with performing the routine consistently" (Turner and Rindova, 2012;pp:30)

The authors provide a list of different day-to-day challenges that compel the organisational actors to introduce changes in routines. These included mechanical failures, roadblocks, changing traffic, weather and natural conditions, and employee iteration or absence. It is important to note here that waste collection employees clearly understand the ostensive aspect of the routine: how and in what sequence the waste is to be collected. The change is introduced in the performative to tackle the day-to-day challenge in executing the known ostensive.

Dittrich, Guérard and Seidl (2016) also argued that there are situations where existing routines fail to tackle the complexity and variety of everyday challenges. Thus, organisational actors enact the routines differently and adapt their actions to specific situations and performances to negotiate the complications of everyday challenges. Over time, this local adaptation led to several important changes in the original routines.

Deng and Robinson (2021) argued for routine change to handle complex coordination issues. The authors argue that certain organisations support variation and growth of routine diversity to improve performance. Describing them as ‘Fluid Organisations’, the authors further argue that compelled by the need to navigate through complex coordination requirements, these ‘Fluid Organisations’ support the pursuit of operational flexibility and encourage the growth of multiple versions/ diversity of a given routine.

The argument common to all the above examples is that actors indulge in creating multiple versions of a routine to tackle daily challenges and handle complex coordination issues.

3.4.1.2 To Correct a Design Issue

If the routine’s design or the current understanding of the routine is believed to be flawed, then the organisational actors will be motivated to trigger a change.

3.4.1.2.1 To correct misalignment

Misalignment can exist between a routine's ostensive, performative, and material aspects (Berente et al., 2016). When organisational actors stumble upon such misalignments, they respond to it by changing the routine. The change could be a formally sanctioned change to resolve the misalignment (Coyte, Emsley and Boyd, 2010) or an unofficially permitted, less than ideal, enactment of the designed ostensive that supports the drifting away of performative from the designed ostensive (Berente et al., 2016).

Organisations may have multiple variations and versions of the same routine. Among these, there may be some incorrect versions of routine that people believe or regard as part of the written procedure, but they are not. These incorrect routines are not rule-determined but are an institutionalised version of the original procedure that organisational actors have followed, believing them to be prescribed (Coyte, Emsley and Boyd, 2010).

Coyte, Emsley and Boyd (2010) found that when such incorrect institutionalised practices or routines are discovered, they are evaluated for efficacy and either changed or dismantled. In their study of accounting routines in a state-owned Australian transport firm, the authors found that when managers discovered routines that were institutionalised variations of the original procedure, they

triggered a routine change process to revert to the original version. The senior manager examined and contrasted the routine against the written procedure. If found to be misaligned, a change of routine was undertaken. These changes were sudden and not incremental. However, this only happened when these institutionalised elements of the procedure conflicted with the objectives of the actors/organisation (Coyte, Emsley and Boyd, 2010). Otherwise, this misaligned routine would have continued undetected.

3.4.1.2.2 To resolve a conflict with other routines

If an espoused routine conflicts with other routines, it is viewed as a design issue and leads to actors taking corrective actions.

Nigam, Huising and Golden (2016) found that if actors discovered a routine conflicted with other interdependent routines, it would be selected for change. Discussing the reasons for a routine being selected for change, the authors quote;

"*the existing routine, in conjunction with interdependent routines, prevented elites from achieving their goals"*(Nigam, Huising and Golden, 2016; pp:561)

Here, conflict in routines and conflict with goals are two independent reasons for change. The reason for goal conflict was discussed earlier in the 'Organisational Priorities' section. A goal conflict may or may not always involve a conflict among interdependent routines.

In another case of conflict between two routines, Labatut, Aggeri, and Girard (2012) observed that the stakeholders disregarded an expert's proposed routine because it conflicted with an existing routine. The authors found that a superior sheep breeding routine designed by the experts was changed during its implementation because it conflicted with the farmer's long-standing summer grazing practices and routines.

3.4.1.2.3 To address scepticism about the routine's design

Scepticism or doubt about the original routine design could trigger a routine change.

Stiles et al. (2015) found that doubts and reservations towards the new routine design prompted managers to introduce changes for cases of a newly implemented people's performance measurement and appraisal routine.

Labatut, Aggeri and Girard (2012) also found that some actors were adamant about introducing variations in the original design as they believed their variation was better than the original design.

Exogenous factors could also fuel scepticism about a routine. Cacciatori (2012) found that an engineering firm changed its project bidding routine due to growing scepticism and doubt about the current routine. The scepticism about their existing routines was fuelled by changes in the government's contracting procedures and some price cuts by competitors. This scepticism led to changes in the bidding routine.

3.4.1.3 To Gain Additional Benefits

If a change in the routine can lead to additional benefits, then the organisational actors will be inclined towards changing the routine.

3.4.1.3.1 To innovate or improve the existing processes

The job of an SOP or Routine is to support efficient working. However, if the organisational actors realise that a change in routine is necessary for improvement, they would seek an opportunity to innovate and improve the existing routine/s.

Bresman (2013) observed this behaviour in their empirical study of the processes related to new drug development. Bresman (2013) found that if a team lacked the expertise or knowledge of a possible drug testing approach, the team would look elsewhere to adopt a new routine. This new routine will replace or change their existing practices. The author calls the group willing to adopt a routine as "seeker" and the group from which an existing routine is adopted as "source" (Bresman, 2013; pp:43)

The desire for improvement is sometimes driven by a desire to find a novel or better way of working. Bresman (2013) also found that project management

teams would often change routines if the change could improve quality or speed up the processes related to the project. The author found that actors under intense time pressure will try to adopt a change that saves time. Time pressure and penalties/costs associated with failure to produce on time were also cited by Aroles and McLean (2016) as a reason to adopt or change a routine that interfered with these performance requirements.

The willingness to improve and innovate through routine change has also been observed in other sectors. Deslée and Ammar (2016) found that for operational improvement and to develop a customer-oriented approach, a French railway company resorted to a process of routine change. This French railway company implemented a decentralised mechanism to entice process innovation and routine change. Creating autonomous local, regional, and national decision centres resulted in the structured innovation of routines.

Deken et al. (2016) also observed a routine change driven by a need for innovation. The author and her colleagues demonstrated that situations require actors to "intentionally strive for novelty" (Deken et al., 2016;pp:659). In their empirical study of an automotive company, the authors posit that the purpose of this search for novelty or routine change could be driven by competitive pressure and the need to innovate.

3.4.1.3.2 To achieve economic benefit

Economic factors often play a significant role in bringing about a change in routines.

Labatut, Aggeri and Girard (2012) found that the participating farmers of a superior sheep breeding program changed the specialist-recommended procedure because doing so had an economic benefit. The awareness that the farmers gained from the artefacts of the routine (the genetic index/score of breeding animals) provided them with an economic opportunity.

The original design of the routine was that every farmer would buy superior breeding semen from the breeding company. However, the farmers changed their routines due to the newly discovered economic potential. As a result, some

farmers started a parallel business of providing superior animals for breeding, and others started to buy breeding samples from these new sources.

3.4.1.3.3 To exploit an ambiguity in the routine template

If the actors perceive that a routine supports ambiguity, they might exploit that ambiguity to enact their favourable interpretation of the routine. While studying HR routines, Stiles et al. (2015) found that managers used cognitive ambiguities in the routine template to reframe the routine in practice. Stiles et al. (2015) found that ambiguities related to language, clarity, intent for the proposed schema, and the expected outcome from adopting the routine made the managers lose trust in the routine. They used the same ambiguities against the espoused routine and initiated changes as they deemed fit. These interpretations or changed versions are often founded on the manager's perception of what changes will promote efficiency.

3.4.2 Conducive Conditions to Routine Change

The search for the answer to the question ‘why routines change’ revealed that changes were often accompanied by conditions supporting deviating from the prescribed procedure. When such conditions were present, the actors found it easier to change an existing routine.

Dittrich and Seidl (2018) put forward a few conditions that support a routine change. The authors argue that for conditions where actors are familiar with the situations at hand and the organisational objectives are more salient, the actors will foreground or give prominence to the final goal/organisational objective and use any means to help achieve it. Here, objectives being salient means that the organisation prioritises pre-defined goals.

There could be more organisational conditions, apart from the familiarity of the situation and imposing goals. This BSLR categorised the contextual conditions-related findings into the following themes: (i) Skills and knowledge, (ii) Process ownership, and (iii) Specification clarity.

3.4.2.1 Skills and knowledge

Gaps or enhancements in the skills and knowledge of the actors can trigger a routine change.

3.4.2.1.1 Change in the Knowledge/ Experience of Routine Participants

A change in the knowledge or experience of the routine participants often triggers the process of routine change.

Suppose organisational actors move to different organisational functions/subunits or domains. In that case, this cross-functional experience and knowledge often help them see the deficiencies and shortcomings in the ongoing routines (Chen, Guo and Zhao, 2021).

Chen, Guo and Zhao (2021) found that assigning managers from the finance function to the procurement department helped improve procurement routines. The cross-domain, cross-functional knowledge that finance managers brought to the procurement function helped re-evaluate and change the ongoing procurement routines. Thus, awareness of interdisciplinary innovations and cross-functional knowledge can trigger the process of routine changes or reconfiguration In their study about the experience of actors and variability in performance, Turner and Fern (2012) also highlight the role of cross-domain experience and knowledge in bringing about routine changes.

3.4.2.1.2 Insufficient skills/training/experience

The skills and experience of the actors have been cited as a reason for a routine change.

Pentland, Hærem and Hillison (2011) found in their study of the accounting routines that factors like the experience of participants and the degree of automation triggered changes in routines. The authors quote;

"It may be that the less experienced people do things that the system is not necessarily appropriate for or cause the system to do different things". (Pentland, Hærem and Hillison, 2011; pp:1379)

The authors further argue that this prevailing condition of unskilled and inexperienced actors can be addressed through automation. Automation can help enforce standardisation.

3.4.2.2 Process Ownership

Conditions surrounding process ownership also shape the process of routine change.

3.4.2.2.1 People with authority over a given routine support change

It is often seen that there is a selectivity dimension to a routine change. Nigam, Huising and Golden (2016) found that among the routines that are likely to undergo a change, only a selected few actually change. The authors argued that a change needs to have the support of the decision-makers.

In their study of call centre employees of a United Kingdom-based multinational energy-supplying firm, Vough, Bindl and Parker (2017) also found that the backing or support of the senior management was essential to change the routine. The authors found that if organisational actors desired to implement a change that could improve work processes or outcomes, the change was only possible once it had the support of senior management.

3.4.2.3 Specification Clarity

Contextual conditions of having vague and unclear routine specifications will support the change of routines. A convoluted understanding about the constituting elements and steps of the routine, such that it's ostensive, will lead to the proliferation of varied performative versions of the routine.

In the context of accounting practices, Coyte, Emsley and Boyd (2010) observed that some capital expenditure evaluation rules and procedures underwent incremental changes while enacting or reproducing them. The authors found that the changes in the routine were a consequence of varied interpretations that originated from the ambiguity and the imprecise nature of the routine template.

3.4.3 How Routines Change

The previous section of this paper presented the reason that triggered or supported a routine change. The following section dwells on the process and dynamism of the change.

3.4.3.1 Outward-driven process of routine change: Learning, observing, or copying

To initiate the change process, routine participants/stakeholders could engage with either communities/teams from within the organisation (Bresman, 2013), or communities external to the organisation (Bertels, Howard-Grenville and Pek, 2016). Alternatively, the organisational actors could also adopt a required change through knowledge exchange between functional or cross-domain communities within the organisation (Cacciatori, 2012; Chen, Guo and Zhao, 2021).

A routine change adopted from external sources requires an element of learning, copying, or imitating (Annosi et al., 2020). This paper identifies the process of learning, imitating or copying a routine as a mechanism of externally driven routine change. This externally driven routine change could be brought about in the following ways; (i) Copy from other teams/communities within the organisation, (ii) Cross disciplinary experience leads to innovation, (iii) Adopted from external communities.

3.4.3.1.1 Copy from other teams/communities within the organisation

The paper by Bresman (2013) proposes a four-stage cyclic process of adopting from another routine, where a group (seeker) adopts an existing routine from another group (source) from within the organisation. The author identifies these four stages as; (i) identification, (ii) translation, (iii) adoption, and (iv) continuation.

In his study of new drug development routines, Bresman (2013) identifies two kinds of identification behaviour: problematic search, where seekers search for a source in response to a specific need, and anticipatory search, where seekers search for routines in anticipation of future problems. For clearly articulated or known problems/issues, the actors follow a behavioural path that resembles (Cyert and March, 1963) conceptualisation of *"Problemistic search".* In this type

of approach, in response to a specific need/problem, seekers search for a source that may have an established routine capable of addressing the seeker's need.

While if the problems or issues are unknown to the seeker, the seeker will adopt an "Anticipatory search" (Bresman, 2013). Anticipatory search is triggered in response to anticipated problems or issues that may be unknown to the organisation. To explain the "Anticipatory" search process, (Bresman, 2013) cites an example of a team working on licensing/approval procedures for a new class of drugs. The team had yet to gain experience with this new class of drugs. That is why they could not foresee the problems or issues they could face as they moved forward. Without clarity on future issues, the team sought external expertise/ knowledge and routines relevant to possible future issues and problems. This search was driven by anticipation.

The next stage of change is about adopting an external routine and contextualising it to one's needs. The adoption stage is complex, as the prevailing organisational context and operational complexities constrain the process of copying a routine. Bresman (2013) argues that depending upon the need and context, actors may either copy an exact routine or proceed with a conceptual or, in principle, imitation. Conceptual imitation is about extracting best practices and common principles from another routine.

Apart from exact replication and, in principle, imitation, Bresman (2013) identified another form of copying behaviour; the trial-and-error replication process. The author argues that some situations demand the actors to develop a tacit skill associated with the routine. Because of a need to develop tacit skills, people may engage in a trial-and-error replication process.

Once the routine is identified, adopted, and contextualised, it must be continued. Bresman (2013) defines continuation as;

"group relies on an enacted routine change until the conclusion of a project without further alteration." (Bresman, 2013; pp:52)

The author argues that the continuation of a changed routine depends on observed outcomes. The observed outcome could be a direct experience related

to the success /failure of the routine or an indirect experience learned from external sources such as the experience of other groups. The relationship between directly observed positive/negative outcomes and the continuation of a routine is relatively well-argued in the literature (Feldman, 2000b; Feldman and Pentland, 2003). However, Bresman (2013) extension to the argument relates to empirical evidence about the influence of indirect experiences over direct ones.

The author argues that if the 'source' (group from which the routine was copied) is trusted and highly regarded, then despite direct adverse experiences, 'seekers' will continue with the copied routine. Figure 10 presents the complete process of Bresman's (2013) mechanism of copying a routine through imitation.

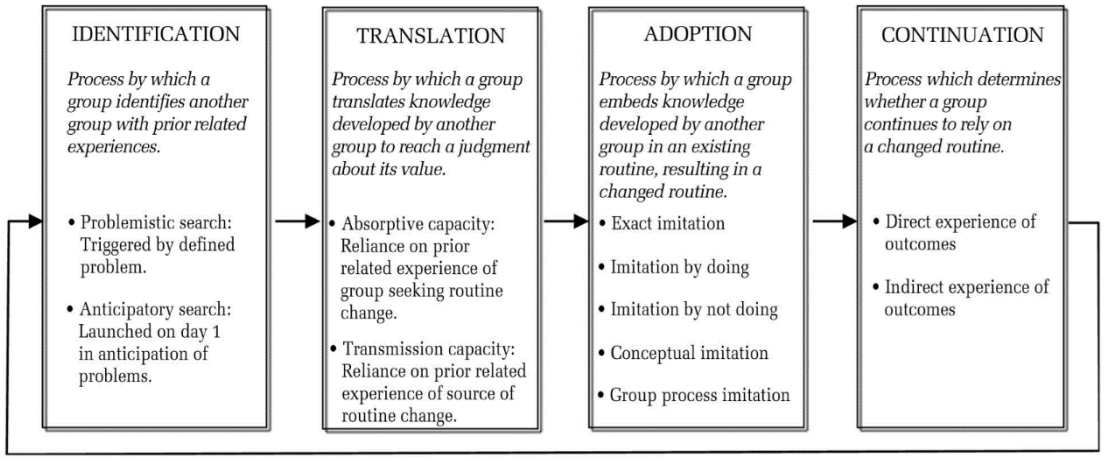

Figure 10: Process of changing a routine through imitation

Source: (Bresman, 2013)

3.4.3.1.2 Cross Disciplinary Experience Leads to Innovation

In their research, Chen, Guo and Zhao (2021) found that internal job rotations provided a context and opportunity for managers to bring about innovative changes. The authors found that managers rich in cross disciplinary experience can see through the deficiencies of existing routines and are also able to use their cross-experiential domain knowledge to bring about innovations. Citing an example of a finance manager improving procurement routines, the author argues that the process of routine change in such a situation will begin with identifying deficiencies, reviewing alternatives and testing innovative alternatives.

Chen, Guo and Zhao (2021) posit that cross-disciplinary exposure helps managers review, scrutinise, critique, and ultimately change their existing routines. Using a theoretical lens of routines as trajectory, the authors suggest three stages of routine change Figure 11.

The first stage is 'knowledge combination'. In this stage, the organisation encourages and facilitates the process of knowledge exchange and distribution among cross-functional business units. This distribution or exchange of knowledge could happen through internal job rotation, cross-functional collaboration, or training about unfamiliar domains.

In the second stage, actors reflect upon their existing routines and practices using the newly gained knowledge or perspective. At this stage, actors scrutinise or critique their existing routine and evaluate alternative possibilities. Once actors have recognised the required changes, they proceed to the final stage of implementing the envisioned routine changes and reviewing its outcomes. At this stage, actors experiment and test the changes in their work settings and appraise the results of the changes. Positive results will ensure that the change gets regularised as a legitimate practice.

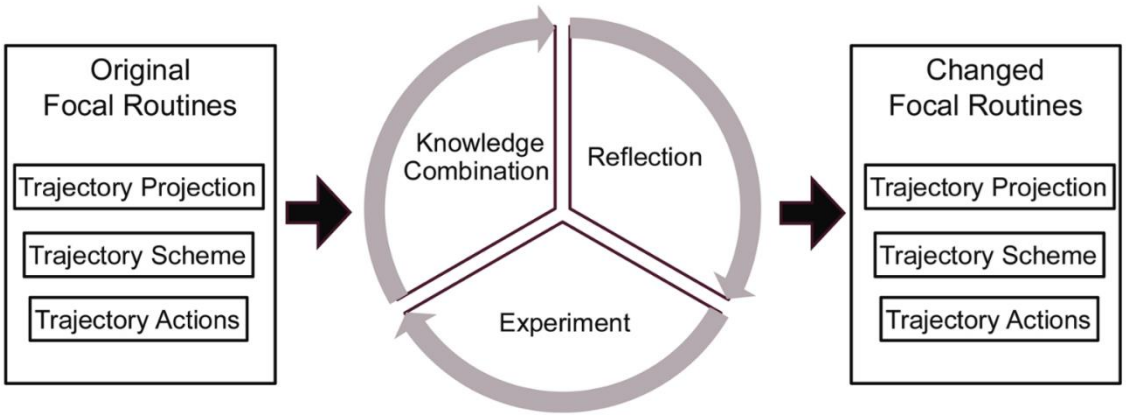

Figure 11: Routine change due to the change in the cross-functional cross-domain knowledge of actors.

Source: (Chen, Guo and Zhao, 2021)

3.4.3.1.3 Adopted from communities external to the organisation

Glaser (2017) investigated the process of routine adoption from communities external to the organisation. While studying counter-terrorism detection routines,

the author found that the process of routine change starts with actors drawing on similar or analogical routines from external communities. Then, these analogical routines are contextualised to the organisation's context using a design performance framework. Glaser (2017) proposes a five-step process to operationalise the design performance framework.

First step: To *abstract the grammar of action* for the routine to be copied.

Second step: Evaluate and *compare assumptions* associated with the current routine and the routine that is being copied from an external community.

Third step: Find ways to *distribute the agency* of performing the routine between humans and artefacts.

Fourth step: Formalise methods and means to *appraise outcomes* associated with the copied routine.

Fifth step: The apprised outcome and the copied routine *are inscribed into an assemblage* of theories, artefacts, and practices for the actors to use.

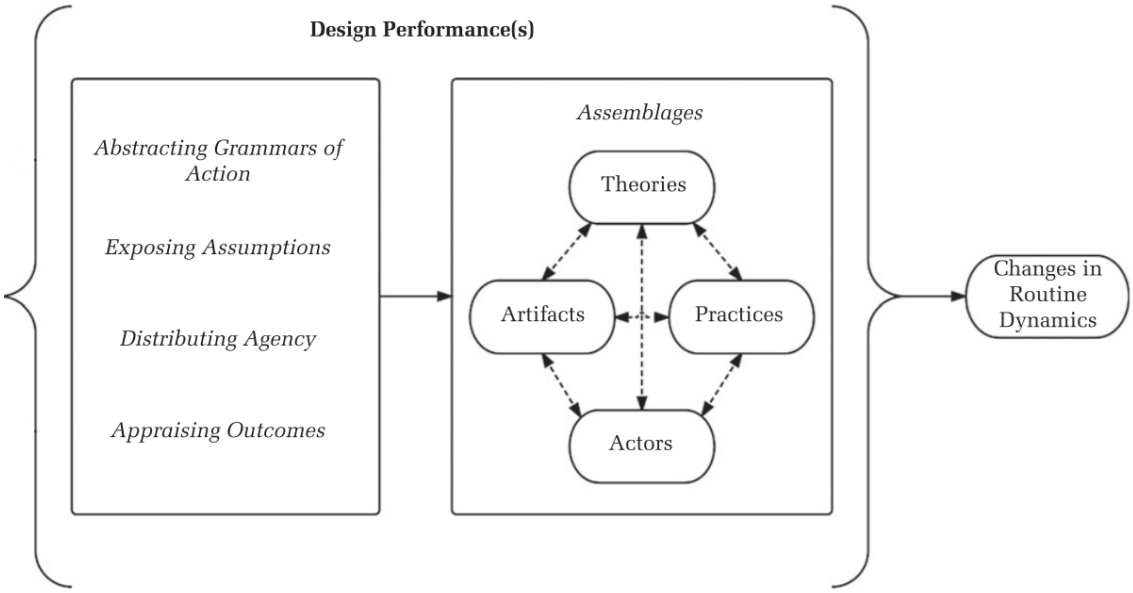

Figure 12: Routine change adopted from external communities

Source: (Glaser, 2017)

In the three processes detailed above, the change in routine resulted from external influence. However, not all changes are driven externally. In literature, routine changes have also been argued to be adaptive and evolutionary changes

that are internally driven (Feldman and Pentland, 2003) and directed at bringing about an improvement (Desai, 2010; Miner, 1990). The following subsection details an inward-driven process of routine change.

3.4.3.2 Inward Driven Process of Routine Change

Organisations are committed to continuous improvement, and in that pursuit, they often review and improve their existing routines and practices. Improvement could be brought about by structured innovation or collective reflection (Miner, 1990).

3.4.3.2.1 Structured Innovation through decentralised autonomous actions

Deslée and Ammar (2016) found that routines in a French railway company changed through a progressive structured innovation process. The change happened because organisational actors indulged in decentralised autonomous decision-making at local, regional, and national levels. The dynamism of this change takes a routine through a path of a decentralised process of structured innovation. This process of routine change through structured innovation requires autonomous decision-making at various organisational levels. This is expected to be a slow and extensive process permeating various organisational levels and structures.

3.4.3.2.2 Collective reflection

Dittrich, Guérard and Seidl (2016) found that conversation and collective reflection are critical for routine change. The authors argue that reflective conversation about a routine's past performance can help identify issues and conflicts that the existing routine might have with ongoing situations. In addition, a reflective conversation among routine participants will help organisational actors explore and envisage the necessary changes that can make existing routines better at handling specific day-to-day challenges.

The enactment of change goes through three stages. Dittrich, Guérard and Seidl (2016) call these steps (i) 'Naming and Situating', (ii) 'Envisaging and exploring',(ii) 'Evaluating and questioning' (Dittrich, Guérard and Seidl, 2016; pp:4)

To begin with, conversation among routine participants helps articulate or name the issues with the existing routines and situate them in the particular aspect of current performance. This is followed by the step where conversation helps envisage and explore the alternative course of action. The final stage of the change is where organisational actors review and critique the changed routine.

Dittrich, Guérard and Seidl (2016) argue that although procedures are under ongoing changes, the process of reflective conversation still helps participants maintain recognizability and continuity between the old and the changed routine. This is helpful to provide legitimacy for future enactment of the changed pattern.

Turner and Rindova (2012) also found empirical evidence for routine change through conversation and communication. The authors found that the increased interaction, communication, and amalgamation of the crew played a defining role in changing the routines.

3.4.3.2.3 Interrelations and relative positioning of routines

Labatut, Aggeri and Girard (2012) found that understanding a routine in the broader context of ongoing practices and routines could help implement changes in the ostensive and develop a new pattern of performative actions. When the sheep breeding farmers found that the superior breeding routines, suggested and designed by technical experts, conflicted with their summer sheep grazing practices, the farmers found a way to develop a new pattern of action within the breeding routine that aligned with their existing practices. Understanding the system of routines helped change the design of the breeding routine.

3.4.3.2.4 Striving adamantly

The interrelation argument presented above was driven by a need to position a new change within the existing practices. The actors had no other ulterior motive to suggest the change. However, the change process could be very different if the pursued routine change is associated with the personal benefits of the actors. The change could be much more abrupt and fiercely/adamantly pursued. Labatut, Aggeri and Girard (2012) found that some participants strived or adamantly demanded a change in the routines. In the farming breeding routine

case, Labatut, Aggeri and Girard (2012) came across a group of breeders that pushed the breeding company to share the genetic data about their animals. Data that was not to be shared. However, the adamancy of these protesting farmers compelled the focal firm to change their original procedure and start sharing genetic data with the farmers. This pursuit for change in the routine by the breeding farmers was motivated by economic reasons.

3.4.3.3 Self-Propelled Growth of Routine Variation and Diversity

3.4.3.3.1 Case of Imprecise Rule/routine

In their study, Coyte, Emsley and Boyd (2010) found that a set of capital expenditure evaluation rules and procedures underwent incremental changes during enactment and replication. Elaborating the process of this routine reconfiguration, authors posit that for situations where the prescribed routine is imprecise and it's impossible to specify precisely, ex-ante, the precise set of actions or activities to be performed, the situation turns into a loose coupling. Such routines are susceptible to incremental changes and decoupling from the original procedure, creating multiple variations and versions of the same process. These various interpretations and versions of the routine gradually become institutionalised and regularised over time.

3.4.3.3.2 Varying interpretations to cope with a variety of technical requirements and decision contexts

General understanding about routines is that at the onset, written procedures and their enactment are more likely to be tightly coupled. If multiple variations and versions of a given procedure exist, then these variations would have evolved gradually, slowly, and incrementally over time. But, for the existence of multiple routine versions and variations, Coyte, Emsley and Boyd (2010) have an alternative thesis. The authors suggest that multiple routine versions/variations of a procedure only sometimes indicate that the written procedures and their enactment started as tightly coupled and then gradually became loosely coupled or less aligned. Instead, from the onset, the inherent imprecision in the written procedure supports the proliferation of varying interpretations. Elaborating upon the process, Coyte, Emsley and Boyd (2010) argue that when organisational

actors come across imprecise or vague SOPs, they try to fit or contextualise them to varying decision contexts and technical/ operational requirements. This context fitting leads to different versions of the same routine that continue to exist.

3.4.4 Summary

This section presented thematically organised literature findings for the review question, “How and why do routines change?”.

The findings indicate that organisational actors sometimes consciously and deliberately introduce routine variations and changes. Changes are introduced when organisational actors perceive that following a prescribed routine might lead to a performance shortfall or it might interfere with their capability to deal with dynamic and complex operational requirements. A deliberate reconfigure or variation in a routine may also occur if organisational actors perceive the routine to have a fundamental design flaw.

Another kind of deliberate reconfiguration may happen if actors want to gain some additional benefit than what the original routine was designed to deliver. It is important to note here that neither the routine has a design flaw nor is it incapable of delivering what is expected. The sole purpose of the variation is to either achieve additional economic benefit or to bring about an innovation.

Qualitative analysis of the selected scholarly articles also revealed that changes were often accompanied by additional conditions that supported the change. Changes in routines were contingent upon the actors' skills and knowledge, issues related to process ownership, and the inherent ambiguity/impreciseness of the routine description.

The answer to the how routine change question was found to be intertwined with the way the routine change or reconfiguration occurred. The change followed different trajectories based on whether the change was outward-driven, inward driven or self-propelled.

The outward-driven routine change process was either adopted from other organisational functions or from communities external to the organisation.

Inward-driven change had aspects of collective reflection and structured innovation. In this type of reconfiguration, the organisational actors themselves conceived and executed the change.

Self-generated or self-propelled routine variations happened for instances where there were ambiguities in the routine template, or there existed a degree of impreciseness in the routine description that led to varying interpretations.

In the next section, this BSLR discusses the review question linking routine change to safety-related outcomes.

3.4.5 Routine Change and Safety

Before I discuss the literature on routine change and safety, it will be important to note that none of the selected journal articles for answering the "how and why routine change?" question considered safety as a context or a construct of interest in the phenomenon of routine change. Thus, to relate the findings of this section with the above section, it would be necessary to compare or draw logical parallels between the two literatures.

Literature on safety acknowledges that routine changes can lead to safety negative outcomes (Ahmed et al., 2020; Li et al., 2016; Pagell et al., 2015; Shevchenko et al., 2018). It is argued that changes in tasks, procedures, or routines might propagate risk from one step to another (Li et al., 2016). Literature on safety associates these procedural changes as either (i) Undesired or (ii) Deliberate reconfiguration.

3.4.5.1 The Undesired Routine Changes

Some undesired procedural changes happen because of a lack of training, lax attitudes, and adverse work behaviours (Edwards and Love, 2016). Procedural changes may be triggered by the operator's awareness of safety procedures, incorrect information cards or artefacts, missing or incomplete procedural drawings or instructions, irregularities in following repair or inspection procedures, or insufficient supervision (Li, Yoo and Zhang, 2016).

Edwards & Love (2016) argue that competency assessment and periodic review of competency training can address the issue of undesired routine changes. In

their study of contractors from the UK's utility sector, Edwards & Love(2016) found that adequate supervision could help correct lax attitudes and adverse work behaviours learned on the job.

Undesired changes can also be addressed by carefully designed artefacts like a written guide on procedural lifecycle management. Ahmed et al. (2020) argue that a procedure guide organised according to the procedure life cycle could help manage procedural changes and positively impact safety. A procedural guide could follow a framework that proposes a continuous review of procedural use through four stages of its lifecycle: (i) procedure design/redesign, (ii) procedure administration, (iii) procedure implementation, and (iv) procedure review/ maintenance. Developing written guides using this framework could address safety concerns and help manage routine change.

A guideline on procedure design would provide an appropriate level of detail about procedural goals, prerequisites, actions and intermediate tasks, and challenges/ safety concerns associated with the task (Ahmed et al., 2020). Aspects of procedural administration should have details on approvals, training, stakeholder engagement, methods of data collection for the process, and process-related audit/checklist/signoffs and ownership.

A clearly designed written guide on procedural lifecycle management could act as an overarching mechanism to address all aspects of undesired routine changes.

3.4.5.2 Deliberate Reconfiguration to Manage Operational Priorities

Production over prevention is a well-known phenomenon. Driven by competing production/ operational priorities, actors are forced to deviate from or change the prescribed procedure. In line with this argument, for the context of large-scale production facilities, Shevchenko et al.(2018) found that routine changes were driven by actor's fixation on day-to-day concerns regarding production and operational issues. The trade-offs that actors made between safety and production targets, such as getting the work done or getting it done safely, were often the cause of unexpected variance in the routines. The case of safety vs.

operational effectiveness is also addressed by Pagell et al. (2015). The authors argue that this trade-off of safety vs. effectiveness is driven by an organisation's choices regarding its production-related routines. The author argued that managers prioritise safety or operations based on the culture and value priorities of the organisation.

Pagell et al. (2015) suggested that organisations can change these priorities from contradictory to complementary by creating a joint management system (JMS) of operational and safety routines. A JMS can simultaneously engage with designing, monitoring, and communicating both the operational and safety requirements. These systems are better equipped to handle changes in routines and can deliver a safer, more effective, and more stable system. Shevchenko et al. (2018) also argued that the presence of JMS helps define formal processes to handle variances and changes in routines.

3.4.6 Routine Change from Aerospace, Oil and gas, and Manufacturing Sectors

One of the objectives of the BSLR was to synthesise findings from papers that mainly investigated routines and change from Aerospace, oil and gas, and large-scale manufacturing sectors. However, the systematic review process yielded very few papers (five research articles) where the research focused on routines and change from the Aerospace, oil and gas, and large-scale manufacturing sectors.

The scarcity of papers in this thematic intersection of specific sectors and routine change literature indicates that very few research endeavours have focused on studying routines from this perspective. This is an exciting finding as, in comparison to routine literature, the safety and accident literature has a very high percentage of papers that focus on the Aerospace, oil and gas, and large-scale manufacturing sectors. Predominantly, change in routines has been studied for noncritical and mundane organisational tasks associated with procurement (Berente et al., 2016; Chen, Guo and Zhao, 2021), accounting (Coyte, Emsley and Boyd, 2010; Pentland, Hærem and Hillison, 2011), IT projects (Bresman,

2013; Cacciatori, 2012), or garbage/ waste collection (Turner and Fern, 2012; Turner and Rindova, 2012).

For a case of large-scale manufacturing, (Ahmed et al., 2020) proposed an approach of writing guides and procedures for routines. The authors suggest that dividing the procedure guide into subsections associated with (i) procedural design and development, (ii) procedural implementation, (iii) procedural administration, and (iv) procedural review would improve safety and compliance with routines.

The initial design and development section is very important in the above argument. (Alhadeff, Da Silva and Reis, 2012) Argue that if there are problems with the initial design, then the project will need innovative solutions in the implementation phase. Discussing the implementation phase of ergonomic routines in petroleum companies, (Alhadeff, Da Silva and Reis, 2012) state that due to *"changes in technology, lack of initially specified material, lack of technical feasibility or cost", it might be necessary to adopt* practical solutions. The argument resonates with the practical action argument of Snook's(2002) theory of practical drift. The dimensions listed by (Alhadeff, Da Silva and Reis, 2012) could be seen as factors driving practical action. (Alhadeff, Da Silva and Reis, 2012) further argue that the participation and support of leaders and higher management are necessary to implement routines and changes.

(Edwards and Love, 2016) argues that despite having the best-designed guidelines and practical solutions, the onsite managerial practices might elevate safety risks. Discussing the use of heavy industrial equipment, the authors empirically inferred those deficiencies in training, monitoring and enforcing safety protocols led to safety hazards.

All the above research papers emphasised the need for a dedicated structured approach to design and implement routines. However, positive changes in practices and procedures will not always require a dedicated, structured program. In a case of a large global manufacturing firm, (Kandora, 2018) found that reverse flow of knowledge and information through regular communication and interaction

among central business units and local communities could facilitate routine changes and adjustments.

The thematic findings from the literature review on routines and industrial sectors provided similar arguments to the arguments discovered in the wider literature on routine and change. These include the reason for the change being design issues and the condition for change being managerial support.

3.4.7 Practical Drift

The theory of practical drift by Snook (2000) refers to the development of localised cultural norms in which, driven by or being fixated on localized action or localised procedural demand, actors tend to ignore the wider system level consequences. The author observed that to address practical operational demands, actors' resort to local and apparently innocuous modifications of system procedures that are potent for causing disastrous failure.

In the recent literature, the theory of Practical drift usually finds a cursory reference along with other theories and models related to *"gradual, adaptive degradation"* (Busby & Bennett, 2007; pp:06) of procedures leading to catastrophic failures. Often cited along with Reason (1997), Rasmussen (1997), Vaughan (1996), and Snook's (2002) theory of practical drift adds to the extensive debate of actions gradually and almost invisibly moving towards the boundary of safe operations.

Citing the theory of practical drift, Lehman & Ramanujam, (2009) argued that an initial, one-off instance of routine violation could amplify due to a gradual but increasing propensity to take risks and to indulge in conscious violation of procedures.

Ortmann (2010) compares the drift to a subtle movement and argues that the phenomenon of Practical drift has some similarities with the phenomenon of path dependency. The author suggests such a phenomenon is undetermined by the intentions of actors, originates out of some small event, and tends to develop an independent direction that may be difficult to detect, foresee or control using intentions existing organisational mechanisms, or procedural blueprints. Often

the local feedback mechanisms strengthen and legitimise such practices that may be locally efficient but systemically dangerous or harmful.

Roeschmann, (2014) sees practical drift as a condition when different groups within the organisation harness different assumptions regarding the same rule, practice or routine. These assumptions are embedded in a social context.

Anderson et al. (2020) observed in the context of Offshore oil and gas production that reliance on social context, social organisation and social practice tends to influence the adaption of normalised, habitual and drifted practices. Drawing on the phenomenon of practical drift, the authors argue that although actors think that they are deliberating their localised actions using intelligent and optimised calculations, these calculations and understanding the risk associated are embedded in a social context. Anderson et al. (2020) further argue that practical drift sets in because, according to actors' calculations, the ecological validity of some rules makes them superfluous, and the actors resort to adaptations.

3.5 Discussion of BSLR

Organisational routines have long been argued to demonstrate a property of inertia. In pure sciences, Newton's law of inertia claims that due to inertia, "*An object at rest remains at rest, and an object in motion remains in motion at a constant speed and in a straight line unless acted on by an unbalanced force*" (NASA, 2023)

Drawing a parallel between routine inertia and Newton's inertia, one could argue that a routine should continue unchanged unless there is some restructuring or resistance force. From an organisational perspective, these forces are represented by the factors that upset the status quo of an existing routine script. being pursued. The literature review on organisational routines revealed factors that disturb the flow of routinised actions and thus trigger a change or restructuring of a given routine. A list of these factors is provided in table 13. To give a meaningful

Table 13: The reasons associated with routine variation/change

Sno.	Citation	Factors or forces contributing to routine change
1	(Bresman, 2013)	Organisational actors change routines to solve known or unknown future problems. The change is driven by an anticipatory search to improve the outcomes.
2	(Chen, Guo and Zhao, 2021)	Reflection on best practices results in an innovative reconfiguration/ improvement of the existing routines.
3	(Coyte, Emsley and Boyd, 2010)	Members need to be made aware that some elements or parts of a given routine are not prescribed in the original written procedures. They are resulting in variations in the performative.
4	(Deslée and Ammar, 2016)	For achiving structured innovation.
5	(Glaser, 2017)	To test new innovations, and for experimenting with new scenarios.
6	Dittrich, Guérard and Seidl, 2016)	The routines changed as the organsiation was relatively young and was aspiring to grow and create new ways of doing things.
7	(Turner and Rindova, 2012)	Increased interaction, communication and amalgamation for day-to-day variations and challenges often compel the organisational members to introduce changes in the routines.
8	Deng and Robinson, 2021)	Need to navigate through complex coordination requirements causes routines to change or routine diversity to develop
9.	(Nigam, Huising and Golden, 2016)	Decision maker support routine change when existing routine conflicts with their organisational goals.
10.	(Oehler, Stumpf-Wollersheim and Welpe, 2019)	Performance feedback and task complexity induced a change.
11.	(Pentland, Hærem and Hillison, 2011)	Routine change occurs when *"boundaries between steps are less rigidly structured and enforced"* (Pentland, Hærem and Hillison, 2011;pp:1380)
12.	(Stiles et al., 2015)	Existing ambiguities/ Scepticism in the routine schema gives opportunity to the organisational members to exploit the situation and reframing the routine.
13.	(Turner and Fern, 2012)	Role experience plays in bringing about changes in a routine**.**
14.	(Vough, Bindl and Parker, 2017)	Changes occur because elites and senior management support them.
15.	(Labatut, Aggeri and Girard, 2012)	The development and implementation of technology cause routines to change.
16.	(Berente et al., 2016)	Routines dynamically adjust/change to enable stable system implementation.
17.	(Aroles and McLean, 2016)	Routines change to accommodate competing performance objectives or to meet critical performance requirements.
18.	(Blakçori, Aroles and Blakçori Senior Lecturer in Business, 2021)	Managerial actions and feedbacks trigger a routine change
19.	(Yang and Lim, 2018)	Temporary incentives prompt a routine change

taxonomical categorisation of these factors, I assigned them into themes and categories. Figure 13: Summary of themes on why and how organisational routines change provides a consolidated view of these themes and categories.

The factors linked to an organisational actor's motivation or willingness to change a routine were named "Actors had a Purpose". These were driven by the beliefs and aspirations of individuals and resulted in an endogenous change in the routine.

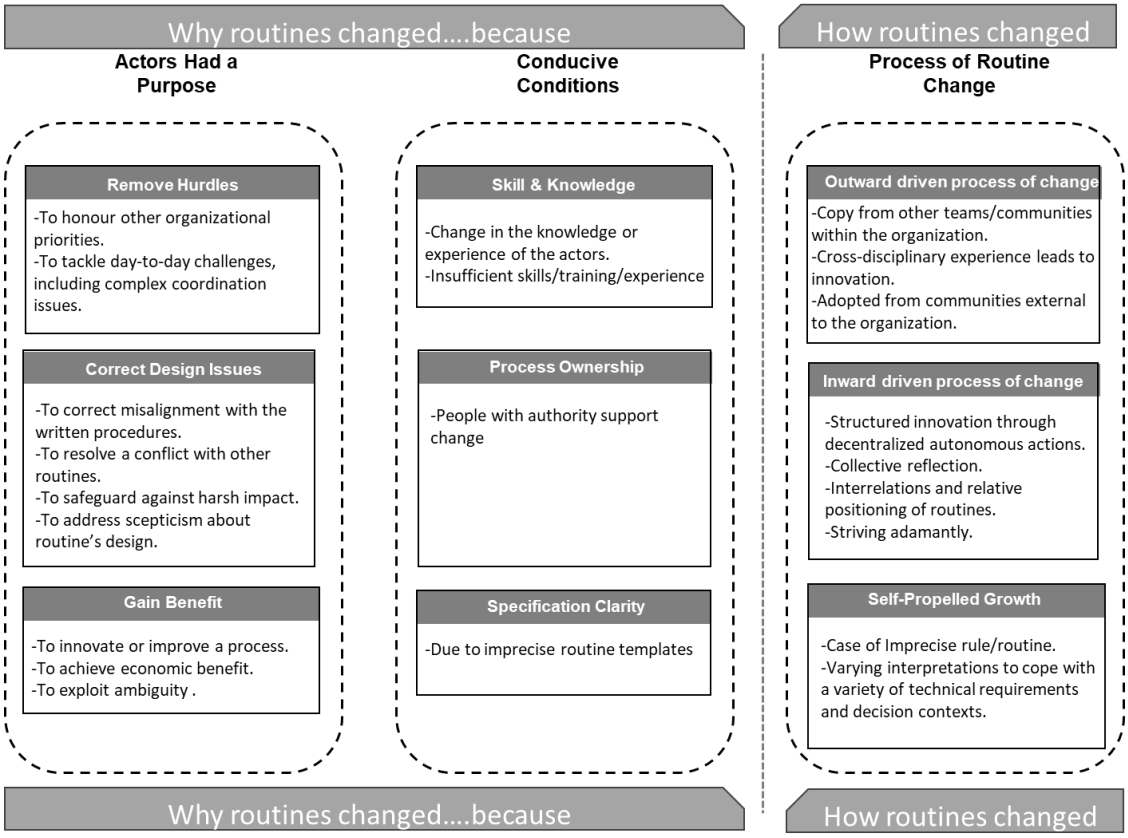

Figure 13: Summary of themes on why and how organisational routines change

These aspirational motivations of actors were the factors that directly influenced the actors to consciously change, restructure or disregard a given routine script or template. In doing so, the actors were fully aware of their actions and took informed decisions regarding trade-offs related to such routine changes. A second kind of organisational routine changing factors was found to be linked to the prevailing landscape of organisational or environmental conditions.

It is important to observe here that very limited discussion of external, organisational or environmental factors was present in the literature. Another observation from this literature review was that all the discussions in the literature regarding impact of routine changes, were focused on positive benefits for operations, performance and outcomes. None of the papers discussed any potentiality of harm or negative cascading effects of such localised routine changes. It was unsettling to find that none of the papers discussed any form of connection or relevance of such changes to safety related outcomes. The literature on organisation routine change was almost oblivious to the negative or harsh impacts of such changes. Another key observation of the review was that very few papers focused on the pathology of routine change, such that only a few papers directly investigated why and how routines change. Most of the why and how arguments extracted from the literature review were not the prime focus of the papers. The answer to the why and how questions were either cursory or a part of indirect/sideline discussions.

The overlapping literature on Safety and routine change also revealed some key insights. In terms of the findings from this literature, similar to the routine change literature, procedural changes investigated in the safety literature could also be categorised as; ‘Undesired’ and ‘Deliberate’.

It was found that operators unknowingly introduced undesired procedural changes due to issues linked to lack of training, insufficient or incomplete procedural specifications or due to incorrect/incomplete procedural drawings, instructions, or related artefacts. It was also suggested that a procedurals change can also be accidently introduced due to an incorrect work behaviour or attitude.

Findings categorised under deliberate changes were driven by the underlying philosophy of Production over prevention or safety vs operational effectiveness. Driven by competing production/ operational priorities, actors were forced to deviate from or change the prescribed procedure. Conscious and deliberate trade-offs were made between safety and production targets. Often the pressure to get the work done over safely resulted in unexpected variances in the routines.

An important observation was that changes in procedures and routines were studied in the context of safety procedures and routines. None of the journal articles investigated the link between routine change and safety for SOPs and routines that were not directly linked to safety procedures or requirements.

The search for literature on Snook's (2002) theory of 'Practical Drift' revealed very few papers. Most of them cited the theory of practical drift alongside a discussion of work related to Reason (1997), Rasmussen's (1997), and Vaughan (1996) . The mention was almost always a passing reference or cursory mention while discussing the phenomenon of actions gradually and almost invisibly moving/ drifting towards the boundary of safe operations. To the best of my knowledge, none of the papers presents a detailed and thorough list of factors and contextual conditions related to the grain of drifted action I intend to investigate. My phenomenon is similar to practical drift, and the same could be said about the current literature on 'Practical Drift'.

I summarise these observations into five key findings.

Key finding 1

The literature on why and how routine change is far from maturity. The current understanding of pathologies of routine change needs to be revised. The field can benefit from empirical efforts to extend and consolidate the factors connected to routine change into meaningful themes and categories.

Key finding 2

There is a need to gain a deeper understanding of organisational and environmental conditions accompanying routine change. Most papers focus on actors' training skills and experiential knowledge. There is a potential to discover more factors and constructs related to the environment and organisational conditions that may support the drifting away of actions from prescribed procedures.

Key finding 3

There is a further need to rank these factors' relative importance or dominance in bringing about a routine change. As a scope for future research, it will be

worthwhile to discover an ordered list of these factors by their relative importance to the phenomenon of routine change.

Key finding 4

There is a general apathy of the literature towards the negative potentiality of routine change. This needs further evaluation. The field can benefit from theorising and documenting the cascading impact of changes in organisational routines.

Key finding 5

Having gained an understanding of the 'Practical drift' being a theory theorising a particular sequence of routine misalignment, it would be worthwhile to identify factors connected to this cycle of slow and steady decoupling. The current literature on practical drift presents a very limited set of factors and environmental conditions leading to this form of decoupling.

3.6 Conclusion of BSLR

The BSLR was conducted to review the literature on routine change and practical drift. The focus of the BSLR was to synthesise and summarise the findings to answer the following review question.

Review Question

Review Question 1: How and why do routines change?

Review Question 2: How do routine changes impact safety?

Review Question 3: How are the aspects of routine change addressed in the Aerospace, oil and gas, and manufacturing sectors?

Review Question 4: How and why does practical drift happen?

Drawing upon literature contributions from the last ten years, this BSLR analysed and synthesised the factors and conditions that support routine change and the

process by which the change occurs. In this section, I present my conclusion about each review question.

Conclusion to the Review Question : How and Why do Routines Change?

The findings of the BSLR revealed that only a few journal articles focused on discovering the factors contributing to routine change. Apart from the following five journal articles, (Dittrich, Guérard and Seidl, 2016; Dittrich and Seidl, 2018; Nigam, Huising and Golden, 2016; Pentland, Hærem and Hillison, 2011; Turner and Fern, 2012) the 'why routine change' question found a very cursory or passing reference in all the other articles.

The papers from the BSLR that helped answer the 'why' and 'how' questions about routine change are presented in the Table 14. The Table 14 lists the paper's main research focus/question. In the last two columns, the table additionally represents which part of the review question was answered.

While extracting relevant arguments from these papers, it was found that most papers from the routine change literature are still attempting to theorise what constitutes as a routine change and what its impacts are. Most papers looked at aspects like; what actually signifies routine change, what is the impact of routine reconfiguration or evolution, how stability and change coexist, the role or interplay of socio-material aspects on change, etc. None of these papers attempts to discover the factors or conditions that bring about a routine change or reconfiguration. Although the focus of these articles was not on routine change, yet they did include a few arguments or propositions about factors related to change.

While the articles that did investigate the factors linked to routine change did not choose to conduct an exploratory study to discover all factors. Rather these papers focused their research enquiry on an ex-ante list of handpicked/selected factors. For example, Dittrich, Guérard and Seidl (2016) checked the role of reflective talks, Nigam, Huising and Golden (2016) argued the role of managerial/

Table 14: Research Focus of selected articles

	Research Question of the paper	Why	How
Annosi et al., 2020)	How to improve routinized activities and how to develop and adapt organizational routines.	N	Y
(Aroles and McLean, 2016)	To understand stability and change. How complexity, heterogeneity and socio-material aspects influence process of replication and change.	Y	N
(Berente et al., 2016)	Do misalignments trigger the dynamics of adaptation toward alignment or drift? Are misalignments always a bad thing? If misalignments persist, how do they relate to integration and control, particularly at an organisational level?	Y	N
(Bertels, Howard-Grenville and Pek, 2016)	how organizational culture shapes an organization's integration and enactment of an external routine	N	Y
(Blakçori, Aroles and Blakçori, 2021)	the role played by managerial feedback on routine change	Y	N
(Bresman, 2013)	How do groups change their routines using vicarious learning?	N	Y
(Chen, Guo and Zhao, 2021)	Exogenous routine change / reconfiguration. How does an organization reconfigure its routines during IT-enabled organizational transformation?	N	Y
(Coyte, Emsley and Boyd, 2010)	how management accounting practices remain stable or change over time	N	Y
(Deng and Robinson, 2021)	Main focus: Impact of routine change. 1) How do changes to emergent routines affect project performance in fluid organizations? (2) How does routine diversity moderate the relationship between routine change and project performance?	N	Y
(Deslée and Ammar, 2016)	how does the business model evolve in interaction with organizational routines?	Y	Y
(Dittrich, Guérard and Seidl, 2016)	how reflective talk contributes to routine change	Y	N
(Dittrich and Seidl, 2018)	How does the enactment of means influence actors' ends, and how does this influence contribute to routine change?	Y	N
(Glaser, 2017)	How organizations engage in a series of design performances to create artefacts in order to intentionally change routines.	N	Y
(Labatut, Aggeri and Girard, 2012)	What is the interplay between the disciplinary effects of tech- nologies and actors' performances in changes to organizational routines?	N	Y
(Nigam, Huising and Golden, 2016)	how organizations come to select some routines for change and not others in the context of organizational search? (Selectivity of routine selection for change)	Y	N
(Oehler, Stumpf-Wollersheim and Welpe, 2019)	we explore the causal effects of top-down performance feedback on routine change .	Y	N
(Pentland, Hærem and Hillison, 2011)	look for factors that drive patterns of action to change.	Y	N
(Stiles et al., 2015)	how do individuals con-tribute to change in both schema and routine, and in particular, how do cognitive and motivational aspects impact on routine and schema co-constitution?	Y	N
(Turner and Fern, 2012)	how the performance experience of actors shapes the stability and variability of routine performances.	Y	N
(Vough, Bindl and Parker, 2017)	The role that social context plays in the process of engaging in proactive work behaviour, as well as routines that support and enable proactivity within the organization.	Y	N

organisational support in routine change, Pentland, Hærem and Hillison (2011)mentioned the role of training while Turner and Fern (2012) tested the hypothesis relating to the experience of actors in routine reconfiguration.

It was only Dittrich and Seidl (2018) that conducted an open enquiry to discover a few factors and contextual conditions leading to routine change. The authors suggested that the purpose to achieve organisational goals drives routine change. They also found that a few organizational conditions such as the actor's familiarity with the process and the organisation's orientation towards the pursuit of performance goals drives routine change.

The BSLR concludes that the current literature has only the most rudimentary grasp of factors contributing to routine change. The field can benefit from an open-ended, unrestricted enquiry into factors and contextual conditions contributing to routine change. Extending this list will be a theoretical contribution to the literature on routine change.

Conclusion to Review Question : How do routine changes impact safety?

Before I present my conclusion regarding the BSLR findings relevant to routine change and safety, it would be worthwhile to note that safety was neither a context nor a construct in any of the journal articles selected from the routine change literature. Routine change literature is oblivious to safety as a context. However, the safety literature acknowledges that changes in tasks, procedures, or routines might propagate risk from one step to the other and lead to safety negative outcomes.

Searching through the outcomes of the literature search made it obvious that there was insufficient literature on the overlap of organisational routines and safety. Most of the safety literature that considered a routine perspective only applied it to safety-related SOPs or procedures. As routine literature ignores aspects of safety, the safety literature also abstains from discussing variation or drift in routine actions and the impact of this on safety outcomes. These two pieces of literature do not talk to each other.

To conclude, there is a general apathy of the literature towards the negative potentiality of drift/change in organisation routines, particularly for changes in routes that are not linked to safety or safe working. This needs further evaluation. The field can benefit from theorising and documenting the cascading impact of changes in organisational routines on safety.

Conclusion to Review Question : How and why does practical drift happen?

Practical drift (PD) is a particular kind of routine change theorised to be triggered for situations where procedural demands do not fit the practical or situational demands. In such situations, the front-line workers, professionals, and experts adjust or alter the recommended procedures, routines and workflows to make them better fit the local needs. With multiple successful repetitions, and over time, actions slowly, steadily, gradually and incrementally drift away or get decoupled from the prescribed procedures.

The uniqueness of the phenomenon necessitates a focused and dedicated study. However, the findings from the BSLR revealed that since 2010, the phenomenon of Practical drift has been mentioned in only a handful of journal articles. These mentions are cursory and are restricted to research papers that discuss theories and models related to *"gradual, adaptive degradation"* (Busby & Bennett, 2007; pp:06).

The conclusion of my literature review is as follows;

1. PD is a phenomenon that is about change in routines. However, the phenomenon has yet to be looked at from a routine lens/perspective.
2. The uniqueness of PD regarding underlying intentionality to trigger a drift makes it stand apart from other forms of routine change. Thus, our general understanding of routine change is insufficient to theorise about PD.
3. The recognition within the safety and accident literature about the potentiality and the severity of adverse outcomes linked to the phenomenon of PD makes it a very pertinent candidate for further study.

The BSLR concludes that PD is a vital phenomenon linked to routine change, and our understanding of why and how it occurs is elementary. Theorising about

this particular form of drift in routines or this grain of routine change will have value for both academia and practice

I will critique the complete literature review chapter in the next sub-section, including the BSLR.

3.7 Conclusion and Critique of the literature

The findings from the literature survey of the three domains, safety, rule and routines, can be combined to progress our understanding of the type of drift in actions I intend to study. A critique of the findings from the BSLR and the rest of the literature review will be used to inform the next phase of my research enquiry. Due to its conceptual similarity to 'Practical Drift', from this point onwards in the thesis, I will call my grain of drift 'Practical drift' with the abbreviation as PD.

I start my literature critique by summarising the similarities and distinctions among related phenomena from rule, routine, and safety literature. This critique will help me articulate my phenomenon of interest.

3.7.1 Similarities and Distinctions

A body of work in the safety and accident literature considers drifting away from recommended procedures to be a cause of safety negative outcomes (Goodman et al., 2011; Ramanujam and Goodman, 2003; Rasmussen, 1997; Reason, 1990; Turner and Pidgeon, 1997; Vaughan, 1999, 2005). This literature further argues that organisational actors are responsible for the occurrence of drift (Alper and Karsh, 2009; Dekker, 2002; Snook, 2002; Torp and Grøgaard, 2009; Vaughan, 1999). Safety and accident literature considers that decoupling actions from the recommendations would lead to a performance shortfall (Marcus and Nichols, 1999; Turner, 1976). However, this view is not shared by the routine literature. The literature on routines considers change as an evolutionary process (Feldman and Pentland, 2003), and argues that such a change could lead to an improvement in the routine (Desai, 2010; Miner, 1990).

Before I present my critique of the literature, I would like to articulate my phenomenon of interest clearly. For articulating my phenomenon of interest, I lean on the theory of practical drift by Snook (2002), as it closely resembles the

phenomenon I intend to investigate. I intend to investigate a particular kind of behaviour where organisational actors drift away from prescribed procedures for the benefit of the organisation. These drifted actions are neither performed with malicious intention nor are a result of any form of slip, lapses or error. These are often necessary adaptions to make the procedures fit the local work demand.

Snook (2002) has investigated a similar phenomenon, “Practical Drift”, which deals with drifts that are consciously and mindfully introduced to benefit the organisation and to make work easier, locally efficient and more effective (Stolte, Vogt and Weber, 2010). The conceptualisation also finds a parallel in the rule literature. (Lehman and Ramanujam, 2009) posit that;

“*rule violations refer to organisational actions that deviate from a given rule. These actions are carried out by individuals or groups acting in formal organisational roles to facilitate attaining organisational goals.”* (Lehman and Ramanujam, 2009;pp:644).

The phenomenon also has semblance to another contribution from the rule literature by (Dahling et al., 2012). In this study, the authors investigate behaviours where some rules are broken in the interest of the organisation or its stakeholders. Naming it pro-social rule-breaking, authors argue that these behaviours are

“motivated by constructive intentions and designed to help the organisation” (Dahling et al., 2012; pp:28)

I chose to draw upon the theory of “Practical Drift” to define my phenomenon of interest. A more nuanced description of my phenomenon is depicted in Table 15.

Further, I intend to contrast the extant body of literature with the conceptualisation of drift by Snook (2002).

If one compares the practical action and task-based logic argument of Snook (2002) with the literature on organisational rules, one will find a contrasting view among the literature. The theory of practical drift posits that to make the work fit the localised/ practical work demands, pragmatic individuals would adopt a task-based logic, and organisational situations of coupling between actions and outcomes will facilitate this behaviour (Bisbey, 2014; Harvey and Sotardi, 2017;

Holtman, 2011; Johnston, 2003; Leemann, 2011; Maurino, 2017; Snook, 2002; Stolte, Vogt and Weber, 2010). At this stage, where actors use task-based logic pragmatically, Snook (2002) does not see it as a concern. Only later, when this task-based logic gets embedded in the local practice and is repeatedly and continually adopted without considering conflicts it may have with the wider set of operations, this action becomes a safety concern.

Table 15: Positioning my phenomena of interest among other key terms.

Focus of my Research	What **is** my Phenomenon			What is **NOT** my Phenomenon		
	Routinised action	Initiated to meet practical work demand	Actions performed as intended	One-off Violation	'Workplace deviance'	Slips, lapses, errors & mistakes
Drift in actions from their established/prescribed work procedures, scripts, or action templates	✓	✓	✓	×	×	×
Explanation	Actions that I study are repetitive, recognisable actions that are not one offs tasks or actions.	Drift from procedures is initiated making the work easier, locally efficient and more effective	Actions that I study are actions that actors are able to perform as intended.	One-off violations are actions that are not routinised. However, actions that I study are routinised.	Because 'Workplace deviance' are counterproductive workplace behaviour, often done with malicious intent, while actions that I study are not intended at harming the organization.	Because 'Slips, lapses, errors & mistakes' are associated with cognitive failure. While actions that I study are not related to cognitive failure.

However, the rule literature does not support any form of practical action driven by a task-based logic. The literature does not acknowledge the necessity of a pragmatic dimension of the action; rather, it argues that if a rule fails to fit the work demands, then it indicates a poor rule design (Borry et al., 2018; Bozeman, 2012).

Task-based logic is an eventuality where the actors feel that the rule is not applicable, and the actors question the effectiveness of a given procedure/rule. Rule literature suggests that this eventuality of questioning a rule's effectiveness could be explained using a set of rule dimensions/ characteristics (Borry et al., 2018; Bozeman, 2012). Rule effectiveness has two dimensions: quality of rule design, called technical proficiency, and the degree of support that organisational stakeholders provide in implementing the rule (DeHart-Davis, 2009). For a drifted

action to replace a prescribed procedure, the rule/procedure would need to fail on these dimensions of rule effectiveness. These dimensions are; "*rule formalization, rule logic, rule consistency, optimal control, and understood rule purposes"* (Borry et al., 2018;pp:370). Awareness of these rule attributes can help the practical drift model synthesise the contextual conditions that lead to applying practical logic.

Besides citing a 'fit local workflow' argument, Snook (2002) abstains from a detailed discussion of factors about why actors drift. However, in the rule literature, there is a detailed list of factors supporting non-compliance. Although non-compliance is not the same as my phenomenon of drifted actions, yet some theoretical explanations about why people indulge in acts of non-compliance are worth considering for my study. These will include factors like; the likelihood of detection, perception of rule legitimacy, value congruence with the rule interaction (Tyler and Blader, 2005), degree of rule formalisation, parity of rule application, and peer-to-peer interaction (Borry et al., 2018).

Similar to the rule literature, routine literature also suggests the reason for the routine change. The BSLR revealed factors and contextual conditions linked to why and how routines change. Although these factors were not directly found for a drift like PD, still the findings from the BSLR are relevant for the progress of my research enquiry.

Discussing change and dynamism in routines, Feldman (2000) claims that routines have a significant potential to change. The author believes these changes happen because organisational actors are thinking, feeling and caring individuals who are embedded in an institutional context that influences their intentions and motivations to perform a routine. Feldman (2000) comments;

"Routines are performed by people who think and feel and care. Their reactions are situated in institutional, organizational and personal contexts. Their actions are motivated by will and intention. They create, resist, engage in conflict, acquiesce to domination. All of these forces influence the enactment of organizational routines and create in them a tremendous potential for change." (Feldman, 2000; pp:614)

The above statement highlights the role of routine participants in bringing about routine change. For my phenomenon of interest, the overarching motivation/intention of organisational participants to drift away from the prescribed procedure is the same as that of Snook (2002); to benefit the organisation or for the *"attainment of organizational goals."* (Lehman and Ramanujam, 2009;pp:644). However, a question arises, why a drifted action is necessary to attain organisational goals, and why is the recommended procedure unfit for this purpose?

Literature on safety, rule and routine has provided some discussion about the purposes that drive actions to disregard procedures. For example, from the rule literature, Espin (2006) identifies that the purpose of breaking the rule is to negotiate work pressure, time pressure, and conflicting procedural demands. In a similar argument, Lawton (1998), from the safety literature, argues that actors find it difficult to manage time pressure and high workloads while staying within the boundary of recommended procedures and thus break rules.

The routine literature also cites similar reasons to change routines. For example, Moorman and Miner (1998) posit that actors change routine to achieve coherence or a better internal fit with the organisational objectives. Martin et al. (2013) find rules ambiguity as a reason to change a routine, and Betsch et al. (2004) also acknowledge time pressure as a reason to change the routines.

However, a more thorough debate on purpose and routine change has been attempted in a recent work by Dittrich and Seidl (2018). Commenting on this eventuality of purpose-driven change in routine; Dittrich and Seidl (2018) quote,

"pursuit of a particular purpose—as a key aspect of agency that can explain both stability and change in routines over time"(Dittrich and Seidl, 2018;pp:113)

The authors use the common English expression of "Means to an End" to develop how purpose shapes routine changes. The online Cambridge Dictionary explains this expression "Means to an End" as particular actions are done because these actions will help you achieve a specific outcome (Cambridge Dictionary, n.d.). The findings from my BSLR also indicate Actor's purpose as a broad taxonomical

category for initiating a variation or change in routine. The factors linked to an organisational actor's motivation or willingness to change a routine were named "Actors had a Purpose". These were driven by the beliefs and aspirations of individuals and resulted in an endogenous change in the routine.

The findings from the last ten years research papers on routine change reveal that actors indulge with an act of changing routine; (i) to remove operational hurdles, (ii) to correct design issues or (iii) to gain some form of benefit .

From a PD perspective, the overarching goal is to benefit the organisation. However, the discussion of these motivations and goals finds a very cursory mention in the routine literature. The literature on PD is also deficient in discussing or arguing these aspects. Only in the rule and safety literature we find a discussion of factors that find a cursory mention in the routine change literature. These include negotiating work pressure, time pressure, and conflicting procedural demands (Betsch et al., 2004; Espin, 2006; Lawton, 1998).

Routine literature also views the need for innovation as a driver or purpose for change (Deken et al., 2016). Denken and her colleagues (refer to Deken et al. (2016)) demonstrated that there are situations that require actors to *"intentionally strive for novelty"* (Deken et al., 2016;pp:659). In their empirical study of an automotive company, the authors posit that the purpose of this search for novelty or change in routine could be driven by competitive pressure and the need to innovate. Thus, one may infer that a change in routine is introduced so that a particular purpose can be achieved.

Elaborating on purpose, Dittrich and Seidl (2018) conducted an ethnographic study on a pharmaceutical firm to demonstrate that the purpose that brings about a change in routines can be visualised as a spectrum between two extremities. One end of the purpose spectrum is driven by an effort to align outcomes to pre-established goals; authors name it *'purposeful action'*(Dittrich and Seidl, 2018; pp:131). This purpose of *'purposeful action'* is accompanied by the contextual condition of actors being more familiar with the routines and the pre-established goals being more imposing. Under such situations, actors are more fixated on achieving the pre-established goals, and their awareness of the process alters

the routine performance. This view is like Snook's (2002) practical action view, in which to solve local problems, the actors adopt a task-based logic, or in other words, they abandon the rule. Snook's(2002) pragmaticism aspect is corroborated by Dittrich and Seidl (2018). Dittrich and Seidl (2018) identify familiarity the process as a condition for engaging with such drifted actions. The other end of the spectrum is about changing a routine to negotiate some immediate circumstances, which authors call *'purposive coping action'*(Dittrich and Seidl, 2018; pp:131). This is more of a situational violation (Lawton, 1998; Reason, 1990) with no long-term outcome.

An important observation from the BSLR findings is that a very limited discussion of external, organisational or environmental factors was presented in the literature. Apart from Dittrich and Seidl (2018), none other from the routine change or PD literature approaches the factors from a contextual condition perspective. However, using the findings from the BSLR, I have taxonomically bundled some factors as contextual conditions. These include (i) skill gaps, (ii) process ownership issues and (iii) specification clarity. Although these contextual conditions do not provide a direct reason for drift, they abet the act of drift. This list is short and needs a more detailed assessment using the theoretical foundation of rules and safety literature.

For the answer to the literature review question 'Why routines change', I summarise the literature review findings as follows.

i. Literature review revealed that individuals perform routines, and these routine participants have their personal preferences, organisational goals and dispositions (Howard-Grenville, 2005; Turner and Fern, 2012). The change in routine is brought about by actors' orientation towards pre-established organisational goals-driven purpose (Dittrich and Seidl, 2018). I further argue that although the 'Fit for Purpose' argument is tangentially provided by the existing studies on rule, routine and safety, none of the existing studies, to the best of my knowledge, provide any detailed list of dominant factors that will govern the fit for purpose evaluation. The field can benefit from empirical

efforts to extend and consolidate the factors connected to routine change into meaningful themes and categories.

ii. The literature further accepts that routine participants are additionally embedded in an organisational context. In order to handle the unfolding of unexpected and emergent situation and to bring about a variation in a routine, actors must have supporting organisational and environmental conditions (Dittrich and Seidl, 2018). However, discussion of such conditions is missing from both the routine change and PD literature. There is a potential to discover more factors and constructs related to the environment and organisational conditions that may support the drifting away of actions from prescribed procedures.

iii. Juxtaposing the argument of purpose-driven routine change with Snook's (2002) practical action and task-based logic argument, one can infer that if the suggested procedure fails to fit the purpose, then the actors will resort to a routine variation, change, or drift. But one can argue that, PD is a particular kind of routine variation/drift, and our general awareness of routine change might not be sufficient to theorise or explain this form of drifted routine actions. A study of routine variations that aligns with the definition of PD will be a contribution to the existing knowledge of routine change literature.

iv. The routine, rule and safety literature present a few overlapping theoretical explanations for drift in actions from prescribed procedures. However, it includes a small number of factors, that are neither taxonomically bundled nor are presented according to their relative importance for the phenomenon. In addition to it, these are not presented or empirically validated for the context of PD. A specific enquiry on routine change, pertinent to PD, will have theoretical and practical relevance for theory and practice.

v. Snook's(2002) theory of practical drift also provides a restrictive view on the purpose or reason that drives the behaviour to replace a rule-based logic with a task-based logic. Snook's (2002) theoretical

explanation needs further refinement. The author only uses ‘practical action’ as a reason and the existence of ‘loose coupling’, as a facilitating factor for drift.

vi. Despite investigating routinised actions, Snook’s (2002) abstains using an organisation routine perspective. The study of PD from a routine perspective will be a useful contribution.

vii. Based on my survey of the literature, I can say that we still have a limited understanding about why and how PD happens. What are the factors and contextual conditions that inform the phenomenon.

Thus, I propose that in order to explain my phenomenon of interest, I would need to answer the following research question;

Research Question 1: Why Practical Drift’ happens?

Sub Question (i): What are the factors that influence the purpose to drift away from prescribed procedures?
Sub question (ii): What factors assist in the act of successfully replacing a formally recommended procedure with an alternate action?

Research Question 2: *What is the impact of* ‘Practical Drift’ *on safety?*
Sub question (i): How drift leads to safety negative outcomes?

3.8 Summary of Literature and Implications

This literature review aimed to discern prominent literature debates informing my phenomenon of interest, which is a grain of routine drift that is conceptually similar to ‘Practical Drift’. This form of drift is broadly concerned with the gradual and steady drifting away of actions from prescribed procedures.

The review's objective was to present a unifying and all-encompassing literature review about ‘drifted actions’ and ‘prescribed procedures’, the two constituting elements of my phenomenon. A preliminary scoping exercise of seminal contributions and founding arguments of the phenomenon revealed that the dimension of drifted action and prescribed procedures were strongly rooted in three literature domains: safety and accident literature, rule-following literature

and organisational routine literature. A co-citation mapping further strengthened the appropriateness of the approach as prominent and highly cited papers of each of these three literature domains could be traced back to seminal articles relevant to my phenomenon of interest.

A review of these three literature domains, safety and accident literature, rule-following literature and organisational routine literature, helped define and set a scope for my research enquiry. In addition to the traditional/ narrative literature review of the three domains, a bounded systematic literature review (BSLR) on routine change literature was conducted to discover the existing theorisation relevant to the general phenomenon of routine change.

Findings of the literature review reveal that aspects of rule/routine change, variation or drift have been independently theorised in these domains and that these literature do not speak to one another. Among the three domains, the phenomenon of drifted actions finds the most contribution from the accident and safety literature. However, a more nuanced and holistic understanding of the phenomenon can only be made by combining the knowledge from each three domains. I conclude that there is a definite potential in bringing together these three bodies of literature (safety, routine and rule-following) to investigate the phenomenon of slow and steady drifting away of actions from prescribed procedures.

Due to its conceptual similarity to the phenomenon of Practical Drift, for the rest of the thesis, I will also be addressing my phenomenon of interest as ‘Practical Drift’ (PD).

The next chapter shall discuss the research design, philosophical perspective, and the ontology for this research.

Part II

Conducting the Study: Research Design and Results

4 Research Design

This chapter on research design presents a rationale for the ontological, epistemological, and methodological choices relevant to addressing my research question. This thesis adopts a critical realist ontology and an interpretive epistemology. The research design is operationalised using an open-ended, exploratory, mixed-method research design with a relevant sampling logic. The data is collected from large-scale manufacturing, oil and gas and aerospace organisations. Data is collected using a mixed method, structured interview approach known as the Repertory grid (RepGrid) (Jankowicz, 2005; Kelly, 1955)

This chapter starts with restating my two research questions and connected sub-questions. The chapter then presents a general discussion of philosophical perspectives in organisational research. It goes on to argue my choice of ontological and epistemological stance that will guide my research design. A discussion of research design and methodological considerations follows this. In this methodology section, I describe my sampling criterion, the instrument of data collection and the analytical framework adopted for data analysis.

4.1 Research Question

The two research questions developed after the literature review chapter are as follows:.

Research Question 1: Why and how 'Practical Drift' happens?

Sub Question (i): What are the factors that influence the purpose to drift away from prescribed procedures?
Sub question (ii): What factors assist in the act of successfully replacing a formally recommended procedure with an alternate action?

Research Question 2: *What is the impact of* 'Practical Drift' *on safety?*
Sub question (i): How drift leads to safety negative outcomes?

4.2 Philosophical Perspective and Research Paradigm

Crotty (1998) suggests that the research design of a research enquiry requires answering two fundamental questions. First, what research methods will be employed? Second, what is the justification of the methodological choices? The answer to the second question requires the researcher to articulate their research purpose and philosophical stance. Justification for our methodological choices is contingent upon aligning our purpose and philosophical perspective, such as our perception of reality and the ways we can study/know about our world and generate knowledge about it.

The philosophical stance chosen by a researcher has a strong bearing on their research design decisions (Zachariadis et al., 2013). Research philosophy helps us understand and obtain knowledge about reality. It provides us with general principles of theoretical thinking and guides our choice of method of cognition and perspective (Spirkin, 1983).

Here, philosophical stance relates to how the researcher views the truth or the nature of reality connected to her phenomenon and what the researcher thinks will be the most appropriate approach to know this reality or generate knowledge about it.

The philosophical elements that inform a researcher's philosophical stance/ assumptions are (i) Ontology, (ii) Epistemology and (iii) Methodology. Together, these elements form a researcher's *'Research Paradigm'.*

4.2.1 Discussion on Research Paradigms and its Elements

"Paradigms as Basic Belief Systems Based on Ontological, Epistemological, and Methodological Assumption" (Guba and Lincoln, 1994;pp:107).

A research paradigm defines and explains a researcher's view of the world they plan to study. It represents a set of theories and fundamental beliefs (or his/her's metaphysics) that shape a researcher's research enquiry. These beliefs define the nature of reality and the range and scope of the relationships that the researcher shares with this world and its constituting elements.

Guba and Lincoln (1994) define an “Inquirer's Paradigm” using three basic philosophical questions.

(i) The ontological question about the form and nature of reality. Matters that lie outside the purview of a defined ontology are considered to be excluded from a legitimate scientific enquiry.

(ii) The epistemological question about the relationship between the inquirer and the enquiry, such as what can be known. The answer to the epistemological question is constrained or contingent upon the answer to the ontological question. One must remember that a researcher can only postulate relationships with the enquiry that are consistent with their ontological assumptions.

(iii) The methodological question about the ways available to the inquirer to study whatever they believe is knowable in the world they have assumed. Similar to the epistemological question, the answer to the methodological question should align with the answers to the first two questions.

The field of research philosophy, from pure science to social research, proposes multiple taxonomical categorisations of research paradigms. To discuss my research philosophy, I draw upon the works Guba and Lincoln, (1994), Crotty (1998) and Blaikie (2009) (Table 16).

Table 16: Research paradigms categorisation

Sno	Research paradigms categorisation proposed by		
	(Guba and Lincoln, 1994)	(Crotty, 1998)	(Blaikie, 2009)
1	Positivism	Positivism	Positivism
2	Post positivism	Post positivism	Critical rationalism
3	Constructivism	Interpretivism • Symbolic • Phenomenology • Hermeneutics	Interpretivism
4	Critical Theory	Critical Enquiry	Critical Theory
5		Feminism	Feminism
6		Postmodernism	Hermeneutics • Classical • Contemporary

Although this is not an exhaustive list, it covers the widely used taxonomical categorisations from the business and organisational research literature.

A researcher's philosophical perspective stems out from the chosen ontology, epistemology and methodology. Before progressing to discussing my philosophical perspective, I will discuss ontologies and epistemologies.

4.2.1.1 Ontology

In social science research, one's ontological stance clarifies one's view on the nature of social reality (Easterby-Smith and Lyles, 2008; Masi and Blaikie, 1995a). Blaikie (1993) defines Ontology as;

"the claims or assumptions that a particular approach to social enquiry makes about the nature of social reality – claims about what exists, what it looks like, what units make it up and how these units interact with each other" (Blaikie, 1993; pp:6).

The focus of the ontological assumption is on questions like whether the social reality exists independent of any human interpretations, whether or is there any common social or context-specific reality in the world, and whether generalisable laws govern social behaviour or not (Ritchie and Lewis, 2003).

Ontological conversations in social science and organisational studies are built upon the dichotomy between realism and relativism. Figure 14 presents ontological categorisation based upon the dichotomy of realist and relativist worldview, as proposed by Guba and Lincoln (1994).

Figure 14: Taxonomical categorisation of Ontological position

Adopted from Guba and Lincoln (1994)

The realists believe in a single reality/world that exists independent of the observer or its actors/participants. Irrespective of human experience, one can

know, experience, understand and study this unitary reality as a ‘truth’ (Moses and Knutsen, 2012).

Whereas relativists view reality to be a construction of the human mind. The proponents of relativist ontology assume that there is no single reality. Instead, the reality is relative or contextual to people’s experiences over time, space and occurrences.

4.2.1.1.1 Realist Ontology: The Realism Spectrum

Based on the degree of the immutability of the one truth or the single reality, one can further categorise realist ontology into a spectrum; (i) Naïve Realism, (ii) structural realism and (iii) critical realism. As one traverse from Naïve realism to critical realism, realist ontology becomes more and more accommodating towards the notion of an immutable, single truth. The assumptions relax by accepting that although there is just one truth about the world, yet the nature of reality is convoluted by human’s capacity to understand or describe it.

Naïve realism: Researchers who subscribe to naive realist assumptions believe that the one true reality can be understood and described if we adopt the right methods. An assumption that can be seen as naive.

Structural Realism: This philosophical position agrees that one and only one reality exists. However, structures related to its definition and discoveries (e.g. taxonomies, norms, measures and technologies) could change the nature of reality.

Critical Realism: Among the realist ontologies, a critical realist philosophical position is furthest from naive realist assumptions. Although they align with other realists about the belief of a single or unitary reality/truth, they further believe it is difficult to perfectly understand or describe this reality.

4.2.1.1.2 Relativist Ontology: The Relativism Spectrum

Relativists believe that reality is what exists in an individual's mind, and since every social system has multiple individuals, thus exists various versions of reality.

It is expected that some beliefs or versions of reality might be common to some particular groups or individuals. This degree or extent of shared assumptions about reality among individuals can be used to describe two forms of relativist ontologies: (i) Bounded relativist, and (ii) Relativism.

Bounded relativism argues that within a certain type of social grouping, like cultural or moral, a set of shared beliefs will exist. These beliefs or versions of reality will differ across groups. Whereas a pure relativist philosophical position contests the existence of shared beliefs. A relativist view posits that beliefs are confined to individuals.

4.2.1.2 A More Nuanced Categorisation of Ontologies for Social Research

Although Guba and Lincoln (1994) provide a very detailed discussion of social research ontologies, a more nuanced categorisation of ontologies for social research design can be found in, Blaikie (2009). Blaikie (2009) uses Realist and Idealist as the two broad ontological categories and additionally proposes a third ontological position (Figure 15), 'Subtle Realist', in the intersection of these broad ontological themes .

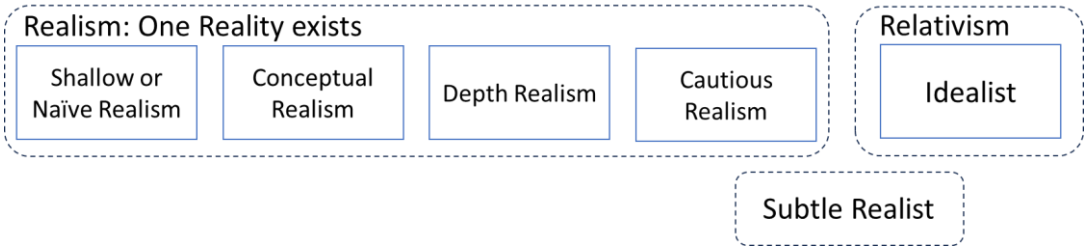

Figure 15: More nuanced taxonomical categorisation of social research ontologies

In the Table 17, I present a side-by-side comparison of the ontologies as proposed by Guba and Lincoln (1994) and Blaikie (2009). The ontological positions that can be mapped to each other in the two taxonomical categorisations are presented in the same row. While other nuanced categories are represented separately.

Depth Realist ontology is the ontological position that I have adopted for my research enquiry. The rationale for this choice will be provided later in the chapter.

Table 17: Taxonomical categorisation of Ontological positions

Sno	Item	Ontological categorisation	
		(Guba and Lincoln, 1994)	(Blaikie, 2009)
1	Realism One reality exists	Naïve Realism One true reality can be understood and described if we adopt the right methods	Shallow or Naïve Realist The phenomenon we study exists independent to us.
2			Objective or Conceptual Realist Reality has an independent existence, but this existence is embedded in collective consciousness, structures and ideas. This reality can be only known through reasoning and thinking.
3		Structural Realism structures related to its definition and discoveries (e.g. taxonomies, norms, measures and technologies) could change the nature of reality.	
4		Critical Realism Single or unitary reality/truth that is stratified in three nested layers or domains and thus making it difficult to perfectly understand or describe this reality.	Depth Realist Reality consists of three levels/ domains: empirical, actual and real.
5			Cautious Realist Although an independent external reality exists, but Imperfections and frailties of human sense and interpretation make it difficult for humans to accurately express or interpret this reality. Researchers should exercise caution or be critical about their ability to study or make claims about such reality.
6	Relativism Multiple realities exist	Bounded Relativism Within a certain type of social grouping, like cultural or moral, a set of shared beliefs will exist. These beliefs or versions of reality will differ across groups.	
7		Relativism beliefs are confined to individuals	Idealist Reality is a representation/ creation of an individual's mind/belief.
8	Positions to overcome deficiencies of Realism and Relativism		Subtle Realist The existence of an external reality that is independent of the activities of the researcher but is socially constructed or is a result of the interpretation of its participants/ actors.

Table 18: Epistemologies based upon the discussion of Guba and Lincoln (1994)

	Research Paradigms			
	Positivism	Postpositivism	Critical Theory	Constructivism
Epistemology	Dualist/ Objectivist	Modified Dualist/Objectivist	Transactional	Subjectivist
Explanation	The phenomenon under study and the researcher are assumed to be independent entities. The investigator can study this phenomenon without influencing it.	'Dualism' is disregarded, but the notion of objective reality is retained. Additionally, we lay emphasis on external guardians of objectivity such as; (i) critical traditions: do the findings correlate to existing knowledge, (ii) Critical community: findings are consistent with professional peers, referees and other actors.	The researcher and the object of research are assumed to be intertwined or interactively linked to each other. The investigator's values inevitably influence the enquiry.	There is a strong interactive link between the researcher and the phenomenon. The findings are 'literally created' during the process of investigation.
What can be known through this Epistemology?	If the prescribed methods are rigorously followed, and all forms of influence (both ways) are avoided, then replicable 'True' findings about the world can be achieved	Critical tradition/community based findings about the world can be known. However, if replicated, these findings may be probably true but always open to falsification.	Value-mediated findings about the world	Created findings about reality

4.2.1.3 Epistemology

Epistemology provides adequacy and legitimacy to the way in which we can generate knowledge about our phenomenon. Epistemology is considered to be the philosophical foundation of what is known to us and how we can extend our knowledge about it (Crotty, 1998)

Guba and Lincoln, (1994) have proposed four epistemological positions linked to their four metaphysical beliefs or research paradigms. Table 18 presents a detailed explanation of these epistemic positions.

Besides Guba and Lincoln, (1994) classification, Crotty (1998) and Blaikie (2009) categorisation of social research epistemologies are also widely used. Figure 16 provides a consolidated list of epistemological categorisation from all of the three authors.

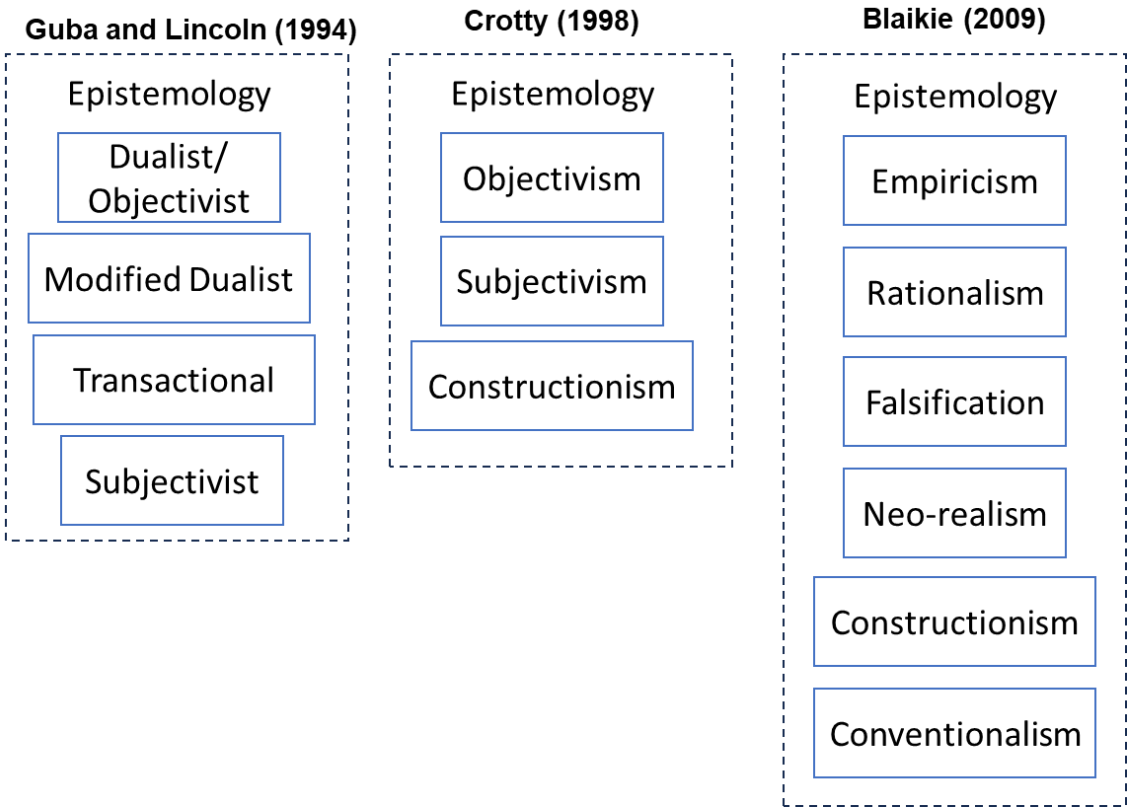

Figure 16: Epistemological classification by different authors

4.3 My Research Paradigm

This research inquiry aims to find how and why routinised actions drift away from prescribed procedures. The term 'routinised actions' relates to the definition of organisation routines, such that;

"repetitive, recognisable patterns of interdependent actions, carried out by multiple actors" (Feldman and Pentland, 2003;pp:95).

The grain of drift I intend to investigate shares a conceptual similarity to the 'Practical Drift' phenomenon (refer to section…. in the literature review chapter).

Guided by the work of Guba and Lincoln, (1994), I chose to conduct this research enquiry using an 'Interpretivist research philosophy, a 'Constructionist' epistemology, and a 'Critical Realist' ontology (listed in Table 19).

Table 19: Research paradigm, ontology and epistemology of my research

Item	My Choice
Research Paradigm	Interpretivism
Ontology	Critical Realist
Epistemology	Constructionist

To discuss the rationale of my research design choices, I begin with a discussion of the philosophical stance of the existing organisation routine literature and why the stance is not fit for my enquiry. I then discuss why I lean towards a realist tradition and why a critical realist ontological stance is the best for this research enquiry. I further present a discussion of why Relativism and constructionism were disregarded and why, within the realist tradition, I adopt a critical realist view. A discussion of critical realism and my methodology will follow after this.

4.3.1 What is the Ontology of Organisation Routines in the Literature

The organisational studies literature accepts that organisation routines demonstrate a degree of dynamism and change, a characteristic that has ontological implications. During the process of replication, routines may stay stable or may undergo a change, resulting in a reality that is often conveyed by

the following words; “The (N) Ever-Changing” (Pentland, Hærem and Hillison, 2011). This duality poses a considerable ontological challenge. The challenge stems from the fact that the recursive and self-constituting relationship between the two layers of routine, the abstract or ostensive layer and the observable performative layer, is hard to fit into a single ontological viewpoint. This is due to the fact that the ostensive is recursively generated from past actions or the performative history and vice-versa. The way this unfolds is that performative exhibits some drifted/ changed versions of the ostensive. Out of these variations, some patterns are selectively retained in the disposition memory of the actors, resulting in modifying the ostensive aspect of routine and the future performatives so forth (Feldman and Pentland, 2003).

This circular recursivity between ostensive and performative aspects of routine, the self-constituting interdependence of history and future actions, is indicative of the phenomenon having path dependency (Schreyögg and Sydow, 2011; Vergne and Durand, 2010) and sensitivity to initial condition. One could conclude that an appropriate ontology to study change/drift in routines and actions needs to account for the above ontological challenges. A chosen ontology should be apt for approaching a mutually constituting and recursive relationship between current and past actions. It should be able to include the aspect of path dependency of routine change and the sensitivity of change to the initial condition (Pentland et al., 2012).

In the existing literature on organisation routines, to the best of my knowledge, none of the research contributions have openly committed to their philosophical position or ontological stance. Some existing studies do discuss the challenges, yet do not provide a conclusive answer about the most suitable ontological stance for organisation routines (see papers: (Aroles and McLean, 2016; Dionysiou and Tsoukas, 2013; Kozica et al., 2014; Stańczyk-Hugiet, 2014). However, the choice of methodologies and research design of existing organisation routine journal articles can be used to understand their ontological and epistemological stance.

A review of routine literature suggests that many empirical studies in the field of routine change or variation have resorted to a longitudinal ethnographic case

study approach (Bruns, 2009; D'adderio, 2010; D'Adderio, 2014; Hedgecoe, 2014; Pentland and Feldman, 2008; Pentland and Hærem, 2015; Turner and Rindova, 2012). This methodology is often regarded as a combination of interpretive and constructionist epistemology (Whitehead, 2004) and is considered an extension of relativism ontology (Al-Amoudi and Willmott, 2011; Rosen, 2001).

However, proponents of routine literature shy away from specifying their epistemic or ontological stance, rather, they choose to call a routine to have a dual ontology (Feldman, 2000a; Pentland and Feldman, 2005; Turner and Fern, 2012). These are structure and agency (Becker et al., 2005; Kozica, Kaiser and Friesl, 2014).

Accepting the role of structure and agency, routine researchers subscribe to the assumption that routines cannot be studied in isolation (Dittrich, 2021). The current literature on routines builds their theories based upon a rich and thick account of how specific actions are situated in traditions, culture, practices, meanings, and features of actors and their interactions. Addressing these connected actions and interactions as "situated actions" (Suchman, 1987), routine research uses ethnography as a method to trace associations among these situated actions and the aspects of structure and agency, such as intent, motivation, cognition of actors and how specific place, time and context influence it.

The current research enquiry into organisation routines is focused on discovering rich contextual insights about routine dynamism. Grounded in the paradigm of constructivism, these research enquiries follow a relativist ontology (Al-Amoudi and Willmott, 2011; Rosen, 2001) and constructionist epistemology (Whitehead, 2004).

However, my phenomenon of interest is neither pure relativist in ontology nor a thorough constructionist epistemology.

4.3.1.1 My Phenomenon is Not a Thorough Relativist

Ontological Relativism believes in multiple truths/interpretations of reality and thus relies on methods that provide a thick and detailed description of social, cultural and individual context. The current literature on organisation routines subscribes to a Relativist ontology and a research design guided by Constructionist epistemology. This can be seen from current literature on organisation routines that favours an ethnographic case-based research design over other alternatives (D'adderio, 2010; D'Adderio, 2014; Hedgecoe, 2014; Pentland and Feldman, 2008; Pentland and Hærem, 2015; Turner and Rindova, 2012).

However, my phenomenon about written procedures, the SOPS, and the actual performance of routine, the performative, are both concerned with objective reality and thus are closer to the Realist tradition. In phenomenon, the written procedures are immutable artefacts of an objective and single reality. Similarly, a routine performance is also an absolute truth and not a manifestation of social/conceptual construction.

My ontological perspective is not 'Relativist'. Drifting away of actions from prescribed procedures is about an objective single truth and not multiple subjective interpretations of it.

In the organisational routine's taxonomy, the written procedure can be considered as an 'Artifact' and actions as 'Performative'. Neither of them, 'Artifact' or 'Performative', are socially constructed. It is possible that actors do not understand the true nature of coupling or decoupling among these two aspects, yet these aspects exist, independent of the researcher's / participating social actor's intervention.

I argue that my enquiry of drift in actions from prescribed procedures is located with the ontological perspectives that align with a 'Realist' tradition.

4.3.2 My Philosophical Perspective, Ontology and Epistemology

After establishing that my enquiry is more 'Realist' than 'Relativist', I will now position it within the 'Realist' spectrum of the worldview. The realist assumptions

of objective reality and one truth gradually relax as we move from Naïve realism to critical realism through structural realism.

I argue that my worldview is not of a ‘Shallow / Naïve’ realist. The research driven by this strong ‘Shallow / Naïve’ realist assumption posits that the one objective truth can be studied, understood and described if we employ the right methods, which is not the case for my phenomenon.

Although my phenomenon subscribes to the assumption of an objective reality, the SOPs and the performed action, I would like to take a cautious approach towards the claim that a perfect and immutable account of this truth can be expressed.

The human participant’s fallibility to understand, express or clearly articulate the relationship between the written procedure and the performed actions creates an additional epistemic dilemma. One can argue that this incapacity of humans to know about their situated actions and the prescribed routines clearly makes deterministic and reductionist methods from the ‘Naïve / Shallow realist ‘ tradition, such as surveys, ineffective.

The research philosophy of my enquiry maintains a more accommodative viewpoint on one truth and objective reality worldview. This is because, although written procedures and performed actions are objective reality, the relationship between different elements of a routine (Ostensive, Performative and Artifact) and how actors understand it presents a challenge for pure positivist enquiry.

The circular recursivity between these aspects of routine, the self-constituting interdependence of history and future actions in routines, existence of path dependency and sensitivity to initial conditions are all indicative of a complex interplay of entities.

There are directly observable events and experiences related to written procedures and the performance of routines that can be understood and expressed by organisational actors. However, the complex interplay of routine elements and the process of replication unfolds at a deeper level. These aspects are inconspicuous to human actors and hard for them to fathom, express or

articulate. This inherent complexity indicates a Depth or a Critical Realist ontology.

4.3.2.1 Why Critical Realism Over Social Constructivism

Critical realism and social constructionism are different philosophical stances offering different explanations of reality and the social world. On the one hand, critical realism acknowledges that the world exists beyond human interactions and their perception; social constructionism asserts that human thoughts shape knowledge of the world and its reality. Social constructionism posits that reality is perceived by values, beliefs, language and social interactions. It is an outcome of shared understating and agreements among people.

One may argue that the ostensive aspect of routine might be viewed as a shared understanding or belief, yet the existence of a routine and the variations in it cannot be considered socially constructed. A change in routine from prescribed procedures is a real phenomenon, and it exists independent of the belief or understanding of the participants associated with it.

Critics argue that social constructionism rather hinders the possibility of objective truth and shared reality as it considers all beliefs to be equally valid. Thus, I consciously chose to migrate away from a constructivist research paradigm.

The focus of my research is on gaining deeper understanding of reality which is independent of beliefs and perceptions. It is more about acknowledging the observable events and the unobservable realm producing those observable events. It is about providing explanations and identifying reasons behind the observable patterns.

For my phenomena of research, the inability of humans to explain the drifting away of their routine actions from prescribed procedures does not mean that the phenomenon of drift does not exist. It exists independent of their knowledge or their awareness of it.

From a perspective of studying drift, an ontological perspective that can help overcome the constraints of realism and relativism is ‘Critical Realism’. I propose

using critical realism to investigate the drifting away of actions from prescribed procedures.

Although, I disregard 'Constructivism' as a research paradigm, I still chose to use social constructionism as an epistemological stance for my enquiry. Guided by the work of Guba and Lincoln, (1994), Crotty (1998) and Blaikie (2009), I posit that for my research enquiry, I will subscribe to a 'Post positivist' research philosophy, a critical realist ontology and a social constructionist' Epistemology.

4.3.3 Critical Realism

Discussing the critical realist stance, Henfridsson and Bygstad (2013) quote, *"It combines a realist ontology with an interpretive epistemology"* (Henfridsson and Bygstad, 2013; pp 911). The critical realist stance further posits that the people's understanding of the world is socially constructed and thus fallible (Mingers, 2004). The stance aligns with my research that accepts people being unaware of drift in routines, and their understanding about the correct way to dispense a routine remains socially constructed and informed by practice.

Critical realism argues that independent of our knowledge, a real world exists, and there are rational methods and approaches to study it and generate theories or scientific knowledge about it (Bhaskar, 1998). However, while accessing knowledge claims about the real world, it is important to consider that our understanding and knowledge about the world and connected phenomenon is constrained by the observer's context, perception and understanding. Thus, our perception of reality is fallible. This fallibility in critical realism is addressed by hypothesising the world to be stratified into three nested domains. The fallibility of the observer is only a part of one of those domains. The next section presents a discussion of stratified layered ontology in critical realism.

4.3.4 Stratified Reality

A critical realist stance compels us to look for underlying causal mechanisms that are not always directly observable. Critical realists visualise realty in three nested layers or domains: the empirical, the actual and the real (Bhaskar, 1998). Table 20 presents a description of these nested domains.

The empirical layer is a domain of reality where one can gather empirical evidence from observers about events/ phenomenon and their experiences connected with the events/phenomenon. However, considering the observer's fallibility assumption of critical realism, this lowest domain of reality is insufficient to draw meaningful conclusions. Preceding the layer of empirical is the domain of Actual. Here, events are triggered regardless of being observed or understood by humans.

The domain of actual constitutes of entities and structures that could either be physical or social. These structures and entities exist independent of our knowledge of them and possess tendencies and casual power. Above these two layers/ domains is the domain of real that exists independent of our perception or knowledge of it. The causal mechanisms are part of the domain of real, and these mechanisms trigger events in the domain of actual, which may or may not be observable by humans in the domain of empirical.

Table 20: Nested domains of critical realism

	Domain of Real	Domain of Actual	Domain of Empirical
Mechanism	✓		
Event	✓	✓	
Experience	✓	✓	✓

Adopted from (Bhaskar, 1998, pp 2).

4.3.5 Epistemology of Critical Realist Ontology

Historically, social science research has overwhelmingly favoured the epistemic question over the ontological views. This is evident from Crotty's (1998) recommendation for a social research design that ignores the ontological question (see Figure 17).

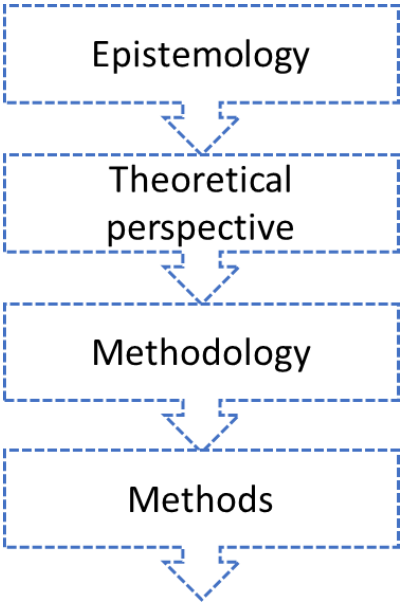

Figure 17: Elements of the research design process

(Adopted (Crotty, 1998;pp:04)

However, in contrast to relativism and social constructivism-driven social science enquiries, Critical realism advocates keeping the ontology in the foreground (Edwards, Paul, K., J. O'Mahoney, and S. Vincent, 2014)

This disregard for epistemic priors often makes linking critical realism to a single epistemic stance difficult. In the discussion and evolution of the critical realist tradition, epistemology has always remained an underdeveloped theme.

Discussing epistemology apt for a critical realist enquiry, (Albert et al., 2020) suggest that 'epistemological relativism' is a good starting point for a critical realist epistemology. The authors further argue that critical realist enquiry can be placed in what the authors call a 'holy trinity' of

"ontological realism, epistemic relativism, judgmental rationalism"

(Albert et al., 2020;pp: 359)

The statement above indicates that a critical realist research enquiry is not afraid of methodological relativism. The commitment towards transcendental realism necessitates a complementary commitment to epistemic relativism. Here, transcendental realism is used to depict a critical realist standpoint. This refers to

a combination of the realist assumption that objective reality exists independent of the observer and a transcendental assumption that regards possible realities to be a condition of the observer's knowledge (Ferraris, 2015).

To summarise the above epistemological position of critical realism, I reiterate Henfridsson and Bygstad (2013) quote about critical realism;

"it combines a realist ontology with an interpretive epistemology" (Henfridsson and Bygstad, 2013; pp 911).

Epistemology of Constructivism/social constructionism is a part of the interpretive research design (Hiller, 2016). Considering critical realism to have interpretive epistemology, I adopted Constructivism/social constructionism.

However, to say critical realism is pure social constructionist epistemology might be not completely true. A critical realist epistemological stance does align to some degree with epistemologies of interpretive research design, yet it also maintains significant differences with a pure social constructionist/ interpretive viewpoint. Social constructionism and critical realism agree that understanding the real world and its phenomena is context-dependent and can be produced through discourse. However, beyond this fundamental assumption, both viewpoints diverge (Harré and Bhaskar, 2005).

Critical realism does not share a social constructionist general tendency to bind all dimensions of social existence to discourse and socially produced knowledge. A critical realist also claims that social reality is also made up of non-discursive structures and processes that potently influence our experiences and understanding of reality (Bhaskar 1989, Harre and Bhaskar, 2005). These material processes and embodied structures should be considered, in addition to socially constructed reality, for their role to shape, alter and create the history, culture and experiences related to a phenomenon.

Aware of the similarities and distinctions between an interpretive viewpoint and critical realism, I made an informed decision to *use social constructionism from the interpretivist* epistemological tradition. This choice will favour the generation of knowledge through discourse and human experience. However, I am aware

that my choice of methodology should simultaneously capture the aspects of a depth ontology and help discover processes and embodied structures that may be influencing epistemic enquiry.

Driven by this unique challenge, I chose a methodology fit for this purpose known as the Repertory grid (RepGrid) (Jankowicz, 2005; Kelly, 1955) . Repertory Grid is a mixed method methodology from the critical realist tradition capable of discovering a more profound level of knowledge.

4.3.6 Methodological Choices Driven by Critical Realism

It is imperative for methodological choice to be aligned with your philosophical stance (Van de Ven, 2007). Over here, it will be important to note that some philosophical choices are more rigid towards methodological considerations than others. For example, in comparison to Critical realism, positivism and interpretivism are less tolerant to a broad range of research methods (Sayer, 2000). While making a choice of methodology to answer why and how questions, one should be conscious that the chosen method should have the ability to go beyond surface-level observations and provide the capability to uncover causal influences.

For pursuing a critical realist-driven enquiry, Easton, (2010) and Healy, and Perry(2000) suggest checking if the research enquiry fulfils a set of criteria. First is with regards to the type of questions that fit critical realist-driven ontological and epistemological assumptions. According to Easton (2010), critical realist ontology can pose questions that answer why events, connected to the phenomenon, occurred. This aligns with the research question of my enquiry, thus validating my choice of a critical realist stance.

Second criteria important for a critical realist research enquiry is to be able to observe empirical regularities about the phenomena under investigation. These empirical regularities help make nuanced arguments and theoretically informed assumptions about the deeper level of causal associations among factors generating the phenomenon. This prompts me to choose a method to look at multiple instances of drift or processes where drift might occur. By looking at

empirical regularities about drifted actions, I can identify patterns within the observed phenomenon. If I choose to study multiple occurrences of drifted routines, then my enquiry will have a methodological fit with a critical realist stance. Later in the chapter, I will present my unit of analysis, which is consistent with this criterion of a critical realist enquiry.

The third requirement of a critical realist enquiry is that it posits social reality to be stratified and have open system characteristics (Danermark, Ekström and Karlsson, 2019). By taking the open system and stratified view of the social reality, critical realism can simultaneously make sense of the subjective experiences of individual actors and the contexts surrounding these experiences. To get a good methodological fit, my chosen methodology should not restrict itself to formal boundaries while deriving meaning from subjective individual experiences. As I would discuss later in the chapter about my instrument of data collection (Repertory Grids) and its analytical framework, it would be evident that the methodological choice perfectly aligns with the requirements set for a critical realist enquiry.

Critical realist enquiry is not a new abstraction for routine, organisational change and knowledge depreciation studies e.g., (Iannacci and Hatzaras, 2012; Volkoff, Strong and Elmes, 2007), thus further validating my choice of the ontological perspective.

4.4 Methodology

Research strategies for organisational and social phenomena could be broadly classified into experiments, surveys and case studies (Robson, 2002). While experiments and surveys are more appropriate for creating incremental knowledge in already matured fields of social enquiry, the case-based approach is argued to have higher validity, in theory, building for nascent or evolving bodies of literature (Parkhe, 1993; Yin, 2009). For this research, I would adopt a case-based approach and investigate cases of drift associated with organisations.

The aim of this research is to explain how and why actors drift away from prescribed procedures? The why question can be answered by focusing on

answering, *'because of this factor……., people drift'*. While the how question can be answered by establishing a causal chain of actions that led to the drift.

4.4.1 Methodological Fit

The process of collecting empirical data from organisations is often addressed as field research. Edmondson and McManus (2007) define field research as *"Systematic studies that rely on the collection of original data – qualitative or quantitative – in real organizations"* (Edmondson and McManus, 2007;pp:1155)

The validity of field research rests upon the methodological integrity of the research process. Edmondson and McManus (2007) argue that to attain methodological integrity in a field research process, one needs to align the key elements of the field research process to the existing methodological and theoretical knowledge of the domain. Based on the maturity of the domain being researched, one can decide on the research question, research design and expected contribution to the literature.

Elaborating upon the notion of theoretical contribution, Edmondson and McManus (2007) posit that theoretical contribution in management research can be viewed as a continuum building upon nascent theory through intermediate to a mature theory of a given field of study. The authors posit that Nascent theory; *"proposes tentative answers to novel questions of how and why, often merely suggesting new connections among phenomena, and it has so far received little research of formal theorizing"* (Edmondson and McManus, 2007; pp1158).

Commenting upon Intermediate theory, Edmondson and McManus (2007) suggest that in contrast to nascent theory, an Intermediate theory extends the provisional explanation of a phenomenon by discovering new constructs and establishing relationships among new and existing constructs. While a Mature theory goes further than an intermediate theory by assimilating a large body of knowledge about a phenomenon. In their own words, Edmondson and McManus (2007) quote that mature theory; *"presents well-developed constructs and models that have been studied over time with increasing precision by a variety of scholars, resulting in a body of work consisting of points of broad agreement that*

represents a cumulative knowledge gained" (Edmondson and McManus, 2007; pp1158). Table 21 shows how the maturity of a field influences methodological choices.

Table 21: Maturity of a field and its impact on methodological choice

State of Prior theory and research	Nascent	Intermediate	Mature
Research Question	Open ended enquiry about a phenomenon of interest	Proposed relationship between new and established construct	Focused questions and/or hypothesis relating existing constructs
Type of data Collected	Qualitative, initially open-ended data that needs to be interpreted for meaning	Hybrid (both qualitative and quantitative)	Quantitative data: focused measures where extent or amount is meaningful
Illustrative methods for collecting data	Interviews: collecting material relevant to phenomenon of interest	Interviews: observations, surveys, collecting material relevant to phenomenon of interest	Surveys, interviews or observation designed systematically coded and quantified, obtaining data to measure extent of salient constructs
Constructs and Measures	Typically, new constructs and also few from formal measures	Typically, new constructs and/or new measures	Typically relying heavily on existing constructs and measures
Goal of data analysis	Pattern identification	Preliminary or exploratory testing of new propositions	Formal hypothesis testing
Data analysis methods	Thematic content analysis coding for evidence of constructs	Content analysis, exploratory statistics and preliminary tests	Statistical inference and standard statistical analysis
Theoretical contribution	A suggestive theory, often and invitation for further work on the issue	A provisional theory, often one that integrates previously separates bodies of work	A supported theory that may add specificity or new boundaries to existing theories

Source:(Edmondson and McManus, 2007)

Although literature on organisational routines has been studied using some mature theories like Actor-network theory (D'adderio, 2010; D'Adderio, 2008; Feldman and Pentland, 2005; Pentland and Feldman, 2008); Practice theory (Caldwell, 2012; Feldman, 2004; Hansen and Vogel, 2010; Hashemi and Zabihi, 2011; Preda, 2000), yet, the literature on practical drift is still at an early stage of maturity. The literature review part of the thesis revealed that overlapping literature on the phenomenon of drifted actions, rules, and routine change is under-researched and poorly understood. One must be cautious about judging

the maturity of practical drift based on the maturity of safety, rule-following and routine literature. I am aware that individual elements of my research phenomenon, such as routine change and drift and deviance within safety and accident literature, follow a particular kind of research methodology. Yet, the maturity of these fields cannot be extended to the phenomenon of practical drift. For example, routine change and variation favour surveys, interviews, group discussion and observation (Reason, Parker and Lawton, 1998).

4.4.1.1 Choice of the Research Approach

The routine literature, in many studies, has adopted an ethnographic approach to gathering data and insights see (D'adderio, 2010; D'Adderio, 2014; Hedgecoe, 2014; Pentland and Feldman, 2008; Pentland and Hærem, 2015; Pilbeam et al., 2016; Turner and Rindova, 2012). On the other hand, the literature on safety and accidents opts for surveys (Lobb, Harre and Suddendorf, 2001; Mkrtchyan, Podofillini and Dang, 2015; Zwirglmaier, Straub and Groth, 2016) or semi-structured interviews (Barton and Sutcliffe, 2009; Zwirglmaier, Straub and Groth, 2016) to study drift.

In the routine literature, the aim of the ethnography research has been to conduct in-depth observation of specific group practices at a place over an extended period by immersing in the social context and looking at the lens from the individual/group being studied. However, the aim of this research was to explore the experience of individuals and, gain the detailed information about drifting actions in their organisational settings and contemplate them to understand emerging patterns. A broader and divergent view was required in a relatively shorter time, and thus, the structured approach of interviews was conducted to understand the nuances of the participant's thoughts and experiences. This helped in keeping the reliability of the data high and repeatable.

Commenting on the link between the maturity of a domain and its methodological choices, Edmondson and McManus (2007) and Parkhe (1993) argue that the theoretical maturity of a domain dictates the choice of research design. Considering that the phenomenon of actions drifting away from prescribed procedures is at a nascent stage of theoretical maturity, based upon Edmondson

and McManus, (2007) recommendations, this research enquiry would be best suited for an open-ended, qualitative enquiry. Aligned with my ontology of critical realism, this open-ended qualitative enquiry will help identify underlying constructs, patterns and meanings buried deeper under the layer of surface-level empirical observations.

I chose a multiple-case design approach as this provides a stronger foundation for theory building (Yin, 2009). Regarding the multiple case study approach, Eisenhardt and Graebner (2007) quote, *"theory building from multiple cases typically yields more robust, generalisable and testable theory than single case research."* (Eisenhardt and Graebner, 2007;pp:27)

4.4.2 Why Not Ethnography

4.4.2.1 The Objective of Enquiry:

Ethnography is preferred when participants, understanding, point of view, and cultural embeddedness are salient to understand and describe alternative realities. If a research enquiry aims to study culturally shaped behaviours, shared values and beliefs, then ethnography could be considered a methodological choice (Edleman and Mandle, 2002). However, my phenomenon does not relate to cultural embeddedness or an individual's values or belief system. Thus, I subscribed to an alternative methodological choice.

4.4.2.2 Generalisability:

Ethnographic descriptions are unsuitable for generalisable interpretations.
This is because ethnographers collect thick descriptive accounts of participants' perceptions and interpretations of reality. This reality is ontologically assumed to be shaped by social context and cultural influences, making it unsuitable for developing generalisable prepositions. Due to this, Ethnographers are advised against abstracting findings from descriptive accounts (Stewart, 1998) I chose not to adopt ethnography as my research objective was to discover generalisable axioms and underlying mechanisms.

4.4.2.3 Ontological Assumptions

Ethnography is often suggested to draw its philosophical roots from Chicago School of symbolic interactionism and pragmatism (Charmaz and Mitchell, 2001). Ethnographer's ontological stance is that multiple alternative accounts of truth and reality exist in a social or cultural context.

Prus (1996) advocates that because of ethnography's ontological and epistemic stance, it is essential for an ethnographer to develop knowledge and awareness about the research enquiry, research setting and the participants of the research, including themselves. A researcher needs a thorough awareness of the location's cultural embeddedness, participants' values and belief systems, participant's perspectives about themselves, the research enquiry, and the researcher. This awareness necessitates spending long durations of time in the natural setting of the research and putting efforts into developing an in-depth understanding of the cultural and individual aspects of the site. However, this will negate the possibility of expanding beyond a context or setting, a possibility that did not align with my research objectives.

4.4.2.4 Epistemic Assumptions

Key epistemic assumption of ethnography is to know what humans believe, behave and value in a given cultural context. Describing ethnographies epistemology, Parse (2001) quotes;

"focusing on the exploration of symbols, rituals, and customs of a cultural group."

(Parse, 2001;pp:128)

Place of the action, people connected with the action and the cultural context of the actions are paramount to an ethnographer. Discussing the epistemic objective of ethnography, Van Maanen (2011) quotes;

"the meanings and practices produced, sustained and altered through interactions […] by particular people, in particular places, at particular times."

(Van Maanen, 2011;pp:221)

From the epistemic stance, it is evident that Ethnographers are interested in drawing meanings from actions and events within a cultural setting (Streubert and Carpenter, 1999). My phenomenon does not necessarily involve cultural aspects to derive meaning for actions and behaviours. This prompted me to disregard ethnography as a methodology.

4.4.2.5 Difference of My Enquiry with other Organisations' Routine Enquiries

Routine scholars adopted ethnography to study actions (Dittrich, 2021). Playing the role of observers, most researchers looked for dynamism and what patterns evolved from such dynamism. Feldman (2015) describes the purpose of ethnography-based data collection it as finding;

"what the actions add up to" (Feldman, 2015;pp:321)

My enquiry of practical drift acknowledges that to begin with, the participants consciously decouple from the prescribed procedure. Then, this may lead to the continuation or development of a pattern. The critical aspect of my enquiry is the initial trigger and the conditions supporting that initial decoupling. This initial act of decoupling cannot be evaluated through daily observation. Knowing about this kind of phenomenon requires the organisational members to access their past knowledge and experience and use it to intuitively think and articulate the factors and conditions supporting such a decoupling of actions from prescribed procedures. This is why ethnographic study of daily routine dynamism and situated actions is not my preferred methodology.

4.4.3 Sampling Criterion

For conducting a multiple case study-based research enquiry, the case selection criterion is an important and critical research design decision (Yin, 2009). (Eisenhardt, 1989) and (Pettigrew, 1990) have argued that the researcher's choice of cases should be guided by the possibility of discovering the phenomenon under research in those cases. Leaning on the argument of (Eisenhardt, 1989) and (Pettigrew, 1990), I adopt a Purposive or Relevance sampling approach (Krippendorff, 2004; Patton, 2004) to select cases that are more likely to have actors' behaviours similar to the ones I am researching. Before

I elaborate on my case selection criterion, I provide a discussion of the different sampling approaches.

Among the most commonly adopted sampling techniques like random, systematic, stratified cluster or snowball, cases are sampled based on the nature of the source, situation, time period or categories, and none of these require pre-reading or analysis of the sampled case (Krippendorff, 2004). However, an alternative sampling approach called the 'Relevance Sampling' or, sometimes referred to as 'Purposive Sampling', purposefully digresses from a random or systematic selection criterion and looks for cases that are most likely to contribute towards answering the research question (Krippendorff, 2004). For this study, I adopted a 'Relevance Sampling' method.

Selection of cases using a 'Relevance Sampling' method requires the following considerations: a decision on which participant, site or firm to choose and the size of the sample studied. Ultimately, the aim is to conceptualise what events, what settings, what actors and what artefacts (Marshall and Rossman, 2010).

The case selection process started with the first step of choosing the right kind of organisation for this study. Considering that largescale multinational organisations have well-defined operations, SOP and organisational routines, multinational organisations were chosen as the primary criterion for firm selection. Due to my interest in the safety aspect of drift, I added a further criterion for organisational selection that the chosen firm should have safety as a high priority. Considering the above two criteria for firm selection, I contacted organisations from Oil and Gas, large-scale Manufacturing, and Aerospace segments. The selection was motivated by the fact that these sectors follow highly structured and well-defined operational procedures and invest heavily in training and ensuring people follow the procedures.

The next step of sampling was to identify the right kind of participants for this study who could provide a deeper level of insight about my phenomenon of interest. The theory of practical drift argues that experienced and knowledgeable work facing individuals, such that *"individuals at the sharp end of systems*"(Pettersen and Schulman, 2019;pp:4), when encountering a local

resistance to a rule-based logic, they adopt a local action or a task-based logic to drift from the recommended procedure (Bisbey, 2014; Harvey and Sotardi, 2017; Haynes, Schäfer and Carroll, 2007; Hedgecoe, 2014; Ortmann, 2010; Snook, 2002; Stolte, Vogt and Weber, 2010). Based on the conceptualisation of practical drift, I argue that the selected participants for this study should have two characteristics: (i) they should be experienced enough to understand the introduction of task-based logic, and (ii) they should be work facing organisational members so that they could comment upon the issues with the application of a rule-based logic. Thus, I chose work-facing managers and individuals with at least four plus years of work experience for this study.

4.4.4 Sample

Based on the above criterion, executives from various public and private firms were contacted using professional networks. A total of 32 executives agreed to participate in the study, and finally, 31 interviews were conducted. Prior to these interviews, a pilot study was also done. The final interviews accounted for approximately 30 hours of recorded interview data. Nine executives did not agree to record the interview, citing confidentiality issues. For these unrecorded interviews, extensive notes were taken during the interview process. The details of the sample are presented in Table 22 and Figure 18.

4.4.5 Unit of Analysis

The unit of analysis for this study was procedures or routines that were not performed as prescribed. Over here, it would be worthwhile to mention that a unit of analysis focusing on drifted actions or routines succeeds in capturing information about organisational actors, positioning of these actors within the process, and wider organisational contexts/ structures connected to these drifted practices.

4.4.6 Instrument of Data Collection

As guided by my ontological stance of critical realism, one can argue that underlying causes for the phenomenon of actions drifting away from the

prescribed procedures cannot be directly deduced from surface-level empirical observations.

Table 22: Description of the Sample

Case Marker	Company	Industrial sector	Position of Interviewer	Mgt level & Experience (yrs)
C 1	World leading Aerospace engine manufacturer	Aerospace	Sr Engineer	Middle (11)
C 2	Public sector Nuclear power plant	Aerospace	Sr Operations manager	Senior (21)
C 3	World leading industrial projects design and delivery firm	Manufacturing	Mechanical Engineer	Middle (6)
C 4	A global engineering solutions company working in fields of power generation, transmission and manufacturing	Aerospace	Application engineer senior tech lead	Senior (9)
C 5	One of the largest state-owned oil and gas company of middle east.	Oil and Gas	Mechanical Engineer	Senior (20)
C 6	A world class automotive OEM manufacturer of Turned components and bearings	Manufacturing	Sr Process control Engineer	Middle (4)
C 7	World's leading manufacturer of large-bore diesel and gas engines, turbochargers, propellers, gas and steam turbines, compressors and chemical reactor.	Oil and Gas	application engineer	Middle (7)
C 8	A leading infrastructure projects company	Manufacturing	Project engineer	Middle (4)
C 9	A state-owned aerospace and defence manufacturing company	Aerospace	Sr Engineer	Senior (12)
C 10	A state-owned public corporation of middle east involved with exploration, production, of crude oil, natural gas, and petrochemicals	Oil and Gas	Sr Process Engineer	Senior (22)
C 11	A global manufacturer of speciality chemicals, adhesives, and coatings for automotive, construction, energy, food and beverage, and pharmaceutical sector	Manufacturing	Scientist	Middle (6)
C 12	state owned aerospace and defence manufacturing company	Aerospace	Sr Engineer	Senior (11)
C 13	The food and beverage arm of a leading global FMCG company with gross sales of more than US$ 10.8 billion	Manufacturing	key account manager	Senior (9)
C 14	A fortune 500 company providing engineering services for a wide range of industrial, commercial, and consumer markets	Manufacturing	senior engineer	Middle (8)
C 15	A state-owned oil and gas company with net assets in range of US$ 48 billion	Oil and Gas	Operations officer	Middle (8)
C 16	A global firm with presence in more than 60 countries executing service and maintenance contracts of commercial aircrafts.	Aerospace	Engineer	Middle (4)
C 17	A world leading solutions provider for industrial boilers and heat exchange units with presence in more than 88 countries and manufacturing units spread across Europe and Asia	Manufacturing	Engineer	Middle (5)
C 18	World's leading automotive manufacturing company	Manufacturing	Design Engineer	Senior (11)
C 19	A global engineering company involved in the installation and running of petrochemical plants for a state-owned oil and gas company of middle east	Oil and Gas	Sr Process Engineer	Senior (22)
C 20	The owner and infrastructure manager of all the railway lines and assets of a European nation	Others	Director, Fleet & Engineering	Senior (16)
C 21	State owned power generation and distribution firm	Manufacturing	Executive Engineer	Senior (31)
C 22	World leading Aerospace engine manufacturer	Aerospace	Stress Engineer	Middle (4)
C 23	World leading manufacturer of lighting and electric products with manufacturing units across Asia, Europe and America	Manufacturing	Deputy General Manager Operations	Senior (22)
C 24	Saudi multinational petrochemical and chemical manufacturing firm	Oil and Gas	Sr Process and Operations Engineer	Senior (21)
C 25	World leading Aerospace engine manufacturer	Aerospace	Sr Project Engineer	Senior (18)
C 26	State owned defence and aerospace manufacturing firm	Aerospace	Sr Design Engineer	Senior (14)
C 27	one of the top steel producing companies of the world with presence across Asia, and Europe. It has annual crude steel deliveries of 27.5 million tonnes	Manufacturing	Engineer	Middle (7)
C 28	A global Petrochemical company among the top 10 petrochemical firms of the world	Oil and Gas	Senior Product Manager and Charterer	Senior (23)
C29	Product engineering firm in the Aero Engines & Aerospace	Aerospace	Senior Engineer	Middle (6)
C30	Public sector Aerospace firm	Aerospace	Technical Manager	Middle (8)
C31	World leading Commercial Airlines	Aerospace	Senior Maintenance Engineer	Senior (20)

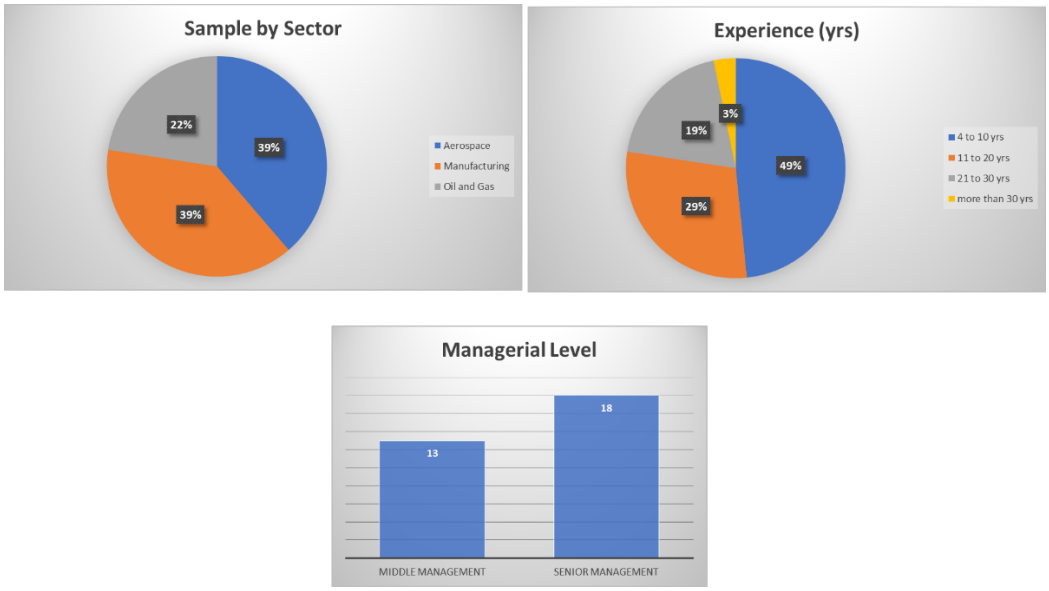

Figure 18: Sample characteristics

A part of the reason for this is that drifted actions originate from adaptations done at the local level to simplify the workflow, and such day-to-day issues are not readily deduced by superficial discussion of the phenomenon. Another reason is that as the drifted action gets routinised and regularised, it slowly, gradually and incrementally starts to drift away from the original design. This process unfolds over a considerable duration of time and is thus not readily deducible by direct observation. This contributes towards the fallibility of individual actors to explain or articulate the phenomenon in its entirety. Thus, the lowest domain of reality, the empirical, is insufficient to provide directly deducible conclusions for the phenomenon of drift.

To overcome this challenge associated with the drifting of actions from procedures, one needs to adopt an intuitive methodology that could draw on the participant's cognitive understanding of the phenomenon.

A methodology fit for this purpose is a mixed-method approach known as the Repertory grid (RepGrid) (Jankowicz, 2005; Kelly, 1955). RepGrid is a systematic interview technique that belongs to a family of cognitive mapping tools (Geraldi, Kutsch and Turner, 2011; Geraldi, Lee-Kelley and Kutsch, 2010) and can simultaneously generate quantitative and qualitative data.

4.4.6.1 Repertory Grids

The RepGrid interview technique was developed by the American Mathematician and Psychologist George Kelly as a tool for analysing individuals (Rogers and Ryals, 2007). However, the tool has found multiple applications in organisational studies (Bradshaw et al., 1993; Brown, 1992; Easterby-Smith, Thorpe and Holman, 1996), marketing(Hair, Rose and Clark, 2009; De Leó and Guild, 2003; Rogers and Ryals, 2007), supply chain (Goffin et al., 2012) and information system's research. RepGrid is often used for domains that are exploratory, complex, and difficult to articulate (Goffin et al., 2012; Rogers and Ryals, 2007). By comparing and contrasting past events, actions and decisions, the RepGrids process can stimulate the participants to think beyond surface-level phenomena and into deeper levels of perception about observations and occurrences.

4.4.6.2 The Grid: Elements and Constructs

The grid used for this structured approach is a two-dimensional table with rows and columns. The top row is populated with events, occurrences, observations or outcomes related to the phenomenon under investigation (Rogers and Ryals, 2007). This list of events is referred to as 'Elements' (Kelly, 1955). In my case, these will be known cases of drift identified by the participants.

The second dimension of the grid is a number of bipolar opposite constructs listed in the grid's first and last columns. These bipolar entities called the 'Constructs', are obtained using a structured questioning approach of comparing and contrasting among a selected group of Elements. Based on their experience, tacit knowledge and understanding of the process and phenomena, participants are stimulated to articulate these bipolar constructs. For example, a bipolar construct in my research could be: All drift –A selected few drifts, drift improves safety – does not improve safety, people are aware of drift – are unaware about drift. Figure 19 provides an exemplary grid relevant to my phenomenon of practical drift.

	Elements (En)	Chosen Triad	E 5.a	E5.b	E 5.c	E 5.d	E 5.e	E 5.f		
SNo	Construct (Rank 1)								Construct Pole (Rank 5)	Construct Code
1	* Process hardly or never followed		3	2	4	3	3	2	Process consistently followed	C 5.1
2	* impact on safety (1 being negative, 3 being no impact and 5 being positive)		2	2	1	2	2	2	Impact on safety (1 being negative, 3 being no impact and 5 being positive	C5.2
3	No urgency in this work	c – f; b	3	5	1	3	2	1	To prevent emergency situation like plant shut down and plant tripping	C 5.3
4	New Entrant learns with time once he starts working	b – f; c	1	1	5	1	1	1	New Person is aware when he joins	C 5.4
5	Related to plant operations	d – e; a	5	1	2	1	1	3	Related to process data extraction for performance analysis	C 5.5
6	This is more common	a – d; e	1	3	4	1	5	2	Frequency is low	C 5.6
7	Related to plant safety	a – b; c	1	1	5	1	1	1	Related to personal safety	C 5.7
8	Procedure are not that much elaborately explained	a – b; c	1	1	5	1	1	2	Better procedure in place	C 5.8
9	Very few people are there to monitor	a – b; c	1	1	5	4	4	2	This has more monitoring	C 5.9
10	Done while plant is running	d – e; f	5	2	3	1	1	5	Done while plant is shut down or running. It can be anytime	C 5.10
11	Nothing to do with updating the documents	d – e; f	2	2	2	1	1	5	This is about updating the document for improvement	C 5.11
12	This involves supervisors for approval . Tedious job	d – e; f	5	1	5	1	1	5	Based on operator's individual experience	C 5.12

f. Reporting Updates on design SOPs
e. Shut down and maintenance process variation
d. Filling form for modifying process
c. Wearing ALL PPE, during Summer
b. Hanging process related alarm set points
a. Data exchange from secured control network

Figure 19: Exemplary Repertory Grid

*The first two constructs (Highlighted in yellow) are intentionally kept common to all interviews, while other constructs are provided by the interviewee.

4.4.6.3 The Systematic Questioning Approach for Rep Grids

The most crucial step of a RepGrid interview process is the articulation/elicitation of a construct. Three approaches are suggested for construct elicitation; each approach uses a different number of elements for comparison and a different questioning technique. These three techniques are Triads, Dyads and full context (Jankowicz, 2005). The sample of construct elicitation questions associated with each technique are provided in Table 23.

Table 23: The three approaches for RepGrid construct elicitation

Construct Eliciting Approach	Number of Elements offered for contrasting	The questions asked from the respondents
Triad	3	How are two of these elements similar but different from a third?
Dyad	2	How do these two elements differ from each other?
Full context	all	How do any of these elements differ from any of the other?

(Hair, Rose and Clark, 2009)

I suggest to use the triad approach for construct elicitation as it provides respondents with a comfortable degree of variety to compare and contrast events and articulate bipolar constructs (Jankowicz, 2005).

4.4.6.4 The Process of Collecting Rep Grid Interview Data

The COVID-19 outbreak severely impacted the phase of data collection in this research. Due to strict social distancing regulations, it was decided to collect the data online. The challenge with this phase was increased with the severe loss of jobs in the aerospace sector and with the enforcement of home working and furlough schemes.

Using professional networks, participants for this study were identified. These participants were approached with a formal email asking for consent to participate in this study. The email opened with a brief introduction to the research and the objective of the data collection process. It went on to state the process of the study and the confidentiality and anonymity clause for the study. Participants were assured that until they provided their consent, no such information would be collected or retained that could be traced back to the participant or identify the organisations they work for. They were also informed that the interview needed to be recorded to retrieve information relevant to the qualitative research, and this recording would not be shared or published. However, consent for recording is voluntary, and if the participants want, they are free to withdraw their consent for recording at any time in the process. The recording would be deleted if they wished.

In cases where the respondents denied permission to record the interview, extensive notes were taken, with their permission, and key points were written down for a later stage of qualitative analysis. All the recorded interviews were transcribed verbatim.

Data collection utilised the method of Rep Grid (a detailed description of Rep Grid was done earlier in this chapter). A mixed method approach was adopted, and almost all the participants found the idea of a Rep grid very interesting and something that helped them in brainstorming. All the interviews followed a

protocol (Figure 20), which was developed on the basis of literature and some pilot and exploratory interviews conducted earlier. For my research, I executed the Rep grid technique in the following steps (see Figure 20).

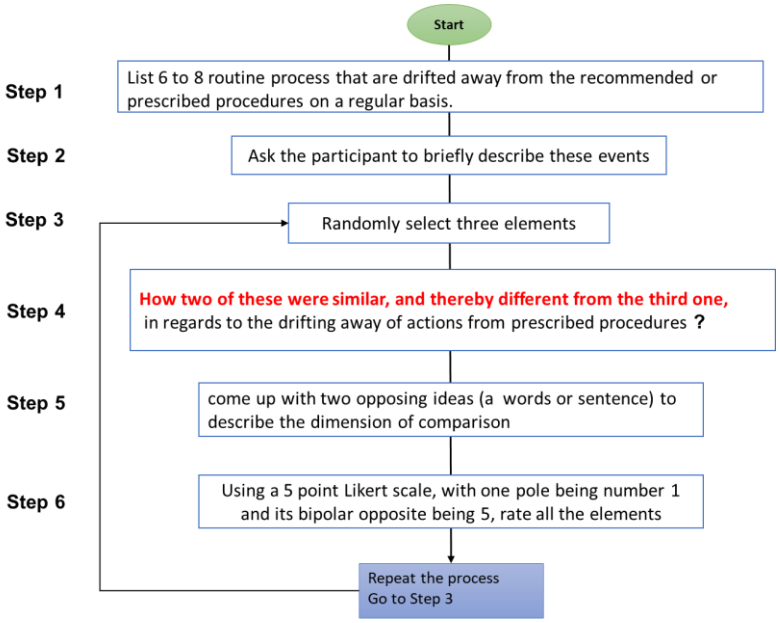

Figure 20: Steps of the RepGrid Process

Step 1: The participants were briefed about the research and the RepGrid interview process. Key terms such as routine, practical drift, deviation and slow and steady decoupling were explained.

Step 2: The participants were then asked to list 6 to 8 routines, tasks or actions that may qualify as a routine deviation or practical drift. These routines were the Elements of the RepGrid process. These elements were given an identifiable name tag (as seen in Figure 19 E5.a to E5.f), written on a flag card, and mentioned in the first row on different columns of a RepGrid format.

Step 3: The participants were then asked to describe these events briefly.

Step 4: Participants were then presented with a randomly chosen set of three flag cards containing one element. Then the participants were asked the question, *"How two of these were similar, and thereby different from the third one, in regards to the drifting away of actions from prescribed procedures?"*

Step 5: The participants were encouraged to think about a deeper level of association among the chosen cards. This was done by moving the cards around while asking the interviewee to think about similarities and differences. “in what sense are they similar and different?” It was important to prompt the participant to assess their experience and understanding of the operations until they clearly explained the contrast they used to compare the three incidents.

The description provided by the participant was used to articulate a bipolar construct pair, and the construct was written on the first and last column of the same row.

Step 6: The participant was then asked to rank all the elements on the dimension of this newly discovered bipolar construct using a 5-point Likert scale. One pole is number 1, and its bipolar opposite is 5.

Step 7: Steps 4 to 6 were repeated until theoretical saturation was reached.

Step 8: After this, the participant was presented with two additional, predefined construct poles.

(i) Process hardly or never followed (Ranked 1) - Process consistently followed (Ranked 5)

(ii) impact on safety (1 being negative, 3 being no impact, and 5 being positive) - Impact on safety (1 being negative, 3 being no impact, and 5 being positive)

The participants were asked to rank all the elements on the dimension of these two additional constructs using a 5-point Likert scale. One pole being number 1, and its bipolar opposite being 5.

During the process of construct elicitation, the laddering technique and further probing questions like ‘Why’, ‘How’ etc., were used to stimulate the respondents to think about deeper levels of association of similarity or dissimilarity among the selected elements. Here, the laddering technique means asking follow-up questions that may help further refine the explanation of constructs articulated by the respondents(Rogers and Ryals, 2007).

4.4.6.5 Interview Protocol

The interview protocol was developed, tested, amended and improved to ensure the correct representation of data collection requirements. It was assured that the protocol was well aligned with this research's phenomena of interest and the research question. The focus was on the research enquiry, and the protocol avoided any sort of interviewer bias.

As recommended by the grounded theory approach of Glaser and Strauss (1967), a few minor changes were made to the protocol to entice and encourage the respondent to think more and delve deeper into the events related to drift. The laddering technique was used during the interview process to have a deeper conceptualisation of the cases.

For this research, where the only way of interviewing people was online due to the pandemic, participants had two parts to the interview. This was done to avoid any form of fatigue caused to them by spending extra hours on screen and computer.

Table 24: Interview Protocol

Step 1	The participant was briefed about the interview process and about key terms. Then a permission for digital audio recording of the interview was taken
Step 2	The participant was then asked to provide a brief description of 4 or more event of drifting away of actions from prescribed procedures. The events were given a name tag and were written down on digital flag cards using Microsoft power point.
Step 3	The participants were provided a random set of three event flag cards and were asked, “How two of these were similar, and thereby different from the third one, in regards to the drifting away of actions from prescribed procedures?”
Step 4	The dimension of similarity and dissimilarity were documented in a grid format as bipolar constructs. To further the understanding about events and the expressed dimensions of similarity and dissimilarity, the participants were asked probing questions like why, how, can you elaborate it further etc.
Step 5	Steps 3 and 4 were repeated until a conceptual saturation was reached

In the first part of the interview, the participants were given a choice to provide a list of events related to drifting away of actions from prescribed procedures. The participants were asked to think of at least 4 events of drift that they are aware of from their present or past work experience. In the second part, the participants had to compare and contrast the three randomly selected events (out of their given events). This was done using a common fixed question; *“How two of these were similar, and thereby different from the third one, regarding the drifting away*

of actions from prescribed procedures?". Table 24 provides details about the steps of the interview protocol.

4.4.7 Temporal Aspect of My Research Enquiry

My research objective is to discover how drift impacts safety. One may argue that drift in the performative is a temporal phenomenon and might need a longitudinal data collection approach. I will now discuss two aspects of my research design. First, since a change in routine is a temporal phenomenon, can my research design capture temporal aspects? Second, can the how question be answered using my methodological choices?

In answer to the first question, I would like to argue that my research design decisions cover the temporal aspect of the research enquiry. My choice of structured interview methodology of the 'Repertory grid' technique can help uncover temporal aspects of the phenomenon.

The origin of RepGrids can be traced to the discipline of psychology (Kelly, 1955). They were developed as a clinical tool to study complex matters related to human behaviour, emotions and psychology. It is important to note that human emotional behaviour and psychology are an evolving temporal phenomenon. These are built over several years of interactions with various social and institutional structures and experiences. RepGrids are unique in their ability to uncover deeper layers of association between surface-level phenomena and events or experiences that may go back several years. Thus, one can infer that RepGrids are a proven methodology for studying temporal and evolutionary complex phenomena and can be used to uncover the stratified reality drift in the performative aspect of routines.

The RepGrid methodology has been effectively used in the organisational science literature to uncover underlying realities and answer the 'how' questions (Rogers and Ryals, 2007). Due to its ontological foundation in the critical realist traditions, RepGrids can help uncover the elements of a phenomenon's stratified reality. The Table 25 below presents an exemplary list of papers that used the RepGrid methodology to answer the how questions.

Table 25: RepGrid and the how questions

Citation	The object of the enquiry
(Lemke, Clark and Wilson, 2011)	How customer experience quality impacts customer relationship outcomes
(Tan, 2005)	How key account managers assess the effectiveness of long-term business-to- business relationships
(ARANDA and FINCH, 2003)	How construction workers modify their risk taking behavior when safety schemes are implemented
(Tan and Gordon Hunter, 2002)	How you formulate and implement an effective Strategic information system strategic plan.
(Cassell et al., 2000)	How individuals see their work environment, control systems, and work behaviours
(Littler and Marsden, 2000)	How buying decisions were made

4.5 Analytical Framework: Qualitative Data Analysis

4.5.1 Grid Analysis

For the Rep grid analysis, I followed the multigrid analysis approach suggested by (Jankowicz, 2005). This was done in two stages; (i) Elicitation of constructs using Bootstrapping Technique of generic content analysis (Jankowicz, 2005), (ii) Undertaking a reliability check of categories found by generic content analysis.

4.5.2 Bootstrapping Constructs

For the purpose of combining the constructs from multiple Rep grids, it is required to pool constructs into meaningful categories. The pooling of constructs into categories requires to systematically identify themes within the constructs that may express similar ideas. This process of systematically pooling Rep Grid constructs is termed as bootstrapping (Jankowicz, 2005).

The bootstrapping generic content analysis approach starts with defining the basic unit, “content unit” of analysis, that represents a single unit of meaning. For RepGrids, this is the construct poles. This content unit is written down in a card that provides details about; construct poles, a description of the constructs, and construct code Figure 21. Similar cards are made for all the constructs discovered in the RepGrid process.

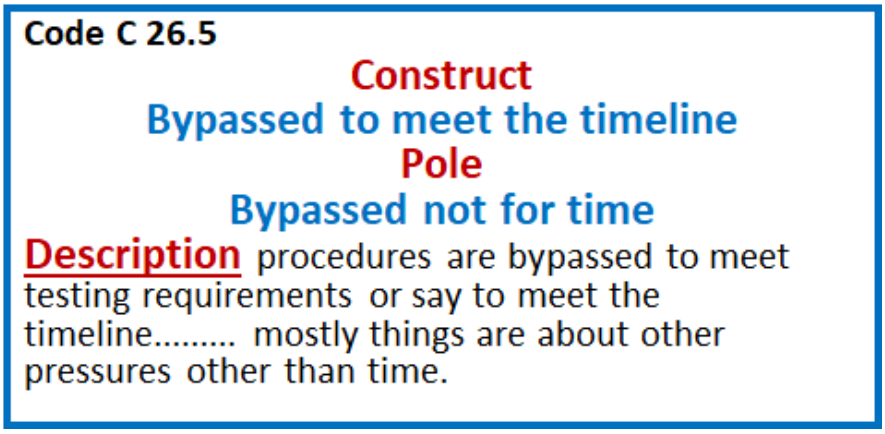

Figure 21: Content Unit Card

The core categorisation process of Rep grid bootstrapping follows the following procedure.

(i) A content unit is selected at random and is compared to another randomly selected content unit. Suppose the two content units have a possibility to place them together under a single meaningful category relevant to the research agenda. In that case, a category is created at the same time, and both are allocated to it.

(ii) If these content units can not be categorised under one category, they are put into two separate categories.

(iii) Remaining items are compared to each of the existing categories, and if they could be allocated to any existing categories, they are placed under that category.

(iv) A new category should be created if the selected content unit does not fit into any of the existing categories.

(v) Over here, it is also important to review the meaning names of all the existing categories. There might be a possibility that at this point, some existing category might need to be redefined, relabelled or reconceptualised to clarify what can and cannot be put under the category. If this happens, then the category is either combined or broken up and the existing content units within the category are reallocated accordingly.

(vi) This process is repeated until all content units are classified.

(vii) There is often a possibility that at the end of this process, there may exist a few content units that do not fit any theme, and to accommodate them, it would be required to create one category for each unit. Such content units are clubbed together as miscellaneous.

(viii) Miscellaneous should not have more than 5% of all the content units. If it has more than 5%, then one needs to redefine or reconceptualise existing categories to accommodate some content units of miscellaneous or move some of their content units to a newly created category that has elements of miscellaneous.

The results are tabulated in an Excel workbook then used for reliability testing.

4.5.3 Quality Criteria for Qualitative Analysis: Validity and Reliability

One needs to be cautious while formulating theory or making claims using qualitative studies as this rests upon the aspect of validity and reliability of the research. Validity indicates how correct, precise and accurate the findings and reliability indicate the ease of its replicability.

For qualitative research, one of the most important elements of validity is internal validity(Miles, Huberman and Saldaña, 1994). Here, internal validity refers to the degree of justifiability for making conclusions about causality from qualitative data (Johnson, 1997). Where the focus of validity is on accuracy, the concept of reliability concerns about the replicability of the research findings (Patton, 2004; Ritchie and Lewis, 2003). This is often strengthened by clearly describing the research process, methodological considerations, and decisions governing the data collection and analysis. In the field of positivist research, validity and reliability can be easily enforced through statistical methods (Buchanan, 1999); however, this is not the case for qualitative research. In absence of statistical methods, the domain of qualitative research draws its validity from the details of the research process that may be able to ensure the findings are transferable and extendable to other settings (Miles, Huberman and Saldaña, 1994).

For the case of Repertory grids, there is a well-defined process for establishing the reliability of the qualitative data (Jankowicz, 2005). It is based upon the argument that the content analysis of data can simply not be just idiosyncratic; rather, it must be reproducible in a way that it makes sense to the reader. Thus,

a reliability check needs to be incorporated by following the stages suggested by (Goffin and Koners, 2011; Jankowicz, 2005). The stages to be covered in the reliability check are identifying categories, allocating constructs to those categories, tabulating the results, and establishing the reliability of the category system. For this research, the coders did a reliability test of the data in two independent teams. A glimpse of it can be seen in the flowchart of Figure 22.

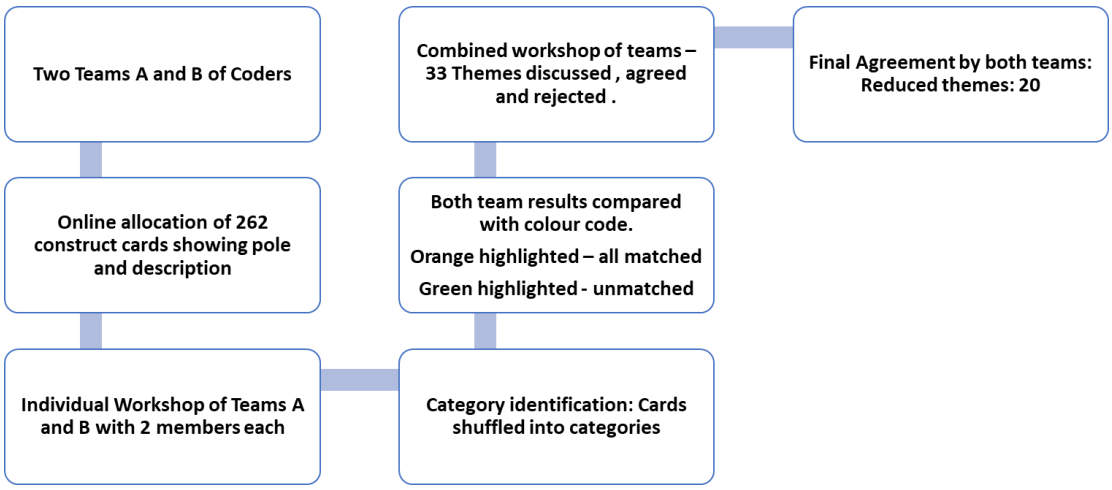

Figure 22: Process of RepGrid reliability testing

In an extended workshop, both teams were handed 262 construct cards, similar to the exemplary card in Figure 21, with construct poles and a brief description. Two files of identical sets were uploaded on a shared drive. The cards had construct reference numbers (like C26.5 in Figure 21). These cards were used to qualitatively code the findings into thematic categories relevant to the phenomenon of interest. The teams were divided to reduce personal bias; one member was an experienced research faculty, and the other was a doctoral researcher. The two teams worked independently, and then after the teams had coded all the construct cards into respective categories and provided a description/ definition of the categories, this interim result was populated in a tabular format known as the Reliability Table (Jankowicz, 2005).

First, in this reliability table, the categories of two teams were placed on the first column and row of the table so that categories with similar definitions occupy the same column and row number for each of the two teams.

So, for example, Team A came up with a construct – Bypassed to save time, while Team B coded a construct as Time/ Production pressure. Since both categories convey similar ideas, the Team A construct was allocated to row 2 while the Team B construct was allocated to column 2.

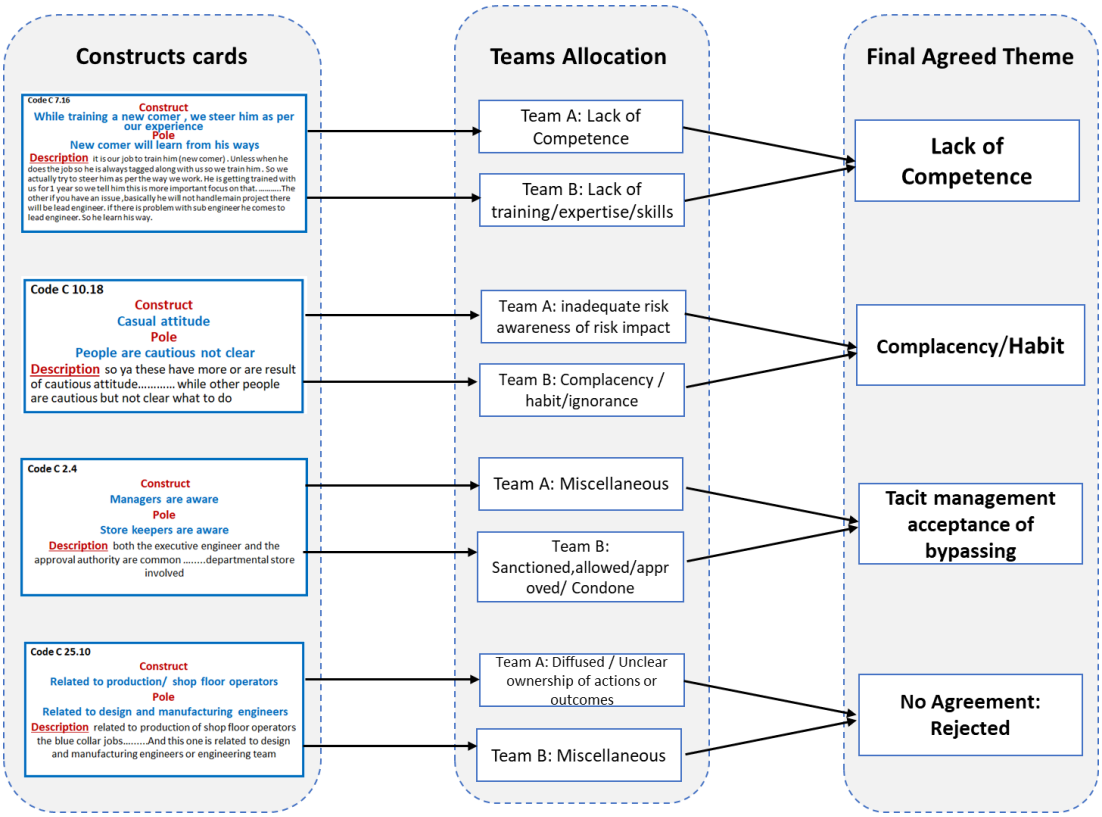

Figure 23: An example of the process of coding the construct card

The advantage of this formatting was that, after populating all similar categories in matching rows and columns, the diagonal cells of the table presented with an opportunity to allocate construct cards that were common to both teams, and all the cards/ constructs in the diagonal were reliable constructs. Refer to the Figure 23 for a sample of the coding process for the construct cards.

However, the first draft of the reliability table yielded less commonality ratio as compared to the acceptable criterion of 80% (Miles and Huberman, 1994). Recategorisation was done for some constructs in another discussion of checking the coding. The teams met in another workshop to discuss and agree upon the constructs that were allocated to different themes by the two teams. Further discussions and negotiations were done to strengthen the definitions of the categories. Once the definitions were redefined unanimously, we worked on the

constructs which were the outliers and were off the diagonal. This was done to get maximum constructs on the diagonal and reach the benchmark of 90% agreement. The constructs where the two teams were not in agreement were discarded from further analysis. At the end, a final agreed table was redrawn with 93.9% reliability. (Jankowicz, 2005).

The original table extended in several pages, so I present a snapshot of the reliability table in figure 24 (full table attached in appendices).

REF				1	2	3	4	5	6	7
			Team B EN	Ambiguous, unclear, unknown, non-specific or non-existant rules	Bypass to save time	Bypassed for production or cost pressure	Tacit management acceptance of bypassing	inadequate risk awareness of risk impact, severity and probability	Inadequate resource and training	financial / personal harm
				1.04, 1.07, 3.07, 3.08, 3.11, 5.08, 7.06, 7.11, 10.07, 10.2, 11.06, 12.04, 14.12, 16.06, 22.05, 23.11, 24.04, 24.06	1.13, 2.03, 2.05, 2.06, 3.09, 4.05, 4.13, 6.06, 6.1, 8.09, 9.1, 11.2, 15.05, 15.09,	2.08, 6.07, 8.04, 10.21, 13.1, 19.09, 21.03, 21.07, 23.04, 24.03, 25.03,	1.06, 2.04, 3.05, 3.06, 4.03, 4.07, 4.08, 6.08, 8.1, 9.08, 10.11, 10.13, 11.09, 13.03, 13.04, 14.07,	1.05, 3.16, 8.06, 8.08, 9.05, 9.06, 10.08, 11.04, 11.07, 11.11, 11.15, 14.08, 15.07, 16.04, 17.07, 18.18, 19.08,	3.15, 4.15, 7.04, 7.07, 10.19, 12.1, 14.04, 14.15, 16.07, 17.14, 18.04, 22.1, 23.06, 26.06, 27.07, 30.04	3.13, 5.05, 11.08, 17.09, 21.06, 25.06, 27.1
		COUNT		18	20	16	31	19	16	7
	Team A - CC									
1	Ambiguous, unclear, unknown, non-specific or non-existant rules	1.04, 1.07, 3.07, 3.08, 3.11, 5.04, 5.08, 7.06, 7.11, 10.07, 10.2, 11.06, 12.04, 12.09, 14.12, 16.06, 17.08, 18.16, 22.05, 23.11, 24.04, 24.06, 27.04	23	1.04, 1.07, 3.07, 3.08, 3.11, 5.08, 7.06, 7.11, 10.07, 10.20, 11.06, 12.04, 14.12, 16.06, 22.05, 23.11, 24.04, 24.06						
2	Bypass to save time	1.13, 2.03, 2.05, 2.06, 3.09, 4.05, 4.13, 6.06, 6.1, 8.09, 9.1, 11.2, 15.05, 15.09, 17.03, 19.03, 25.14, 26.05, 29.01, 30.03	20		1.13, 2.03, 2.05,2.06, 3.09, 4.05, 4.13, 6.06, 6.1, 8.09, 9.10					
3	Bypassed for production or cost pressure	2.08, 6.07, 7.07, 8.04, 10.21, 13.1, 19.09, 21.03, 21.07, 23.04, 24.03, 25.03, 25.07, 25.11, 25.13,	18			2.08, 6.07, 8.04, 10.21, 13.1, 19.09,				
4	Tacit management acceptance of bypassing	1.06, 2.04, 3.05, 3.06, 4.03, 4.07, 4.08, 6.08, 9.08, 10.11, 10.13, 11.09, 13.03, 13.04, 14.07, 14.09, 14.14, 14.18, 16.1, 16.11, 17.1, 17.11, 18.15, 19.06, 19.1, 21.05,	31				1.06, 2.04, 3.05, 3.06, 4.03, 4.07,4.08, 4.10, 6.08, 9.08, 10.11, 10.13, 11.09,			
5	inadequate risk awareness of risk impact, severity and probability	1.05, 3.16, 5.03, 8.06, 8.08, 9.05, 9.06, 10.08, 11.04, 11.07, 11.15, 14.08, 15.07, 16.04, 17.07, 18.18, 19.08, 27.06	18					1.05, 3.16, 8.06, 8.08, 9.05, 9.06, 10.08, 11.04, 11.07, 11.15, 14.08, 15.07, 16.04, 17.07, 18.18, 19.08, 27.06		
6	Inadequate resource and training	3.15, 4.15, 7.04, 10.19, 12.1, 14.04, 14.15, 16.07, 17.14, 18.04, 22.1, 23.06, 26.06, 27.07, 30.04	15						3.15, 4.15, 6.04, 7.04, 10.19, 12.1, 14.04, 14.15, 16.07, 17.14, 18.04, 22.1, 23.06, 26.06, 27.07, 30.04	
7	financial / personal harm	3.13, 5.05, 11.08, 17.09, 21.06, 25.06, 27.1	7							3.13, 5.05, 11.08, 17.09, 21.06, 25.06, 27.10,

Figure 24: Reliability table

First in this reliability table, the categories of two teams were placed on the first column and row of the table in such a manner that categories with similar definitions occupy the same column and row number for each of the two teams. So, for example; Team A came up with a construct – Bypassed to save time; while Team B coded a construct as Time/ Production pressure. Since both categories convey similar ideas, Team A construct was allocated to row 2 while Team B construct was allocated to column 2. The advantage of this formatting was that, after populating all similar categories in matching rows and columns, the diagonal cells of the table presented with an opportunity to allocate construct cards that were common to both teams and all the cards/ constructs in the diagonal were reliable constructs .

However, the construct codes that did not lie in the diagonal, were discussed and resolved in the next steps of the reliability testing.

In the next step, the teams met in another workshop to discuss and agree upon the constructs that were allocated to different themes by the two teams. Further discussions and negotiations were done to strengthen the definitions of the categories. Once the definitions were redefined unanimously, we worked on the constructs which were the outliers and were off the diagonal. This was done to get maximum constructs on the diagonal and reach the benchmark of 90% agreement. At the end a final agreed table was redrawn with 93.9% reliability (Jankowicz, 2005).

4.5.4 Saturation point with regard to data collection

The data saturation point is an essential methodological element of any qualitative research. The saturation point in qualitative research signifies the criterion at which data collection and/or data analysis is discontinued (Saunders et al., 2018). This is because on reaching a saturation point, no new information emerges from the interviews, participants or data source (Lowe et al., 2018).

With its origin in Grounded Theory research (Glaser and Strauss, 1967), it can be defined as *"the point in coding when you find that no new codes occur in the data. There are mounting instances of the same codes, but no new ones"* (Urquhart, 2013; pp:194)

It is a point in data collection and analysis where there is a (non) emergence of any new code or theme (Birks and Mills, 2015; Given, 2016; Olshansky, 2015). Some authors refer to this point as a point of theoretical saturation where all the constructs relevant to theory building are fully represented by the data (Starks and Trinidad, 2007). At this point one may conclude that the research has covered a sufficient range of data and the outcomes from its analysis are credible to draw meaningful conclusions and interpretation. In social science qualitative research, saturation is achieved at about a sample size of 15 interviews (Hennink and Kaiser, 2022). This is evident from the Figure 25 that presents findings from a systematic review of sample size and saturation.

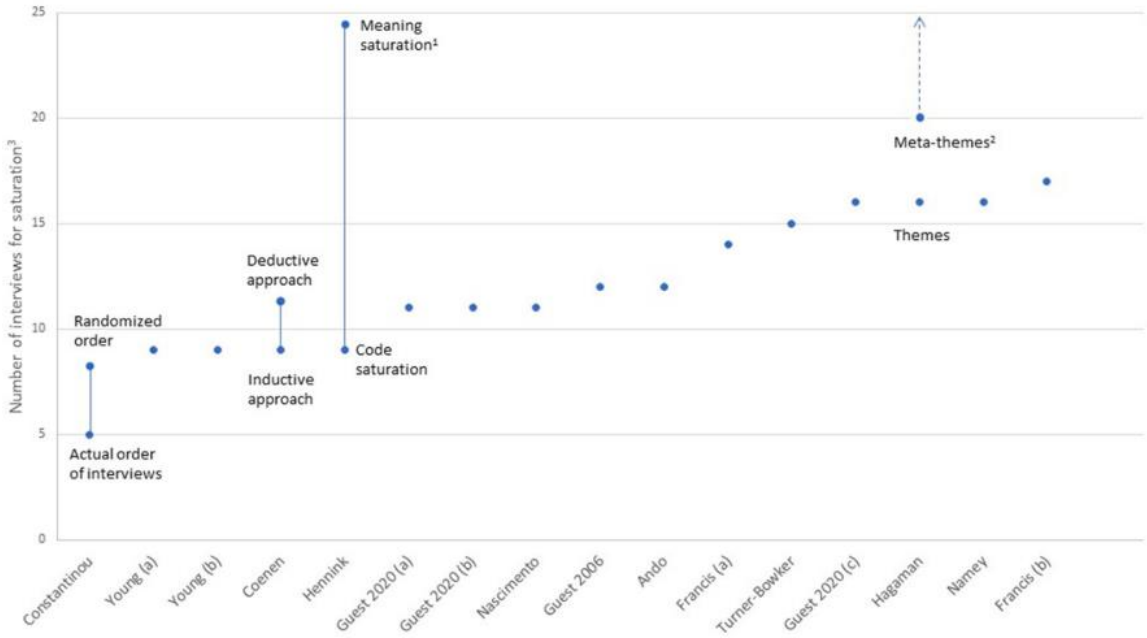

Figure 25: Sample size and theoretical saturation

Adopted from : (Hennink and Kaiser, 2022; pp:7).

For my research, I drew upon the methodology from similar studies (refer to Table 26) and decided to conduct 28 interviews before stopping to analyse the sample for thematic and theoretical saturation. The logic of this approach was to collect sufficient sample before stopping to check whether I needed further data collection or not.

Table 26: Number of interviews and data saturation from highly cited papers

SNo	Citations	Number of interviews
1	(Feldman, 2000a)	20 semi structured
2	(Feldman, 2004)	20 semi structured
3	(Bruns, 2009)	13 semi structured
4	(Coyte, Emsley and Boyd, 2010)	13 semi structured
5	(Goffin and Koners, 2011)	30 semi structured
6	(Dittrich, Guérard and Seidl, 2016)	30 semi structured
7	(Lin, Chen and Su, 2017)	29 semi structured
8	(Chen, Guo and Zhao, 2021)	12 semi structured

For my sample, a rigorous qualitative analysis of the interviews by two independent teams revealed that after the first 6 interviews, 76 % themes were identified and clear trends started to emerge (refer to Figure 26 and Table 27). The constructs were falling into broad themes identified by two teams of expert and researcher in the coding process. The saturation point for my sample emerged to be at 14th interview (refer to Figure 26 and Table 27). Beyond the 14th interview, no new construct or theme was discovered from the rest of the interviews. The two teams had a high degree of intercoder reliability and thus it was concluded with certainty that there was no need for further data collection.

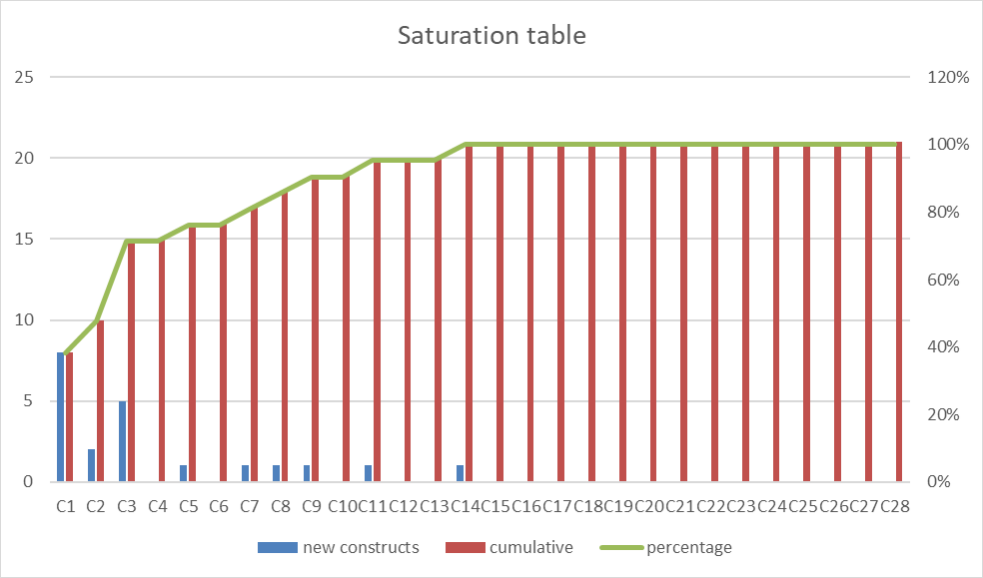

Figure 26: Data collection and thematic saturation

4.6 Analytical Framework: Quantitative Data Analysis

Rep grid is a mixed methods approach that simultaneously generates qualitative and quantitative data. In my data collection of 31 Rep grids, I collected data on 197 real routines, procedures and actions, which drifted away from their original design. This resulted in 262 construct poles. The participant rated all these events using a 5-point Likert scale for their conceptual proximity to constructs and poles relevant to a particular interview. This rating resulted in 700 quantitative data points of Likert scale ranking. Considering 197 events of drift as my sample size

(as this will be the unit of analysis for the quantitative phase), this is a statistically significant data set that can be subjected to further analysis.

Table 27: Data saturation

interview codes	new constructs	cumulative	percentage
C1	8	8	38%
C2	2	10	48%
C3	5	15	71%
C4	0	15	71%
C5	1	16	76%
C6	0	16	76%
C7	1	17	81%
C8	1	18	86%
C9	1	19	90%
C10	0	19	90%
C11	1	20	95%
C12	0	20	95%
C13	0	20	95%
C14	1	21	100%
C15	0	21	100%
C16	0	21	100%
C17	0	21	100%
C18	0	21	100%
C19	0	21	100%
C20	0	21	100%
C21	0	21	100%
C22	0	21	100%
C23	0	21	100%
C24	0	21	100%
C25	0	21	100%
C26	0	21	100%
C27	0	21	100%
C28	0	21	100%

The quantitative analysis was conducted using two approaches. The first approach is Rep grid-specific quantitative methodology to consolidate constructs from multiple Rep Grids and use a statistical technique to identify dominant constructs. This methodology is based upon the work of (Goffin, 2002; Goffin, Lemke and Szwejczewski 2006; Lemke, Goffin and Szwejczewski, 2003; Raja et al., 2013). The second approach targeted finding configurations/ combinations of the key factors discovered from the previous quantitative phase, using Qualitative Comparative Analysis (QCA) (Ragin, 1987; Rihoux and Ragin, 2008). The QCA methodology provides an approach to empirically analyse causal configurations

among factors and connected outcomes. For my study, I employed QCA to reveal causal configurations of my key drift-causing factors that could deliver safety negative outcomes.

4.6.1 Quantitative Analysis Based on Multiple RepGrid Consolidation Methodology

Each of my RepGrid has two sets of data: a set of personal constructs articulated by respondents for each set of randomly selected triad of drifted events and the ranked influence of these constructs, expressed in 5 5-point Likert scale, on every drifted event listed by the given respondent. The consolidated list of all the personal construct poles articulated in my 31 interviews accounted for 262 construct poles, while there were close to 700 individual Likert scale data points corresponding to a drifted event and a construct pole. In the qualitative analysis, this consolidated list of 262 construct poles from 31 individual grids was thematically categorised into 20 high-level thematic categories, using bootstrapping methodology.

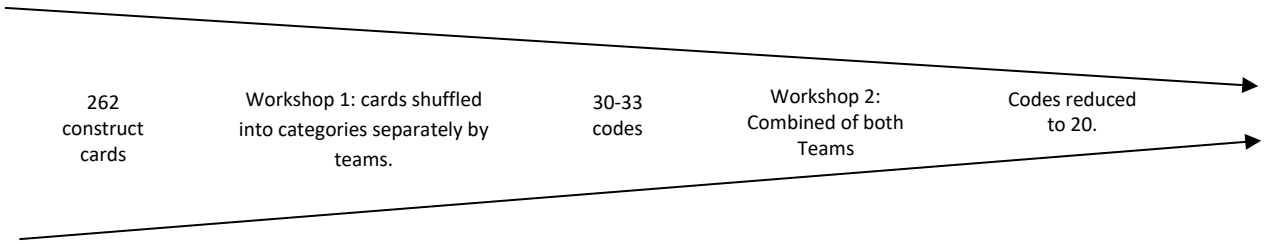

Figure 27: Reduction from respondent constructed codes to final themes

The reduction of respondent articulated constructs to final themes is depicted in Figure 27. However, the Likert scale data was not used during this process.

In this section of multiple RepGrids quantitative analysis, I statistically consolidate the personal construct Likert scale ranking of every drifted event to identify key categories. At the end of this exercise, I would be able to comment that among the 20 unranked thematic categories formed in the qualitative phase of this study, which ones are key categories, and what is the relative influence of each category on the phenomenon of my interest.

4.6.1.1 Creation of Common Construct Grid

Each RepGrid presents the respondent's ranking of drifted events on the dimension of the respondent's articulated personal construct poles. The qualitative bootstrapping process revealed that although different respondents articulated their personal construct poles differently, yet there were common themes among construct poles of all the 31 interviews. After a thorough validation process, the individual RepGrid personal constructs were consolidated into 20 higher-order themes, where every personal construct of each RepGrid could be identified with one of the consolidated high-level theme.

In order to arrive at a common construct grid with comparable constructs, every individual personal construct from each RepGrid was replaced by its equivalent higher-level construct theme. This process resulted in a new set of 31 RepGrids, with every drifted event ranked against the high-level 20 construct themes instead of the 262 individual personal constructs. Element ratings corresponding to the construct identified by the interviewees were retained for the new common constructs. These grids were then uploaded to a specialised Rep Grid Software, Idiogrid (Grice, 2004), providing me with a quantitative statistical analysis set for each grid. The output from Idiogrid was used for further comparative analysis of the consolidated construct themes. This process will be discussed in the next section.

4.6.1.2 Identification of Dominant Constructs

The quantitative methodology to identify dominant constructs from multiple Rep Grid data has been proposed by Lemke, Goffin and Szwejczewski (2003). The starting point for this analysis is the calculation of frequency for the common constructs. Goffin, Lemke and Szwejczewski (2006) argue that the frequency of occurrence does not account for the weighted ratings allocated to a construct. Approaching a conclusion only based on frequency as a measure might skew the results because a high-frequency construct might indicate that a construct is obvious to the interviewees. Disregarding construct's rating will fail to reveal its dominance on the phenomenon. Thus, in addition to frequency, it would be necessary to account for the variability of the ratings across the cases.

Comparing the variability or spread of the ratings for a construct will help reach a conclusion that how strongly the respondents differentiate among the constructs and their impact on the events of drifted actions.

Lemke, Goffin and Szwejczewski (2003) quote;

"The variability of a construct is a measure of the spread of its ratings (in the evaluation process) compared to all the other constructs. The higher the variability of a construct is, the greater is its importance to the respondent,"

(Lemke, Goffin and Szwejczewski, 2003;pp: 25)

To measure the relative importance of a construct for a respondent, Lemke, Goffin, and Szwejczewski (2003) propose a measure; '*Average Normalized Variance'* (ANV). The authors suggest that a dominant construct should simultaneously meet two criteria: (i) Its frequency of occurrence across interviews should be more than 25%, and (ii) the ANV of the construct should be above a threshold.

4.6.1.3 Average Normalized Variability (ANV) for Constructs

As discussed earlier, ANV and construct frequency data are together necessary to arrive at a much more nuanced argument about the strength of the constructs with regard to the phenomenon. ANV represents the spread or variability of the ratings across the elements (Goffin, Lemke and Szwejczewski, 2006; Goffin and Koners, 2011; Lemke, Goffin and Szwejczewski, 2003; Raja et al., 2013).

Adopting the methodology presented in Lemke, Goffin and Szwejczewski (2003); Goffin, Lemke and Szwejczewski (2006); Goffin and Koners (2011); and Raja *et al.* (2013), I calculate an overall ANV for all grids using the following steps.

Step 1: Number of Average constructs per grid: Since all grids are of varying sizes, one needs to find the average number of constructs per Rep Grid. For my data, the total number of Rep grids is 31 and the total number of constructs is 243 (the one judged as relevant after the bootstrapping stage). Thus, my average constructs per grid are 243/ 31. This comes out to be, on an average, 7.84 constructs per grid.

Step 2: Find the Normalised Variance (NV) of Each grid: Before we can aggregate the variances of a construct over all the grids, it would be required to find the normalised variance of every construct for each individual grid. Following the methodology adopted by (Pidcock, 2017), the NV for each grid is calculated using the following equation.

*Construct's NV = %TSS * No of constructs in the grid / Avg. No. of constructs per grid*

Equation 1:Calculation of Normalised Variance (NV) for a given construct of a given Rep Grid

In this equation 1, % TSS represents the 'Total Sum of Square' (TSS) of each construct, expressed as a percentage of the sum of TSS values for all the constructs in the grid. Here, 'Total Sum of Square' is the conventional variability measure that expresses the squared sum of the difference of each Element's construct rating with the overall construct mean rating. This measure is a part of the standard construct descriptive statistics that Idiogrid (V- 2.4) generates for a given grid.

Step 3: A Construct's Consolidated ANV for Multiple Rep Grids: Consolidated ANV for a given construct is the average of all the NVs for that construct, from multiple grids. This overall ANV is now normalised.

This final value of ANV for all the constructs can be used in tandem with frequency data to interpret the importance of constructs.

4.6.1.4 Analysis of Constructs by the Safety Impact of an Event

In my Rep grid data collection, the actors were asked to use a 5-point Likert scale to rate every drifted action on the dimension of its impact on safety. The rating was 1 and 2 for a negative impact on safety, 3 as neutral impact and a rating of 4 and 5 for a drifted procedure having a positive impact on safety.

To understand the influence of constructs on impact on safety, a similar ANV analysis to the one conducted for all events was performed on a data set consolidated by each type of safety impact category. The Elements of every individual grids were reduced to three categories: negative , neutral and positive,

impact on safety. These new grids, formed by replacing events with a consolidated safety impact category, were loaded on Idiogrid to calculate the %TSS for each construct. This %TSS was used to arrive at a final value of ANV for each construct with regard to the three cases of safety outcomes: positive, neutral and negative.

4.6.2 Beyond Key Individual Factors: A Study of Causal Configurations

Until now, I discussed the qualitative and quantitative methodology to identify two broad themes: (i) the factors that influence the phenomenon of actions drifting away from prescribed procedures, and (ii) the dominant or key factors that result in negative or non-negative outcomes. In this section, I build this theory further by discovering mechanisms related to negative safety outcomes of drift. These mechanisms will be represented as configurations/ combinations of the key factors and would be quantitively found using the methodology of Qualitative Comparative Analysis (QCA) (Ragin, 1987; Rihoux and Ragin, 2008).

The methodology of QCA is considered to be apt for discovering causal configurations of factors that may lead to the occurrence of a certain binary outcome (Ragin, 1987; Rihoux and Ragin, 2008). The birth of the QCA methodology could be attributed to the recent advancements in regulatory theories and the study of philosophical causation. Causation has been studied from philosophical, sociological, and scientific perspectives. Some of the theories from these fields include the theory of ‘Physical Causation’ (Dowe, 2000), which builds upon the law of conservation of energy, ‘Counterfactual theory’ of causation (Lewis, 1973), which necessitates the presence of a cause but disregards the possibility of absence or omission of a cause (Strevens, 2003), and ‘Probabilistic theory’ of causation (Suppes, 1970) that uses Bayesian probability and is widely used in social science research (Mumford and Anjum, 2013).

The discussion of causation in Critical realist ontology, which is my chosen ontological perspective, argues that causation should be viewed as a process which is produced by the action and interaction of different entities at different

layers of reality. Talking about causation from a critical realist perspective, Elder-Vass (2005) quotes;

a process in which the real emergent causal powers of a variety of entities interact to produce events' (Elder-Vass, 2005;pp:332)

This thesis of causation in critical realism is closely aligned to Mill's (1874) view on causation ;

"for every event, there exists some combination of objects or events…the occurrence of which is always followed by that phenomenon. We may not have found out what this concurrence of circumstances may be, but we never doubt that there is such a one" (Mill, 1874;pp:237)

Mill's (1874) thesis on causation builds upon the (Hume, 1977) regulatory theory of causation. The premise of the regulatory theory of causation is that if an event 'E' occurs after a condition/ factor 'A', and factor 'A is a necessary and sufficient condition for E, then we can conclude that E is caused by A. There is an inherent problem with this argument of the regulatory theory. The problem is that it fails to address necessary and sufficient conditions that may not be a cause of the outcome; this problem is often addressed as the redundancy issue in causation. Mackie (1974) refined the view by stating that causes should be viewed as 'INUS' conditions; *"insufficient, but necessary part of an unnecessary but sufficient condition"* Mackie (1974). Using an example of a house fire caused by a short circuit, Mackie (1974) elaborates the concept of the 'INUS' condition by arguing that a short circuit is not a sufficient part of the problem as a short circuit alone cannot propagate a fire. For the fire to propagate, one needs flammable material. Thus, a short circuit should be viewed as a necessary part of a more general condition of flammable material accompanied by a short circuit. However, the condition is not the only condition to result in the outcome of house fire as flammable material could be accompanied by other situations as well, such as lighting strike, arson etc., to result in the same outcome of house fire. Thus, one can say that a short circuit is a necessary part of a sufficient condition "short circuit+ flammable material".

Although Mackie's (1974) improvement helps resolve some inconsistencies in the causation argument. Yet, it fails to distinguish between causal and spurious factors/ regularities and also falls short of resolving the issue with omission or pre-emption (Spector, 2011). However, Mackie's (1974) INUS theory is still very influential in establishing the proposition that causation should be approached using a combination of factors.

Building upon this premise that causation should be established using a combination of factors, I argue that QCA methodology fits the purpose as it provides the set of conditions associated with an outcome. Qualitative Comparative Analysis (QCA) (Ragin, 1987; Schneider and Wagemann, 2012; Thiem and Duşa, 2013) and fuzzy-set QCA (fsQCA) (Fiss, 2011; Ragin, Strand and Rubinson, 2008) are a practical approach to establish causation for real-world outcomes. This approach draws on the theoretical background of causation in regulatory theories to present a systematic method of establishing causation. With the use of Boolean Algebra, this approach is able to reject redundant factors and is able to arrive at a selected set of regularities or factors that produce a causal influence on the outcomes.

This method is particularly suited to discover conjunctural or configurational causation related to a particular outcome. The approach is able to simultaneously interpret numerical data from multiple cases along with case-specific knowledge (Ragin, 1987). The approach contrasts with the standard statistical approach examining the relationship between independent and dependent variables. Instead, QCA excels in investigating different configurations of factors. Commenting upon the advantage of QCA over traditional statistical methods and about the unique possibility of using QCA to examine multiple combinations of factors and their impact on outcome, Jordan *et al.* (2011) quote;

"probe how combinations of conditions produce an outcome versus a singular test of an independent variable's relationship to a dependent variable' (Jordan *et al.*, 2011;pp:1161).

4.6.2.1 Conducting QCA on The Rep grid Quantitative data

Due to its ability to test the impact of a combination of effects on a given outcome, QCA has been argued to be effective in developing and advancing theory (Crilly,

Zollo and Hansen, 2012; Lacey and Fiss, 2009). The most important feature of QCA is that it allows for a more nuanced argument by evaluating asymmetry in a set of factors that support the occurrence of an outcome and the set of factors that inhibit the outcome (Fiss, 2011). This goes beyond the traditional statistical techniques, which may use the same regression function to predict both the presence and absence of an outcome (Crilly, Zollo and Hansen, 2012; Lacey and Fiss, 2009).

Table 28: Software options available to conduct QCA

Software	Environment	Methodology
acq	Unix shell	csQCA, fsQCA
FSGoF	DOS	Fit test for fizzy-set analysis
Fs/QCA	Windows,macOS	csQCA,fsQCA
fuzzy	Stata	csQCA,fsQCA
Kirq	Windows,maxOS,Linux	csQCA,fsQCA
MDSO/MSDO	Web app	MDSO/MSDO
EvalC3	Microsoft Excel(Windows)	QCA type configurational analysis
TOSMANA	Windows(.NET/Mono)	csQCA,mvQCA,fsQCA
QCA Add-in for Excel	Ms Excel	csQCA,mvQCA,fsQCA
Can	R	Coincidence analysis
Set method	R	Additional functions for QCA
LogicOpt	R	Truth table minimization
NCA	R	Necessary condition analysis
QCA	R	csQCA,mvQCA,fsQCA
QCA3	R	csQCA,mvQCA,fsQCA
QCAfalsePositive	R	Type I error test
QCApro	R	csQCA,mvQCA,fsQCA
QCAtools	R	Additional functions for QCA
Venn	R	Draw Venn diagrams

Source: (Rubinson, 2021)

The QCA methodology is operationalised using the following steps;

(i) *Selecting predictor variables and binary outcomes associated with the events or cases under examination:* In my research, these events or cases are the 197 cases of drifts provided by the 31 Rep grid interviews. The outcome variable is the impact of drift on safety, and the predictor factors are the dominant/ key factors discovered by the Rep grid quantitative data analysis. In my research design, this outcome variable, the impact of drift on safety, was assessed for each event of drift using a five-point Likert scale.

(ii) *Set A Binary Form:* QCA requires to express of the configuration sets of predictor and outcome variables in a binary form. This binary form (0 or 1) represents the presence or absence of a variable or outcome. In my data, the values of predictor and outcome variables are not binary as they are the participant-provided ranking (between 1 to 5) for each of the combined constructs identified by bootstrapping methodology and the outcome variable of impact on safety. In order to transform the 5-point Likert scale values into a binary value, I chose the following criterion.

- For the outcome variable, impact on safety, the participants have assigned 1 and 2 for a negative impact, 3 for a neutral impact and 4 and 5 for a positive impact of drift on safety. For QCA analysis, the threshold representing full negative impact is set at a Likert scale value of '1', and the threshold for full non-negative impact is set at a Likert scale value of '5'. The value of 3 is assigned as the crossover value where Negative impact turns to Neutral or positive. Thus, the outcome of negative impact is for values Likert scale value of 1 and 2 while the binary opposite of it, a 'non-negative impact, will correspond to the values 3,4 and 5. Using Excel functions, the Likert scale data of the safety outcome was transformed to a binary value of 0 or 1.

- For transforming key common constructs in a binary format (Presence/absence of an attribute in a case), I assign values 1 and 2 of the Likert scale to depict the absence of the variable (depicted by a ‘0’ in QCA table) and values 3, 4 and 5 to represent the presence of the variable (depicted by a ‘1’ in QCA table).

(iii) Conduct a Boolean minimisation for analysis of configuration (using QCA software): Once I arrived at a raw data table with all key factors and the outcomes transformed into a binary outcome (0 or 1), the next step was to find causal configurations using the process of Boolean minimisation for analysis of configuration. To conduct a Boolean minimisation for configuration analysis, the research community of QCA has provided multiple open-source software options Table 28. These options differ regarding the underlying analytical software engine they use for the Boolean minimisation.

Among the available software options to conduct QCA, I chose the Excel QCA Add-In software (Cronqvist, 2019).

4.7 Summary

This chapter presented a discussion of my philosophical and methodological considerations. The philosophical stance was aligned with my research enquiry, and a research design was proposed consistent with the research enquiry. Every decision of the research design process was grounded in achieving a methodological fit between the research topic and the research design. The rationale for each step of the research design process was presented. The chapter further elaborated on sampling criteria, my unit of analysis and my instrument of data collection. A discussion of my qualitative and quantitative analytical framework followed it. Within the qualitative framework, I also discussed my proposed method of achieving validity and reliability in my qualitative research design.

5 Findings

This chapter of findings presents the results of my Repertory Grid (RepGrid) data analysis. RepGrids, as an instrument of data collection, can simultaneously capture the qualitative and quantitative data associated with one's phenomenon of interest.

I begin this chapter with a detailed discussion of my qualitative findings. This is followed by a discussion of my quantitative analysis of the RepGrid data. The quantitative RepGrid findings are based upon multi-RepGrid quantitative analysis methodology that helps identify key constructs relevant to the phenomenon. This analysis helps identify the key factors connected to drift and the key factors related to safety outcomes. Quantitative comparative analysis (QCA) is conducted to identify causal configurations of these key factors for the case of safety negative outcomes.

5.1 Qualitative Results

Qualitative RepGrid data, associated with events of drifted actions, are discussed using a thematic classification empirically derived from the bootstrapping methodology of RepGrid analysis. The bootstrapping method used a qualitative thematic categorisation process to cluster respondents' proposed constructs into meaningful higher-order categories. The sorting and clustering of the RepGrid construct poles were done with the underlying objective of answering the research questions set at the onset.

The bootstrapping method succeeded in allocating 262 construct poles into 20 high-level thematic categories. Table 29 presents the names and meanings of these categories, while figure 28 presents these categories in descending order of the number of respondents who reported that the particular theme contributed to drift in their organisation. Figure 28. indicates the relative dominance of categories, such that categories reported most of the time are staked higher on the left while the categories mentioned by fewer respondents form the long tail of the distribution on the right.

To begin with, I present in Table 29 all the bootstrapping categories and the case markers where these themes were present. Table 29. also provides some exemplary quotes of respondents relevant to a given category

. These exemplary quotes are presented by the case, and RepGrid construct markers in which the aforesaid quote was made.

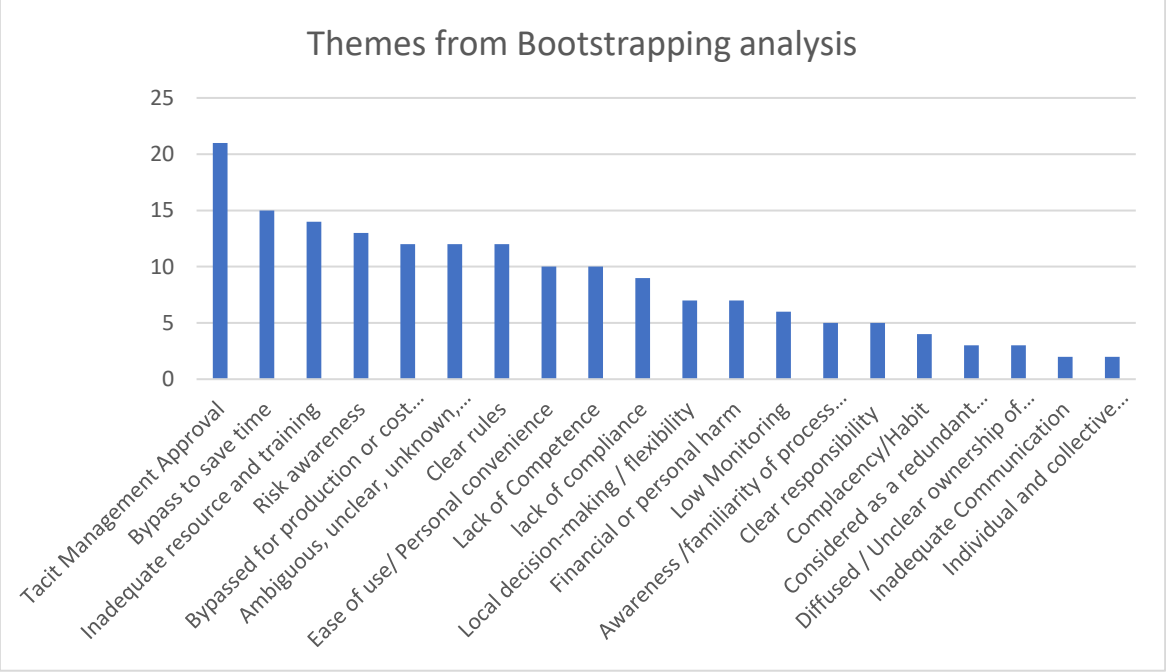

Figure 28: The number of respondents citing the given thematic categories

Figure 28 presents the percentage of participants who reported the ideas that fall under a given thematic category.

For the purpose of structuring the arguments, I thematically group my findings using the two themes that evolved in my critique of the literature: (i) Purpose: Factors that shape an actor's Intent to change a procedure and (ii) Support: Factors that support the actual act of disregarding a procedure. There is a third set of themes that correspond to an eventuality where actors indulge in drifted action not because it helps solve any organisational problem or achieve any pre-defined organisational goal, but rather because they are having gaps in their understanding or motivation. I refer to this as (iii) Gaps in actor's motivation, process ownership, process understanding and required skills..

Table 29: Bootstrapping themes and there meaning

Category from bootstrapping	Description	Exemplary quotes
Bypass to save time	The drift was driven by the actor's intent to reduce process time.	C8: timeline is critical. C15: these are being drifted in order to prevent loss in time
Bypassed for production or cost pressure	The drift was shaped by strict production pressure to maintain the required output level or to keep the production lines running.	C25: We are waiting for formal approval but we don't want to delay the start up so and we don't want to have production losses, so formal approval process may continue but at the same time operator will take the call and will start up the process. C19: deviation from normal process is because of production target.
Ambiguous, unclear, unknown, non-specific or non-existent rules	The presence of ambiguous/unclear or insufficient rules leads to drifted actions. If the procedures were not detailed enough or did not apply to the situation in hand, actors drifted away from prescribed procedures.	C5: Procedures are not that much elaborately explained C22:I can say they are ambiguous
Clear rules	A very explicitly detailed procedure leads to drift. Process steps are so rigid and prescriptive that the work facing individuals find it difficult to implement them.	C26: The procedure is to be followed but if we follow it, we face problems. C1: We engineer, we know the process and we know that there is no point to go with steps.
Ease of use/ Personal Convenience	The alternate action was more convenient and easier than its original rule.	C31: But people take adjustable spanners which can handle multiple components which is against the recommendations. C7: For the ease of equipment selection, the people have created their own design tools to simplify things, but then these tools are not verified and approved by the R&D and Core team
Additional safety barrier	The presence of two or more safety barriers or checkpoints for the same job/process leads to drift in additional safety mechanisms.	C15: so, the safety measure that is being drifted is the additional safety measure.
Tacit Management Approval	When management turns a blind eye or tacitly approves drifted actions, this condition supports and encourages the drifted actions as accepted norms.	C9: It often has senior management approval. These are important to meet project delivery deadlines and senior management approves them. C21: Top management acknowledges and approves the constraint. everybody in the department knows the constraints, they acknowledge it and support
Low Monitoring	When SOP is neither strictly monitored (monitoring is lax) nor enforced, this becomes one of the key factors for actions getting drifted.	C27.9: They don't check here if we are wearing gloves or jackets or even masks. They don't bother about it and they simply sign without checking C9.9: there is no process to check or monitor how we did it.
Risk awareness	When participants believe that they are fully aware of the associated risk and can judge the severity of possible outcomes associated, they make informed decisions to bypass the procedure.	C19: People do sometimes take risks in performing operation and maintenance activities by not using necessary PPEs …as they presume that they know the risk and it is okay to take a chance.
Financial or personal harm	The possibility of financial, reputational or personal harm is disregarded to meet other process objectives.	C17: the shafts are discarded because a broken shaft could cause a safety issue ...we are using a discarded shaft so it's a gain for the company because the shaft being a costly component.

Awareness /familiarity of process or alternatives	Awareness and familiarity with the process fill actors with confidence. They find alternatives to work with, which could be a practical solution though not as per the guidelines.	C1: A separate tool that's not in manual but we are so much experienced we use it , people doing job knows alternative, so they look for different tool that is better for this job.
Local decision-making/flexibility	Drift is supported by the conditions that allow actors to exercise local decision making flexibility.	C8.811: Certain amount of deviation is allowed. C1.10: (Variations from prescribed procedures) Can be approved locally by engineers
Clear responsibility	Clarity or knowledge about the process ownership or responsibility, such as who is in charge or responsible, acts as a condition to execute a drifted action.	C26.3: The activity was confined to one division; one division will be held responsible.
Diffused / Unclear ownership of actions or outcomes	In procedures involving multiple actors, there existed a potential to drift as the boundaries of process ownership were blurred.	C20: as responsibility of safe working was constantly shifted from the jurisdiction of one team to another or from one person to the next, it was difficult to pinpoint who was responsible
Individual and collective responsibility	The construct conveys whether the ownership of the process was with an individual or a team/group. (It is a description of drift type)	C 20.3: It is the function of the team not abiding by the process, Other is about individual contraventions
Inadequate resource and training	Lack of training, resources or knowledge led to people drifting away from prescribed procedures.	C17: In training area, there is a common feature that we don't undergo proper training, it is company's responsibility to give training. But we aren't trained and instead we start working. C3: These could be mitigated with say by training. So, providing appropriate resources could resolve the problem.
Lack of Competence	Due to the inability or competency of workers, they act according to the way they judge is appropriate. This leads to drift.	C13: it is more about the labour who is not very educated as compared to the person involved in E who has knowledge and education both. So, it is like a low skilled labour on one side
Lack of compliance	The conscious act of non-compliance leads to drift.	C1: Engineers are aware that they are drifting
Complacency/Habit	The participants became accustomed to their working environment, and their drifted way of working became the acceptable norm in the organisation.	C25: I would say people's behaviour habits influence actions. It is a behaviour and habit related deviation with no intention behind it.
Inadequate Communication	Disrupted communication creates a barrier to passing the information, and thus, operators devised their way of working.	C7: Lack of communication as you don't have direct approach

Table 30: Thematic category by number of participants

Themes from Bootstrapping	% of people who reported this theme
Tacit Management Approval	65%
Bypass to save time	48%
Inadequate resource and training	45%
Risk awareness	42%
Bypassed for production or cost pressure	39%
Ambiguous, unclear, unknown, non-specific or non-existent rules	39%
Clear rules	39%
Ease of use/ Personal convenience	32%
Lack of Competence	32%
lack of compliance	29%
Local decision-making / flexibility	23%
Financial or personal harm	23%
Low Monitoring	19%
Awareness /familiarity of process or alternatives	16%
Clear responsibility	16%
Complacency/Habit	13%
Considered as a redundant additional safety barrier	10%
Diffused / Unclear ownership of actions or outcomes	10%
Inadequate Communication	6%
Individual and collective responsibility	6%

5.1.1 Purpose: Factors that shape an actor's Intent to change a procedure

The first step towards indulging in a drifted action begins by rejecting the recommended action. If the drift is not being undertaken with any bad intention or for personal gain (as is the case of my chosen phenomenon of interest), the organisational actors need a firm ground to reject the prescribed action. Snook (2002) called it a practical action to apply a task based logic and Dittrich and Seidl (2018) called it a purposeful action to indulge with a procedural change that helps the achieve a salient pre-defined organisational goal.

Table 31: Thematic categorisation of qualitative findings

Selective Code	Axial Code	Open Code (Bootstrapping category)
Purpose (Factors that shape an actor's Intent to change a procedure)	Workplace Pressure	Bypass to save time
		Bypassed for production or cost pressure
	Conflict with Procedure Design	Ambiguous, unclear, unknown, non-specific or non-existent rules
		Clear rules
		Ease of use/ Personal Convenience
		Considered as a redundant additional safety barrier
Support (Factors that support the actual act of disregarding a procedure)	Quality of Enforcement	Tacit Management Approval
		Low Monitoring
	Confidence to Predict Outcomes	Risk awareness
		Financial or personal harm
		Awareness /familiarity of process or alternatives
	Process Ownership	Local decision-making / flexibility
		Clear responsibility
		Diffused / Unclear ownership of actions or outcomes
		Individual and collective responsibility
Gaps (Changes introduced due to gaps in actors' motivation, skills and in process ownership or understanding)	Skill & Knowledge	Inadequate resource and training
		Lack of Competence
	Compliance and Habits	lack of compliance
		Complacency/Habit
		Inadequate Communication

The findings suggest that when actors perceive that the recommended action is unfit or impractical to negotiate realistic situations, processes and operational demands, they are motivated to disregard it. The two main themes that drove such behaviours were workplace pressures and conflict with procedure design. The themes that reflect a misfit of procedures with the impending workplace pressures were bypassed for production or cost pressure and bypass to save time. While the factors that could be linked to issues with procedural design were (i) the recommended procedure was ambiguous, unclear, unknown, non-specific confusing or non-existent rules, (ii) Considered as extra safety barrier, (iii) For ease of use and personal convenience, and (iv) clear rules.

In the following section, I provide a detailed discussion of these aspects.

5.1.1.1 Workplace Pressure

5.1.1.1.1 Bypassed Due to Production or Cost Pressure

There are eventualities where a strict production pressure of either a running production line or of meeting strict output-related requirements compels the actors to drift. Findings from my data reveal that in these situations where actors felt compelled or burdened to deliver upon production and costs

targets, actors bypassed crucial requirements and process recommendations to protect the production line from stopping or to achieve the target output levels.

The pressure to keep the production lines running often forced actors to regularly drift from prescribed procedures in manufacturing. Similarly, after a scheduled or unscheduled plant shutdown in the Oil and Gas sector, plant start-up procedures are often expedited by bypassing many recommended procedures and checks. The pressure to start producing again forces individuals to find procedures that can be bypassed or ignored. Managers perceive a delayed start as a production loss and cost to the company.

Managers felt a constant organisational pressure to produce or keep the lines running and often viewed procedural bottlenecks in procuring raw materials,

spare parts or services as a threat to the production process. This often-prompted drift in procedures related to the procurement process.

The respondent from firm C6 disclosed that an uninterrupted supply of spare parts and components was necessary to keep their production processes running. The recommended procedures required these components to be bought from certified suppliers or follow a lengthy supplier qualification process to buy from unlisted vendors. However, to meet production targets, production managers often procured these parts from non-authorized dealers or local vendors. The respondent argued that it was necessary to drift from the procedure as getting formal approval at the right time was not realistic.

"*Like I explained, if we wait for one, one and half months or two months, we lose our efficiency on the production, so to curb that thing, we just buy it from local supplier and then we start our work, resume our work."*

The act of drifting to avoid procedural bottlenecks was not restricted to external or inter-organizational procurement. Many cases reported similar issues but with regards to within the organisation or internal procurement. A typical example of this was reported by the respondent from firm C25 in the aerospace sector. The respondent disclosed that the formal approval process for the issue of materials and parts from their internal store was often a subject of drift.

Citing the reason for the formal issue process being too cumbersome, the respondent expressed that if they acted as recommended, it would be difficult for them to meet production targets.

Another firm in the Aerospace Sector, Firm C30, also raised a similar concern about material from internal stores. The respondent quotes;

"*Products are issued as when we required them, and approval is obtained later or sometime even not obtained."*

Raising a similar concern, an executive from firm C19 in the oil and gas sector quoted,

“We are waiting for formal approval but we don’t want to delay the start-up so and we don’t want to have production losses. So formal approval process may continue, but at the same time operator will take the call and will start up the process.”

Mandatory quality checks of raw material batches arriving at the factory gates were also reported to be a bottleneck for production and thus was a process often drifted. Findings suggest that the quality check procedures were skipped if they conflicted with the production deadlines. A senior manager from firm C13, in the food manufacturing sector, with over nine years of experience, was not at all hesitant to accept that on-the-gate quality checks for inward raw material were often skipped if the material was critical for keeping the plant running and meeting the production targets. Discussing a particular event where an incoming critical batch of white flour was taken up straight for production without conducting the mandatory quality checks, the respondent from firm C13 argued that it becomes an operational necessity to drift. He further argued that one has a certain degree of trust in the supplier, and based on the supplier’s past quality performance, one could accept the raw material with minimal testing. In the words of the case marker C13,

“when we are told that they (production function) don't have enough raw material for the production, but they had to run the plant, so we bypass material quality check.”

The findings suggest that production pressure and the urge to keep the lines running often compel managers to take practical approaches that often conflict with or contradict the recommended procedures.

Discussing events related to meeting production schedules, the respondent from firm C23 disclosed an issue connected with accepting raw materials that did not meet set quality standards. The respondent disclosed that their manufacturing unit procures large volumes of sheet metals to produce chassis, other tractor units, and farm equipment components. The SOP clearly states that all the sheet metals should be received in a rust-free condition from the suppliers. However, there are many times when there is mild oxidation (rust) on the sheets. The

respondent conveyed that as they are aware that this mild oxidation would be easily removed in the pre-treatment process of the sheet metal, the quality team will pass the raw material for use. The act of disregarding the set quality criterion is driven by the fact that supplies of sheet metal are infrequent and mostly in bulk, and if rejected, the replacement batch will take substantial time to arrive. This could have a severe knock-on effect on the production. Raw material not meeting the set quality criterion is often accepted to avoid disruption in production. Commenting on the issue, respondent of C23 quoted;

"However, there were many a times when a material received has rust, still these are accepted for undertaking production."

To reduce the plant shutdown period and minimise production loss, people never waited for formal approvals and initiated plant start-up activities while the formal authorisation was still being approved. Respondents from firms C19 and C24 discussed similar variations related to the maintenance process undertaken during a plant shutdown. These variations or local adaptions in the recommended procedures were undertaken to avoid hurdles in the production process.

5.1.1.1.2 Bypassed to Save Time

The findings of my data revealed that some drifted actions were targeted at identifying adaptations or alterations in the recommended procedure that would be a quicker way of accomplishing an organisational task or result in some form of time-saving. Here, the drift was driven by the actor's intent to reduce process time.

The actors believed that their drifted actions would accomplish a task at the desired level of output/quality in a shorter duration than the way in which the original procedure recommends it. Actors reporting these behaviours simultaneously reported themselves or the actors indulging in these actions to be technically proficient, knowledgeable and capable of executing a time-saving drifted action.

For example, a respondent from case C1, an aerospace firm, reported that engineers often resorted to locally developed assembly and tool use guidelines

as they felt that these drifted actions were more time-efficient than using the recommended procedures. Respondent from Firm C3 also agreed that drifted processes that provided quick working were often adopted over lengthy and time-consuming SOPs or procedural recommendations. Discussing a procedure for submitting project working time sheets at a designated time every Friday afternoon, the respondent from firm C3 disclosed that most people would fill the sheet by Thursday and use guesswork to populate the tentative project working hours for the next day of Friday. This is done to save time and effort in creating the timesheet on a Friday afternoon, as one might be busy with meetings or site visits on a Friday afternoon, which could lead to missing the submission deadline.

Respondent of firm C9, an aerospace firm, also discussed a bypass related to paperwork and time-saving. This SOP bypass relates to a process of repairing faulty units (Aeroplane components or modules) and an allied process of KMR (Kit material requisition). The SOP outlines taking out the suspected faulty part from the unit, reject or quarantine that part depending upon its class and get a new one issued from the spare's stores. However, it's quite common that the new part issued from the stores might not function properly with that unit, and after trying it out, it might need to be returned, and another one be issued from the store. If the SOP is followed, then the engineers must do all the paperwork of issue and return to the store every time they try out different suspected components. In place of this routine, what they do is that they unofficially take the new parts as an informal loan from the store and try with the unit. Once the unit works perfectly with a new part, the pending paperwork of KMR (Kit material requisition) against the unit is completed. Like this, engineers are able to avoid multiple issues and return related KMRs. Regarding the process, the respondent of firm C9 quoted that;

"Doing it by the book is a waste of time."

A similar situation was discussed by firm C6, where all the recommended steps of the procurement process were not followed, and some steps were bypassed to save time. The executive from firm C6 disclosed that the recommended process of procuring spare parts for their manufacturing unit is a very exhaustive

and lengthy e-tendering (electronic tendering) procedure. This requires several authorisations and clearances. Due to time pressures, they avoid the e-tendering process and instead buy from non-authorised suppliers, which is a quick fix, but it bypasses the recommended procedure. The interviewee of firm C6 stated,

"We do not want to wait for 45 days or 60 days for e-tendering, so we buy from non-authorised supplier…..quick work basically."

Firm C2, from the aerospace sector, also reported that guidelines for procurement were often drifted as following all procedures by the book would result in unnecessary waste of time.

It was also seen that SOPs related to formal approvals and clearances were often disregarded if they caused unnecessary delay or stoppage of work. Often, senior management team members would signoff clearance documents without following the proper procedures. An example of it was disclosed by a respondent of Case C17, an industrial heat exchanger manufacturing firm. Discussing about the signing off industrial designs of heat exchangers, the interviewee told that there is a SOP where a template is to be signed by three people: junior engineer, senior engineer/ lead engineer and HOD. Once the junior engineer gets the work done by the draughtsman, the lead engineer checks and then the design template is to be signed off by the senior managers/ head of the department. However, Senior Managers are often busy and not accessible when required, so to save time, empty templates are signed off by the Senior Managers in advance. These ready-made signed templates are always used to save time.

A similar signing-off-related process was observed in C15 in the oil and gas sector. The respondent disclosed the process of authorisation of scaffolding safety checks was frequently bypassed. Citing the reason for drift, the respondent said about the procedure:

"drifted in order to prevent loss in time."

Document approval process bypass was also reported by C19, where people deviated from the document authorisation process since TAs (technical authorities) were generally busy and could not spare time to review the

documents. Expressing their helplessness regarding the necessity to drift, the interviewee from C19 quoted;

"We know documentation is required; it may take a long time for approval, but we don't wait for the formal approval to happen. We start taking the documents, even the unsigned copy"

The bypassing of procedures to save time was an important factor. The factor was reported by (48%) of the respondents and was omnipresent across all the three investigated organisational sectors.

5.1.1.2 Conflict with Procedure Design

5.1.1.2.1 Ambiguous, Unclear, Unknown, Non-specific Confusing or Non-existent Rules

Another significant contributor to the drifted practice was the presence of ambiguous/unclear or insufficient rules. In the absence of clear guidance or procedures, the situations are liable to subjective interpretation. When faced with such eventualities, organisational actors form alternative practices and routines that slowly and gradually drift away from the original procedural design.

A respondent from case C16 discussed one such process where the nonexistence of a rule led to people forming their own versions of the routine. This process relates to the SOP of inspecting a commercial jetliner to identify the issues to be tackled in the next scheduled maintenance. Although there are some guidance documents and protocols for evaluating and prioritising issues that need to be undertaken for maintenance, yet the dossier is open-ended and incomplete. The team of engineers that inspect the aeroplane would often use their subjective interpretation to ignore what they would judge as noncritical and minor issues.

In the absence of a detailed SOP, they will form an opinion about what is critical for flightworthiness and what is not. Based on this, some issues could be delayed for taking up in maintenance. Although these minor issues mostly relate to the cabin side of things, yet in the absence of clearly defined recommendations, people form their own standards that are passed on to their peers and juniors.

Another issue related to missing documentation was pointed out by a respondent from another aerospace manufacturing firm, case C12. This was regarding an abnormal feel in the brake pedal due to improper rigging of the brake lever mechanism. The issue was that the brake lever adjustment clearance parameters were not provided in the documentation, and everyone used their subjective interpretation to adjust the rigging mechanism. Pilots often came back and complained about unnecessary discomfort. Regarding the adjustment of the rigging mechanism for the brake, the interviewee from C12 quotes;

"they (The technicians) were not clear of what to do…, but they accidentally came within the limits most of the time… and they thought what they are doing is 100% right."

Another significant issue about the SOP was raised by participants from the oil and gas industry. Oil and gas sector respondents from cases C5 and C24 all were of the opinion that SOP cannot provide details for all possible scenarios encountered in a very dynamic and ever-changing petrochemical production environment. Respondent from C24 quotes;

" the plant is very dynamic, while the SOPs or set of instructions are made based upon some set of activities. … you could have a malfunction or problem that you may have not accounted for while making SOP."

Respondent from C5 expressed that;

"The SOPs provided by the design are not always easy to implement or practical during operations. While working there are many eventualities where working according to the process of design isn't possible."

Many respondents accepted that situations, procedures, or rules liable to interpretation are often the point of contention and usually a place where drift can set in. This is not restricted to operations, maintenance, design or production processes but extends into other routines as well, like communication.

One such incident related to communication was discussed by the respondent of firm C7, operating in the Oil and Gas sector. The event relates to the frequent

project and design-related communications that used to happen between design teams in the UK, USA and Japan. The respondent, a part of the UK team, conveyed that there was no clear protocol for contacting other teams for a design-related update or clarification. Every country team followed their own version of the process. The design team in Japan could only be contacted through an official hierarchy by sending the query to the respective heads, who would then pass it on to the relevant design team or engineers. The design teams and people of the Japanese team did not appreciate direct contact. While, in contrast to Japan, for the team in the USA, it was fine to call and speak directly to the engineer working on the project, bypassing any official hierarchy. In the absence of a clearly defined procedure, people dealt with the process in a way that suited their philosophical narrative and working culture. The respondent from firm C7 quoted;

"Because we are sandwiched between two factories who think differently…we say we are one company, we are supposed to do the process as defined, but it never happens. In reality, when you have two factories in different locations, you always have two different mindsets, so it is up to you to take the best of both."

Ambiguity leading to drift also played a role if the procedure was either not detailed enough or not applicable to a situation at hand. In such situations, actors often resorted to practical solutions to fill the gaps arising from interpretations.

An executive from firm C23, a farm products manufacturing firm, described a scenario where the process was altered to achieve a practical solution. The case relates to the process of press-fitting rubber sleeves on the transmission assembly of a farm tractor unit. For a good fit, the design data sheet of the product recommended a permissible difference in the inner and outer diameters of the sleeve material and transmission line, respectively, that was necessary to achieve the desired quality of covering over the transmission line. However, there were situations where the transmission line diameter exceeded the permissible limit, and thus, it was not possible to put the sleeves over it**.** To resolve such a situation, sometimes operators would reduce the temperature of the transmission line to result in contraction, and eventually decrease in the diameter. With a

decreased diameter of the transmission line, operators were easily able to put sleeves over it. However, it was a practical solution, yet not a part of SOP.

Thus, one can conclude that ambiguity and non-specificity of SOP could lead to the formation of subjective routines and drifted practices.

5.1.1.2.2 Effective Extra Safety Barrier

The presence of an additional safety barrier results in people drifting away from the primary mechanisms. The presence of two or more safety barriers or checkpoints for the same job/process leads to drift in additional safety mechanisms.

Organisations use a layered approach to safety in their safety-critical processes. By design, organisations build additional secondary safety barriers to processes already protected by some primary safety mechanism. This extra layer of security is provided to cover the remote possibility of the primary safety barrier being rendered ineffective. Findings from my research indicate that the SOPs and processes related to the secondary safety mechanism are often relaxed. Actors disclosed that secondary safety barriers, like additional safety belts or harnesses, precautionary locking or mechanical jamming mechanisms, and mandatory safety signage for isolated electric circuits, were not followed with equal vigour as for the primary safety mechanisms. Organisational actors put a lot of energy and resources into ensuring that the primary safety mechanisms are followed as per the recommendation. Still, the same level of attention is not provided to the secondary safety processes. This extra line of defence is sometimes viewed as redundant and unnecessary.

Events of drift related to this aspect of operation were observed in the Oil and Gas and manufacturing sector.

Discussing one such drifted practice, the respondent from firm C15, a world-leading oil and gas exploration and refining firm, discussed procedures for setting up scaffolding in the manufacturing plant for scheduled maintenance of large reactors and equipment. The process is protected by two layers of protection, firstly by a safety belt that restrains a worker from the scaffolding and secondly

an additional safety net to save people from falling if the safety belt fails to tackle the eventuality of safety belt breaking. As per the recommended procedure, the additional safety net is mandatory to be installed around the scaffolding, but procedures and checks around its installation were regularly drifted. The respondent from firm C15 conveyed that over-reliance and trust in the safety belts meant that the workers did not comply with extra safety net requirements. In his words,

"so, the safety measure that is being drifted is the additional safety measure."

The participant was not hesitant to accept that the practice was very common and was a serious threat to safety.

The additional barrier argument does not always apply to secondary barriers. There were events where the presence of an additional feedback, safety or checking mechanism resulted in people drifting away from the primary mechanisms. Two such examples were discussed by Firm C17 and C11 respondents, both from the manufacturing sector. Respondent of firm C17, a large-scale industrial heat exchanger manufacturing organisation, disclosed that the junior engineers designing heat exchangers would not follow all the recommended procedures. They will often use previous designs and drawings because they are aware that these designs will go through multiple checks and testing. Thus, their initial step in the process is not so critical. They are aware that the organisation has multiple feedback loops capable of identifying errors, and thus, they can drift from recommendations or be relaxed about their initial design process. The awareness of the existence of a tertiary layer of protection made actors more ambitious in indulging in drifted behaviours.

Firm C11 reported a similar drift in the primary mechanism for the case of calibrating test instruments and equipment. The recommended procedure for calibration of lab equipment and instruments is that recognised organisations must externally calibrate these scientific instruments. However, it's very common for people working on tools and instruments to self-calibrate their tools and instruments. This is done using trial and error rather than subscribing to the organisation's procedures. The actors drift on these procedures as they are

aware that the organisation has additional alternate checks that would be done later in the process. Thus, drifting at primary activity does not pose a serious threat. The respondent of *C11 said,*

"I think it is kind of convenient to get rid of this. And we have the convenience you know to avoid it. At the same time, it is not that risky because we have alternate checks. Like we have an alternate for that."

5.1.1.2.3 Ease of Use/Personal Convenience

The findings from the data reveal that actors often converged to drifted actions that were easy and quick alternatives to the recommended procedure. There were instances where a procedure drifted despite being very clear and prescriptive because the alternate action was more convenient and easier than its original rule. Faced with such an eventuality, on some occasions, organisational members chose to adopt convenient drifted versions for processes that the actors viewed as non-essential or critical.

Before I undertake a discussion for this category, there is a need to position this thematic categorisation with respect to a category discussed earlier, 'bypassed to save time'. In the 'bypassed to save time' category, the drifted action aimed to reduce process time. In contrast, in this category of 'personal convenience', the objective is driven by achieving personal gain of ease or convenience. Due to the nature of RepGrid data, some case events discussed for the 'bypassed to save time' category will also find a mention in this category of "Ease of personal convenience". This may give a false impression that both categories have a conceptual overlap, but they do not. Since the process of RepGrid repetitively asks respondents to think about multiple dimensions of a chosen triplet, we would find the same events being represented in different themes. This is because a respondent could come up with multiple facets/ dimensions related to the same group of three RepGrid event triplets. For example, for firm C9, an aerospace firm, the event E9.b appears for construct case marker C9.10 and C 9.04 (refer to figure 29).

	Elements (En)	Chosen Triad	E 9.a	E 9.b	E 9.c	E 9.d	E 9.e	E 9.f		
SNo	Construct (Rank 1)								Construct Pole (Rank 5)	Construct Code
1	Process hardly or never followed		3	2	1	2	4	4	Process consistently followed	C 9.1
2	impact on safety (1 being negative, 3 being no impact and 5 being positive)		3	3	3	3	2	2	Impact on safety (1 being negative, 3 being no impact and 5 being positive	C9.2
3	Saves time and paperwork	b -d ; f	2	1	2	1	2	5	Time has no role	C 9.3
4	Its an additional procedure	b -d ; f	3	1	5	1	3	5	It's a required procedure	C 9.4
5	It will not have any impact on work continuation	b -d ; f	5	1	1	1	5	5	If we don't do this , work will stop	C 9.5
6	No impact on assembly sequence	c -e ; a	5	1	1	1	1	1	This forces us to alter our assembly sequence	C 9.6
7	we are very cautious	a -e ; c	1	3	5	3	1	2	We casually do it	C 9.7
8	It often has senior management approval	a -e ; c	1	5	5	1	1	2	We are not expected to do this	C 9.8
9	This is not monitored by quality	f -c ; b	1	5	1	1	1	1	The result is to be demonstrated to quality	C 9.9
10	Doing it by the book is a waste of time	b -c ; f	2	1	1	2	4	5	We try and do it maximum by the book	C 9.10

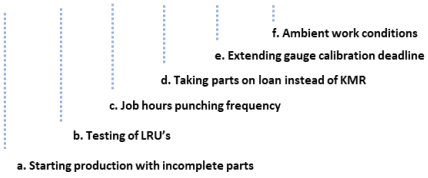

Figure 29: RepGrid of Firm C9 from the aerospace sector

In the bootstrapping process, the construct case marker C9.10 was allocated to the thematic category 'Bypassed to save time' while construct case marker C9.04 was allocated to 'ease of use/personal convenience' (refer to figure 29).

One may notice that case event E9.b, about testing LRUs, appears in both the construct poles C9.10 and C9.04. This appearance of case event E9.b in the two different bootstrapping thematic categories is representative that this event had both dimensions supporting the drift. This particular event, E9.b, was considered a time-saving option by the respondent and was also argued to provide ease of use/ personal convenience. It is important to note that not all events that may save time will provide ease of use for the actors; however, there will be some overlaps. For example, Ease of use and convenience was cited as a reason for drift in activities that required completing paperwork or filling detailed reports. These activities also find a lot of mention in the category of save time. This common occurrence indicates that for such drifts, actors felt that they were able to save time and that it was more convenient to disregard the recommended procedure. The respondent from firm C26, another aerospace firm, disclosed that job cards are avoided while making the manufacturing components to ease the paperwork. The job is loaded for manufacturing without completing the entire

procedure to reduce unnecessary extra work and make it quick and easy. In this firm, C26 mentioned,

“without making job card, people will take up the job…. they will avoid job cards to ease paperwork”.

Another type of drift that had both time-saving and ease-of-use aspects was using universally compatible tools and procedures. To make the job fast and easier, it was informed by many participants that engineers used alternate tools or created their own design tools to simplify things. C7 described about same as

“For the ease of equipment selection, the people in Japan have created their own design tool to simplify things.”

A similar tool-related issue was raised by the respondent from Firm C31, a commercial airline. The respondent, who heads the maintenance division of commercial aircraft, disclosed that often, there are different tools prescribed for different components of an aircraft. However, when engineers are called to attend to some issues in planes that are ready to fly for an onward journey, engineers will often take a universal tool set as these adjustable toolsets are quite convenient to work on a range of aircraft components and jobs. Although there is pressure to release the plane quickly for the onward journey, the practice is more driven by the convenience of using one tool on multiple components. The respondent from C31 quotes;

“But people take adjustable spanners which can handle multiple components which is against the recommendations.”

Respondent from firm C10, an Oil and Gas firm located in the Middle East, gave an example of this behaviour. The respondent named the act as tailgating at entry and exit points, which relates to the recommended procedure of swiping the security cards at entry and exit points. The respondent explained that people generally go in and out of the plant in groups. In most situations, only one person would swipe his card, while others would tailgate him without swiping their cards. In the plant, many entries and exit points are controlled by swipe cards. The rule says that every individual person must punch in and out their cards as this might

be important in case of emergency for accounting how many people are inside that premise. However, the priority is given to personal convenience; thus, the deviated version of tailgating becomes the common accepted norm. C10 also revealed that others easily copy the drifted version. Regarding tailgating, it was said,

"*as soon as you see other people doing it, you start doing it without understanding the reason or logic behind it."*

An engineer from Aerospace firm C16 also shared a similar experience regarding using access cards. He explained that for accounting, people would religiously follow the procedure at the start and end of the day. However, for leaving the premises during the day, only one person will use the access card to open the door, and the rest will follow him. This is a very common practice and continues under the name of convenience.

Now, I discuss some examples of ease of use that have no relevance to the save time category. Convenience was also widely discussed regarding wearing PPEs; this aspect of drift was not related to saving process time. Personal comfort or sometimes discomfort made people drift procedures related to wearing PPEs. Many respondents agreed to the fact that although people tend to follow the rules, but compliance is more often symbolic in nature. Commenting on this symbolic compliance, the respondent from firm C25 stated that the safety goggles are never worn properly. The respondent further stated that these goggles are mostly left hanging from the neck, only to be worn on some occasions, such as to avoid scrutinising eyes. Similar experiences were shared by respondents from C27 and C5. The respondent from C27 quoted;

"Company has provided PPEs to each and every individual which has to be worn at all times on shop floor, but people neglect it. Sometimes safety goggles are worn by personnel's after seeing safety supervisor."

Although the respondent from firm C5, a large-scale oil refinery in the Middle East, accepted that wearing safety goggles was a frequently drifted procedure, he empathised with the workers by stating that the hot summer climate of the

Middle East creates discomfort with these glasses. Most respondents agreed that wearing PPEs was crucial for ensuring safety, yet they were not shy to accept the associated discomfort that promotes such drifted practice.

5.1.1.2.4 Clear/ Explicit Rules

The strength of the RepGrid process is that it evokes the respondent to think about a deeper level of associations among the selected events. My research found that discussion on drifted events often made the respondents ponder how clear or explicit the rules were. Clarity as a construct is conceptually opposite to the construct of unclear rules. Some respondents disclosed that sometimes, a very explicitly detailed procedure is a cause to drift as the extensiveness of clarity and detail makes it difficult to execute the exact way as it is documented in the SOPs. Respondents from firms C1, C2, C4, C10, C11, C12, C14, C20, C21, C26 and C29 all discussed about drifted activities linked to clearly articulated and explicitly expressed procedures. Despite actors being aware and clear about the procedure, they still drifted.

Clarity of rule as a construct helps bolster an argument that the suggested rule dimension of clarity may act counterintuitively to the behaviour of drifted action. If the rule is clearly formulated and very prescriptive, it might leave less scope for manipulations towards making it fit the practical demands of day-to-day operations. This dimension of clarity, which is viewed in literature as a positive rule attribute, might become a candidate for causing a drifted action. Process steps are so rigid and prescriptive that the work-facing individuals find it difficult to implement them.

The respondent of firm C1, from the Aerospace sector, had no hesitation in accepting that four of his drifted routines were occurring in detailed, explicit and clearly communicated procedures. These procedures were for guidelines on engine assembly, the manuals provided for new engines, tools prescribed by the manuals and the sequence of tools that must be used for a specific job. The clarity in the procedures meant that engineers could argue the validity of a procedure in a much better manner and could pick up on issues that they felt did

not match their contextual work demand. Taking about how engineers felt about these clearly defined and sometimes constraining rules, the respondent said,

“We engineer, we know the process, and we know that there is no point to go with steps.”

The above statement elaborates on the situation where the rule designers, to achieve a high degree of clarity, end up making the rule so rigid and prescriptive that the work-facing individuals find it difficult to implement it. Thus, one may argue that because the rules are clear and prescriptive, there may be situations where the prescription does not apply. These unusual/unaccounted-for situations then provide the basis for justifying drift.

The respondent of firm C2, another aerospace firm, also expressed similar views about two drifted procedures. Talking about the first one, the respondent called the prescribed procedure:

“Highly procedural in nature”, while for the second one his view were that, work with fixed guidelines”.

For his/her event of drift, the respondent from the firm quoted it to be a very well-designed process. Adding on to other attributes of the procedure, the respondent disclosed that the action needed expertise to dispense it, and it had strict deadlines. The argument that comes forth from this construct of clarity is that, yes, the respondent agreed that the process was absolutely clear to the workers, yet the other process characteristics, such as strict deadlines and being dispensed by experts, created a possibility and necessity for drifting from the recommendation.

Comments made by the respondent of firm C26 about problems with a clearly stated procedure;

“The procedure is to be followed, but if we follow, we face problems.”

Clarity had made organisational actors realise that what were the issues with the procedure.

5.1.2 Support: Factors that support the actual act of disregarding a procedure

5.1.2.1 Quality of Enforcement

5.1.2.1.1 Tacit Management Acceptance of Bypassing, Allowed/Approved/ Condone

The data revealed that management and managers often turned a blind eye or tacitly approved drifted actions. This act of tacit approval or turning a blind eye to drifted actions encouraged legitimising drifted actions as accepted norms.

In Case 24, a petrochemical-based fertiliser plant, the respondent disclosed that there are various occasions when your senior managers ask you to expedite tasks. To do so, you often need to bypass the SOPs. The manager approves of such a bypass. Discussing a post-shutdown start-up procedure, the respondent said there is a technically justified start-up cycle time for a petrochemical unit. This cycle time is constrained by the fixed heating up and refrigeration rate for all exchangers, reactors, columns and feeds. Despite being aware of the process required time, the senior management team of your chain is always pushing to expedite the process and reduce downtime. Regarding such unofficial dictates for expediting, the respondent said

" You only say, I will try and see how quickly I can manage it. And once you have agreed to try, it means that in place of 12 hours, you will try and start it in 8 hours. And when you do this, you will bypass the SOP on one or the other place. You will do it against something mentioned on the SOP."

Similar issues were raised by respondent from Case 9, an aerospace manufacturing unit. Discussing about the SOPs related to replacing crucial units and components in aeroplanes, the respondent accepted that to meet project delivery deadlines, they are forced to disregard some processes. The SOP clearly states that an assembly operation cannot be undertaken for a module until all the parts are received. However, due to long lead times and delays in acquiring the right parts, the assembly team does not wait for the whole module to arrive. Instead, they will alter their assembly sequence and try to work with whatever parts are available until the remaining parts arrive. The respondent further added

that the whole management team is aware and accepts that this practice is important to meet project deadlines, and thus, no one questions the disregarding of SOP.

In another case, case C13, a manufacturing unit of a world-leading confectionary brand, the respondent quotes about a biscuit production line that;

" We have to pass both dry and wet material through a metal detector as per SOP. As per SOP, anything that is not passed through the metal detector shall not be passed. We must scrap that wet and dry material, but we never do."

The respondent disclosed that as per the procedure, three hours of material from the production line needs to be scraped, which is of a very high value. So, the unofficial rule is to add it back to the production line and let it pass through the metal detectors again. Everyone in the organisation is aware of the practice and silently approves it as well.

The aspect of tacit management approval leading to drift was also evident in routines related to auditing and bookkeeping of financial and stock data. An example of this was cited by the respondent from firm C2, an aerospace sector firm. The respondent of C2 narrated that, every year, an audit is conducted at departmental stores for a physical reconciliation of stock in the books and stock in the store. The respondent further stated that it was not uncommon to have a mismatch between the two stocks, such as in books and what was present in the stock. In such cases, mismatches were required to be resolved. To reconcile the stock mismatch, false entries of material receipt or issue were made in the books to resolve the issue. Although it was not the right thing to do, but by doing this, the department was able to satisfy the independent auditors. As this was done only for minor stock variations and mismatches, it also had an unsaid tacit approval of the senior management team.

Similar acts of management condoning drift were reported by Case C3, C11 and C16 as well.

5.1.2.1.2 Impact of monitoring and supervision / Checking/enforcing/auditing

When SOP is neither strictly monitored (monitoring is lax) nor enforced, this becomes one of the key factors for actions getting drifted. The data also revealed that the quality and frequency of process monitoring had a significant bearing on actions getting drifted away from prescribed procedures.

In case C5, the respondent disclosed that the SOP related to data exchange from a secured control network is neither strictly monitored nor enforced, and this was one of the key factors for it being drifted from SOP. Elaborating on the case, the interviewee explained that the central control room is a crucial part of any large-scale oil and gas unit, and data flow through this control room and associated network must be protected against any virus attack. In most of the industries, there are strict policies for extracting this data for analysis, like only CDs are allowed to copy data. However, people prefer to use personal USB drives for data extraction and portability. Since the SOP is not strictly monitored, the insecure practice continues. The respondent quotes;

"very few people are there to monitor it."

A similar drifted practice was flagged in the case of C3 about using personal USB drives to extract files from servers.

Another major concern around monitoring and enforcement was about wearing PPE (personal protective equipment). In case C8, the respondent indicated that additional safety precautions regarding working at heights, such as safety belts, are often not taken as managers do not enforce or monitor them strictly.

Similar narratives regarding PPE were shared in firms with case markers C11 and C27. Interviewee from case C11 told that people preferred personal convenience over the right way of wearing the PPE. The respondent disclosed that people felt discomfort wearing masks, gloves and safety goggles and thus wore them to tick the box rather than in the right way. Referring to the practice of putting on the PPE when the supervisors are observing you, the respondent from case marker C27 quoted;

“Sometimes safety goggles are worn by personnel after seeing the safety supervisor.”

Monitoring issues were also reported for entry and access points, which prompted people to use fire or emergency exits regularly. This kind of behaviour was also discussed in the thematic category of personal use; however, I would like to argue that ineffective or lax monitoring allows such behaviours to proliferate. Such behaviours, for example, were cited by the respondents from case markers C10 and C16. It was revealed by the respondents of these firms that people would drift from the SOP of swiping the entry-exit cards and would rather tailgate others because the monitoring was laxed.

Monitoring frequency and quality also impacted the organisational processes connected to testing or design. In one such example connected to firm C26, operating in the design and manufacture of missile systems, the process of rig testing of propulsion systems and components was susceptible to some drifted practices. The recommended procedure stated that all procedures connected to the test run to be carried out in the presence of a dedicated monitoring committee. However, in actual practice, many sub-routines and allied tests were completed to avoid delays without involving the monitoring committee.

Similarly, in firm C9, another defence aviation company, the testing procedure for LRUs (Line replaceable units) was also subjected to some drifted practices. Testing LRU’s system involves the lengthy procedure of adjusting and calibrating various test parameters. This procedure is done through simulation on test rigs. The recommended procedure states that an operator must first test the unit himself/herself and then repeat the same tests in front of a Quality Control person. However, the step of preliminary testing of LRUs before presenting it to quality is usually missed. Engineers call the quality control people to come and witness the test when it is being tested for the first time. This saves engineers the burden of carefully calibrating and setting up the simulation rig twice. Since there is no initial monitoring for the step where the LRUs are tested for the first time, thus the process is skipped. The respondent acknowledged that this has become a usual

and very pervasive practice that is also shaping the way other procedures are done.

Sometimes, the frequency of monitoring or audit also impacts how the routine is enacted.

Monitoring and supervisory issues were also reported in cases; C2, C5, C8, C9, C17, C27.

5.1.2.2 Confidence to Predict Outcomes

5.1.2.2.1 Awareness/familiarity of process or alternatives

Awareness and familiarity with the process fill actors with confidence. They find alternatives to work with, which could be a practical solution, though not as per the guidelines.

A respondent from an aerospace component manufacturing firm disclosed that engineers would use their experience and familiarity with the procedures to choose drifted actions over prescribed procedures. The respondent quotes, *" A separate tool that's not in manual but we are so much experienced we use it, people doing the job knows the alternative, so they look for a different tool that is better for this job."*

Process awareness also provides a good understanding of associated risks and the possible cascading effects one's action could have on the wider system. Findings revealed that this was particularly true for large-scale industrial operations where people develop a very high degree of familiarity to detect and take corrective actions for change in process parameters of temperature, pressure and reaction; for large-scale reactors, heat exchangers, turbines, pumps and distillation columns. Experiential knowledge about control room issues, error alarms, destabilising system behaviours and many what-if scenarios equip these individuals with the ability to play with the system in a manner that no one else could do. Often, their actions are not from standard working procedures, yet they are able to deliver outcomes. Drifts connected to the aspect of process awareness were mentioned by two respondents from the firm, a large-scale oil refinery and the large-scale unit manufacturing fertiliser from Naphtha (a Hydrocarbon from Crude Oil).

Discussing a case of manually overriding alarm signals, the respondent from C5 mentioned that the central process control room of the refinery has many process alarms signals to alert operators about process parameters deviating from the recommended or safe zone. Respondent further added that there are occasions when flood alarms would appear due to the instrument malfunctioning, and experienced engineers would look at the process and manually override the alarm to cut it off temporarily. However, when that instrument becomes normal, operators usually would be slow to re-activate the automatic setting. The procedure does not recommend an interim manual cut-off for the alarm but rather recommends making a permanent stop and properly investigating the process by filling up the required process analysis paperwork. Yet, with experience, engineers would know what to react on and what to ignore.

A similar scenario was disclosed by the plant manager. Discussing a scenario about restarting the production plant after a maintenance shutdown, the interviewee explained that experienced plant managers can start the process despite process parameters being away from the recommended. Citing an example, he explained that SOP mentions that certain psi of Ammonia pressure is necessary for the reactor column before the rest of the processes can be brought online, yet, due to their knowledge about the process, some plant managers are able to start production at sub-optimal conditions. He further disclosed that these people would boost the time saved, which is in 7 to 8 hours, and no one will ask if all the startup procedures were performed as per recommended or not. This is only possible if one has good knowledge of the system.

Similar ideas were shared by C14, C22 and C23 from the manufacturing and aerospace sectors. Here, with time and experience in their respective fields, operators find alternatives to work with, which could be a practical solution, though not as per the guidelines. A firm C23 respondent from manufacturing conveyed that experienced operators have devised alternate solutions to many unusual problems encountered in the process. These solutions slowly become a

norm and get retained as a part of their daily work. Appreciating these alternate versions, the respondent of C23 quotes;

"When I'm facing the problem again and again so why not adhere or develop a new kind of process so that my actual time taken for is reduced drastically…… you can deviate even see easily here you have to be more experienced.."

Thus, the experience of people, too much familiarity with the task and even other possible alternate ways of working all these added to the deviation or drifting away of actions from prescribed procedures.

5.1.2.2.2 Financial and personal harm

The possibility of financial, reputational or personal harm is disregarded to meet other process objectives.

The data revealed that competing organisational objectives compelled the actors to indulge with such drifted actions that had the potential to inflict financial or harm to the organisation or threaten the individual safety or well-being. Yet the actors chose to proceed with these drifted actions. Drift in following the regulations around safety training or PPEs(C5), moving sensitive project files from secured office servers to personal laptops(C3), prioritising procurement budgets for running the factories rather upgrading the worn-off PPEs (C21), investing costly resources on projects that customers verbally commit and not formally contracted (C11), proceeding with manufacturing without completing all the mandatory validatory simulation runs(C25), etc. were many such cases discussed by the respondents where the possibility of financial, reputational or personal harm were disregarded to meet other process objectives.

In a discussion about drift implications, a respondent from firm C11 disclosed that some of the disregarded procedures could have had severe implications for the reputation of the company, and some were potentially a threat to the individual's well-being. Citing an example of design teams commencing work based on verbal clearance of future projects, the respondent accepted that this practice could lead to losses for the organisation if the verbal commitment of future partnership with customers did not go through. However, the choice to indulge with this drifted

action was motivated by the possibility of saving valuable time in the project development process. Similarly, on the personal harm front, the respondent disclosed that drift in procedures related to completing the mandatory online HR training and course on safety and working with hazardous materials was a potential threat to individuals' well-being. Despite actions having financial, organisational or personal safety implications, actors continued to indulge with them.

Respondent of firm C3 accepted that moving critical project files to a personal laptop was a possible threat to the organisation, yet the drift was necessary for managing project deadlines. Respondent of firm C21 disclosed that limited budgets for urgent purchases were mostly spent on spare components that ensured the lines running, while the upgrade of worn-off PPE equipment was consciously chosen to be delayed. Prioritising other aspects over possible personal or financial harm was the underlying argument that dominated this construct of the data.

The finding is useful to argue that in contrary to a general view that awareness of financial or personal harm would motivate people to ardently follow procedures, the data reveals that other competing organisational requirements supersede this aspect.

5.1.2.2.3 Awareness of Risk Impact, Severity and Probability

RepGrid interview data indicated that for many of the drifted events, participants expressed that being aware of the associated risk and being able to judge the severity of possible outcomes associated with the drifted actions helped shape their behaviour, and they made informed decisions to bypass the procedure.

In Case C11, a speciality chemical manufacturing firm, the respondent discussed the SOP bypass regarding the calibration of instruments by authorised firms. The respondent disclosed that engineers in quality function would calibrate some non-critical instruments themselves and would not send them to an external firm that is designated in SOP for all such instrument calibrations. Talking about this bypass, the respondent quotes;

"… we have the convenience you know to avoid it. At the same time, it is not that risky too.... you now because it is not that risky because we have alternate checks."

The factor that prompts them to indulge in such a drifted procedure is that they perceive the SOP of instrument calibration as low risk.

Similarly, a respondent from Case C1, an aerospace component manufacturing firm, disclosed that engineers would often use tooling that is not prescribed, as they see this, like the replacement of tools, as less risky and with their experience, they have confidence in their decisions. The same respondent also described about people on shop floors having a handy book in their bag and making notes of it to avoid going through long prescribed procedures again. This is called the *black book* in their jargon and is used routinely even though it carries the risk of missing upon crucial piece of change in information. The participant said that too much information to access made people lose interest in perceiving the risk involved, and operators were handy and confident about this 'black book'. It was quoted,

"As you remember I told you about the black book which is different than the manual we have so I would say that it's risky because things can change without knowing."

There is also a possibility that this judgement or perception of risk could be incorrect. Commenting on the possibility of incorrect assessment of risk, case C19, a large-scale petrochemical plant, the interviewee quoted that;

"People do sometimes take risks in performing operation and maintenance activities by not using necessary PPEs …as they presume that they know the risk and it is okay to take chance. … Operator thinks risk is low but actually it could be moderate or even high."

Respondent from firm C3, a mechanical engineer from a world-leading industrial project design and delivery firm, told that their engineering commissioning sites have a high risk of exposure to fumes and dust from welding, paint and other activities. Company strictly advocates that every person visiting the construction

site should wear a full set of PPE, including a mask and safety glasses. However, people ignored this using their personal judgment of the risk associated. The respondent quoted;

"If you are not wearing PPE , you are always aware that you are pulling yourself at risk but your ignorance might take over or your instinct might say it's not risky enough while statistics might say ya its actually risky."

The risk was discounted and ignored based on how people interpreted the degree and severity of the risk. Data revealed many such cases where people choose to drift from the procedures as they perceive it to be less of a threat. Similar actions related to PPE were discussed in the case of firm C27, a large-scale steel manufacturing firm. The respondent of firm C27 disclosed that wearing PPEs is only honoured by the people superficially and not in spirit. The safety goggles were put on by personnel after seeing the safety supervisor.

In the above cases, it was an informed decision to bypass the procedure as, with experience, the organisational actors judged the severity and risk of the bypass as low. However, there were instances where a lack of awareness also contributed to incorrectly assessing the risk associated with drifted actions. For example, in Case 10, a large-scale petrochemical unit, the respondent expressed that many workers, especially lower-level workers, do not have much awareness about what kind of personal protective equipment (PPE) is suitable for what kind of application. This lack of awareness about the risk results in drifting away from procedures. Discussing about the SOP for using protective gloves, the interviewee quotes;

"you have gloves they are not suitable for some job and it says in permit to take gloves and you are not sure which type of gloves, while this requires more knowledge of job, like which PPE you need to use for job."

In the above example, it is worthwhile to note that people do follow the SOP of wearing the glove, but due to their lack of awareness, they fail to pick the appropriate glove recommended for the job. Most of the people involved in this act truly believed that they had completely complied with the procedure, yet their

actions were drifted away from recommendations. The same reason for drifted action was found in case C15 as well.

Issue related to skipping steps was discussed by the respondent of firm C27, a steel-producing firm. Discussing the way risk awareness is highlighted in his firm, the respondent conveyed that they are supposed to carry out a 6 six-directional risk assessment. This risk assessment is drafted in a document and provided to the workers, yet workers ignore the assessment and make a personal judgment about what is safe and what is not. Talking about the issue, the respondent quoted;

"We have 6 directional hazard (east , west , north, south , up and down); we identify risk there and fill it in the document. Operator has to verify if that condition is worth working, but they don't take that hazard, and people get to work; we have had accidents in past but no improvement."

Thus, one can conclude that for a drifted action to be undertaken by organisational actors, besides the need to drift, one would also require the above facilitating contextual conditions.

5.1.2.3 Process Ownership

5.1.2.3.1 Local decision-making / flexibility

A possibility to exercise a degree of flexibility in the recommended procedure or the practice of taking the liberty to locally alter the procedures was found as one of the factors that incited drifted actions. Drift is supported by the conditions that allow actors to exercise local decision-making flexibility.

Findings revealed that local versions of recommended procedures coexisted and flourished alongside their original counterparts. Local alternate versions or solutions are built on the logic of task and convenience. Some of these local variations are so strong and sticky that they get selectively retained in the system, and they end up replacing the original version.

In all three manufacturing sectors, oil and gas and aerospace, operators could negotiate day-to-day practicalities with a mix of original routine and a modified or altered local version. With time, these local decisions diffuse through practice and

merge with daily routines to become acceptable norms or regularised practices. In the absence of any immediate adverse outcome or conflict with other organisational processes, these practices get strengthened through multiple successful replications and subsequently get embedded in the system.

A respondent from firm C1, an aerospace firm, disclosed a practice among the engineers of having a handy book, a cheat code or a self-made abridged version of the manual, which they called a 'black book'. This was developed to avoid going through the lengthy information in the manuals. It helped them quickly narrow down to relevant measurements that were required for a certain kind of job. Due to this ease of personal use, the RepGrids constructs connected with this event have been identified in the bootstrapping category of 'Ease of use/personal convenience'. However, this drift is also related to the organisational conditions that support local decision-making and flexibility. In this category, I would like to argue that although the use of the Black book was convenient, but it would not have been possible if the engineers closer to the job did not have the flexibility to use such an approach. The drifted practice was so prevalent that the original manual would be seldom referred. The respondent also disclosed that on several occasions, people worked on their own workflow and steps to assemble components rather than what was prescribed. They had their own local guidelines for every work. Commenting on the process, the respondent quoted;

"we will create local instructions and say we will put our name against it and say technically there is no problem in deviating by doing these."

Similarly to the above, a respondent from firm C4 also corroborated the findings of having multiple localised versions in their software automation testing procedure. The respondent explained that software is required to go through a rigorous testing process in which the engineers design a set of tests that are conducted in automation. The procedure lists the number and types of automation tests that would be required. However, the engineers were compelled to drift from the recommendation and follow the localised version of the test design. The drift was not to do less testing or to save time; rather, it was to

assuage the QA team's expectations. An efficient design would be to cover the functions with less automation tests so that a number of unwanted or repetitive tests could be avoided in the automation server. However, QA and management were of the opinion that the greater the number of autotests, the more robust the design would be. Hence, despite knowing that additional tests were redundant, the test engineers still created unwanted tests to increase numbers. A drift from recommended, but it helped them meet local expectations. Talking about the redundant tests, the respondent from firm C4 quoted;

"decision is taken by a very local level."

Local versions are embedded so deeply into the organisation that they are difficult to replace. One such event was discussed by a respondent from firm C14, a world-leading engineering in manufacturing corporation. Talking about the resistance that the firm faced while trying to replace a localised legacy version of a process, the respondent quoted.

"it is practised it is Legacy what they have been doing so far they still prefer to do it in the same way even though there is a new procedure"

Overall, general and widespread sentiments around the existence of localised practices were expressed across multiple firms. A project engineer from a reputed heat exchanger manufacturing firm, C8, commented;

"So even though they are prescribed procedures, a certain amount of deviation is still allowed"

Similarly, a general comment on local versions made by an application engineer from the oil and gas sector firm C7;

"You have written procedures, but no body follows it… We say we are one company we are supposed to do the process as defined but it never happens…In our department we only follow localised version."

5.1.2.3.2 Clear Responsibility

Clarity or knowledge about the process ownership or responsibility, such as who is in charge or responsible, acts as a condition to execute a drifted action.

When the actors were aware of who was in charge or under whose ambit the task lies, it acted as a condition for the actors to drift away from the prescribed procedures.

Respondents conveyed that being aware of the process ownership was important for the people drifting. This knowledge helped them understand the degree of rigidity or flexibility that could be exercised. For example, a respondent from firm C8 disclosed that when a sign-off on the vehicle distance travelled was done by junior members of the staff, the drivers often.

5.1.2.3.3 Diffused/ Unclear Ownership Of Actions Or Outcomes

Also, in procedures involving multiple actors, there existed a potential to drift as the boundaries of process ownership were blurred.

There were organisational tasks that actors learnt from peers or co-workers, like the best practices around project files handling issue firm C3. In the absence of a clear directive on who is the authority for the task and whose style of working and procedures need to be replicated, the organisational actors struggled with the replication dilemma. Similar issues were raised by respondents from firms C15 and C20. For example, in firm C15, an oil and gas refining and exploration firm, replication dilemmas existed for procedures related to secondary safety mechanisms. The respondent explained that there are primary mechanisms for ensuring safe working and some additional secondary mechanisms to make the system failproof. However, when people learn on the job through their peers rather than through standard operating procedures, and when they come across a range of behaviours, they are faced with this dilemma of whose approach should be followed. Discussing the event where loading containers with liquid petroleum gas, a very hazardous and flammable substance, to protect the truck from any accidental movement, there is a mandatory procedure to manually restrain the truck wheels using a metal device. This is a secondary mechanism, as the primary mechanism is to ensure that the handbrake in the truck is applied. However, the procedure does not suggest that whose responsibility it is to put the wheel restraining device. There are multiple stakeholders involved in this procedure with many steps. Different people execute the procedure differently. In

some cases, the truck drivers would take this restraining initiative, and in others, the loading team would do that. Lack of understanding about process ownership, the procedure is liable to drift. The respondent firm C20 accepted that due to this unclear responsibility, many times, this procedure is missed out.

The respondent of firm C20 also highlighted another issue related to process ownership. Discussing two events where, due to the involvement of multiple stakeholders from different departments, locations and functions, the delivery of a safe working environment was often challenging. The respondent further noted that as the responsibility of safe working was constantly shifted from the jurisdiction of one team to another or from one person to the next, it was difficult to pinpoint who was responsible. There existed a potential to drift as the boundaries of process ownership were blurred.

The respondent further noted that this unclarity of process ownership also obscured the organisational reward and penalty mechanism that was installed to influence drifted behaviours. The respondent accepted that due to the existence of diffused or lack of process ownership, conferring of reward or penalty could be construed incorrectly.

The quantitative analysis resulted in a set of 20 higher-level factors that were found to be influencing the phenomenon of drift. These factors answer the question why actors drift away from the prescribed procedure.

5.1.3 Gaps: Changes introduced due to gaps in actors' motivation, skills and in process ownership or understanding

Until now, the findings on actions drifting away from procedures represented the factors that question the purpose or validity of recommended procedures, check if conditions are conducive for drifting and present the factors that help actors narrow down to a set of suitable alternatives. However, there are a set of additional factors, like skill or training gap or a lack of motivation, that may also lead to drifted actions.

The factors that I address under this theme are (i) Skill Gaps and (ii) Compliance and Habits

5.1.3.1 Skill & Knowledge

5.1.3.1.1 Inadequate resources and lack of training

Many cases highlighted that lack of training, resources or knowledge led to people drifting away from prescribed procedures.

Discussing an issue about landing gear malfunction, a respondent from case C12, an aerospace manufacturing firm, disclosed that during a painting job of the component, a technician's lack of skill and awareness resulted in the blocking of a vent hole of the landing gear system. This resulted in a serious problem with the landing gear. The interviewee explained that these technicians always painted the components and followed their usual way. However, on this occasion, their usual way resulted in blocking the vent hole. They did not understand the hazard associated with blocking the vent hole, as the recommendations were not adequate. Thus, they never took any precautions to avoid it.

Similar points were discussed by many others. For example, the respondent of case C27, a large-scale steel manufacturing plant, mentioned that often workers preceded for work without the mandatory briefing, also known as the toolbox talk. The respondent quotes;

“Prior to any work we have to make technician aware of work and hazard and all this is called toolbox talk. But here we don’t give those talk most of the time.”

Many participants were informed about work being started by untrained workers or jobs started with incomplete training. C14 in the manufacturing firm discussed that despite the importance of training, many times, the training was not scheduled on time, and people were send on the job with incomplete knowledge.

“Training is a must, but always necessary training doesn't happen like to that before you get to a job there are cases where they don't happen upfront so prior to job”.

In the manufacturing sector too, C17 admitted that errors are bound to happen in case employees aren’t trained completely, it was quoted,

"In training area, there is a common feature that we don't undergo proper training, it is company's responsibility to give training. But we aren't trained and instead we start working, example I was accompanying lead engineer. Company send you on the job and learn there. Also, I am not aware of familiar with those different words being used in the company. So, when I am unaware for complete process then errors happen"

An engineer from manufacturing firm C3 was briefed about contractual obligations. The contractual obligations dictated that any design changes on site by the sub-contractor must be approved formally by design consultant prior to any works being undertaken. However, sub-contractors often bypassed this obligation due to various reasons such as time, cost saving, etc. The respondent also admitted that better training and resource availability could mitigate such deviations in the firm. It was said,

"These could be mitigated with, say, by training. I would say the other is habit-based and subjective and you could choose. So, providing appropriate resources could resolve the problem."

Other case markers discussing lack of training and resources or knowledge were C4, C6, C10, C16, C18, C26, C30.

5.1.3.1.2 Lack of Competence

Due to the inability or competency of workers, they act according to the way they judge as appropriate. This leads to drift.

On aspects of competency leading to drift, the data revealed that the operators in the firms acted on their competence and their expertise skills or knowledge to judge the process, and alternatives played a role in the drifting of actions from prescription. Commenting upon how people's competency impacts the possibility of drift, the respondent from firm C6, a firm into mining and treatment of ores and minerals, told that in the mining industry, we provide extensive training on the recommended procedures, yet, due to inability or competency of workers to process and follow the imparted knowledges, people act according to the way

they judge is appropriate. This leads to drift. Elaborating upon the argument, the respondent quoted;

"We always train the workers, but sometimes they don't just follow it, that's the issue. So, we don't have so many educated people, the labourers who are not totally educated, so they don't always follow the instruction we give."

Similar issues with lower-skilled workers were reported by respondent from firm C13, a leading food and confectionary manufacturing firm. The respondent disclosed that some processes are beyond the comprehension of low-skilled workers and thus result in drifted actions. Talking about an event where low skilled worker failed to act as prescribed, respondent quotes;

" (talking about an event) is more about the labour who is not very educated as compared to the person involved in (other event), who has knowledge and education both. So, it is like a low-skilled labour on one side."

In a case connected to the firm C12, a defence aerospace firm, competency led to a serious safety threat. This event relates to the painting job of landing gear systems. The respondent disclosed that there is a crucial vent hole in an aircraft landing gear system that needs to be unobstructed. However, the person who was asked to paint the landing gear system had no knowledge or idea of such a necessity, and due to his lack of competence, he filled the vent hole with excess paint. Due to this, during landing, the landing gear malfunctioned and caused a major incident.

Competency becomes a serious threat if the drifted version of incompetent people is copied and replicated.

5.1.3.2 Compliance and Habit

5.1.3.2.1 Lack of Compliance

This construct, originating from my RepGrid data, sheds light on the status of awareness or knowledge about the drifted procedure. The argument put forward by respondents under this subhead compares two contrasting possibilities: one that actors were fully aware of the drifted action, and they proceeded with it consciously. The construct does not posit why this was happening, as the why question is answered elsewhere. It just highlights the existence of two phases of

drift, one where awareness of drift exists and in the other, and probably more dangerous of the two phases, where the awareness is depleted or completely lost. Over here, I would like to reiterate that due to the nature of RepGrid data collection, there will be multiple events that would find a common mention in this category as well as in other categories. However, the construct dimensions articulated by the respondents for these common events will be different.

The respondent of firm C7 disclosed that the design team often used unverified and unapproved tools. Elaborating on the issue, the respondent said that the design team in Japan have created their own design tool to simplify things, but these tools are not verified and approved by the R&D and Core team in the US, who make the final design decisions. The important distinction between this category and others having the same events is that the design team of Japan is aware, yet they continue to work on these tools as this fits their workflow and improves their design output. The reason for this could be among the ones discussed in earlier thematic categorisations, such as to save time, for personal use and due to a lack of risk awareness, yet the underlying argument of this category is that despite knowing about the existence of a clearly defined procedure, the actors chose not to comply. The argument here is that lack of compliance is demonstrated, however, with a positive intent.

The respondent of firm C1 also accepted that there are drifted behaviours that people adopt from their peers and continue without questioning their validity or logic. The underlying argument is that they are aware of the drift yet choose to continue. A similar issue was raised by the respondent of the firm C1; when discussing such behaviours, the respondent articulated a construct;

“Engineers are aware that they are drifting.”

Similarly, the respondent of firm C18, a world-leading automobile manufacturer, quoted on the aspect of a conscious act of non-compliance;

“They(organisational actors) knew they are doing wrong, they just didn’t follow the procedure”.

The underlying meaning of this construct was that drifted practices can exist as practices where there is a conscious lack of compliance.

5.1.3.2.2 Communications

Disrupted communication creates a barrier to passing the information; thus, operators devise their own way of working.

The three sectors studied here all exhibited a link between communication and deviation or drifting of actions. When the communication was disrupted, it created a barrier in passing the information and thus, operators devised their own way of working. Poor, inadequate or even unclear communication resulted in a lack of transparency and process ownership. Respondent from firm C29 in the aerospace sector reported of communication-linked drifts in the design process. The lack of communication and hindrance in information flow had resulted in the propagation of a silo culture within the organisation. The respondent addressed this silo culture as a black box, where different teams of the design process had no awareness of things happening in other teams. People gradually got confused about what was the expected level of communication and who was responsible for communicating.

Similar issues around communication were mentioned by firm C7, from the oil and gas sector. The process of communicating with design teams was highly skewed regarding the cultural context of the country where the design team was based. Respondent, being a part of the UK design team, mentioned that while design team members in the USA were welcoming and they appreciated a direct one-to-one contact, the team in Japan was much more conservative in their approach in handling communication. It was known to every team member in the UK that to communicate with their design team members in Japan, one needed to send the queries through a hierarchical protocol, while in the USA, one could just pick up the phone and call the design team member. Despite having the same recommended procedure regarding communication, the practices differed. In the words of the respondent of C7,

"*There is lack of communication. It's not that people don't communicate; they communicate but it's that sometimes you don't have direct approach."*

5.1.3.2.3 Complacency/Habit

While talking to the participants, a small set of RepGrid construct polls (four of them 9.07, 10.18, 14.05, and 25.12) were identified in the bootstrapping as

themes having complacency and habit as the underlying theme. It was seen that for some routine organisational actions, a degree of complacency towards drifted actions had become a norm. The drift had become a habitual working behaviour. The participants became accustomed to their working environment, judged the risk based on their experience and knowledge, and finally getting an unsaid support from the management; their drifted way of working became the acceptable norm in the organisation.

In firm C25 from the aerospace sector, the respondent conveyed that the rule recommends that before taking up a job, one is mandatory to read instructions. However, every time, reading of the instructions is disregarded. The respondent articulated a construct regarding this behaviour as;

"Habit related to shop floor operators"

Another respondent from the oil and gas sector, C10, said that people are complacent about safety alarms. The respondent quoted that people have a casual attitude towards office safety alarms as they start with an underlying assumption that most of the time, these alarms are test alarms rather than an actual events.

Another common deviation in this theme was filling up forms or timesheets. Respondent from firm C9, an aerospace firm and C14, a world-renowned engineering and manufacturing firm, reported such behaviours originating out of habit and complacency. The respondent of firm C14 disclosed that on different projects, a task-based code is generated, and time sheets are to be filled as per the job or task. Ideally, if a person works on different jobs, they should fill different time sheets for different codes. However, people fill all the hours in any one job code and move on. This habit has become a normal process.

"what they have been doing so far they still prefer to do it in the same way even though there is a new procedure."

Regarding a drifted approach towards accounting of job hours for the team of workers working under the managers of C9, the respondent manager from firm C9 said that

" We casually do it."

Being habitual or being complacent towards working with a drifted action was a reason for these drifts to occur and for these behaviours to get passed over to others.

In the next section, I will use quantitative methods to rank these factors by their degree of influence on the phenomenon.

5.2 Quantitative Results

5.2.1 Quantitative Analysis Based on Multiple RepGrid Consolidation Methodology

In the qualitative analysis, the consolidated list of 262 construct poles discovered from 31 individual grids were thematically categorised into 20 high-level thematic categories using bootstrapping methodology. However, the Likert scale data was not used during this process. In this section of multiple RepGrids quantitative analysis, I statistically consolidate the personal construct Likert scale ranking of every drifted event to identify key categories. The multigrid method uses overall frequency, unique frequency, % unique frequency, and Average ANV score to statistically compare the quantitative data of my RepGrids. The methodology section provides a detailed description of this method.

5.2.1.1 Safety Outcome and Regularity of Drift

The RepGrid interview protocol simultaneously generates quantitative and qualitative data. Quantitative data is generated by a Likert scale-based ranking to express the influence of each personal construct pole conceptualised by the respondent on the set of drifted events discussed in that particular interview. With an intention to study the impact of drift on safety and with an intention to discover the routine frequency of the drifted actions, I included two fixed construct poles in each RepGrid interview. These construct poles asked the respondents to rank the events of drift on their impact on safety and on the frequency of following the drifted process. Figure 30 and 31 presents the descriptive values for these two fixed construct poles.

Figure 30 represents a distribution of the 197 cases of drift, indicating their impact on safety being negative, neutral or positive. As it is evident from the pie chart that, 47 % of the 197 events were judged by the respondents to have a negative

impact on safety. It was also reported by the respondents that 17% of the drifted events discussed in this research were having a positive impact on safety. This is an important observation as contrary to the general belief that drift is always negative to safety, my findings suggest that drift can also lead to safety positive outcomes.

Figure 31 presents data on the aspect that were the drifted actions a one-off violation or were they more frequent and routinised. Results from the data indicate that 60% of the drifts discussed by the participants were routinely drifted, such that they drifted on more than half of the replications.

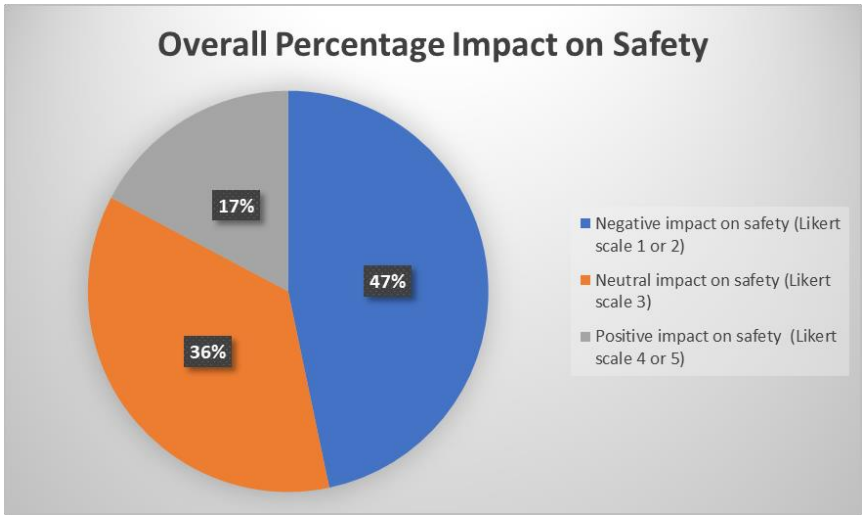

Figure 30: Distribution of all events by their impact on safety

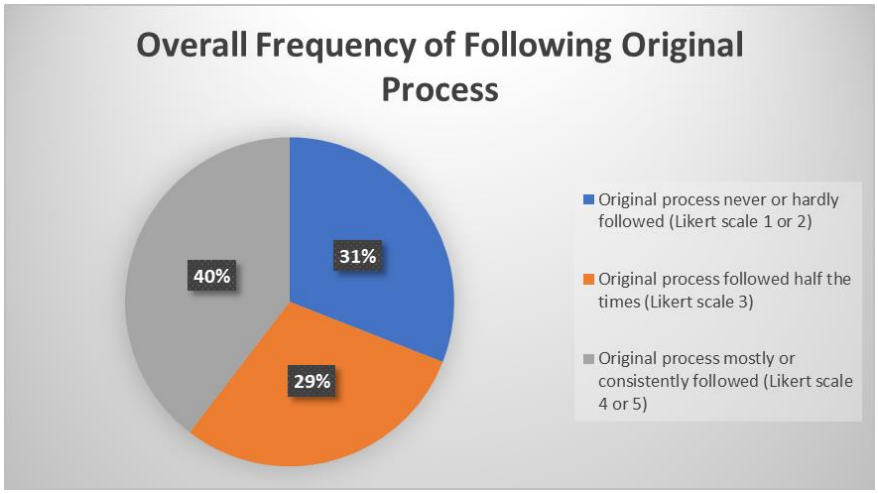

Figure 31: Distribution of all events by the frequency of following the original procedure

5.2.1.2 Analysis of Frequency

The frequency of occurrence for a construct is the first step of consolidating quantitative data from multiple RepGrids. Using a frequency cloud functions, a visual representation of commonly occurring constructs was created in figure 32.

The pictorial word cloud representation of the construct frequency provides a good overview of how the constructs rank, in terms of frequency, relative to each other.

Figure 32:Frequency of constructs across interviews

The quantitative value of frequency is reported in the Table 32. The column of overall frequency reports the total occurrence of the common construct in all interviews, while the 'Unique Frequency' (UV and UV%) represents the number of unique mentions of the given construct. The factors are arranged in the decreasing order of their frequency of occurrence in the personal constructs articulated by each respondent.

The combined results of overall frequency, unique value, % unique value and ANV are presented in Table 32. The factors discovered through bootstrapping are presented in Table 32, in a descending order of their % UV. The last column, named as 'Key' of the Table 32, indicates that the given factor is a key (depicted by 'Y') or not a key factor (depicted by 'N'). The key factors are highlighted in the

Table 32 in 'Grey'. The criterion for a factor to be considered key or not is based on its ANV score. Any factor with an ANV score greater than the average construct per grid, which in my data is 7.84, is considered a key construct.

Table 32: Overall and Unique Frequency of constructs

Categories	Overall Frequency	UV	%UV
Tacit Management Approval	30	20	65%
Bypass to save time	20	15	48%
Inadequate resource and training	15	14	45%
Risk awareness	17	13	42%
Bypassed for production or cost pressure	16	12	39%
Ambiguous, unclear, unknown, non-specific or non-existent rules	18	12	39%
Clear rules	17	12	39%
Ease of use/ Personal convenience	14	10	32%
Lack of Competence	15	10	32%
lack of compliance	9	9	29%
Local decision-making / flexibility	9	7	23%
Financial or personal harm	7	7	23%
Low Monitoring	17	6	19%
Clear responsibility	5	5	16%
Complacency/Habit	4	4	13%
Diffused / Unclear ownership of actions or outcomes	5	3	10%
Awareness /familiarity of process or alternatives	3	3	10%
Considered as a redundant additional safety barrier	2	2	6%
Inadequate Communication	2	2	6%
Individual and collective responsibility	4	2	6%

In the next step, I calculate the variability of construct ratings across events of drift. The results demonstrate that out of the 20 constructs identified through the method of bootstrapping, **SIX** of them were found to be key constructs based upon the ANV multigrid approach. These six constructs are (i) Tacit management approval, (ii) Bypass to save time, (iii) Inadequate resources and training, (iv) Risk awareness, (v) Ambiguous, unclear, unknown, non-specific or non-existent rules, and (vi) Low monitoring. Over here, there are two important observations. Firstly, the construct *'Bypassed for production or cost pressure'*, although it had a very high %UV at 39%, yet its ANV score of 7 was marginally lower than the threshold Avg ANV value of 7.84. Secondly, the construct *'Low monitoring'*,

despite having a relatively low %UV score at 19%, was still found to have a relatively high ANV score of 10 and thus got included in the dominant or key factors list.

Table 33: Combined results of overall frequency, unique value, % unique value and ANV

Categories	Overall Frequency	UV	%UV	Avg ANV≥ 7.84	KEY
Tacit Management Approval	30	20	65%	12	Y
Bypass to save time	20	15	48%	8	Y
Inadequate resource and training	15	14	45%	9	Y
Risk awareness	17	13	42%	8	Y
Bypassed for production or cost pressure	16	12	39%	7	N
Ambiguous, unclear, unknown, non-specific or non-existent rules	18	12	39%	9	Y
Clear rules	17	12	39%	7	N
Ease of use/ Personal convenience	14	10	32%	6	N
Lack of Competence	15	10	32%	7	N
lack of compliance	9	9	29%	5	N
Local decision-making / flexibility	9	7	23%	5	N
Financial or personal harm	7	7	23%	5	N
Low Monitoring	17	6	19%	10	Y
Clear responsibility	5	5	16%	3	N
Complacency/Habit	4	4	13%	3	N
Diffused / Unclear ownership of actions or outcomes	5	3	10%	2	N
Awareness /familiarity of process or alternatives	3	3	10%	2	N
Considered as a redundant additional safety barrier	2	2	6%	2	N
Inadequate Communication	2	2	6%	1	N
Individual and collective responsibility	4	2	6%	1	N

This is indicative that although people made multiple mentions of the construct ‘Bypassed for production or cost pressure’, yet its relative importance to the phenomenon was not sufficiently high. While the construct ‘Low monitoring’ gathered a few mentions yet, it was strongly related to drifting away of actions from prescribed procedures.

The qualitative analysis found the factors linked to the drifting away of actions from the prescribed procedure, while the quantitative analysis empirically ranked them in order of influence. These findings can be put together as a factors model of drift (Figure 33). The model presents these findings arranged by the themes and subcategories for structuring this results chapter. The model also highlights the key factors found using the multi-grid empirical analysis. In Figure 33, the relative importance of constructs is depicted by the size of the arc that the constructs transcribe. The arc of each construct is proportionally represented with respect to its %UV contribution. For example, the construct of Tacit management approval has the highest %UV contribution of 65%, and thus, the arc of this construct transcribes the largest angle among all constructs. In Figure 33, the three thematic groupings of the constructs; factors that help the 'Fit for purpose' evaluation against the pre-defined organisational goal, factors that support the actual act of disregarding a procedure, and factors related to un-addressed gaps, are depicted by dark blue, grey and light blue colours respectively. The dominant set of constructs identified by the ANV analysis is depicted in orange. Using different colours and different size of arcs helps differentiate between different constructs and thematic categories and also help establish the relative importance of these constructs and thematic categories.

5.2.1.3 Analysis of Constructs by the Safety Impact of an Event

The impact of constructs on safety is presented in Table 34. The analysis of the findings for this table was conducted as follows. In my RepGrid data collection, the actors were asked to use a 5-point Likert scale to rate every drifted event (that forms the elements of the RepGrid) on the dimension of its impact on safety. The rating was 1 and 2 for a negative impact on safety, 3 for a neutral impact and a rating of 4 and 5 for a drifted procedure having a positive impact on safety.

Figure 33: The factors contributing to drifted actions

Key factors determined by their *Average Normalized Variance*

Table 34: Influence of constructs on impact on safety and the overall unique value and % unique value

Categories	All		Safety Negative		Safety Neutral		Safety Positive	
	UV	%UV	ANV	KEY	ANV	KEY	ANV	KEY
Tacit Management Approval	20	65%	12	Y	13	Y	10	Y
Bypass to save time	15	48%	5	N	13	Y	19	Y
Inadequate resource and training	14	45%	8	Y	8	Y	1	N
Risk awareness	13	42%	8	Y	7	N	0	N
Bypassed for production or cost pressure	12	39%	6	N	7	N	6	N
Ambiguous, unclear, unknown, non-specific or non-existent rules	12	39%	8	Y	9	Y	10	Y
Clear rules	12	39%	6	N	5	N	5	N
Ease of use/ Personal convenience	10	32%	9	Y	4	N	11	Y
Lack of Competence	10	32%	7	N	6	N	5	N
lack of compliance	9	29%	3	N	6	N	0	N
Local decision-making / flexibility	7	23%	8	Y	5	N	0	N
Financial or personal harm	7	23%	6	N	6	N	0	N
Low Monitoring	6	19%	9	Y	9	Y	4	N
Clear responsibility	5	16%	3	N	2	N	3	N
Complacency/Habit	4	13%	2	N	3	N	2	N
Diffused / Unclear ownership of actions or outcomes	3	10%	1	N	1	N	7	N
Awareness /familiarity of process or alternatives	3	10%	3	N	3	N	4	N
Considered as a redundant additional safety barrier	2	6%	2	N	4	N	0	N
Inadequate Communication	2	6%	3	N	2	N	0	N
Individual and collective responsibility	2	6%	1	N	4	N	5	N

The rating was 1 and 2 for a negative impact on safety, 3 for a neutral impact and a rating of 4 and 5 for a drifted procedure having a positive impact on safety.

To understand the influence of constructs on impact on safety, a similar analysis to the one conducted for all events, was performed on a data set consolidated by

each type of safety impact category. The Elements of every individual grids were reduced to three categories, negative, neutral and positive, impact on safety. These new grids, formed by replacing events by a consolidated safety impact category, were loaded on Idiogrid to calculate the %TSS for each construct. These %TSS were then used to arrive at an ANV value for each construct. See the results in table 34 .

It is important to note that the UV and % UV values are associated with the 20 consolidated themes discovered through bootstrapping qualitative analysis, and these are unaffected by the safety-related scores.

The results from this analysis of key drift factors ranked for their impact on safety present some interesting insights.

(i) Two factors, *'Risk Awareness'* and *'Local decision making /flexibility',* were judged by the respondents to be connected with only the safety negative outcomes.

(ii) Two factors, *'Inadequate resource and training'* and *'Low Monitoring',* were considered by the respondents as factors that can never make operations safer or, in other words, never lead to safety positive outcomes. However, drifts instigated by these factors might be neutral to safety at times.

(iii) The drift caused by the factor *'Ease of use/Personal convenience'* was seen as both to either improve or decrease safety.

(iv) Factors *'Tacit Management Approval'* and '*Ambiguous, unclear, unknown, non-specific or non-existent rules'* were universally linked to all sort of outcomes ranging from positive, neutral to negative safety outcomes.

(v) The factor *'Bypass to save time'* was seen by respondent as a very positive safety outcome factor. In the view of participants, drifts driven by such factors were either neutral or positive to safety.

The results are indicative that the '*Save time'* option was predominantly exercised if the outcome is either safety positive or neutral. While '*Risk Awareness'*, *'Local*

decision making /flexibility', Inadequate resource and training' and *'Low Monitoring'* were factors that the organisations should be concerned about as when these factors are found to be linked to drifts, then the drifts have more potency to return safety negative outcomes. This is a very important result from an organisational perspective.

5.2.1.4 Causal Configurations of Safety Negative Outcomes: A QCA Analysis

The QCA methodology is designed for developing an interrelationship between a wide array of causal effects (Whitley, 2008). It works on the principle that there is a set of necessary and sufficient combinations of causal conditions that may lead to a given outcome (Fiss, 2011). Applied using a formal logic of Boolean algebra, QCA empirically investigates the relationship between a binary outcome of interest (negative impact on safety in my study) and all possible binary combinations (such that presence or absence) of the predictor variables / conditions (Russo et al., 2016).

The first step of QCA analysis is identifying the key/ dominant predictor variables. The quantitative analysis of data using the multi-grid ANV technique has provided a set of key factors related to safety-related outcomes. In table 35, I present this list of factors along with their abbreviations used for conducting the QCA analysis. Since the factor *'Bypass to save time'* was not found to be statistically relevant for the safety negative outcomes, thus this factor was dropped, and the QCA analysis was conducted by the from the seven factors.

The safety-related data for this analysis was captured in the process of operationalising the RepGrids. Safety as an outcome was provided as a fixed construct to the respondents. Respondents were asked to rank all their drifted events on the dimension of the impact of drift on safety. This resulted in 197 real cases of drift being ranked on a scale of 1 to 5 for their impact on safety. Here, rank one signifies extreme negative impact, 3 as neutral impact and 5 as positive impact on the safety performance of the overall process.

The result from a QCA solver (for my case, the QCA Excel Add-In software) is typically generated in three parts: (i) a 'Truth Table' which presents possible combinations of combined factors that logically fit the outcome, (ii) a list of 'Prime

Implicants', calculated using Boolean minimisation, that represent a combination of factors that satisfy the sufficiency condition for the tested outcome and (iii) a 'Solution' set of necessary and sufficient prime implications that represent a complete statement of structural combinations that are arrived at by removing redundant implications from the second step of Boolean minimisation.

Table 35: Dominant factors related to Safety outcomes and their Abbreviation used for analysis

Categories (Abbreviation)	All		Safety Negative		Safety Neutral		Safety Positive	
	UV	%UV	ANV	KEY	ANV	KEY	ANV	KEY
Tacit Management Approval (Tacit_Mgt_App)	20	65%	12	Y	13	Y	10	Y
Bypass to save time (Save_Time)	15	48%	5	N	13	Y	19	Y
Inadequate resource and training (Inadeq_R_T)	14	45%	8	Y	8	Y	1	N
Risk awareness (Risk_Awae)	13	42%	8	Y	7	N	0	N
Ambiguous, unclear, unknown, non-specific or non-existent rules (Amb_rules)	12	39%	8	Y	9	Y	10	Y
Ease of use/ Personal convenience (Ease_Personal_Conv)	10	32%	9	Y	4	N	11	Y
Local decision-making / flexibility (Local_decision_flex)	7	23%	8	Y	5	N	0	N
Low Monitoring (Low_Monitoring)	6	19%	9	Y	9	Y	4	N

The QCA results are populated in a Boolean notation of **' * '** signifying the logical operator **'AND'** and **' + '** signifying the logical operator **'OR'**. In the result the presence of a factor is represented by writing the factor in an uppercase notation **' CAPITAL'** and the absence of a factor is represented by writing the factor in a **'lower case'** notation. Exemplary notational combinations are provided in Table 36. An extract of raw table used for the QCA software is presented in Table 37.

Table 36: Exemplary notational combinations

Tested Factors	Resulting Boolean Notation	Logical Interpretation	Verbal Interpretation
X, Y, Z	X*Z +Z*y	'X' AND 'Z' OR 'Z' AND NOT 'Y'	The combination of factor 'X' and factor 'Z' is sufficient, or Factor 'Z' without factor 'Y' is sufficient.

Table 37: Extract of raw table used for the QCA

Drifted Event Case	Tacit_Mgt_App	Risk_Awae	Amb_rules	Low Monitoring	Inadeq_R_T	Ease_Personal_Conv	Local_decision_flex	Safety Outcome (N=0, NP=1)
C23h	0	0	1	0	0	1	0	1
C22a	0	0	0	0	0	0	0	0
C22b	0	0	0	0	0	0	0	0
C22c	0	0	1	0	0	0	0	0
C22d	0	0	0	0	0	0	0	1
C22e	0	0	1	0	1	0	0	1
C22f	0	0	1	0	0	0	0	1
C21b	1	0	0	0	0	0	0	0
C21c	1	0	0	0	0	0	0	0
C21d	0	0	0	0	0	0	0	0
C21a	0	0	0	0	0	0	0	1
C21e	0	0	0	0	0	0	0	1
C21f	0	0	0	0	0	0	0	1
C20a	0	0	0	0	0	0	0	1
C20d	0	0	0	0	0	0	0	1
C20b	0	0	0	1	0	1	0	1
C20c	0	0	0	1	0	1	0	1
C20e	0	0	0	1	0	1	0	1
C20f	0	0	0	1	0	1	0	1

5.2.1.4.1 Results for the QCA Analysis

The results of the QCA calculations are provided in Table 38. The QCA result of Table 38 represents causal configurations for all the actual drifted events with negative impact on safety set at 0 and neutral / positive impact on safety set at 1. The top part of the table is the 'Truth Table'. Contradictory cases (which form a part of the QCA output) have been removed, leaving 28 rows, with some rows

having multiple cases suiting the results configuration. These multiple cases, represent that these drifted events share similarity in terms of their impact on safety.

The next part of the table represents a list of implications. This part of table indicates the minimum combination of factors that would imply a given outcome

Table 38: QCA Analysis Output: Configuration for impact on safety

Drifted Event Case	Tacit_Mgt_App	Risk_Awae	Amb_rules	Low Monitoring	Inadeq_R_T	Ease_Personal_Conv	Local_decision_flex	Safety Outcome (N=0, NP=1)
C8e, C2e, C2g	0	0	0	0	0	0	1	1
C14c	0	0	0	0	1	0	1	1
C20b, C20c, C20e, C20f	0	0	0	1	0	1	0	1
C23e, C23b, C23c, C23h	0	0	1	0	0	1	0	1
C22e, C16b, C14f	0	0	1	0	1	0	0	1
C23g	0	0	1	0	1	1	0	0
C5c	0	0	1	1	0	1	0	0
C12a	0	0	1	1	1	0	0	1
C8d	0	1	0	0	0	0	1	0
C17b, C17f, C17g	0	1	0	0	1	0	0	0
C15f, C15d, C8b	0	1	0	1	0	0	0	0
C8a	0	1	0	1	0	0	1	1
C16g	0	1	1	0	0	0	0	0
C11d	0	1	1	1	0	1	0	0
C3d	0	1	1	1	1	0	0	0
C2d	1	0	0	0	0	0	1	1
C26a	1	0	0	0	1	0	1	1
C9b	1	0	0	1	0	0	0	1
C4d	1	0	0	1	0	0	1	1
C4a	1	0	0	1	1	0	0	0
C16d, C16e, C14b	1	0	1	0	1	0	0	1
C17h, C16c	1	1	0	0	0	0	0	0
C19f	1	1	0	0	0	1	0	1
C14d	1	1	0	0	1	0	1	0
C18a, C11e	1	1	0	1	0	0	0	0
C14g	1	1	1	0	1	0	0	1
C10a	1	1	1	0	1	1	0	0
C1e	1	1	1	1	0	0	1	0

No.	# Implicants: 19		
1	tacit_mgt_app*RISK_AWAE*AMB_RULES*ease_personal_conv	0	C16g, C3d
2	tacit_mgt_app*RISK_AWAE*INADEQ_R_T	0	C17b, C17f, C17g, C3d
3	TACIT_MGT_APP*RISK_AWAE*amb_rules*inadeq_r_t*ease_personal_conv	0	C17h, C16c, C18a, C11e
4	TACIT_MGT_APP*RISK_AWAE*LOW MONITORING	0	C18a, C11e, C1e
5	TACIT_MGT_APP*RISK_AWAE*LOCAL_DECISION_FLEX	0	C14d, C1e
6	TACIT_MGT_APP*AMB_RULES*LOW MONITORING	0	C1e
7	TACIT_MGT_APP*AMB_RULES*EASE_PERSONAL_CONV	0	C10a
8	TACIT_MGT_APP*LOW MONITORING*INADEQ_R_T	0	C4a
9	RISK_AWAE*AMB_RULES*LOW MONITORING	0	C11d, C3d, C1e
10	RISK_AWAE*low monitoring*LOCAL_DECISION_FLEX	0	C8d, C14d
11	RISK_AWAE*LOW MONITORING*INADEQ_R_T	0	C3d
12	RISK_AWAE*LOW MONITORING*EASE_PERSONAL_CONV	0	C11d
13	RISK_AWAE*LOW MONITORING*local_decision_flex	0	C15f, C15d, C8b, C11d, C3d, C18a, C11e
14	RISK_AWAE*INADEQ_R_T*LOCAL_DECISION_FLEX	0	C14d
15	amb_rules*LOW MONITORING*INADEQ_R_T	0	C4a
16	AMB_RULES*LOW MONITORING*inadeq_r_t	0	C5c, C11d, C1e
17	AMB_RULES*LOW MONITORING*EASE_PERSONAL_CONV	0	C5c, C11d
18	AMB_RULES*LOCAL_DECISION_FLEX	0	C1e
19	INADEQ_R_T*EASE_PERSONAL_CONV	0	C23g, C10a
#Solutions: 2			
tacit_mgt_app*RISK_AWAE*AMB_RULES*ease_personal_conv + tacit_mgt_app*RISK_AWAE*INADEQ_R_T + TACIT_MGT_APP*RISK_AWAE*amb_rules*inadeq_r_t*ease_personal_conv + TACIT_MGT_APP*LOW MONITORING*INADEQ_R_T + RISK_AWAE*low monitoring*LOCAL_DECISION_FLEX + RISK_AWAE*LOW MONITORING*local_decision_flex + AMB_RULES*LOW MONITORING*inadeq_r_t + INADEQ_R_T*EASE_PERSONAL_CONV			
tacit_mgt_app*RISK_AWAE*AMB_RULES*ease_personal_conv + tacit_mgt_app*RISK_AWAE*INADEQ_R_T + TACIT_MGT_APP*RISK_AWAE*amb_rules*inadeq_r_t*ease_personal_conv + RISK_AWAE*low monitoring*LOCAL_DECISION_FLEX + RISK_AWAE*LOW MONITORING*local_decision_flex + amb_rules*LOW MONITORING*INADEQ_R_T + AMB_RULES*LOW MONITORING*inadeq_r_t + INADEQ_R_T*EASE_PERSONAL_CONV			

The second column of implications represent the cases to which these set of factors apply to. For example , the implication number 2 was arrived from a set of case marker; C17b, C17f, C17g, C3d . The resultant configuration for this implication is;

tacit_mgt_app*RISK_AWAE*INADEQ_R_T

This can be interpreted as that this combination of factors *(**tacit_mgt_app** was not there but the factor of **RISK_AWAE** and **INADEQ_R_T** were present)* can be seen as an implicant for an actual incident of negative safety outcome happening due to a drifted action. Here one factor '***tacit_mgt_app'*** is represented in '**LOWER CASE'** indicating that it needs to be absent from the causal combination, while the other two factors are mentioned in a **'UPPER CASE'**, indicating them being necessary conditions for this safety negative outcome.

This outcome is consistent with our understanding of how things happen in an industry. The result indicates that if people performing the routines are confident about their ability to judge the drift associated with their actions, but are not yet fully trained to handle the operations, then despite management being very critical about any drift or violations (such that no tacit approval for such behaviours), there is a high likelihood that drifted behaviours under such combination of factors, will lead to safety negative outcomes.

A drifted event which can be explained using this causal configuration, was disclosed by the respondent of firm C24, working for a Petrochemical production unit. Discussing an event where a new large scale petrochemical cracking unit was set up for production by a very large world leading petrochemical firm, the respondent narrated that it being a very large-scale plant, needed thousands of experienced engineers and operators to run it. However, due to a lack of resource in the job market for that particular technology of production plant, people with sufficient experience in other similar manufacturing units were hired for the job. Over here he explained that each Petrochemical plant is based upon different technologies and manufacturing machineries from different firms who hold a patent for such processes. He further conveyed, that despite having years of experience in one technology, will not ensure your capability to run a plant based on other technology. Discussing the event, the respondent conveyed that since plant was already ready for production, the newly recruited engineers and operators were immediately deployed to run it, without providing them with enough training on this technology. This resulted I some major accidents and casualties.

This is a typical case similar to the implication 2,

tacit_mgt_app*RISK_AWAE*INADEQ_R_T

The firm being a world leading multinational petrochemical manufacturer, had well defined policies around safe operations. Thus, one can conclude that due to the history of the company in operating large scale petrochemical units, there was no tacit managerial approval for any form of drift. Although, the engineers hired to run the plant were not versed with this new production plant and technology, yet they had sufficient experience running similar plants and thus they believed that they were capable to judge the risk, indicating 'Risk Awareness' was there. However, they were not trained for this particular technology of production and were directly employed to run the plant. This resulted in safety negative outcomes.

Table 39: The configuration solutions

Implicants Number	Factor Present	Factor Absent	Configuration part of Solution1 , 2 or both
1	RISK_AWAE*AMB_RULES*	tacit_mgt_app *ease_personal_conv	both
2	RISK_AWAE*INADEQ_R_T	tacit_mgt_app	both
3	TACIT_MGT_APP*RISK_AWAE	amb_rules*inadeq_r_t*ease_personal_conv	both
8	TACIT_MGT_APP*LOW MONITORING*INADEQ_R_T		Solution 1 only
10	RISK_AWAE*LOCAL_DECISION_FLEX	low monitoring	both
13	RISK_AWAE*LOW MONITORING*	local_decision_flex	both
15	LOW MONITORING*INADEQ_R_T	amb_rules*	Solution 2 only
16	AMB_RULES*LOW MONITORING*	inadeq_r_t	both
19	INADEQ_R_T*EASE_PERSONAL_CONV		Solution 1 only

The QCA results reduce the 28 rows of the 'Truth Table' to a total of 19 implications. Now, these 19 prime implications are combined to form two 'Solutions', presented in the last part of the QCA results. These two solutions combine different combinations of implications to produce three sets. Table 39

presents a summary of the two solutions proposed by the analysis. These solutions present multiple combinations of the 19 implicants discovered in the Boolean minimisation process. For the purpose of gaining a better understanding of the implicants, I represent the factors ordered into two columns by factor present and factors absent in an implicant. The table also presents in the last column that if the implicant given in the row was a part of both solution or was in one of the two. These other causal configurations can also be related to multiple drifted events discussed by the respondents.

Part III

What the Study Tells: Discussion, Conclusion and Limitations

6 Discussion

The chapter on results and findings revealed several themes influencing the phenomenon of actions drifting away from prescribed procedures. In this chapter of discussion, I position my findings in the existing literature and draw connections between the two.

To begin with, I further elaborate on the factor model presented in the results chapter. The findings from this model are compared to the existing theory from the rule, routine and safety literature. This is followed by a discussion of key drift-causing factors that are found to be associated with safety negative outcomes. These factors are visually arranged to represent a conceptual model of drift factors connected to safety outcomes. This model uses a colour gradient/heat map approach to categorise these key factors by their impact on safety, being positive, neutral or negative. The chapter ends with a conceptual model depicting configurations of these key factors that may lead to safety negative outcomes. This model draws upon the Boolean minimisation analysis of the key factors from the gradient model and uses QCA terminology to express the configuration of these factors contributing to safety negative outcomes. These three visual representations/models together succeed in answering my research question and sub-questions.

6.1 Factor Model of Drifted Actions

The chapter on findings presented a detailed discussion of factors that help actors define the ‘Fit for purpose’, factors that support the actual act of drift and factors that relate to gaps in motivation, training and process ownership that lead to drifted actions. These factors were empirically ordered to reflect their relative influence on safety using their UV % and ANV scores (Average Normalised Variance score). Figure 34 presents a model depicting these factors.

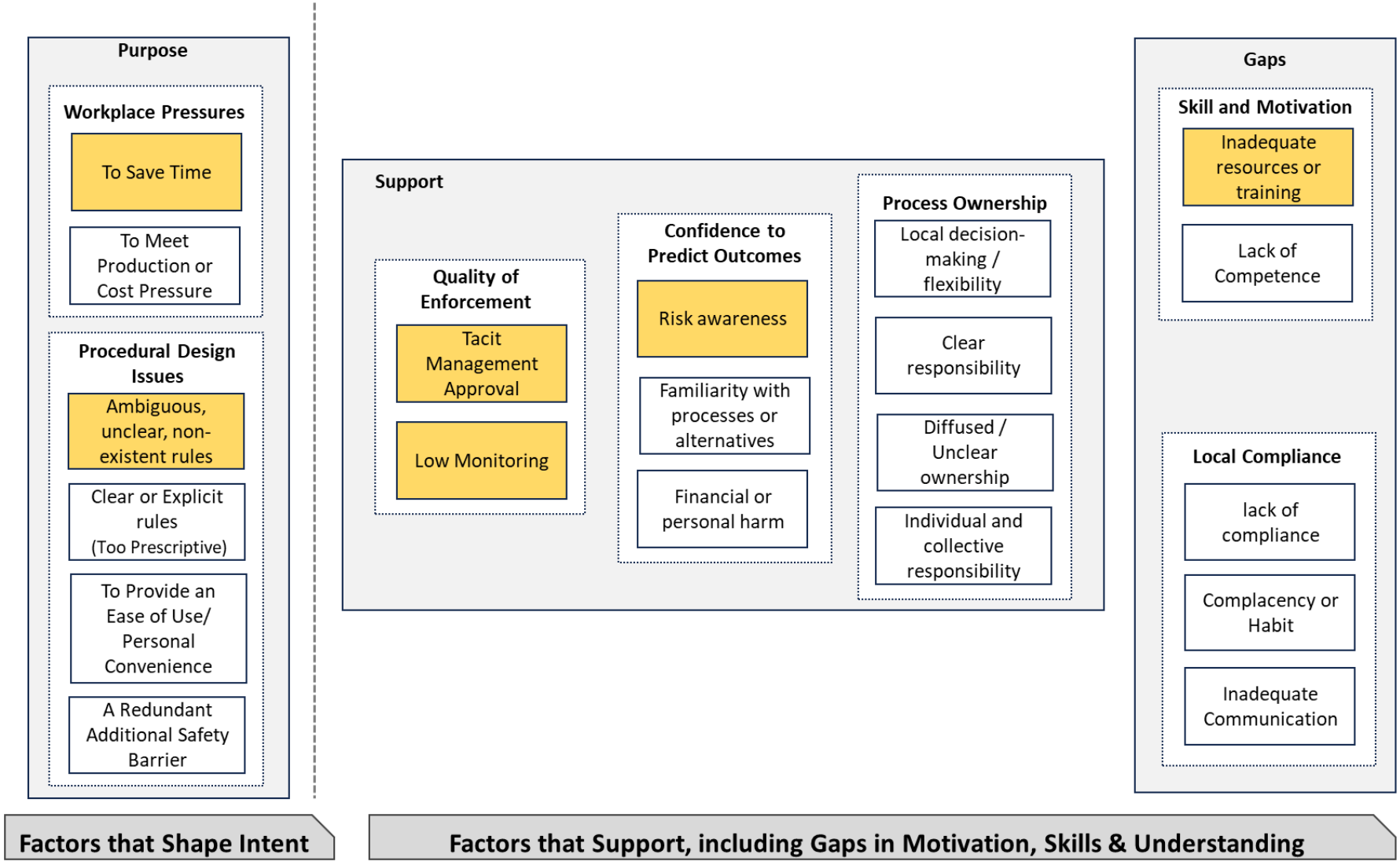

Figure 34: Factors and key factors

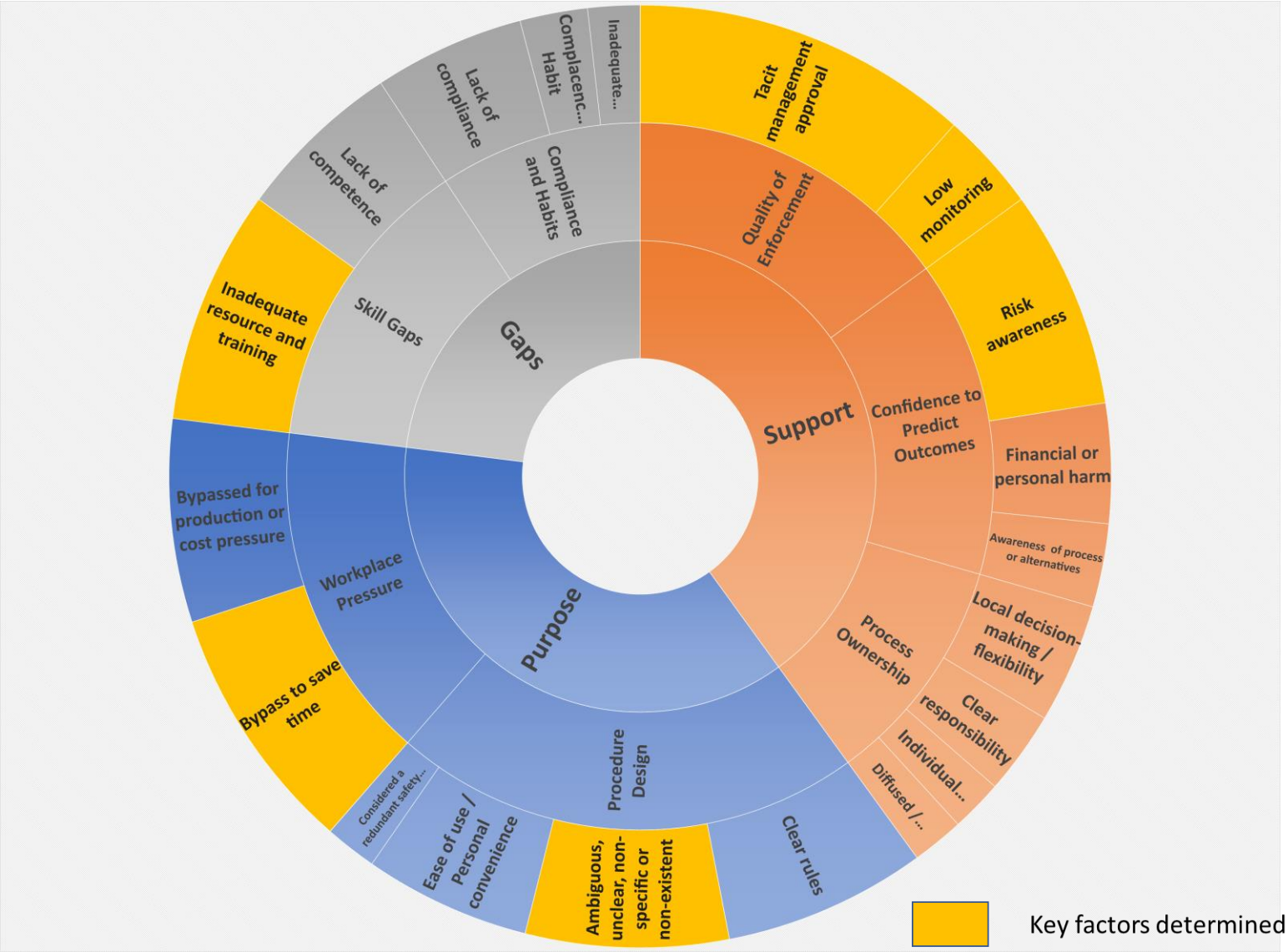

Figure 35: Copy from results: The factors contributing to drifted actions

To account for relative importance of each factor I condense these findings into a conceptual factor model (Figure 35 presents a copy of it from the results chapter). The sunburst model of Figure 35 is a hierarchical representation of the categories, ordered from the root or core category at the centre to the subcategories at the outer circumference of the chart. These charts are also called the radial treemaps where the size/ area under each sections/ arc in each concentric circle represents the weighted contribution of that category.

The results are thematically grouped to reflect two themes that had evolved in my critique of the literature;

(i) Factors that help the 'Fit for purpose' evaluation against a pre-defined organisational goal, and

(ii) Factors that support the actual act of disregarding a procedure.

The set of factors that do not fit the above categorisation are bundled into a third theme of *'Unaddressed Gaps'*. This theme reflects eventualities where actors indulge in drifted action not because it helps solve any organisational problem or achieve any pre-defined organizational goal, instead because they have gaps in understanding or motivation.

(iii) Unaddressed gaps in actor's motivation, process ownership, process understanding and required skills.

In the factor model (Figure 35), the relative importance of constructs is depicted by the size of the arc that the constructs transcribe. The arc of each construct is proportionally represented with respect to its %UV contribution. For example, the construct of Tacit management approval has the highest %UV contribution of 65%, and thus the arc of this construct transcribes the largest angle among all constructs. The three thematic groupings of the constructs; factors that help the 'purpose' evaluation against a pre-defined organisational goal, factors that support the actual act of disregarding a procedure, and factors related to unaddressed gaps, are depicted by blue, orange and grey colours respectively. The dominant set of constructs identified by the ANV analysis are depicted in orange colour. The use of different colours helps differentiate between different

constructs and thematic categories. In addition, the varying size of arcs that are transcribed by these factors helps establish the relative importance of these constructs and thematic categories.

The factor model represents 20 higher-order thematic categories (in the outer arc of the circle) identified by two teams using the qualitative bootstrapping approach. The model further differentiates the Six key categories (depicted by the orange colour of the arc) discovered through statistical analysis using the ANV (Average normalised variance score) approach. Although 14 of the 20 constructs did not turn out to be key constructs, yet, I argue that these 14 constructs are also meaningful for my research and require further discussion.

In the next section, I discuss each set of my higher-order themes and my derived thematic categories. I use this discussion to draw connections between my findings and the existing literature.

6.1.1 Evaluating the Recommended Procedure for its Fit for the Purpose

There is literature that agrees with the argument that a misalignment between purpose and procedure could lead to the alteration of the procedure (Desai, 2010; Levitt and March, 1988; March, 1991a). My findings also suggest that some endogenous routine changes were deliberately introduced because actors perceived these recommended procedures as unfit or impractical to negotiate realistic situations, processes, and operational demands. In these drifts, an underlying purpose drove the organisational actors to consciously disregard the recommended procedures.

The thesis of a purpose-driven change also emerged as a theme of the literature review. Figure 36 presents an adaptation of the literature review findings where themes relevant to ‘Fit for Purpose’ have been highlighted.

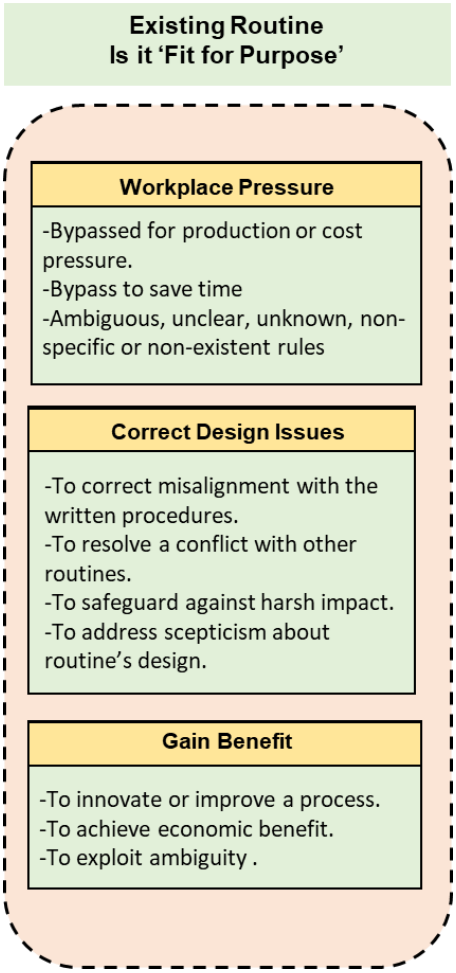

Figure 36: A Copy of Literature Summary of themes on why and how organisational routines change

Some notable mentions of the above, fit-for-purpose thesis, can be found in the organisation routine and safety & accident literature. (Dittrich and Seidl, 2018), from the organisation routine literature, talks about Intentionality and a sense of purpose as important sources of routine change. The authors quote;

"pursuit of a particular purpose—as a key aspect of agency that can explain both stability and change in routines over time" (Dittrich and Seidl, 2018;pp:113)

Snook's (2002) from safety &accident literature also suggests that drifted behaviours are triggered for situations where procedures do not match the practical work demands, such that procedures are not 'Fit' for the intended purpose or desired objective. Snook (2002) quotes;

"when the rules do not match the situation, pragmatic individuals adjust their behaviour accordingly" (Snook, 2002; pp 193)

My theorisation of purpose driven routine change and its subcategories do find support from the literature. However, as I already mentioned in the literature review discussion, the 'Fit for Purpose' thesis is not presented as a focused discussion, rather it finds slanting and tangential mention in some of the existing studies on rule, routine and safety.

In line with the themes that emerged from the literature review, in my findings I further categorise the 'Fit for Purpose' category into two categories (i) Workplace pressure and (ii) Procedural design issues. I will now present a discussion of these categories with regard to existing literature.

6.1.1.1 Workplace pressure

The findings suggest that following the prescribed procedures sometimes made negotiating operational complexities, targets, and workplace pressures difficult. Organisational actors chose to disregard routines for the purpose of; (i) saving time or (ii) managing production or cost pressure.

6.1.1.1.1 Bypass to Save Time

This research revealed that motives to save upon process time were an important determinant of drifted behaviours. It was observed that if bending, changing, or disregarding procedural steps resulted in accomplishing a task in a shorter duration, then actors were likely to drift from the recommended procedures. Actors conveyed that there were situations where following all procedures by the book would unnecessarily waste time. To efficiently negotiate such situations, one would require to drift from the recommended procedures. It is important to note here that these drifts were not driven by any compelling time pressure or a looming deadline; instead, these behaviours were driven by the actor's intent to reduce process time.

The findings highlighted that such actions were often driven by positive intentions and were targeted towards creating value for the organisation. A similar argument in the rule literature has been presented by Dahling et al. (2012). The authors

note that some rules are broken in the interest of the organisation or its stakeholder. Naming it as pro-social rule-breaking, authors argue that these behaviours are,

"motivated by constructive intentions and designed to help the organization" (Dahling et al., 2012; pp:28)

Discussing the factors supporting such behaviours, Dahling et al. (2012) highlight that these behaviours are often driven by the intention to save time and money for the organisation, a behaviour that was also observed for my research, but for routine violations and practical drift. This bending or violation of rules and procedures is seen as an adaption by Maurino (2017). Commenting on the positive aspects of practical drift, authors comment that such variations in procedures could be;

"*more productive, may save time and energy, may be easier, or safer*"

(Maurino, 2017;pp:13)

The sentiments and mood of the participants from my research also resonated with Maurino's (2017) argument. In another rule-bending study, Sekerka and Zolin (2007) found that rule bending was necessary to save time in the majority of the cases investigated by them. My findings empirically corroborate Maurino's (2017) and Sekerka and Zolin (2007) assertions, but for the aspect of practical drift and routine violations.

Change in a routine for the purpose of saving performance time was also cited as a reason in a few organisation routine studies. Bresman (2013) observed change in routines to speed up projects. Time pressure and penalties/costs associated with failure to produce on time were also cited by Aroles and McLean (2016) as a reason to adopt or change a routine.

These results are an essential addition to the existing theory of practical drift as these highlight saving time as an intention to drift. This time saving intention is not driven by a performance shortfall expectation, instead it's an innovative choice to improve the process. This distinction has not yet been argued in the

existing literature of practical drift and thus provides relevance to my findings. These findings highlight that in their evaluation of recommended procedure's fit with the local procedural demands, actors also evaluate the possibility to expedite the actions and save crucial process time. This finding is vital for organisations. By recognising the potential of improving processing times associated with some procedures, organisations can review such processes and incorporate meaningful suggestions of connected stakeholders. By engaging with such drifted practices, organisations might also discover some local time-saving alterations that may be conflicting with global standards. Having found such conflicting actions could make procedure globally optimal from both the safety and efficiency perspective.

6.1.1.1.2 Managing production or cost pressure

Workplace demands put strain and pressure on individuals (Karasek Jr, 1979). The findings of this study revealed evidence of the effect of production pressure on the phenomenon of drift.

My findings reveal that if actors believe that they will encounter a production or performance shortfall by following the recommended procedure or fail to meet time, cost or production targets, they will feel the urge to disregard, skip or alter procedures or skip a few steps. In my data, an unsaid tension to produce and meet organisational expectations was often causing people to bend the rules and procedures. Many participants of this research accepted that the pressure to meet production targets and keep the lines running was often the reason to bend/skip key procedural steps.

Like my findings, the accident and safety literature also acknowledge that that pressure to meet production and cost related objectives drew actors into disregarding recommended procedures. Work of (Betsch et al., 2004; Espin, 2006; Lawton, 1998; Sandfort, 2000; Sekerka and Zolin, 2007; Tummers et al., 2015) Harris and Bromiley,(2007), Kahneman and Tversky, (1979); and March, (1997), Vaughan (1996) , all corroborate that Expectation of performance shortfall could trigger bending or skipping of rules/procedures.

For example, Espin (2006) interviewed surgeons, nurses and anaesthesiologists to conclude that work pressures, time pressures, and conflicting demands trigger a search for alternative procedures. Laurence (2005), in a safety related study of mining industry, found that a reason for drift from the procedure is the pressure exerted by managers, peers and the organisation to increase production. Lehman and Ramanujam (2009) also found that pressure of performance shortfall triggers a disregard of procedures. Veiga, Golden and Dechant (2004), argue that if actors believe that bending or breaking the rule will enhance their performance, then they are likely to do so. Betsch *et al.* (2004), also provide an empirical evidence that time pressure could lead to a routine variation. However, these all relate to one-off violations, and do not relate to routinised actions.

Vaughan (1996) also acknowledges that most organisational actions and behaviours are governed by economic constraints and pressure to meet the schedules. These factors often convolute the behaviours about following procedures. Similar arguments have been presented in the rule and routine literature. For example, the bearing of production pressure on drifted action is also corroborated in the rule following literature. From this domain, Lehman and Ramanujam (2009) observed that the search for an alternative routine is contingent upon the aspirations concerning process performance.

This premise of cost and production pressure also finds semblance with Lawton (1998); Reason (1990) discussion of ‘Optimising violations’. Such violations are undertaken to honour broader set of objectives like handling production pressure, or for improving production efficiency (Hale and Borys, 2013; Hudson et al., 1998).

Production pressure could take many forms. For example, a respondent of my study from a petrochemical-based fertilizer plant (firm C24), revealed that for expediting the plant startup procedures after a shutdown, crucial start-up steps are sometimes omitted, and key process start-up parameters are overlooked. This is like Kirsner and Biddle (2012), who argue that different forms of production pressure can lead to the circumvention of essential procedures. One such example from their study is an anaesthetist who tried to save some time by

skipping some crucial checks on the breathing apparatus. Kirsner and Biddle (2012) suggest that this drift was driven by people's efforts to please management by demonstrating that they are better at saving time and thus consequently saving money for the organisation. The workplace deviance literature also acknowledges the influence of work pressure on drifted practices (Hedgecoe, 2014). Support for the performance pressure argument is evident in the following quote by Jackson and Adams (1979);

"*The tendency for organizational participants to deviate from rules that no longer serve a purpose seems to depend on the amount of pressure to get the job done"* (Jackson and Adams, 1979;pp:272);

The operational pressure observed in my data was focused on meeting short term output, production, cost or time requirements. The support to the thesis of short term performance shortfall leading a change in rule following behaviour can also be found in the work of Lawton (1998). The author argues that often there are situations where the possibility to follow the " work to rule" (Lawton, 1998; pp:88) policy is impractical, and it becomes challenging to dispense a task at hand without breaking the boundaries of the rule. These are occasional violations that Lawton (1998) call situational violations. Reason (1995) also link time pressure to the act of disregarding a prescribed procedure. The literature on organisational routine also acknowledges that situations related to performance shortfall can prompt organisations to search for alternative actions or procedures that may be able to fix the issue of underperformance (Cyert and March, 1963; Greve, 1998).

The findings also corroborate with the general thesis of the routine change literature. Routine change literature accepts that a conflict between the existing routine and the desired organisation objectives prompts the actors to take evasive actions. Routines seen as barriers to achieving the organisational goal will likely be changed or discontinued (Oehler, Stumpf-Wollersheim and Welpe, 2019). If following a recommended procedure resulted in lower efficiency, performance or output, then there is a high likelihood of the routine being either changed or

completely ignored (Aroles and McLean, 2016; Nigam, Huising and Golden, 2016; Turner and Rindova, 2012).

One can conclude that there is evidence in the literature that cost and production pressure or anticipation of production shortfall could trigger a search for alternatives.

Routine literature suggests a few mechanisms that trigger this search for alternative procedures or coerce actors to move away from recommended procedures. Desai (2010) taxonomically categorises these mechanisms as; "*Problemistic search, Slack search or Institutional search*" (Desai, 2010; pp 189). The problematic search mechanisms trigger a search for an alternate action if the decision-makers experience or expect a performance shortfall. The slack search mechanism represents the potentiality in which firms with excess resources may experiment to test newer alternatives (Levitt and March, 1988; March, 1991a). In contrast, 'institutional search' is a routine variation done at a firm level to mimic successful routines of either their counterparts or from the wider sector of their operations.

Although I did not study how workplace pressure translates into a change in procedures, my findings parallel the 'Problemistic search' aspect of procedural change. Similar to the trigger in Problemistic search', my data also demonstrated that an expected shortfall in performance could trigger drifted actions. Dahling et al. (2012) refer to such actions as 'Constructive intentions' (Dahling et al., 2012; pp:22) that are aimed at helping the organisation.

6.1.1.2 Procedural Design Issues

Findings revealed that the actors were inclined to change or abandon a prescribed routine if they considered its design or template flawed, vague, unclear, rigid, or too prescriptive. A similar theme relating to issues with procedural design also emerged in my literature review. The arguments from literature related to aspects of scepticism about the current design and conflict or misalignment with other routines (Berente et al., 2016; Coyte, Emsley and Boyd, 2010; Labatut, Aggeri and Girard, 2012; Nigam, Huising and Golden, 2016).

In my findings, the broad category of design issues leading to a change in routines consists of the following subcategories. (i) the recommended procedure was ambiguous, unclear, unknown, non-specific confusing or non-existent rules; (ii) the procedure was too implicit, rigid and clear that it required local adaption; (iii) the procedure conflicted with ease of use and personal convenience, and (iv) the procedure was considered as an extra safety barrier. Next, I present a discussion of these subcategories.

6.1.1.2.1 Ambiguous, Unclear, Non-specific and Non-existent Rules

The findings from my data highlight the importance of ambiguous, unclear, non-specific and non-existent rules in shaping the phenomenon of drift. If the procedure was unclear, ambiguous or non-specific, then actors deemed it unfit for purpose and opted for apt alternatives. The procedure was considered ambiguous if the actors were unsure about who owned which part of the procedure or were uncertain about which procedure to choose from multiple alternatives.

Organisation rules literature posts that the fundamental purpose of rules or procedures is to achieve predictability and standardisation in actions (Cyert and March, 1963; March and Simon, 1958). By purpose, rules and procedures must be well-designed, clearly understood and well-specified (Ramanujam and Goodman, 2003). However, if they fail on the clarity dimension, they lose their purpose to direct or constrain actions. Martin et al. (2013) quotes,

"rule ambiguity creates the opportunity for organizational actors to ignore the rule" (Martin et al., 2013;pp:553)

If a rule fails to direct actions, then it is considered ineffective. The rule literature posits that a rule's effectiveness is linked to three rule characteristics, "*rule logic, rule consistency and understood rule purposes"* (Borry et al., 2018;pp:370). Suppose a rule is perceived to be ambiguous, unclear or unspecific. In that case, one may conclude that the rule is ineffective and has faltered upon one or more of the above rule characteristics and, thus is susceptible to change.

A similar sentiment was evident from my findings as well. Although my findings related to practical drift, such as a particular kind of routine drift, still they have semblance with the assertions of the rule literature. Many respondents from my research cases expressed that routine templates that are liable to interpretation are often the point of contention and usually a place where drift can set in. If the procedure was either not detailed enough or did not apply to a situation in hand, people are likely to follow a version they consider most appropriate. In such situations, actors often resorted to practical solutions to fill the gaps arising from interpretations. Stiles et al. (2015), from organisation routine literature, observed similar patterns in the HR routines of a firm.

Arguments linking rule clarity and rule effectiveness are also made by Lehman and Ramanujam (2009). The authors define the aspect of procedural ambiguity by the degree of external consensus about a procedure's behavioural requirements. In the absence of consistent understanding about a policy or a procedure liable to multiple interpretations, it should be deemed unclear, ambiguous, or vague (Edelman, 1992; Goodrick and Salancik, 1996). Although, some authors argue that a degree of ambiguity in certain kinds of procedures might be necessary, permitted or even judged to be legitimate (Edelman, 1992). However, ambiguity is mostly deemed a negative condition and is considered to prompt a search for alternatives. Regarding ambiguity, Veiga, Golden and Dechant (2004) quote ;

"company policies that are ambiguous, out-of-date, or simply wrong in the eyes of the manager—can lead to rule bending" (Veiga, Golden and Dechant, 2004;pp:86).

Literature on rule, routine and safety accepted that procedural ambiguity is important for understanding the phenomenon of disregarding a procedure. Findings from my research extend the role of procedural ambiguity to explain why people drift from prescribed procedures, an aspect not discussed within the core literature of practical drift.

6.1.1.2.2 Ease of Use/Personal Convenience

The findings from the data reveal that in some drifted events, the actors commented that the alternate version was easy and more convenient. Ease of use for argument was often associated with events that were judged as non-essential or critical to the organisational working. For example, Ease of use and convenience was cited as a reason for drift in activities that required completing paperwork or filling detailed reports/ timesheets. This construct highlights the procedures that do not relate to actors' core proficiency or job, and if they are not easy or convenient to perform, then the actors are likely to disregard or bend them.

The literature on rule and routines argue that organisational rules, procedures and routines are instruments designed to standardise actions, focus attention, and restrict the search for alternate ways to perform a given organisational task (Borry et al., 2018). Rules and routines provide action scripts, templates and SOPs to accomplish organisational goals easily and efficiently (Schulz, 1998). However, if a recommended procedure fails on ease and efficiency, the organisational actors will be motivated to search for alternative actions (Cyert and March 1963; Greve, 1998, 2003).

Routine literature argues that adaptations and changes in a routine are sometimes necessary to handle dynamic and complex operational requirements. Changes and variations in prescribed procedures may facilitate a degree of ease and convince to effectively dispense the task in hand and fulfil organisational objectives (Aroles and McLean, 2016; Deng and Robinson, 2021; Dittrich, Guérard and Seidl, 2016; Turner and Rindova, 2012). My findings also suggest that a routine's ease and convenience significantly affect people’s perception of a procedure’s fit for purpose.

6.1.1.2.3 Additional Safety Barrier

In a few cases, a very peculiar behaviour related to drift was discovered. This finding relates to additional safety barriers installed by the organisation to prevent accidents. Although cited in a few cases, the peculiarity of the behaviour begs for its discussion as it could significantly impact organisations. Participants of this

research disclosed that there are processes where organisations employ two successive barriers or protection mechanisms to make a system fail-proof. In such scenarios, the secondary safety mechanism is often bypassed. Actors disclosed that secondary safety barriers like additional safety belts or harnesses, precautionary locking or mechanical jamming mechanisms, and mandatory safety signage for isolated electric circuits were not followed with equal vigour as for the primary safety mechanisms. For example, a recommendation to put an additional wheel locking mechanism to the primary recommendation of using hand break while filling oil tankers in petrochemical units (case id C15) was routinely bypassed. One could argue that the presence of two routines fulfilling the same task was seen as redundant, unnecessary or irrelevant. Thus, the secondary routine was ignored.

To the best of my knowledge, there is no known reference to such behaviours in the literature. The only association this behaviour can draw is with Banja 's (2010) suggestion that if there are situations where the rule is perceived to be irrelevant and following them is considered irrational, actors either abandon/disregard the rule or search for alternatives. In my findings, these additional safety barriers were perceived as irrelevant and thus were prone to drift.

In this section, I argued that the initiation of a drifted action is triggered by a procedure's failure to fit the local work demands or purpose. Two quotations from Sekerka and Zolin (2007) and Desai (2010) appropriately summarises people's search for a ' Fit for Purpose'. Commenting upon the failure of a procedure to serve the intended purpose, Sekerka and Zolin (2007) quote;

"Officials bent the rules either to achieve better performance or because the rules were deemed faulty" (Sekerka and Zolin, 2007;pp:228)

While Commenting on organisation's search for alternatives procedures and routines, Desai (2010) quotes

"Rule violations may signal that routines in place at an organisation are no longer appropriate, and hence that routines in the organisation are beginning to drift out of alignment with the environment" (Desai, 2010; pp:189)

Weick, (1998), Miner, Moorman and Bassoff, (2001) and Vera and Crossan, (2005) have also written about the link between drifted actions and the appropriateness of the recommended procedure. All these studies argue that if the existing procedures do not apply to the situations encountered in an organisational setting, individuals are compelled to bypass or alter the procedures.

To summarise the purpose-driven routine change category, it can be said that the theoretical grounding of the purpose-driven change is predominantly found in the rule-following literature. There are also some indirect references to such arguments in some studies of organisation routine literature. However, my research has established its relevance for the type of drift I call practical drift. As found with my data, the categories of purpose extend beyond the existing theorisation of routine and rule literature. The fact that this argument finds a limited discussion in the safety and accident literature makes these findings even more important as the phenomenon of 'Practical drift' defined by Snook (2002) is founded on safety and accident literature. My theorisation of purpose as a factor and its subcategories are very important for this literature.

6.1.2 Factors that Support the Actual Act of Disregarding a Procedure

The findings suggest that there are some accompanying conditions that support the drifting away of actions. A similar theme also emerged in the literature review. Figure 36 presents an adaptation of the literature review findings where themes relevant to 'supporting conditions' have been highlighted.

6.1.2.1 Quality and Consistency of Rule Enforcement

The theory of practical drift abstains from commenting upon factors necessary to successfully replace a rule-based logic with a task-based logic. The findings of this research suggest that although a compelling need to drift is created by a condition of the rule being a misfit with purpose. Yet, some conditions may fit the description of additional contextual accompanying requirements necessary to support the occurrence of drift. Although I did not specifically ask the participants to think of accompanying conditions for drifted actions; still, a set of factors

discovered in this research could be considered as accompanying conditions to drift. Aspects concerning the quality of rule enforcement, factors that shape drifted action choices and factors that invoke trust and confidence in the outcomes of the drifted actions could be argued to represent ongoing or surrounding contextual conditions that influence the onset and perpetuation of drifted actions.

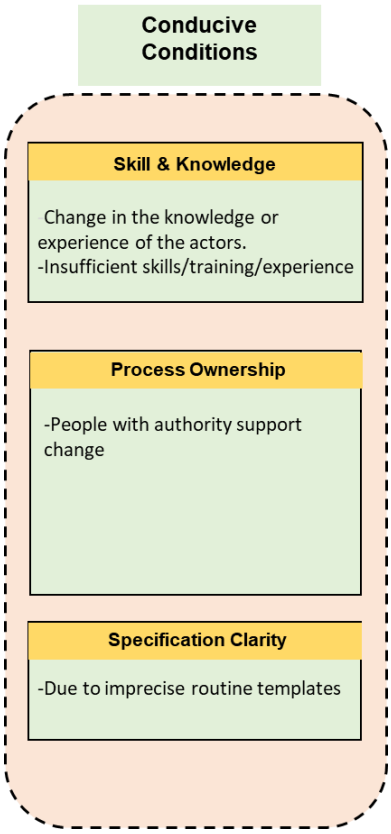

Figure 37: A Copy of Literature Summary of themes on why and how organisational routines change

Literature on organisational rules argues that rule enforcement's quality and consistency can inhibit rule breaking or bending (Borry, 2017; Borry et al., 2018; DeHart-Davis, Chen and Little, 2013; Tyler and Blader, 2005). Factors like monitoring behaviours, encouraging desired behaviour and sanctioning undesired behaviour (Tyler and Blader, 2005). The quality and consistency of rule enforcement captures the effectiveness of organisational processes to deter behavioural variations and the violation of procedures by detecting and sanctioning undesired behaviours. For a drifted action to initiate and then

perpetuate unchallenged, requires contextual conditions where none of the concerned stakeholders or members of the wider organisation flag or scrutinise the drifted actions. The present theory of practical drift does not provide supporting arguments for why and how organisational actors could successfully disregard the original rule.

The findings highlight that disregarding an established SOP would require unofficial managerial/supervisory approval and support for the act. This aspect has not been dealt with in the theory of practical drift. This finding can help explain why a drifted action fails to evoke a managerial response.

The findings of this research highlight that inadequate rule enforcement can subdue organisational response to drifted practices. These findings are consistent with the literature on rule following (Borry et al., 2018), routine violation (Reason, 1995) and the theory of decoupling (Heese, Krishnan and Moers, 2016). Baysari *et al.* (2009) argue that 'Unsafe Supervision', which the author argues constitutes inadequate supervision, supervisors' failure to correct known problems, and supervisory support for planned inappropriate operations, could significantly impact rule-following behaviour. Baysari *et al.* (2009) expand this taxonomy into aspects of inadequate supervision, planned inappropriate operations and the act of failing to address or correct a problem. Reason, Parker and Lawton (1998) view quality and consistency of rule enforcement as 'Administrative controls' designed to control and constrain deviant behaviours. From my findings, I discuss the aspect of inconsistencies in quality and consistency of rule enforcement using two broad categories: (i) Weak Sanctions (ii) Weak Detection.

6.1.2.1.1 Weak Sanctions

The findings from my research revealed that there were instances where management and managers turned a blind eye towards drifted actions or tacitly approved these drifted actions.

Hollinger and Clark (1983) found that the severity of sanctions was a deterrent against deviating from recommended procedures. The authors empirically

concluded that the condition of having weak sanctions for deviant behaviours was a more influential variable than the possibility of detection. The above argument corroborates the findings of my research. In my results, it was discovered that Tacit management approval was a factor in close to 65% of the cases. Tacit management approval for drift is a form of weak sanctions towards drifting from procedures as managers deliberately condone an act of drift.

Weak sanctions could also be viewed as a lack of rule enforcement. The impact of rule enforcement in supporting the possibility of rule-breaking or bending has also been empirically proven by Hannah and Robertson (2015). The authors demonstrate that lack of rule enforcement undermines the authority and legitimacy of the rule and prompts rule bending.

In my research, the aspect of management failing to correct a problem is found to be intentional. Management chooses to condone or turn a blind eye to drifted actions directed towards addressing performance shortfall. My data reveals that this tacit managerial attitude favouring a process variation is an important argument as it is the most rated category of the empirical ANV analysis. This act could support the planned inappropriate operations category defined by Baysari *et al.* (2009) in their unsafe supervision data collection instrument.

6.1.2.1.2 Weak Detection

The findings highlighted that the quality and frequency of procedural monitoring impacted actions, getting drifted away from prescribed procedures. It was found that if the procedural controls were either not strictly monitored or enforced, actors were more susceptible to drift. Most of such drifts were found to be in non-critical procedures such as skipping entry exit access point protocols in facilities, rules around data governance, and procedures related to the bookkeeping of stock register entries. However, in some cases, lax supervision was also found to have corrupted critical procedures—for example, procedures concerning using PPE.

Findings from my research demonstrate that organisational mechanisms of monitoring and detection and managers' commitment to enforcing them are all important factors for initiating and continuing drifted practices. This includes

inadequacy in frequency and quality of monitoring and inadequacy in the capability of the process to pin responsibilities for actions and outcomes. The safety literature has argued the susceptibility of actions to drift under conditions of inappropriate or lax supervision and detection. Reason, Parker and Lawton (1998) advocate that procedures should be backed with appropriate monitoring and sanctions. Routine literature also recognises the impact of detection on triggering routine change. Feldman and Pentland (2003) argue that variations between performative and ostensive dimensions of a routine are impacted by managerial enforcement of procedures and by the quality of monitoring. Lehman and Ramanujam (2009) also argue that the likelihood of violations is impacted by the contextual conditions surrounding the monitoring and detection of procedural disregards. Although inappropriate monitoring in itself is a drifted practice (Ramanujam and Goodman, 2003), yet it furthers the possibility of other drifted behaviours to get installed and continue.

The purpose of monitoring is not realised until the monitoring of actions and detection of deviant behaviours are not appropriately communicated to the right stakeholders (Edelman, 1992; Edelman and Suchman, 1997). In an empirical study on railway accidents, Baysari, McIntosh and Wilson (2008) also provide evidence that the adequacy of monitoring plays a role in the installation of drifted practices. It is important to note that monitoring not only as a process, but also as a management intention could influence employee safe working practices (Rundmo and Hale, 2003). Hale *et al.* (2012) also argued that workplace failures were driven by weaknesses in monitoring and supervision. The authors argued that it was largely due to managers' and organisations' failure to quell or correct unsafe behaviour. Goodman *et al.*, (2011) also argue that mechanisms of monitoring and correcting errors could help identify and correct errors and deviant practices. In an empirical case study, Ramanujam (2003) also observed that change in monitoring had led to an increase in incidents of actions deviating from prescription.

An important observation is that although this theme finds a significant discussion in the safety and the rule-following literature, it is absent from organisational

routine literature. Organisation routine literature is oblivious to this dimension of drift-causing factors.

To summarise, I argue that Tacit management approval for drift is a very important factor as it is highly rated in my empirical analysis. This is a form of weak sanctions towards drifting from procedures as managers deliberately condone an act of drift. By separating detection mechanisms from condoning mechanisms, I can argue that condoning plays a dominant role in perpetuating drifted actions, an argument that corroborates Hollinger and Clark (1983) theme of sanction severity.

6.1.2.2 Confidence to Predict Outcomes

In the previous section, I discussed factors that trigger a search for alternative actions.

Once the triggers and conditions are right for disregarding a recommended procedure, it would now require identifying an action that fits the purpose and does not conflict with other personal and organisational objectives. This will require actors to be confident about their chosen alternate actions. This is an essential step in the process of drifting away from prescribed procedures.

6.1.2.2.1 Risk Awareness and Judgement about Financial or Personal Harm Associated with Drift

Findings from my research indicate that the efficacy of an alternate action could be established if the actors are confident about their ability to predict the range of outcomes expected from undertaking that action. Participant-led discussion about individual cases of drift highlighted that an alternate action choice that posed a low risk of personal harm or financial loss was most likely to be chosen as the alternate procedure. This is evident because the construct of risk awareness is a prominent theme with a very high %UV value of 42%. The theme also has a ANV value greater than the ANV threshold, making it a statistically significant factor. For many cases, actors reported that the drifted procedure had a low financial or personal harm/risk. With actors observing low risk being a common theme for multiple events of drift, it is indicative that there might exist a causal relationship between risk awareness and susceptibility to drift. Before

indulging in an alternate practice, actors tried to assess the risk associated with a chosen alternative. The actors used their understanding of the process to assess the associated risks and then chose the options with justifiable levels of risk. The justification of associated risk was traded off with the necessity to drift from the prescription. Risk assessment was an essential step for justifying the appropriateness of their chosen drifted action. I argue that this assertion of actors about the risk is a self-constructed mechanism to justify their behaviours.

Festinger and colleagues (Festinger, 1954, 1957; Festinger and Carlsmith, 1959) were among the first academicians to establish the relationship between rationality and justification of actions. Actors in organisations rationalise events and outcomes based upon their justification of how such events will either enhance or protect their interests (Staw, McKechnie and Puffer, 1983). It is known that people try to find rational justifications for improper behaviours (Festinger and Carlsmith, 1959; Festinger, 1957; Staw, McKechnie and Puffer, 1983). The findings of my research resonate with this argument of justifying improper behaviour.

The risk assessment argument, which acts as a motivation for disregard of recommendations, as well as the personal convenience argument, have both been cited in the safety and accident literature (English and Branaghan, 2012; Lobb, Harre and Suddendorf, 2001; Saleh et al., 2014; Zeitlin, 1994).

Zeitlin (1994) quotes;

" if a worker places high value on his or her time, convenience, self-image, status among peers, and other factors, and if he or she estimates the probability of being injured by disregarding an instruction as sufficiently low, then it is likely that the instruction will be ignored…" (Zeitlin, 1994; pp 179)

The rational risk justification idea for drifting has also been empirically validated by Williamson *et al.* (1997). The authors provide statistical proof that risk justification was one of the crucial factors that prevented people from safe working. Shapira (2002) also argues that risk perception is an important determinant of behaviours causing drifted actions.

The findings of my research revealed that in most cases, the risk assessment was used as a mechanism to downplay the associated risk with a drifted practice, thus paving the way to enact it. An example of such behaviours was evident in the quotes of the participant of C19, a large-scale petrochemical plant. The interviewee commented about the relaxed attitude towards wearing personal protective equipment (PPE), that;

"performing operation and maintenance activities by not using necessary PPEs …as they presume that they know the risk and it is okay to take chance."

Over here, I would like to caution the readers that if low-risk perception serves as a justification for drift, it does not mean that a converse will be true, such that high-risk perception would deter drifted behaviours. In my data, there were cases where risk awareness was taken as a consideration for drifting, but in situations where the actors perceived it to be a high risk, actors continued with the drift due to other contextual factors. The underlying argument of such cases was that I am aware of the risk, and I have considered them, yet it is necessary to act contrary to the process recommendations.

Reason (1995) names this kind of behaviour as a necessary violation. Actors often view these necessary alterations in the procedures as the only possible pathway to meet procedural demands (Reason, 1995). The act of choosing a risker drifted action seems to be counterintuitive to typical human behaviour. However, the contextual performance pressures and process KPIs (Key performance indicators) compelled actors to act this way. The aspect of management pressure and the tension to comply with it is evident from a quote by a participant from firm C24, a large scale petrochemical fertiliser production unit. Discussing restarting the plant after a scheduled maintenance breakdown, the interviewee discloses;

" You only say, I will try and see how quickly I can manage it. And once you have agreed to try, it means that in place of 12 hours, you will try and start it in 8 hours. And when you do this, you will bypass the SOP on one or the other place. You will do it against something mentioned on the SOP."

Actors conveyed that these risky drifted actions were necessary to meet process or production deadlines. This dimension finds a parallel in the work of Hedgecoe (2013). Commenting upon the trade-off between risk and the practicality of getting the work done, Hedgecoe (2013) quotes that

"everyday culture of a workgroup accommodates and normalises risk as part of the practical effort to get work done". (Hedgecoe, 2013;pp:66)

Proof of Hedgecoe (2013) argument was evident in multiple cases of my research. There were multiple such occasions where organisational actors were compelled to work with more risky drifted actions that could satisfy process needs.

Thus, one could summarise that the perceived risk associated with an action can influence rule-following behaviours (Lehman and Ramanujam, 2009). Organisational actor's perception of the risk associated with different actions results in a variety of behaviours (Beck and Kieser, 2003; March, Schulz and Zhou, 2000; Zhou, 1993). My research posits that it's not only the low-risk perception that entices drifted actions. There are situations where, despite being aware of higher risk, actors choose to pursue a drifted behaviour to meet procedural demands.

However, participants did acknowledge that despite cautious appraisal of associated risk, safety concerns remained relatively high. The participants also agreed that there was substantial risk associated with such actions. These findings corroborate the assertion by Amalberti (2001) and Reason, Parker and Lawton (1998) that drifting of actions from prescribed procedures can result in the erosion of safety margins.

6.1.2.2.2 Awareness/ familiarity with process and alternatives leads to Overt Pragmatism

The findings of my research highlight another critical aspect of drifted actions, which stems from the experience, knowledge and high degree of awareness that actors have about their operations and processes. This aspect was particularly salient in the more complex, technical and challenging operational environment.

It was revealed in the discussions of the drifted events that the experience of people, too much familiarity towards the task and alternate ways of working; all these contributed towards drifting away of actions from prescribed procedures.

Findings highlighted that actor's awareness and familiarity with the process filled them with confidence. The actors believed that their knowledge of complex systems and operations positioned them above others. Elaborating on this argument, participants expressed that their extensive and deep awareness of the operations and connected processes helps them judge the associated risks and the possible cascading effects of their actions on the wider system. This found a particular mention for processes attached to large-scale industrial manufacturing and operations. Respondents conveyed that experienced plant operators and engineers have a critical understanding of operating and controlling large-scale reactors, heat exchangers, turbines, pumps, and distillation columns. These experienced individuals are better at dealing with issues concerning process parameters such as temperature, pressure and chemical reactions. Experiential knowledge about control room issues, error alarms, destabilising system behaviours and many what-if scenarios equip these individuals with the ability to play with the system in a manner that no one else would be able to do. Often their actions are not from standard working procedures, yet they can deliver outcomes. In one such discussion, the respondent from Case C1, an aerospace component manufacturing firm, disclosed that engineers will use their experience and familiarity with the procedures to choose drifted actions over prescribed procedures.

This kind of behaviour has been discussed by Snook (2002). The author links the initiation of practical drift with individuals' experience and knowledge. This experience and knowledge allow individuals to alter procedures to fit the practical task demands. Although Snook (2002) details this aspect of knowledge and experience, the author does not develop the ideas further or compare and contrast them with similar observations from other literature domains.

The role played by knowledge and experience in drifted actions is not limited to the arguments of Snook (2002). It has also been recognized in the safety,

accident, and routine following literature. It has been argued that experience and procedural knowledge are influential in defining decisions and weighing the probability of possible outcomes (Joe, Joe and Boring, 2016). Actors' knowledge, experience and anticipation of obstacles shapes an individual's perceived control over actions and behaviours (Phipps, Beatty and Parker, 2015). The routine literature argues that as actors gain experience, they develop and modify their understanding of the ostensive procedure (the perceived recommended procedure) (Feldman and Pentland, 2003; Rerup and Feldman, 2011). This experientially developed understanding of an ostensive aspect of routines provides actors with the confidence to bend, alter or modify the performative dimension of a routine (Pentland and Feldman, 2008). Routine literature further posits that experience of process or a history of multiple successful repetition/ replication of actions results in the formation of procedural memory (Cohen and Bacdayan, 1994) and habitual behaviour patterns (Ouellette and Wood, 1998). This experience helps actors refine their action repository by assimilating action sequences that produce favourable outcomes, and these actors are highly likely to reproduce these actions (March, 1991a; Pentland, Haerem and Hillison, 2010). Linking this argument with drifted actions, I argue that experienced individuals are more likely to seductively pursue pragmatic alternatives as they have a history of successful replications to bolster their pursuit of pragmaticism.

The practice of overindulgence with task-based logic in itself is problematic. However, the highly contagious nature of this practice makes it more dangerous. The obstinate pursuit of alternate actions by experienced individuals could organically grow over time and is likely to diffuse or get passed on by practice and observation to other fellow workers and alter other procedures. Findings were indicative that peers and juniors observed and learned on the job. This was more prevalent in highly complex and technically challenging settings, where organisational members replicated prevalent practices rather than approaching the work using formal recommendations. Leemann (2011) has also argued that drifted practices are reinforced and diffused through observation. The author posits that organisational actors often turn to their fellow workers for advice rather than checking what the manuals prescribe. This accessibility of instant advice

and the trust in the experience and expertise of fellow workers reinforces the belief in the drifted actions. Within the safety and accident literature, referring to risky habits, Barkan, Zohar and Erev (1998) argue that in most natural settings, the adequacy or appropriateness of a decision is learnt or established based on experience.

Another issue with overreliance/ trust in experience/ knowledge, both of self or peers, is that it could set a dangerous precedent to approach contextually unrelated or disconnected future decisions using the same ideology. Snook (2002) has warned about the potential of such behaviours to permeate rational and well-designed procedures. The author writes;

"the seductive persistence of pragmatic practice loosens the grip of even the most rational and well-designed procedures." (Snook, 2002; pp:193)

Within my findings were examples and situations where such situations occurred. To simplify burdensome and inapplicable rules, actors became more relaxed and flexible while approaching other rules. This potential danger that over pragmatism entails about corrupting procedures that are well designed and do not need any alteration, could be argued to reflect a form of path dependency (Ortmann, 2010). Path dependency of a process signifies a course or trajectory of events or actions to develop in, grow or follow a certain direction or path that is determined by the initial condition of the process (Ortmann, 2010). The existence of a recursive relationship between actions and history, such that the capability of past actions to influence the likelihood of future actions, is fundamental to a path-dependent process (Sydow, Schreyogg and Koch, 2009; Vergne and Durand, 2010) or path creation (Garud, Kumaraswamy and Karnøe, 2010).

The tendency of a drift, initiated in one burdensome or misfit rule, to propagate in the direction of altering other well-designed rules could be argued to be a path-dependent characteristic of drift. Path dependence has been observed in the routine literature. The underlying argument in the literature is that a stable and well-designed procedure, which does not require a pragmatic alteration, is also altered or drifted. Pentland *et al.* (2012) found in an empirical model that historical decisions had a significant bearing on the future trajectories of procedures.

However, due to the lack of temporality of my collected data, I abstain from making this claim that over-pragmaticism could push the system to a dangerous path of drift. However, my data indicated that this eventuality has a strong probability of happening. I would leave this aspect for future researchers to investigate.

6.1.2.2.3 Financial or Personal Harm

Findings indicate a behaviour that seems contrary to the logical response of an individual. In a few cases, the respondents disregarded or ignored the possibility of financial, reputational, or personal harm to meet process objectives. Respondents acknowledged that some of the disregarded procedures could have had severe implications for the company's reputation, and some were potentially a threat to the individual's well-being. Yet, actors continued with a drifted procedure to meet organisational priorities. These actions are focused on the good of the organisation.

Literature on organisation routines does not investigate the harmful or negative cascading effects of decisions. Rule following literature has theorised a counterproductive workplace/ organisational behaviour, where people act for personal gain or for harming the organisation or its stakeholders (Bennett and Robinson, 2000; Robinson and Bennett, 1995). However, this is a conceptual opposite of the observations in my findings.

This behaviour is contrary to a general view that awareness of financial or personal harm would motivate people to follow procedures ardently; the data reveals that other competing organisational requirements supersede this aspect. A continuous choice to expose to a possibility of harm for the betterment of the organisation is a novel phenomenon that, to the best of my knowledge, has no parallel in the organisation science literature.

6.1.2.3 Process Ownership

Most of the respondents across multiple firms accepted the existence of localised practices. Findings suggest that the growth and perpetuation of alternative

processes were contingent upon the aspects of process ownership and the degree of local decision-making flexibility.

Some studies of the routine change literature acknowledge that the process's ownership and authority dimension does impact the decoupling of a routine's performative aspect from its prescribed script or template (Nigam, Huising and Golden, 2016; Vough, Bindl and Parker, 2017). Nigam, Huising and Golden (2016) and Vough, Bindl and Parker (2017) both found that to bring about a desired change in procedures, one will require the support of the people with authority over a given routine.

In some cases, flexible and innovative organisational conditions support the growth of routine variations. This argument finds support in the work of Deng and Robinson (2021) about 'Fluid Organisations'. The authors found that certain organisations support variation and growth of routine diversity to improve performance. Describing them as 'Fluid Organisations', the authors argue that these organisations support operational flexibility and encourage the growth of multiple versions/ diversity of a given routine.

Findings resonate with observations in my data. For example is the black bookcase from firm C1, an aerospace firm, where engineers had developed a handy alternative, a cheat code, or a self-made abridged version of the manual. This 'black book' helped them quickly narrow down the relevant information required for a certain kind of job. This is only possible when the organisation supports flexible approaches and alternatives.

6.1.3 Unaddressed Gaps

In the findings of this research, some instances of drift were linked to a condition of simple ignorance on the part of the actor. This ignorance could result from a skill gap, training gap or even a competency gap in the understanding of the concerned stakeholders. A few events of drift were also found to stem from motivation or process ownership-related aspects of a recommended procedure.

Participants of this research acknowledged that in some cases, if actors had inadequate training or competency, they could suffer from the possibility of

judging the procedure as a misfit and might consider pursuing an alternate version or try to identify an adaption for the process. To make a distinction here, this adaptation is not necessary as it originates from an incomplete understanding of the procedure. In the findings, there were cases where, due to a lack of competency or training in a specific operational environment, manufacturing process or machine, people often adopted alternate actions based upon their past experience from other organisations, industry, process or machinery.

6.1.3.1 Skills and Motivation

6.1.3.1.1 Training Gap

Results highlighted that some events of drift were related to insufficient training. It was evident from the discussions that lack of training, resources or knowledge led to people drifting away from prescribed procedures.

Findings indicated that training-related issues were more prominent when new entrants started work without the mandatory training on procedures, equipment and operations. It was disclosed by the participants of this research that training was not conducted regularly due to a lack of resources, which meant that new recruits were expected to learn on the job and through observation. Discussing such an eventuality, the respondent from firm C14, a manufacturing firm, disclosed that despite the importance of training, the training was often not scheduled on time, and people were inducted into the job with incomplete knowledge.

My research findings suggest that for cases of insufficient training, organisational actors would have no other choice but to approach procedures based upon their knowledge of similar processes from previous job or experience, which might not be contextually applicable, appropriate, or correct. Findings suggest that in the absence of training, new entrants relied either on their experience from other processes or jobs or learnt the procedures through observation. In both situations, the actors ended up developing an alternate version of the recommended procedure. Due to incomplete awareness, skill and knowledge, the performative aspect of the procedure ended up getting decoupled from the ostensive aspect. For example, in firm C17 from the manufacturing sector, the

participant admitted that errors are bound to happen if employees are not completely trained.

The existing organisational science literature views training as a necessary mechanism to standardise actions and to help develop uniform practices (Mody, 2001). Training equips the organisational members with the skills to act on prescribed guidance and dispense procedures correctly and accurately (Baiche, Walliman and Ogden, 2006).

The literature acknowledges that inadequate training or skill could leave actors unfamiliar with the procedure and situational awareness (Chuang et al., 2016); a situation that often results in process variability (Pentland, 2003). Banja (2010) cites inadequate training as a system weakness, a theme that was also evident in my findings.

Training succeeds in familiarising stakeholders with prescribed procedural guidelines and deter unwanted deviation or errors (Lawton, 1998). Lawton (1998) argues that training can help improve stakeholders' knowledge and awareness, thus restricting procedural variations. My research participants also agreed with the above assertion that training reinforces authority of rules and prescribed procedures. The participants further cited that drift from the procedures occurred where either the training didn't exist or was deficient. This is corroborated by the quotes of the participant from firm C14;

"Training is a must, but always necessary training doesn't happen like that before you get to a job there are cases where they don't happen upfront, so before the job".

Lawton (1998) argues that to avoid deviant behaviours, it is required that the content of a rule and the purpose of its existence should be thoroughly established, and training is the way to do so. The author further argues that such training initiatives should be routinely delivered to reinforce the rule logic. Reason, Parker and Lawton (1998) argue that appropriate training is necessary to promote correct procedural performance.

Similar to my findings, Liu and Li (2014) have demonstrated the influences of training in shaping performance of organisational actors. In their empirical study of validating the Standardized Plant Analysis Risk-Human Reliability Method (SPAR-H), Liu and Li (2014) took experience and training as an independent variable and found it to have a moderating role on performance shaping factor; thus validating the thesis that training has a causal influence on performance.

6.1.3.1.2 Competency and Skill Gap

In my findings, competency gaps linked to the execution of procedures were seen as a factor influencing drift. The results of my research emphasised the link between competency and skill gaps and the act of drifting away of actions from prescribed procedures. There were many situations, typically in the complex and highly challenging technical environment of the aerospace and oil and gas sector, where people stuck in a competency trap, continued with it. This trap of competency fuelled the persistence of drifted practices. Commenting upon how people's competency impacts the possibility of drift, the respondent from firm C6, a firm into mining and treatment of ores and minerals, said that in the mining industry, we provide extensive training on the recommended procedures, yet, due to inability or competency of workers to process and follow the imparted knowledge, people act according to the way they judge is appropriate. This leads to drift.

The organisational studies literature has established that training influences skill and competency (Brockmann, Clarke and Winch, 2011; Wodruffe, 1993). Lack of skill and competency triggers a search for alternative ways to execute a procedure. The routine literature acknowledges that when a competency gap is created, it restricts the actor from correcting the existing routines (Espedal, 2006). Levitt and March (1988) called this situation to be a "competency trap," (Levitt and March, 1988; pp: 322-323) in which organisations approach a task in a way they know how to do it and not in a way it should be done. Competency might become a serious threat if the drifted version of incompetent people is diffused through practice (Hansen and Vogel, 2011) and passes its information to others through multiple successful replications (Baum and Singh, 1994). This typically

happens for operational conditions with loose coupling between actions and outcomes (Snook, 2002). Under such operating conditions, the incorrect practice gets legitimised and embedded in the existing repository of procedures. Strengthening this argument, Levitt and March (1988) posit that the absence of unfavourable or negative outcomes from incompetent actions generates positive local feedback. This positive feedback strengthens the localised trust in the practice and limits the possibility of getting out of this competency trap.

6.1.3.2 Compliance

The theme of compliance from my findings relates to aspects of habit, complacency, a general apathy towards compliance and issues concerning inadequacy of communication. These dimensions have been addressed and discussed within the rule-following literature.

6.1.3.2.1 Lack of Compliance

There is significant literature around Non-compliance, an umbrella term that includes a range of stakeholder behaviours such as bending the rules, not honouring the rule's spirit, and completely disregarding rules (DeHart-Davis, 2009). The literature suggests multiple explanations for non-compliance; such as pressure to perform (Sandfort, 2000; Sekerka and Zolin, 2007; Tummers et al., 2015), prevailing organisational culture (Borry, 2017; Pandey and Moynihan, 2006), individual personality (Bozeman and Rainey, 1998; DeHart-Davis, 2007) or effect of benefits in following rules (Battmann and Klumb, 1993).

In my study of drifted actions, I did not investigate the dimension of individual traits or social traits like prevailing culture. Neither was I looking for why people show a lack of compliance. My findings just unpacked the fact that a routine change was also associated with a conscious lack of compliance. A finding that has relevance as my unit of analysis was routinised actions and such observations are absent from the organisation's routine literature.

6.1.3.2.2 Communication

Another theme within this categorisation was communication. (Jackson and Adams, 1979) had argued that inappropriate communication impacts rule-

following. Here also, there is a general absenteeism of the dimension from the routine literature. However, the routine literature presents an antithesis of the rule literature's communication argument. Where rule-following suggests that inadequate communication will impact rule adherence, Turner and Rindova (2012) from organisational routine literature, argue that routine changes through conversation and communication.

Thus, having access or too little communication are both contributing towards the change of a routine. The rule nonadherence refers to the eventuality in a negative light while the routine literature views it as a positive change or outcome. This is an important observation. I propose that the communication, conversation, and dialogue are aspects that may need further investigation to assess their role in bringing about a positive/negative change in routine.

6.1.3.2.3 Complacency or Habit

The third dimension of compliance category is Habit.

My research identified 'local practice being followed' as an important theme on drifting away of actions from the prescribed procedure. The findings indicate that drifted practices had continued because the actors viewed them as safe and the best fit for handling operational expectations. The actor's trust in these alternate procedures was built on a history of successful replication. Many drifted practices had gained legitimacy and acceptance as a fit candidate to replace the recommended procedures.

The literature also indicates such eventualities. It has been argued that in the absence of immediate untoward incident or unfavourable outcome, the drifted local practice is deemed safe and the operational situation is believed to be under control (Starbuck, William H and Milliken, 1988). Every little departure from the defined procedure contributes to organisational members getting used to it or normalised (Dekker, 2011). As actors build up a memory of multiple successful replications, the drift, with time, gets institutionalised in the system of the organisation (Ashforth and Anand, 2003) and people get accustomed to the deviated practice. The literature on normalisation (Vaughan, 1999) suggests that

drifted acts are ingrained in the existing procedure of the organisation. These alternate versions succeed in replacing and deleting the prescribed version from people's procedural memory, and this aberration gets accepted as a legitimate procedure (Bromley and Powell, 2012).

The findings of my research provide clear evidence that the local version of procedures existed as unwritten norms, and such norms were neither questioned nor flagged. In multiple cases of drift discussed by my research participants, the respondents expressed no remorse or concern for not following the recommended procedure. Neither did the participant express any concern about or question the appropriateness of a drifted practice. They were normalised for the aberration.

Literature also indicates that as operational practices drift towards pragmatic and acceptable day-to-day, fit for purpose, alternate actions, and locally developed alternate procedures will emerge (Johnston, 2003). With time, organisational members become insensitive towards these locally developed deviant practices and do not consider them worth correcting (Price and Williams, 2018). As these variations do not return any immediate untoward outcome, the actions are thus routinised, and deviations are accepted as normal (Ramanujam and Goodman, 2003).

My research findings indicate that organisational members get normalised to local practices. Some typical examples from my data about local practices being installed and regularised are respondent from firm C1, Aerospace firm quotes;

"we will create local instructions and say we will put our name against it and say technically there is no problem in deviating by doing these."

Another participant from firm C14, a world-leading engineering and manufacturing corporation, talks about the firm's resistance while trying to replace a localised legacy version of a process. Commenting on the issue, respondent quoted;

"it is practised. It is Legacy what they have been doing so far. They still prefer to do it in the same way even though there is a new procedure."

To build the discussion around the local practice being followed in the firms, the literature on normalisation alone will be of limited value unless combined with the literature on habitual routines. The routine literature has evolved from the social customs and habits of individuals and groups (March & Simon, 1958; Stene, 1940). The literature has identified that habitual patterns of drifted routines (Ouellette and Wood, 1998) are included in the actors' behavioural repertoire (Becker, 2004; Reynaud, 2005). Due to the habitual following of drifted actions, the task is carried out without applying any explicit attention to it. Such drifted habitual routines are said to be self-sustaining (Gersick and Hackman, 1990). This research supports the idea of these previous research contributions.

My research findings extended the notion of normalisation and habitual deviance by bridging it with the alternate actions of the actors. When the recommended actions did not fit for the purpose, organisational actors converged to deviant alternative procedures. Over time, and after multiple replications, this local decision-making gets embedded in the individuals' procedural memory, and these routines become the normal feature of the process.

6.2 Safety Outcomes and Drift

The analysis for safety-related outcomes of drift revealed three key findings: (i) a list of ‘Eight’ dominant drift-causing factors that were influencing the safety-related outcomes, (ii) a categorisation of these eight factors by their impact on safety being positive, neutral or negative, and (iii) causal configuration of factors that led to safety negative outcomes. I present a brief recap of these safety-related findings.

6.2.1 Recap of Safety and Drift Findings

6.2.1.1 Dominant Drift Causing Factors Influencing the Safety-Related Outcomes

Eight drift-causing factors were found to be dominant in producing safety-related outcomes. These were; (i) Risk Awareness, (ii) Local decision making /flexibility, (iii) Inadequate resource and training, (iv) Low Monitoring, (v) Ease of use/Personal convenience, (vi) Tacit Management Approval and (vii) Ambiguous,

unclear, unknown, non-specific or non-existent rules and (viii) Bypass to save time(refer to Table 40).

Table 40: Result of quantitative statistical analysis to find corelation between various safety outcomes and drift causing factors

Categories	All		Safety Positive		Safety Neutral		Safety Negative	
	UV	%UV	ANV	KEY	ANV	KEY	ANV	KEY
Tacit Management Approval	20	65%	10	Y	13	Y	12	Y
Bypass to save time	15	48%	19	Y	13	Y		
Inadequate resource and training	14	45%			8	Y	8	Y
Risk awareness	13	42%					8	Y
Ambiguous, unclear, unknown, non-specific or non-existent rules	12	39%	10	Y	9	Y	8	Y
Ease of use/ Personal convenience	10	32%	11	Y			9	Y
Local decision-making / flexibility	7	23%					8	Y
Low Monitoring	6	19%			9	Y	9	Y

The results from this analysis of key drift factors ranked for their impact on safety presents the following insights.

(i) Two factors; *'Risk Awareness'* and *'Local decision making /flexibility'* were judged by the respondents to be connected with only the safety negative outcomes.

(ii) Two factors; *'Inadequate resource and training'* and *'Low Monitoring'* were considered by the respondents as factors that never lead to safety positive outcomes. However, drift instigated by these factors might be neutral to safety at times.

(iii) The drift caused by the factor *'Ease of use/Personal convenience'* was seen as both, to either improve or decrease safety.

(iv) Factors *'Tacit Management Approval'* and '*Ambiguous, unclear, unknown, non-specific or non-existent rules'* were universally linked to all sort of outcomes ranging from positive, neutral to negative safety outcomes.

(v) The factor *'Bypass to save time'* was seen by respondent as a very positive safety outcome factor. In the view of participants, drifts driven by such factor were either neutral or positive to safety.

The results are indicative that '*Save time'* option was predominantly exercised if the outcome is either safety positive or neutral. While '*Risk Awareness'* , *'Local decision making /flexibility', Inadequate resource and training'* and *'Low Monitoring'* were factors that the organizations should be concern about as when these factors are found to be linked to drifts then the drift has more potency to return safety negative outcomes. This is a very important result from an organisational perspective. These findings can be visually represented using a venn diagram (Figure 38).

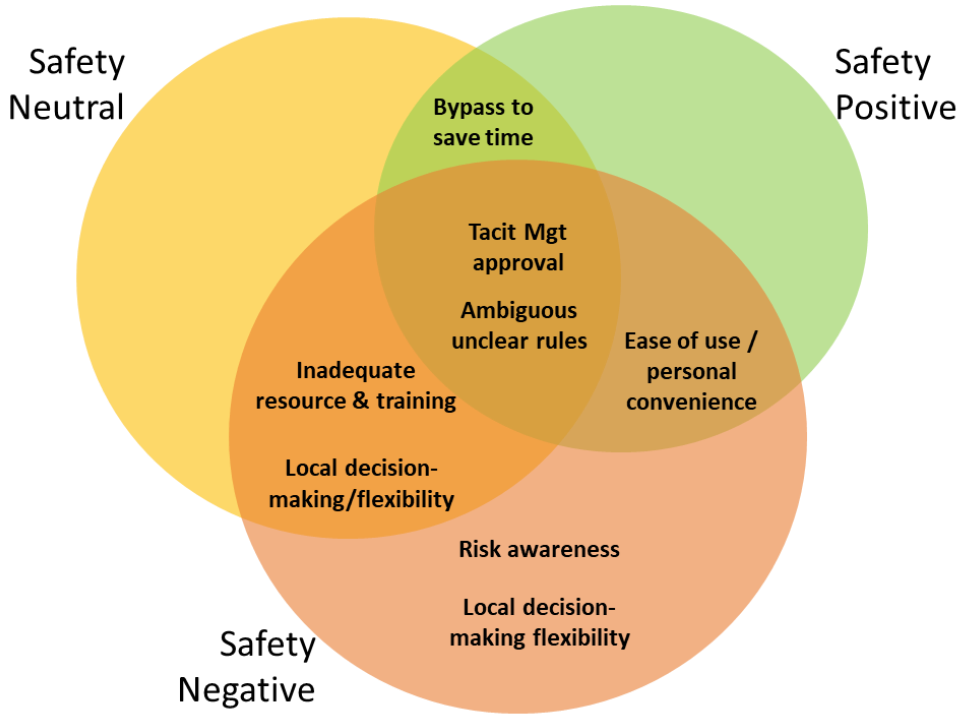

Figure 38: A venn diagram based representation of safety outcomes and categories that relate to them

In the venn diagram, I used the theme red, amber, and green to represent Negative, neutral and positive safety outcomes respectively. I further use the same colour coding to convert these findings into a conceptual model of colour gradient map (Figure 39).

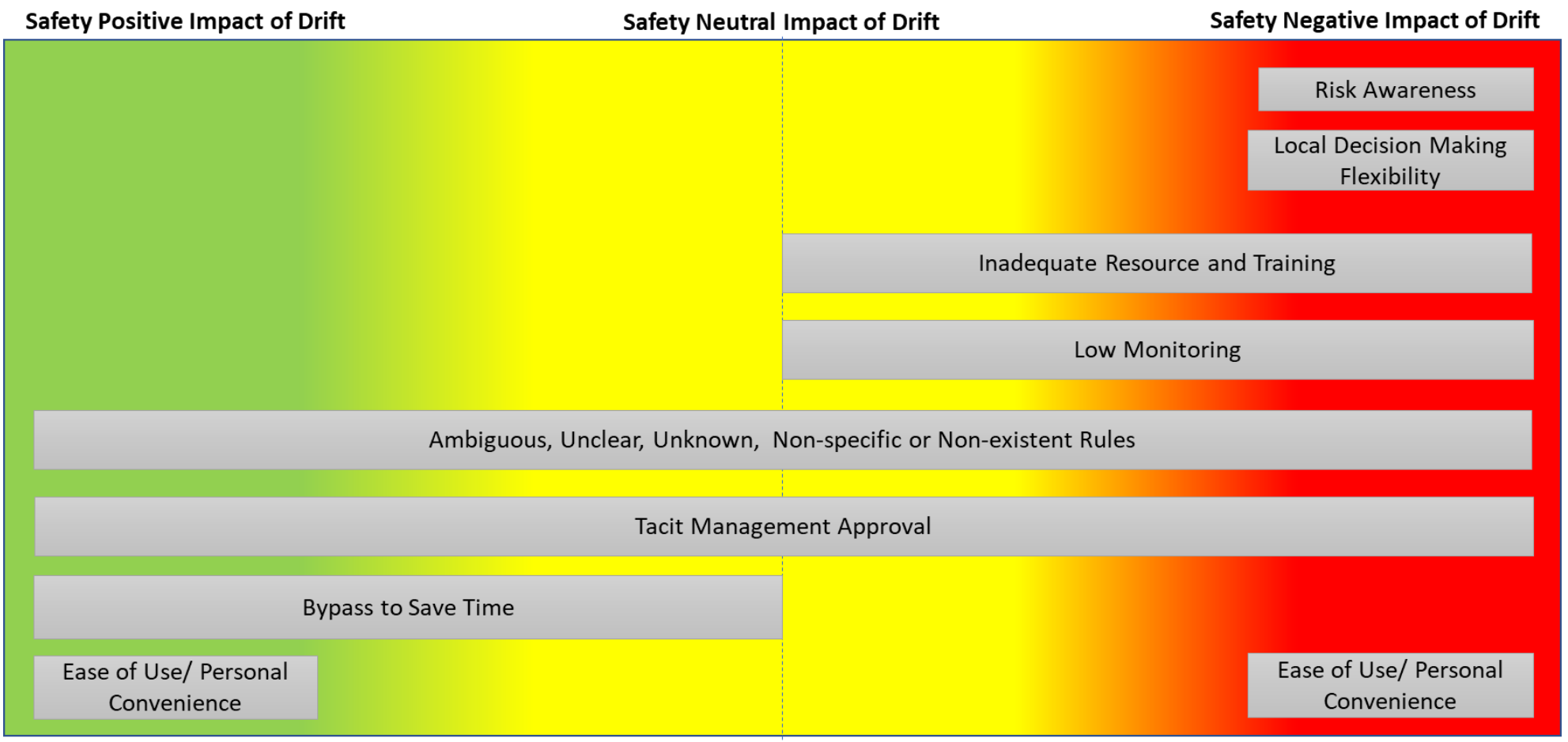

Figure 39: Gradient Model of dominant drift causing factors that influence safety related outcomes.

With a use of green, yellow and red gradient, I represent the continuum from safety positive impact of drift (represented by a Green colour) to safety negative impact of drift (represented by a Red colour), through safety neutral impact of drift (represented by a Yellow colour).

The colour gradient map of figure 39, visually represents the range of safety outcomes delivered by a given drift causing factor. For example, factors 'Risk awareness' and 'Local decision making flexibility' are on the red zone of the colour gradient, representing that these two factors were statistically found to be only linked to safety negative outcomes. While, factors 'Inadequate resource and training' and 'Low monitoring' extend from the centre of the yellow gradient to the red zone, indicating these factors were linked to safety neutral and safety negative outcomes. The factors 'Ambiguous, unclear rules' and 'Tacit management approval', extend from the green to the red zone, indicating that these two factors were found to be linked to a range of safety outcomes from safety positive to safety negative.

The findings from my research reveal that drifts related to the factor of risk awareness and local decision flexibility were likely to be routinely drifted, and they had a higher potential for promoting unsafe practices and safety related issues.

6.2.1.2 Ambiguous and Unclear Rules and Tacit Management Approval: The Full Spectrum of Outcomes

My findings further reveal that drifts caused by factors ambiguous and unclear rules and tacit management approval are related to a full spectrum of safety outcomes. In some cases, respondents saw them as negative or neutral to safety, while in some others, they were found to have a degree of positive impact on safety. This is indicative that risk outcome for drifts related to such factors is unpredictable and thus a cause of concern for organisations.

This observed association of "ambiguous, Unclear rules" and "tacit management approval" with a range of safety outcomes is at odds with safety and accident literature and the rule-following literature. It is widely argued in this literature that tacit management approval or ambiguous rules would lead to a greater likelihood

of negative outcomes. However, I would like to draw on the routine literature to argue this factor's safety positive aspects.

6.2.1.2.1 The Safety Negative Aspect of Tacit Management Approval and Ambiguous/ Unclear Rules

Literature on accidents and safety recognises the dangers associated with ambiguous rules. It has been empirically reasoned that such ambiguous rules could potentially lead to the regularisation of localised alternatives/ practices as legitimate routines and have the potential to negatively impact safety (Ashforth and Anand, 2003; Vaughan, 1996). Ambiguity about rules, deviations and potential consequences of deviation, could also have an impact on safety performance (Tamuz and Thomas, 2006).

Here, discussing the dimensions of ambiguity and tacit management approval will be worthwhile, as proposed in the safety and accident and rule-following literature.

Ambiguous Cues by Management

Ambiguity is not restricted to the rule per se. The construct is argued to extend deeper into all accompanying aspects of organisational deliverables and objectives that make understanding the recommended procedure unclear or ambiguous.

Richter and Koch (2004) point out that ambiguous cues from the management could result in the ambiguity of intentions. The authors argue that if the management is simultaneously stressing two conflicting dimensions; first increasing production and reducing wastage in one context, and second emphasising on maintaining safety-related performance indicators, then the actors will be confused about which objective to pursue. This ambiguity and lack of clarity may lead to safety negative outcomes.

The findings of my research also indicate ambiguities surrounding output, efficiency, and performance trade-offs may lead to drift. Participant chose alternative actions that prioritized objectives that they felt were more salient in a given situation, rather than acting as per the recommended procedure.

Organisation's approach towards managing risk

Tacit approval to rule following, bending or breaking has been argued to be linked to the organisation's approach towards managing risk. Lehman and Ramanujam (2009) argue that organisations search for alternative procedures reflects the organisation's approach towards managing risk. Some organisations will be more flexible towards adopting alternate procedures and thus will be poor in managing risk. The authors explain this poor risk management eventuality by highlighting that search for drifted actions tend to make organisations more tolerant to risk, a situation that elevates the threat of accidents and safety compromising events.

Elevated Risk Tolerance and Loose coupling of Outcomes

Growth of alternatives actions and variations in routines will continue unabated if one cannot establish a direct link between negative consequences and alternate procedures Lehman and Ramanujam (2009). However, if one can establish a link between a negative outcome and a change in the performative aspect of routine, then it will force the management to rethink about approving such behaviours. The possibility to be able to establish or not establish a link between an action and its related consequences is dependent upon aspect of coupling. In a loosely coupled environment outcomes of actions are not tied together or are loosely associated with each other (Beekun and Glick, 2001). While the converse happens in a tightly coupled environment.

Lehman and Ramanujam (2009) argue that increased risk tolerance may flourish in loosely coupled organisational situations. This is because, a tacit management approval to safety negative alternate actions will not be corrected or flagged as the action and its outcome are loosely coupled or exhibit a lag with the time (Beekun and Glick, 2001). This situation creates unknown and unpredictable conditions for acts of violations. In such loosely coupled situations, the impact on the safety of these local alternate routines is hard to judge or establish (Snook, 2002). This lag in action and outcome poses a greater risk which is that these locally adopted alternate practices, with possible risk potential, may gain legitimacy and approval of the actors and that they may get regularised.

Commenting on the loose coupling of actions and outcomes; Lehman and Ramanujam (2009) quotes;

“ actors initiating a violation may remain unaware of the outcomes, and actors experiencing the outcomes may remain unaware of the violation ” (Lehman and Ramanujam, 2009; pp 648).

Unaware of the domino impact of their drifted behaviours, actors continue altering procedures to meet procedural demands of time, cost, or output. These drifted actions do not immediately produce an unfavourable or adverse outcome (Ramanujam and Goodman, 2003) but could lead to a serious safety compromising event in the future.

The eventuality is further worsened by the fact that the organisation routine literature considers all routines to have a degree of stickiness and inertial tendencies (Feldman and Pentland, 2003). Thus, due to this inertial tendency, there is a high likelihood for an alternate action to be locally adopted, regularised and continued unchallenged. This stickiness could prevail even when the situations become unambiguous and clear. The stickiness of drifted counterparts of ambiguous or unclear procedures and of routine drifts that have a tacit management approval are a matter of concern and a safety threat.

6.2.1.2.2 The Safety Neutral and Positive Aspect of Tacit Management Approval and Ambiguous/ Unclear Rules

Routine literature argues that if organisations recognise that a change in routine is necessary for improvement, they will seek an opportunity to innovate and improve the existing routine/s (Aroles and McLean, 2016; Bresman, 2013; Deslée and Ammar, 2016).

This is often a structured routine evolution process that has management support and backing (Deslée and Ammar, 2016). These behaviours are both encouraged and rewarded. Deken et al. (2016) observed that such tacit management backing persuades actors to "intentionally strive for novelty" (Deken et al., 2016;pp:659).

It is important to note here that such kind of innovation-driven structured routine reconfiguration, evolution and change are often associated with positive outcomes (Chen, Guo and Zhao, 2021). These positive outcomes can be for both performance and safety-related outcomes.

6.2.1.3 Bureaucratic Dimension of Drifted Actions

The prevailing bureaucratic culture of the organisation has a defining influence on aspects of compliance/noncompliance with organisational rules (Adler, 2012; Elliott and Smith, 2006; Gouldner, 1954; Hynes and Prasad, 1997). The bureaucratic approach adopted by authorities and the resulting social, behavioural and cultural readjustments by workers could be used to explain actions causing drift or variations in organisation routines (Adler, 2012; Elliott and Smith, 2006; Gouldner, 1954; Hynes and Prasad, 1997).

Although, in my research, I did not focus on social, behavioural and cultural readjustments originating from the prevailing bureaucratic regime, yet participants of my research did highlight a few arguments connecting routine following behaviours and bureaucracy. In hindsight, I can draw a connection between a few of my research observations and Gouldner's (1954) classical study in gypsum mines about the collapse of rule-following behaviour.

Gouldner (1954) conducted an empirical study to establish the role of authority and bureaucracy in determining work patterns and behaviours. By dissecting, modifying and redirecting Weber's (1922) conceptualisation of institutional bureaucracy, Gouldner (1954) theorised the supple relationship between agency and work-related / rule-following activity. In line with Gouldner's (1954) argument, the decoupling of actions from procedures in my themes (i) Tacit Management Approval, (ii) Low Monitoring, (iii) Clear Explicit Rules, (iv) Local Decision flexibility, and (v) Lack of Compliance; could be discussed using aspects of authority and bureaucracy.

I draw upon Gouldner's (1954) taxonomy and use patterns, (i) Indulgence pattern and (ii) Mock Bureaucracy to argue aspects of drifted routines and bureaucratic arrangements that help flourish drifted patterns.

The "indulgence pattern."

Gouldner (1954) discusses a social order and the characteristics of interactions between the workers and the authorities from a time when bureaucratic arrangements were non-existent. Labelling it as an 'indulgence pattern', Gouldner (1954) observed that in this phase management took a flexible and lenient approach towards enforcing rules. This situation is where management

disregards breaking or bending the rules (Elliott and Smith, 2006; Hallett and Ventresca, 2006).

My theme 'Tacit Management Approval' can be argued to be a phase of an 'indulgence pattern'. Consciously introduced routine variations relating to this theme are supported by a generalised apathy of the authorities towards hierarchical rule enforcement and by a widespread managerial leniency towards rule noncompliance. This management behaviour parallels Gouldner's (1954) description of the management style in the gypsum mines from the incumbent manager 'Old Dough's ' era. Gouldner (1954) describes the indulgence pattern of the manager, Old Doug, in the following lines;

"never came around much; 'ran the plant by phone'; gave the workers free (gypsum) board; related to everyone in a friendly and personal way; did not push men for their absences" (Gouldner, 1954;pp:82).

Respondents from my research also discussed managerial and supervisory arrangements that supported consciously adopted variations in the prescribed procedures. Although most of the drifted routine patterns discussed by my respondents were introduced for the organisation's betterment, they were only possible because of a bureaucratic structure resembling an 'indulgence pattern'.

Mock Bureaucracy

Mock Bureaucracy arises when authorities make a bureaucratic push to enforce rules and worker's resist it as they intend to continue with their indulgence patterns (Elliott and Smith, 2006). As a compromise the workers and authorities reach to a loosely coupled arrangement " *where the workers let the management save face and have their rules as long as they looked the other way as the workers went about their daily lives"*(Hallett and Ventresca, 2006;pp:918).

My themes of 'Low Monitoring' and 'Local Decision flexibility' could be argued to be representing aspects of 'Mock Bureaucracy'. The rules exist but are not monitored, workers exercise flexibility and the management turns a blind eye to such a behaviour.

Gouldner's (1954) ethnographic case study exposed work patterns that followed a sequence of changes from pre-arrival bureaucracy to post-arrival bureaucracy. However, I investigated 31 cases and 197 actions decoupled from prescribed

procedures. Thus, the patterns discovered in my findings cannot be ordered in a temporal sequence as each organisation of my study can be argued to be at different stages of its bureaucratic evolution, and the cases discussed by the respondents relate to varying times in the past.

Another important distinction between the patterns observed in my study and the patterns discussed by Gouldner (1954) is that my respondents discussed patterns that were intrinsically aimed at improving the organisation's effectiveness. However, this is not the case with Gouldner's (1954) patterns.

Safety and accident literature sides with Gouldner's (1954) view that conflict between authority and workers often lead to negative outcomes for rule following behaviours. However, I beg to differ with this common belief and would like to draw upon the study of (Elliott and Smith, 2006) to explain my observations. Based upon their study of safety regulations in football clubs, the authors, (Elliott and Smith, 2006) make an important assertion that cultural adjustments regarding rule-following are often influenced by "Organizational values, the institutional mindset and patterns of regulation" (Elliott and Smith, 2006;pp:314). In line with the argument, my research also confirms that driven by an organisational value and institutional mindset to do good, these organisational actors indulged in drifted actions.

6.2.2 Answering How drift leads to safety negative outcomes: Factor Configurations Model

The findings of this research identified a set of factor configurations that can explain safety negative outcomes associated with drifted actions. These findings have run the first step to identify which combination of factors appear to be present or absent in the safety negative outcome. To the best of my knowledge, the current literature on safety and drift does not have any study that presents a factor configuration linking drift and safety negative outcomes. This study paves the pathway for future studies to establish causal relationships among the configuration of constructs discovered by my research.

I use the findings from Table 38 and Table 39 to propose a conceptual model (Figure 40) of factor configurations associated with safety negative outcomes.

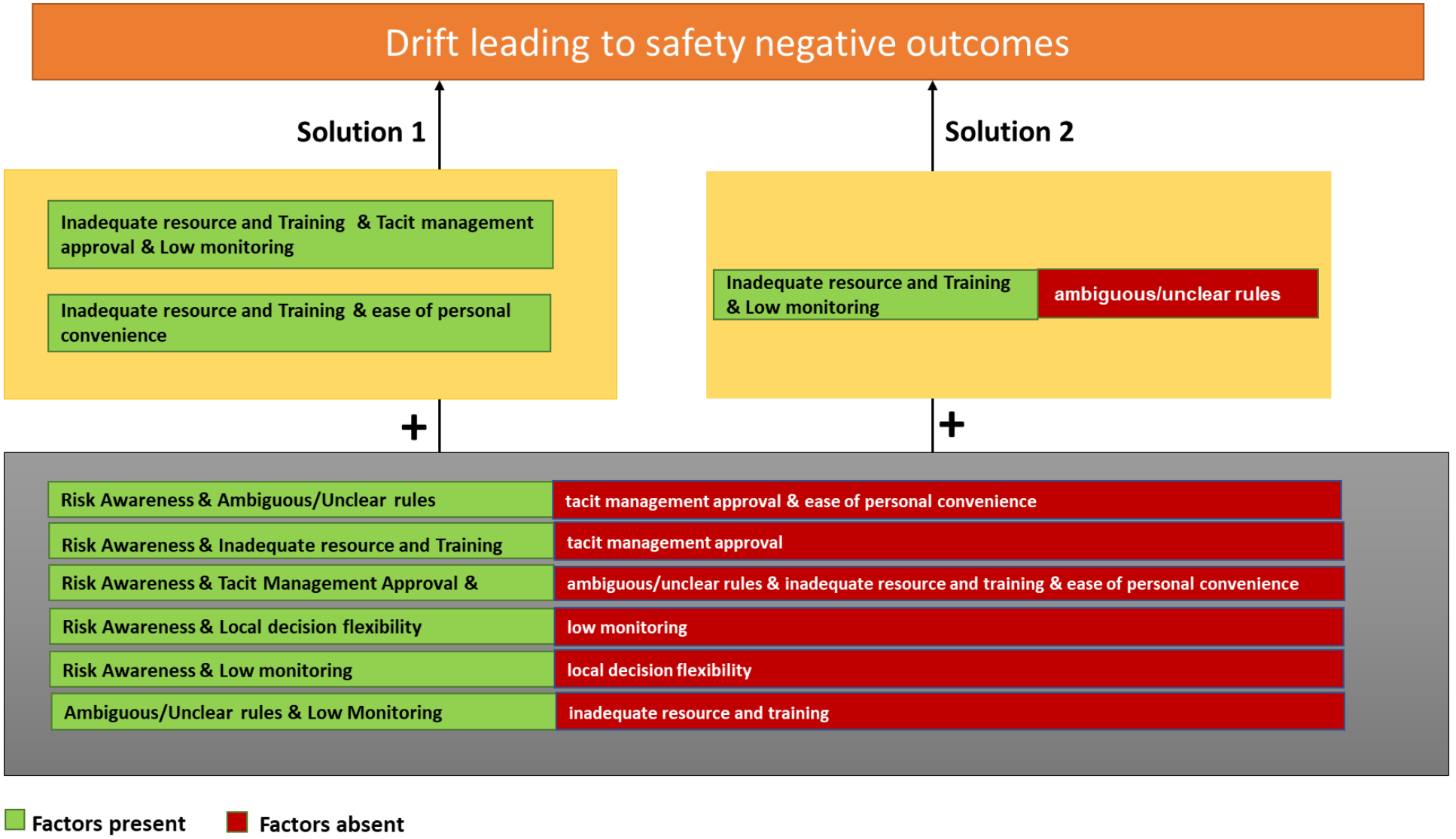

Figure 40: Factor Configurations of Safety Negative Outcomes: A Conceptual Model

6.2.2.1 Factor Configurations of Safety Negative Outcomes: A Conceptual Model

The Boolean minimisation approach for detecting factor configurations leading to safety

The common factor combinations will be discussed first followed by a discussion of combinations unique to each solution. Among the factors that constitute the common solutions, the presence of Risk Awareness as a factor is noted in five of the six solutions. Its presence has been noted along with; (i) INADEQUATE RESOURCE AND TRAINING, (ii) TACIT MANAGEMENT APPROVAL, (iii) LOCAL DECISION MAKING FLEXIBILITY, (iv) LOW MONITORING.

Over here, I confirm to the nomenclature of depicting configurations, as suggested by Ragin and colleagues (Ragin, 1987; Ragin, Strand and Rubinson, 2008; Rihoux and Ragin, 2008). The presence of a factor is depicted with upper case, while factor absent is depicted with lower case. The symbol '*' indicates logical condition 'AND' while '+' indicates logical condition 'OR'.

negative outcomes resulted in the identification of two solutions. I combine the findings from these two solutions to present a conceptual model of safety negative outcomes related to configurations of drift causing factors.

The first solution presents eight configurations of drift causing factors, related to safety negative outcomes. While the second solution identifies seven configurations. There are six configurations that are common to both solutions. Based on the data from this research, these configurations indicate that the presence or absence of which drift causing factors would result in a safety negative outcome.

In the conceptual model (Figure 40) the presence of a factor in a combination is represented by green boxes while the absent of a factor is presented inside a red box. To differentiate among common and unique configurations, in the conceptual model (Figure 40), the common configurations are depicted inside a grey colour box while the unique configurations related to the two solutions are presented inside amber colour boxes. The plus sign is indicative that the unique configuration should be viewed as an additional configuration to the set of configurations common to both solutions.

Common Configurations to the Two Solutions

(i) The first combination is

RISK AWARENESS* AMBIGUOUS/ UNCLEAR RULES * (tacit management approval * ease of personal convenience)

The combination indicates that presence of a combination of Risk awareness and Ambiguous rules despite having an absence of tacit management approval to drift and the drift leading to no advantage of personal convenience, this can still deliver safety negative outcomes. This combination points towards drifts that originate out of conditions where people find it difficult to implement rules as the recommended rule is either ambiguous, unclear or not applicable to the situation in hand. In such situations, based upon their appraisal of the risk, people devise an alternative routine and start working on it. Even if the overall culture of the organisation does not sanction drifted actions, such that management/ managers do not approve drifted behaviours, and the devised alternative action also serves no convenience of purpose, then too people drift. This combination of factors is potent to deliver safety negative outcomes.

(ii) If from the above solution we retain the factor of Risk awareness and replace Ambiguous rules with Inadequate resource and training, then despite having absence of tacit management approval for drift, such that management/ managers do not approve drifted behaviours, the drift would be negative to safety.

RISK AWARENESS* INADEQUATE RESOURCE / TRAINING * (tacit management approval)

This is for situations where actors will judge themselves to be capable to appraise risk yet would have not received a formal training on the current processes or machines. Such situations are negative to safety despite organisation/ management giving no support to such drifted actions.

(iii) Another combination of factors along with Risk awareness are situations or drifted actions that have a tacit management approval or behaviours that are winked off by the management. The findings indicate that drifts caused by a combination of with Risk awareness along with Tacit management approval, and in absence of three factors; absence of ambiguous rules along with absence of both Inadequate resource and training and ease of personal convenience, is likely to return safety negative outcomes.

RISK AWARENESS* TACIT MANAGEMENT APPROVAL * (ambiguous rules * inadequate resource/training * ease of personal convenience)

This combination of drift causing factors could be understood as an eventuality where a drift is supported by a condition of actors believing that they have full awareness of the risks associated with such drifted actions and the management is relaxed towards enforcing recommended actions. The other contextual conditions are that the rules and procedures are clear, serves no convenience of purpose and people are well trained to follow the rules. If in such conditions, the actors pursue drifted actions then this drift will have potential to deliver negative outcomes.

(iv) If factor of Risk Awareness combines with local decision making flexibility, and there is an absence of sufficient monitoring, then the drift occurring under such situations can also lead to negative outcomes.

RISK AWARENESS* LOCAL DECISION FLEXIBILITY * (low monitoring)

(v) If factor of low monitoring is present along with a situation where actors judge themselves to be capable to appraise the risk associated with drifted behaviours, then despite not having any local flexibility to alter the routines, still the drift caused in such a situation can lead to safety negative outcome.

RISK AWARENESS* LOW MONITORING * (local decision flexibility)

(vi) The presence of ambiguous rules along with condition of low monitoring will deliver safety negative outcomes if the situation is accompanied by the absence of the factors inadequate resource / training. This absence indicates that people are well trained, but if rules are ambiguous and they perceive that the monitoring is low, then drift under such combination of factors will return safety negative outcomes.

AMBIGUOUS/ UNCLEAR RULES * LOW MONITORING * (inadequate resource and training)

In all the above six configurations common to both solutions, the factor of Risk Awareness, had its presence in five of them. This finding is suggestive that people's perception about themselves, of being a good judge of risk associated with their drifted behaviours, has a serious implication on safety.

Apart from these six common configurations related to the two set of solutions, there are three combinations that are unique to each solution.

Unique configurations to Solution 1

The two unique configurations to solution set one are;

INADEQUATE RESOURCE / TRAINING RISK *TACIT MANAGEMENT APPROVAL * LOW MONITORING

and

INADEQUATE RESOURCE / TRAINING RISK * EASE OF PERSONAL CONVENIENCE

The two configurations leading to negative safety outcome are unique in a way that they only suggest about the presence of a combination of factors. The factor inadequate resource and training if combines with organisational conditions having laxed rule enforcement and monitoring, such that tacit management approval and low monitoring; then the drift caused under such situation is likely to have negative consequences. The second configuration suggests that people that are not properly trained, and if such people pursue a drifted action for personal convenience, then this eventuality is likely to lead to negative outcomes.

Unique configurations to Solution 2

The solution set two has only one configuration unique to it. This is;

INADEQUATE RESOURCE / TRAINING RISK * LOW MONITORING * (ambiguous/ unclear rules)

This combination suggests that organisational conditions where there is insufficient monitoring of rules and the actors are not adequately trained, then despite having very clearly laid down rules and procedures, such that absence of ambiguous rules, the drift caused under such situation will be a concern for safety.

The important thing to note in the unique solutions is that the factor 'Inadequate resource and Training', is a part of all these solutions. This highlights that this is also a very important factor to consider about safety outcomes of drifted behaviours.

6.3 The Material-Ostensive-Performative Dimension of a Routine

Change in a routine is often expressed using the 'Material', 'Ostensive' and 'Performative' dimensions of a routine (Berente et al., 2016; Pentland and Feldman, 2005; Volkoff, Strong and Elmes, 2007).

Physical and technical artefacts used to define or illustrate the procedural steps and enactment recommendations form a routine's material dimension (Berente et al., 2016). These relate to the original routine design and may include SOP manuals, display boards, electronic or manual forms and templates, clocks, documentation, measuring gauges and devices (Nelson and Winter, 1982). The ostensive aspect' of routine is the stakeholders' abstract, generalised understanding of the routine and its constituting elements (Desai, 2010; Howard-Grenville, 2005). While the enactment of routine is known as its 'Performative' dimension (Feldman and Pentland, 2003).

Berente et al. (2016) lists three possible misalignments or forms of decoupling within these three dimensions; (i) Ostensive -material, (ii) Material-performative,

and (iii) Performative -ostensive. The authors use the following conceptual diagram to capture these alignment/misalignment possibilities (Figure 41).

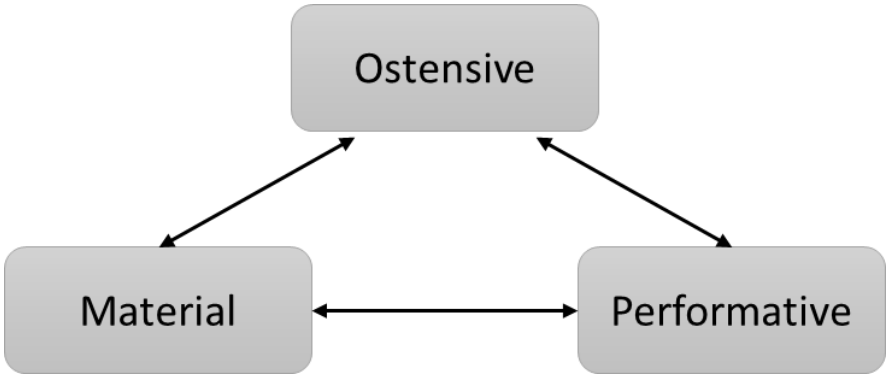

Figure 41: Alignment among dimensions of routine

Adopted from (Berente et al., 2016; pp:03)

The phenomenon I studied looks at the decoupling of actions from prescribed procedures. From a routine perspective, one can associate actions with the performative dimension of routine and prescribed procedures with the artefacts or the material aspect of a routine. My phenomenon chooses not to dwell with how materiality differs from stakeholders' abstract, generalised understanding such that the 'Ostensive' element of a routine. This aspect would require to study how people make sense or meaning of the artefacts and how this understood meaning might change over time. I consciously forced the respondents to discuss events where actions drifted away or got misaligned from written procedures (refer to interview protocol in the methodology chapter). Thus, my findings and its discussion should be viewed as a theorisation of material-performative decoupling.

6.4 Summary

The phenomenon of my research is drifting away of actions from prescribed procedures. This research sets out to extends our current understanding of the theory of practical drift. The literature on practical drift suggests that Practical drift is initiated by practical actions (Snook, 2002). At the stage of initiation, organizational actors adjust recommended procedures, routines and workflows to make them better fit the local needs (Stolte, Vogt and Weber, 2010).

My research provides empirical evidence that drifting of actions from prescribed procedures could be undertaken to benefit the organization or meet organizational goals and targets. In many cases, the drifted action was primarily chosen to solve some contextual issue or to achieve a set of organizational goals.

Going beyond the practical action logic provided in the theory of practical drift (Snook 2002), with my research, I empirically prove that other organisational aspects such as quality and consistency of rule enforcement or operational pressures, have a causal influence on drifting of actions. With my research, I delineate the factors that support the evaluation of the recommended procedure for its fit for the organisational purpose and the factors that help the actual act of disregarding a recommended procedure. I further argue that some factors causing drift are more potent to impact the process safety. I also provide a set of factor combinations that can lead to safety negative outcomes.

7 Conclusion and Limitations

This thesis set out to investigate the drifting away of actions from prescribed procedures. In this chapter of conclusions, I present the contributions to knowledge made by this doctoral study, the limitations of this research, and future research directions. The contributions of this research are discussed from both the academic and practitioner's perspective.

The chapter begins with a summary of the research. In this section of summary, I restate my research questions and reintroduce the phenomena of my interest. I also provide a concise summary of my findings. A discussion of key theoretical contributions follows this. Next in the chapter, I discuss the contributions made to practice and the limitations of this research. The chapter ends with a discussion of future research direction.

7.1 Research Summary

The overarching aim of this doctoral study was to empirically explore the decoupling or moving away of actions from the prescribed work procedures, script or action templates. This doctoral research investigated two aspects of the phenomenon; the factors that influence the drifting away of actions from prescribed procedures and what is the impact of drift causing factors on safety related outcomes.

To open this chapter of contributions, I restate the research questions. The research objectives of this doctoral enquiry were operationalised using the following research questions and sub-questions;

Research Question 1: Why 'Practical Drift' happens?

Sub Question (i): What are the factors that influence the purpose to drift away from prescribed procedures?
Sub question (ii): What factors assist in the act of successfully replacing a formally recommended procedure with an alternate action?

Research Question 2: What is the impact of 'Practical Drift' on safety?

Sub question (i): How drift leads to safety negative outcomes?

The drifting away of actions that I investigated were the ones that are neither a result of malintent or an error on the part of the participating stakeholders. Rather, these behaviours are mindfully initiated to benefit the organisation and make work easier, locally efficient, and more effective (Stolte, Vogt and Weber, 2010). An additional characteristic of these actions is that they are not an isolated or one-off act of deviating from a procedure; instead, they become a part of the ongoing organisational routines. The phenomenon in the literature that resembles closest to my phenomenon of interest is Snook's (2002) conceptualization of the phenomenon of practical drift. Snook (2002) argues that although a logic of task installs these behaviours, but after a considerable amount of time and multiple successful replications, these actions slowly and incrementally drift away from the prescribed procedures. It has also been argued that as these actions become routinised and progressively replace the designed procedures, these actions result in making the system unsafe and susceptible to accidents and failures (Maurino, 2017). Due to its conceptual similarity to 'Practical Drift', throughout this thesis, I chose to address my phenomenon of interest by the name 'Practical drift' (PD).

To empirically explore my chosen phenomenon of interest, I investigated 197 real cases of drifted procedures from 31 large-scale organisations distributed over Aerospace, Oil and gas, and large-scale manufacturing organisations. The choice of organisations was driven by a logic to investigate firms that have a high degree of formalization of written procedures and have strong regulatory mechanisms to ensure compliance to the prescribed procedures. Additionally, these organisations were also chosen for their strong focus and commitment to safety and accident-free operations.

The study adopted a mixed-method approach known as Repertory grid (RepGrid) (Jankowicz, 2005; Kelly, 1955). RepGrid is a systematic interview technique that belongs to a family of cognitive mapping tools (Geraldi, Kutsch and Turner, 2011; Geraldi, Lee-Kelley and Kutsch, 2010), and is able to simultaneously generate quantitative and qualitative data. The data was qualitatively analysed using a

generic content analysis approach that systematically pools qualitative RepGrid data into meaningful categories (Jankowicz, 2005). The quantitative data of RepGrid was analysed using two approaches. The first approach is Rep grid specific quantitative methodology to consolidate constructs from multiple Rep Grids and use a statistical technique to identify dominant constructs (Goffin, 2002; Goffin, Lemke and Szwejczewski, 2006; Lemke, Goffin and Szwejczewski, 2003; Raja et al., 2013). The second approach used the dominant themes identified in the previous quantitative analysis and employed Qualitative Comparative Analysis (QCA) (Ragin, 1987; Rihoux and Ragin, 2008). The QCA methodology provides an approach to empirically analyse configurations among factors and connected outcomes. For my study, I employed QCA to reveal causal configurations of my key drift causing factors that could deliver safety negative outcomes.

Empirically grounded results in both the quantitative and qualitative data helped arrive at the factors that influence the drifting away of actions and the factors that influence the safety outcome of such actions. The findings also helped quantitatively order these factors by their relevance and degree of impact. To arrive at a more nuanced understanding of the phenomenon, the findings were condensed into a factor model of drift and two conceptual models (figure 42, 43, 44 and 45) presents a copy of them from the results chapter) related to safety outcomes. Together these models helped demonstrated why Practical drift happens and why actions of organisational actors' drift away from prescribed procedures. The factors model categorised the findings from this research into higher-order themes discovered in the literature. The factor model also provided a visualisation to demonstrate the relative degree of impact of each thematic category on the phenomenon of drift and the factors that were found to be key factors.

This chapter aims to demonstrate the theoretical and practical contribution to knowledge made by this doctoral study. In the next section, I discuss the theoretical contributions of this research, and in the subsequent section, I discuss contributions made to practice.

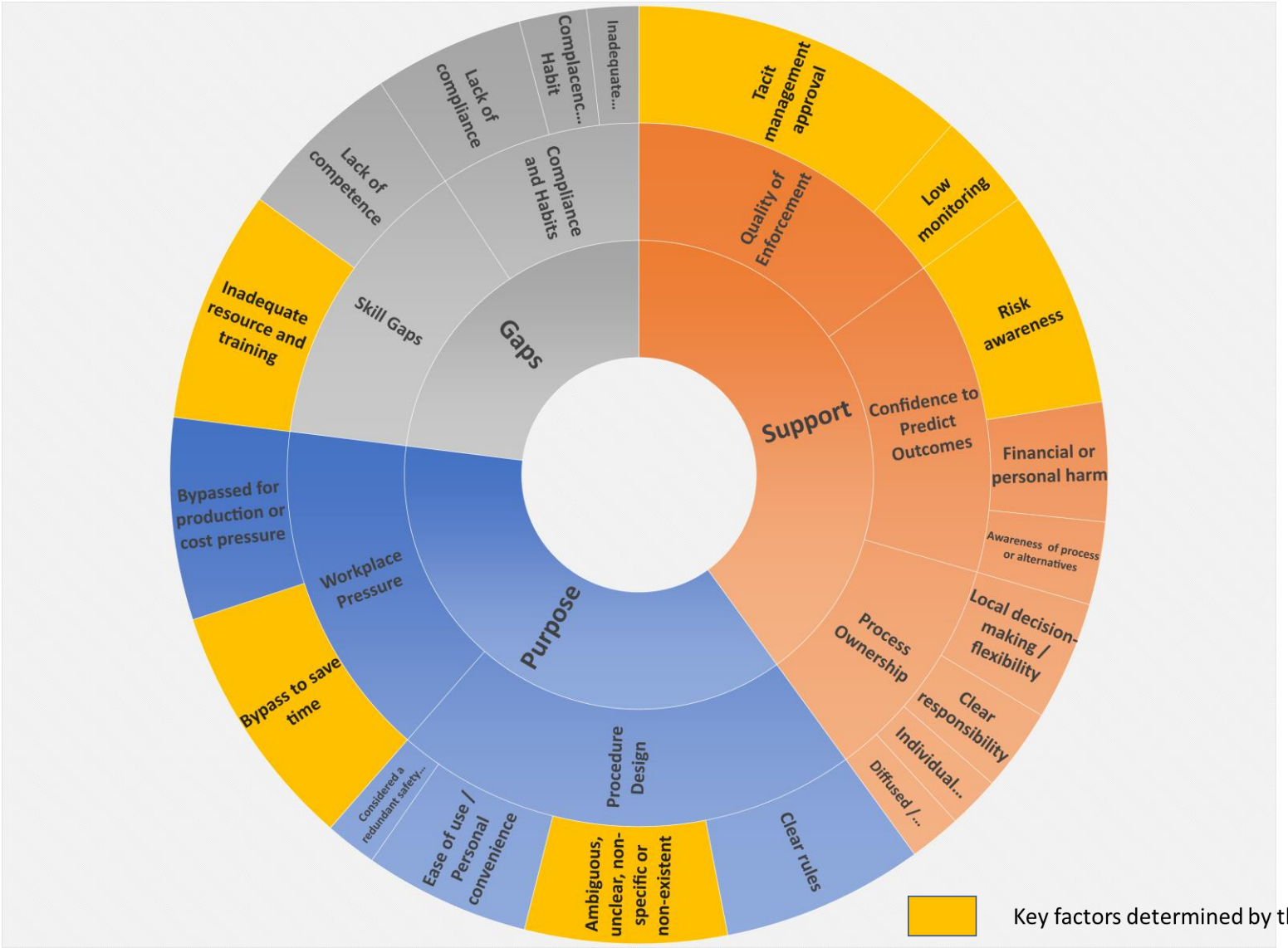

Figure 42: Copy from results chapter :The factors contributing to drifted actions

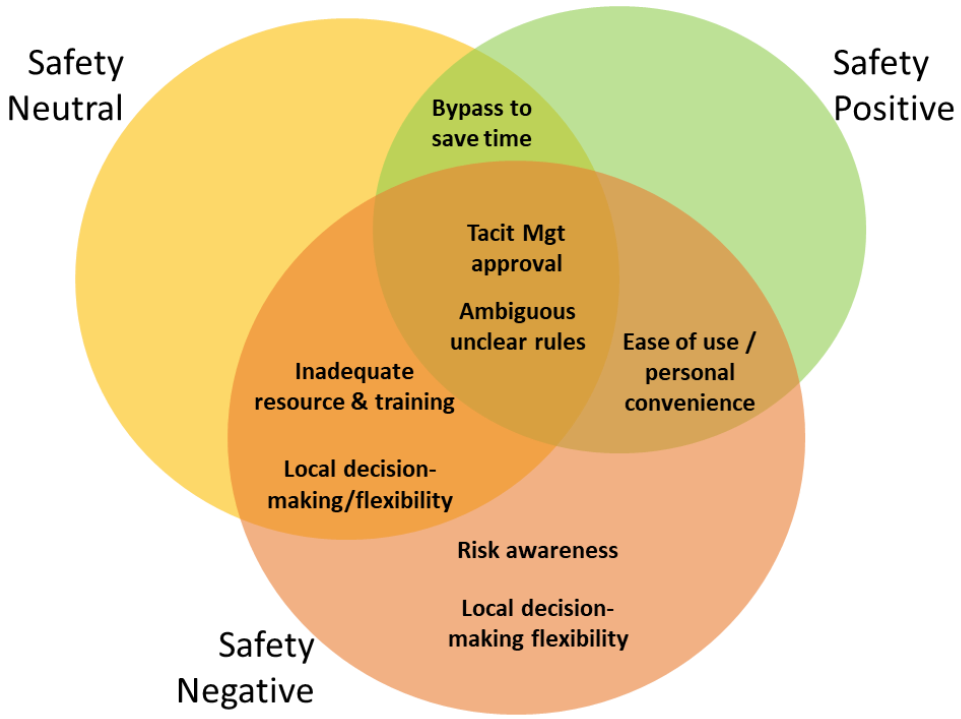

Figure 43: A copy from figure 38 of venn diagram based representation of safety outcomes and categories that relate to them

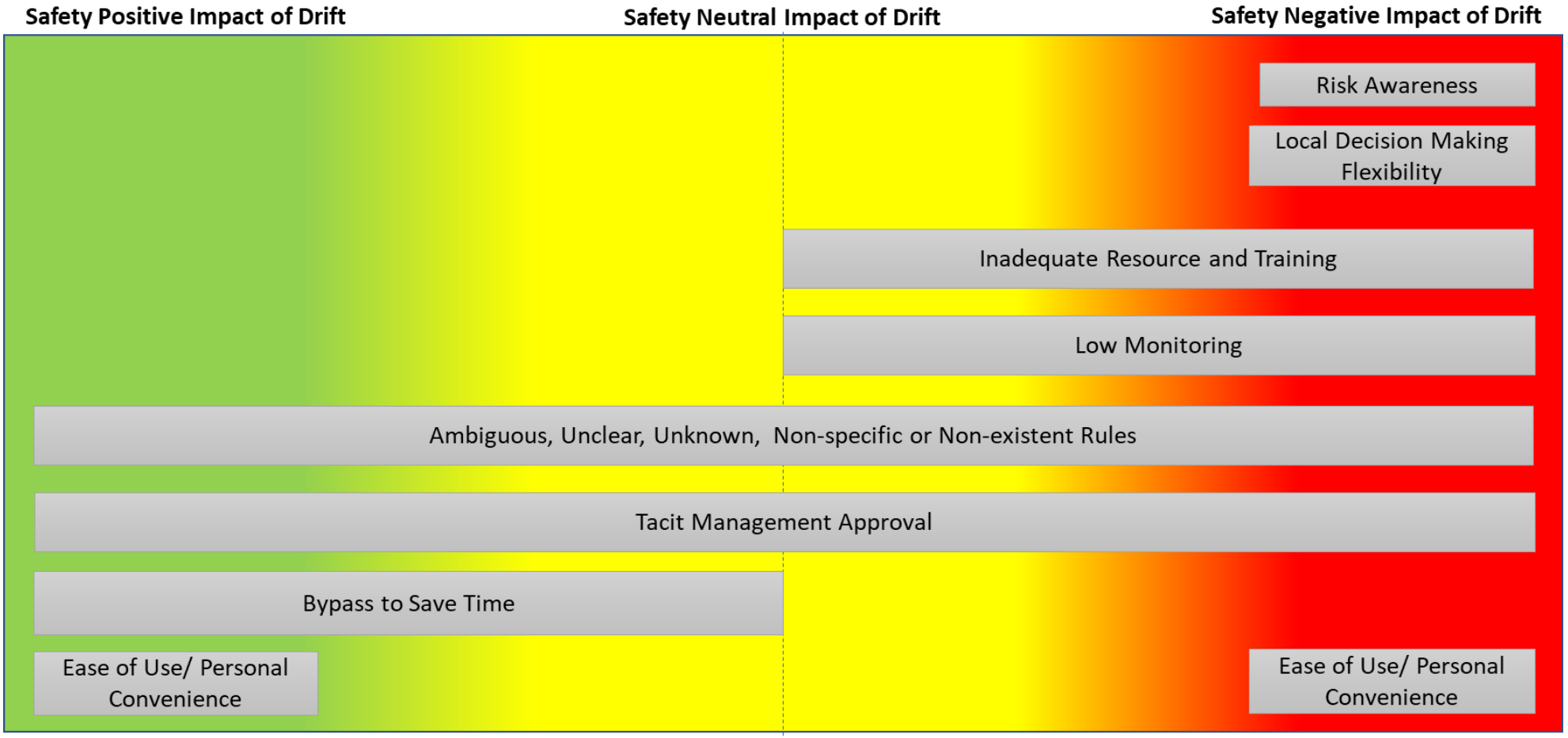

Figure 44: Copy from discussion: Gradient Model of dominant drift causing factors that influence safety related outcomes

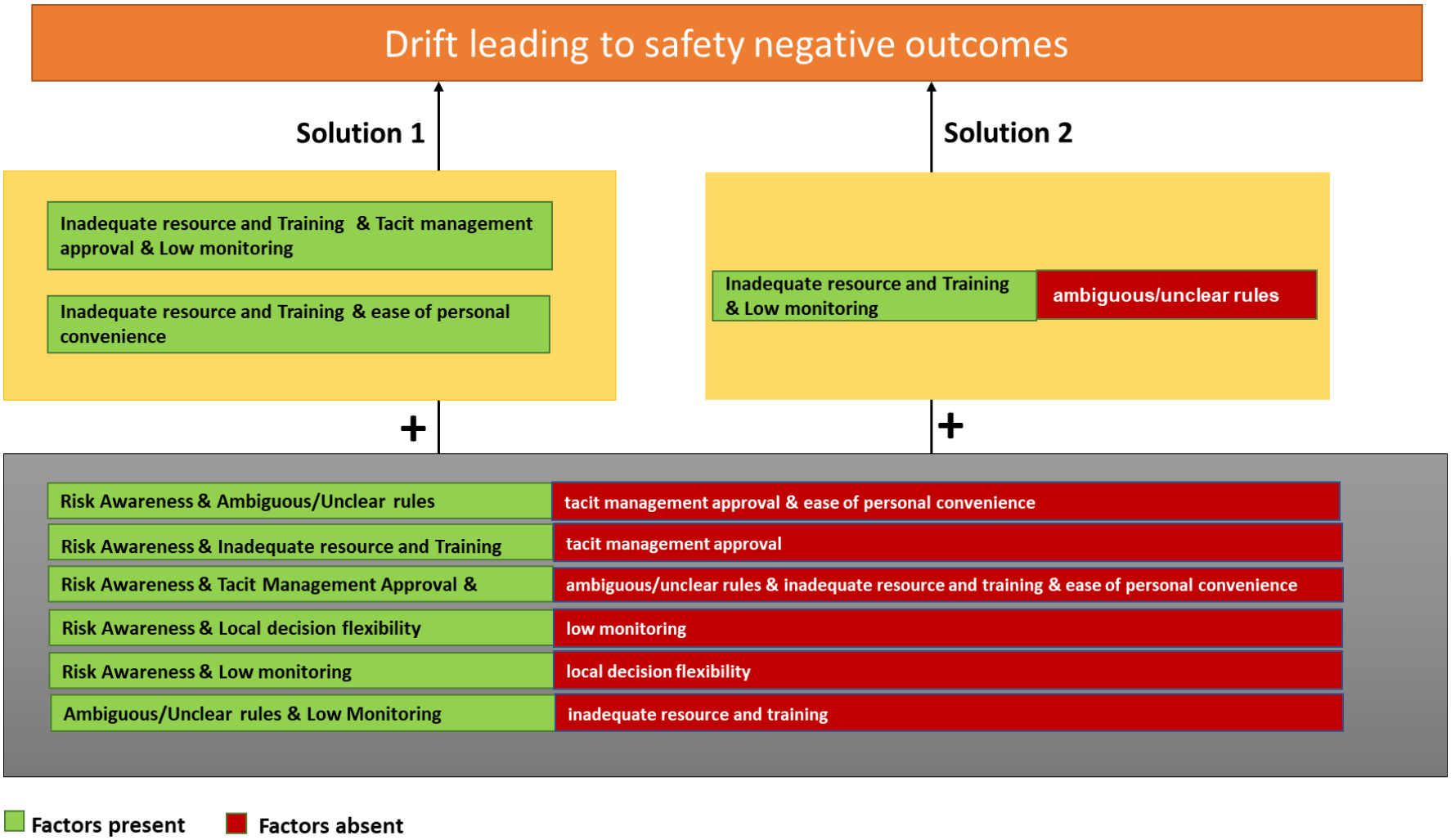

Figure 45: Copy from discussion: Factor Configurations of Safety Negative Outcomes: A Conceptual Model

7.2 Contribution to Knowledge

The primary objective of this research was to explain why a particular kind of drift happens in routines and how it impacts safety. This kind of routine drift that I investigated represents a variation in the performative element of routine from its prescribed template, script or recommended procedures. These variations in the performative are consciously introduced to benefit the organisation and to make work easier, locally efficient and more effective. The phenomenon I investigate resembles Snook's (2002) conceptualisation of practical drift, a phenomenon from safety and accident literature. However, it being a type of routine variation, I chose to conceptualise it using the lens of organisation routines literature.

7.2.1 Empirical Proof of the Widespread Presence

The literature synthesis revealed that since 2010, Practical drift has been mentioned in only a handful of journal articles. In the recent literature, the theory of Practical drift usually finds a cursory reference along with other theories and models related to *"gradual, adaptive degradation"* (Busby & Bennett, 2007; pp:06) of procedures leading to catastrophic failures (Anderson, Busby and Rouncefield, 2020; Lehman and Ramanujam, 2009; Ortmann, 2010; Roeschmann, 2014).

This doctoral research proposes that in the industry, there is a widespread presence of a behavioural pathology resembling Practical Drift. A case-based inquiry of 197 cases of drift from large multinational organisations of the Oil and Gas, Manufacturing, and Aerospace sectors revealed multiple routine performative that were decoupled from the recommended procedures. At the centre of such drifted actions was an underlying intention to benefit the organisations and to make workflow match the practical procedural demand.

It is important to note that Practical drift is a phenomenon of change in organisational routines. However, to the best of my knowledge, the routine literature has not yet touched upon any phenomenon of routine change that remotely resembles practical drift.

Thus, there is a two-prong opportunity to contribute to both organisation routine and safety and accident literature by empirically validating a widespread presence of Practical drift or this particular kind of routine change.

By empirically validating the presence of this behaviour across organisations from different sectors, it is here where this study makes its ***First contribution*** to the body of literature on safety and accident and routine literature.

Practical Drift is a particular kind of routine variation/drift. This purpose-driven decoupling of the performative aspect of routine from the prescribed procedures should be seen as a specific form of misalignment or decoupling between the actions and prescribed procedures that is consciously and mindfully introduced to benefit the organisation and to make work easier, locally efficient, and more effective (Snook, 2002; Stolte, Vogt and Weber, 2010). Routine literature has not yet turned its focus to such a phenomenon about variations or changes in routines. My empirical proof about the existence of such type of routine change ***extends and revises*** our understanding of the phenomenon of routine change. Identifying and isolating a new form/kind of routine change phenomenon is my ***Second contribution*** to the body of knowledge.

7.2.2 A Combined Theoretical Lense of Rule, Safety and Organisation Routine Literature

Snook (2002) focuses predominantly on the safety and accident literature and pivots his argument on a few selected theoretical developments from the safety field, such as the Normalisation of deviance (Vaughan, 1996). This can be seen as a gap and provides an opportunity to make a theoretical contribution by bringing upon theoretical developments from other literature domains.

One could argue that if reasoned from the perspective of the rule-following literature, Snook's (2002) argument supporting the need for a necessary adaptation of a task-based logic or a practical action would fall under the definition of a poor rule design (Borry et al., 2018; Bozeman, 2012). At the same time, routine literature would view it as an evolutionary growth of variations in the

performative aspect of routine (Dittrich, Guérard and Seidl, 2016; Miner, 1991; Pentland, Hærem and Hillison, 2011).

The uniqueness of practical drift regarding underlying intentionality to trigger a drift makes it stand apart from other forms of routine change. Thus, our general understanding of routine change is insufficient to theorise about practical drift.

7.2.2.1 Intention or Purpose to Drift: An Extension to our Understanding of Routine Change and Practical Drift

Snook (2002) uses the logic of practical action and loose coupling in the organisation to explain the phenomenon of practical drift. Yet, his explanation remains disconnected from theoretical developments in the rule and organisational routine literature.

It is worth noting that organisation routine literature also accepts that changes in routines *"are motivated by will and intention"*(Feldman, 2000;pp:613). Similarly, in line with safety and organisation routine literature, literature on rule and rule-following behaviour also claims that rule bending or violation are intentional behaviours (Beatty and Beatty, 2004; DeHart-Davis, 2007). However, these intentions/motivations or sense of purpose that prompts actors to drift from recommended procedures is not sufficiently researched.

The literature review of routine change revealed that the current literature has only the most rudimentary grasp of factors contributing to routine change. Apart from the recent work of Dittrich and Seidl (2018) on purpose and routine change, no other existing studies empirically link purpose to drift from recommended actions. Most papers focused their research enquiry on an ex-ante list of handpicked/selected factors. For example, Dittrich, Guérard and Seidl (2016) checked the role of reflective talks, Nigam, Huising and Golden (2016) argued the role of managerial/ organisational support in routine change, Pentland, Hærem and Hillison (2011) mentioned the role of training while Turner and Fern (2012) tested the hypothesis relating to the experience of actors in routine reconfiguration. Although Dittrich and Seidl (2018) highlight the influence of purpose in bringing about a change in routines, they, too, abstain from clearly

theorising a comprehensive list of purposes that may cause actions to drift away from recommended procedures.

With my empirical data, I ***confirm*** the suggestion of Feldman (2000) and Dittrich and Seidl (2018) from the routine literature that 'purpose' plays a role in shaping routine change. I further extend our current understanding of routine change by providing an extended list of purposes for triggering a change in organisational routines. This adds to the growing literature on routine change. My consolidated and ordered list of purposes adds to the arguments and findings of other routine literature authors. This is my ***Third contribution*** to the body of knowledge on drift and routine change.

Where routine literature is deficient in articulating purpose, the notion of purpose is at the forefront of Snook's (2002) theory of practical drift. Snook (2002) argues that driven by the need to match the practical demands and local workflow demands; actors are motivated to drift from recommended procedures. However, Snook (2002) also abstains from further elaborating on the purpose of the debate.

Considering that Practical drift is a particular type of routine change studied under the aegis of the safety and accident literature, my synthesised list of purposes also contributes to the literature of 'Practical Drift'. My findings ***extend*** Snook's (2002) theory of Practical drift and add a grain to the safety and accident literature by suggesting a set of factors under the category of 'Purpose' that trigger drifted actions. The synthesis of purposes leading to practical drift extends the literature on adopting normalised, habitual and drifted practices (Anderson, Busby and Rouncefield, 2020; Lehman and Ramanujam, 2009; Ortmann, 2010; Roeschmann, 2014). This is my ***Fourth contribution*** to the body of knowledge on 'Practical Drift' and safety and accident literature.

7.2.3 Organisational Conditions Supporting the Growth of Drifted Practices

Literature on safety, rules, and routine shows that having a purpose alone is not a sufficient reason to abandon the recommended procedures or routine. For actors to drift from recommended procedures, one would need additional

supporting organisational and contextual conditions. Dittrich and Seidl (2018) link routine change with two organisational conditions: (i) organisations fixated on achieving pre-established organisational goals and (ii) the situations prompting a change in the routine being more familiar to the organisational members. Literature on rules also suggests conditions surrounding rule monitoring and enforcement as important determinants for rule-following/ breaking behaviour. However, Snook's (2002) theoretical explanation of practical drift does not elaborate on conditions supporting practical drift. The author chooses to build the practical drift argument only on one contextual condition of loose coupling between organisational subunits. The same argument is continued in further discussions of practical drift (Anderson, Busby and Rouncefield, 2020; Lehman and Ramanujam, 2009; Ortmann, 2010; Roeschmann, 2014).

With this research, I ***extend*** Snook's (2002) explanation of conditions supporting drifted actions.

Routine change literature also presents a limited discussion of conditions that support routine change. Apart from Dittrich and Seidl (2018), all other discussions about accompanying conditions to routine change are cursory. Few authors from the routine literature, like Chen, Guo and Zhao (2021), Nigam, Huising and Golden (2016), Turner and Fern (2012), and Pentland, Hærem and Hillison (2011) do discuss the role of skills, knowledge, training and authority on routine change, yet these discussions remain rudimentary. With my theorisation of an ordered list of conditions supporting the act of drift, I also ***extend*** the current literature on routine change.

My theorisation of contextual factors that support the act of disregarding prescribed procedures extends our understanding of Practical drift and routine change. These factors are arranged into three broad categories: (i) quality of rule enforcement, (ii) factors influencing actor's confidence to predict outcomes, and (ii) conditions related to process ownership. Within these three categories, the factors supporting the phenomenon of actions drifting away from prescribed procedures are tacit management approval, low monitoring, risk awareness, familiarity and awareness of the process and its alternatives, financial and

personal harm, local decision-making/flexibility, clear responsibility, diffused / Unclear ownership, individual and collective responsibility.

This research empirically identifies a set of salient or key conditions that influence drifted actions. These dominant conditions are Tacit management approval, low monitoring, and risk awareness. This is my ***Fifth contribution*** to the body of knowledge.

7.2.4 The Safety Dimension of Routine Change

Synthesis of the literature revealed that the theory of Practical drift usually finds a cursory reference along with other theories and models related to *"gradual, adaptive degradation"* (Busby & Bennett, 2007; pp:06) of procedures leading to catastrophic failures. The eventuality of drifted actions leading to process degradation or negative consequences resonates with the typical theorisation of routine or procedural changes as presented in safety and accident literature (Ahmed et al., 2020; Li et al., 2016; Pagell et al., 2015; Shevchenko et al., 2018).

However, a review of the literature on change in organisation routine revealed that organisation routine scholars have yet to theorise the safety dimension of a routine change. This was an obvious inference, as safety was neither a context nor a construct for any of the articles reviewed from the routine change literature.

A reason for this disparate treatment of safety outcomes in the safety and organisation routines literature could be traced to the choice of procedures investigated in the two literatures. Where safety and accident literature focuses on high-impact safety-related SOPs or procedures, the organisation's routine change literature chooses mundane and uncritical tasks for its theory building.

With my study, I provide empirical evidence to support the view that drift/change in organisation routines could lead to negative potentiality. This negative outcome need not be restricted to processes or activities related to safety or safe working. These negative outcomes also occur for mundane organisational activities and tasks. The empirical results from my study about routine change and safety outcomes ***extend*** the scope and dimension of the routine change literature. The evidence from my study establishes that safety should also be a consideration

for changes introduced in everyday mundane organisational activities and tasks. This is my ***Sixth contribution*** to the body of knowledge.

I argue that among the factors that cause drift, not all factors are equally potent to produce safety-negative outcomes; some factors may produce safety-neutral or safety-positive outcomes. With my findings, I empirically prove that some key factors have more propensity to deliver safety negative outcomes than others. This study found that drift associated with '*Risk Awareness'* and *'Local decision making /flexibility'* were statistically significant in producing safety negative outcomes. While drift associated with '*Inadequate resource and training'* and *'Low Monitoring'* were found to be associated with either neutral or safety negative outcomes. I also empirically demonstrate that one factor, '*Save time,'* could be linked to safety-neutral and safety-positive outcomes. This aspect of drift has not yet been explored in the literature. Further extending upon the findings of factors linked to safety outcomes, this research identifies a set of factor combinations that can be linked to safety negative outcomes if present or absent. This is my ***Seventh contribution*** to the body of knowledge.

Besides these direct contributions to knowledge, this study also makes a contingent contribution to the domain of rule, routine and drift research. For the study of routine change or drift, the preferred methodology is ethnography. With this study, I extend the set of methods available to the field of study of routine, rule and drift by demonstrating the value of using RepGrids and the theory of personal construct (Kelly, 1955) to study routine change or drift. This is my ***Eighth contribution*** to knowledge.

7.3 Implications for Practice

The aspects of drifting away of actions from the prescribed procedure have implications for practice. Organisations can gain insights about factors and conditions that can cause the actions to drift away from prescribed procedures. Organisations can also gain from the findings linking drift-causing factors to safety negative outcomes.

The findings from this research suggest that despite having clearly articulated rules and formal procedures to enforce them, drifted actions continue unabated. These drifts are exercised as norms and are never discussed or addressed using existing organisational mechanisms. The dimension of this finding that should be of interest to organisations is that this research compels the organisations to accept this as an operational reality and motivates the organisations to devise mechanisms to address such behaviours.

Another important dimension of my research for the organisation is that most of these drifted behaviours are exercised to make workflow suit the local demands and for the purpose of benefiting the organisation. While doing so, connected stakeholders let these actions flourish through lax rule monitoring and enforcement. This deterioration in quality and consistency of rule enforcement could have a deeper impact on the overall rule-following culture in the organisation. I argue there is no such thing as turning a selective blind eye to some rules while being strict about others. Deterioration in quality and consistency of rule enforcement for meeting operational aspirations and targets is a dangerous phenomenon, and organisations should investigate the factors discussed in this research.

This research also provides a ranked influence of the factors related to drift and safety outcomes. It further provides a combination of factors that may have more influence on generating safety negative outcomes. By being aware of the combination of factors that are more potent to deliver safety negative outcomes, organisations can invest in opportunities to address such factors. Organisations could also prioritise their efforts based on the ranked influence of these factors.

7.4 Future Research

The literature on rule, routine and safety has all pointed towards the possibility that a stable and well-designed procedure, which does not require a pragmatic alteration, is also susceptible to change. My research did not focus on this possibility, and thus, such eventualities were not revealed. Future research on drift and routine variation could particularly investigate the causes and impact of drift on routines that should not have been subjected to pragmatic alteration. This

future research could answer the question of why purposeful routine actions or practical task-based logic starts to be universally applied to a wider set of routine procedures that might not have required such alterations. And, what organisational mechanisms can bring about a corrective action on such behaviours?

Snook (2002) talks about a temporal element of practical drift. The author argues that as time progresses, the routines slowly and incrementally drift away from prescribed procedures. The temporality and path dependency of routine change are also quite well established in the routine literature (Feldman and Pentland, 2003; Pentland et al., 2012). In my study, I did not investigate the temporal element of the change. Future research could study the evolution of these drifted practices over time. The temporal aspect could focus on explaining how drifted actions change and become more and more separated from the SOP.

In this research, I only focused on why and how drift occurs in an organisation. Now, future research endeavours could investigate how organisations can avoid drift from occurring. These future studies can focus on corrective strategies and mechanisms to address drift.

The possibility of incorporating a feedback loop and acting upon organisational learning opportunities could have an impact on the occurrence of drift. One could argue that drift continues to propagate because management does not intend to recognise or regularise these actions formally. The decision choices and contextual conditions leading to these unofficially sanctioned procedural alterations are formally blocked from feeding back into future decisions or learnings. The informal and unofficial nature of such practices deters them from being included in any future process improvement initiative. Actors seldom reflect upon it or diagnose the reason why such reorientation or adaptation was necessary. Investigating the feedback mechanism from a learning theoretic perspective could provide a valuable extension to the theory of practical drift.

7.5 Limitations

Every research has limitations connected with the decisions taken during the process, and my research is no different. In this section, I acknowledge the limitations of my research.

The first limitation originates from my chosen research strategy and the key decisions taken during the research process. These key decisions impose certain limitations on my outcomes. The decision to adopt a relevance sampling method over a random or theoretical sampling could be argued to have had an impact on the findings and the patterns of outcomes that originated from the data. Due to a focus on industries with a high degree of rule and routine formalisation and simultaneously with large production and output targets, one may wonder if the findings could be extended to smaller operations. Adopting the relevance sampling technique also robbed the possibility of coming across idiosyncratic cases that may have been revealed if random sampling had been done.

Another limitation of this study relates to data collection. The data has been collected from a single respondent from each firm in their respective organisations. The participants of this research were engineers, operators, and managers with first-hand experience and information about drifting away from actions from the prescribed procedures. However, having first-hand experience does not preclude them from adding a personal bias. In future studies, this possibility of having an element of personal bias in the data set could be avoided by including more respondents from each firm.

Moreover, the examples of drifted actions shared by the respondents could not be corroborated or co-related with their organisation and other connected stakeholders, as only a single respondent was chosen from each firm. This could be argued to have limited the possibility of getting deeper and additional interesting insights.

Furthermore, time and external situations also posed certain limitations. Due to the pandemic, the data was not collected face to face and was either done online or over the phone. Significant effort was put into this mode of data collection; however, the technological fatigue posed a challenge as possibly the data lost

some of its breadth by excluding those who could have participated if this was a face-to-face data collection method.

Reflection on Limitations

Apart from the above limitations, one limitation posed the biggest challenge. It was about participants' hesitation in acknowledging and discussing their consciously drifted actions. Consciously altering routines is seen as a contentious issue, especially in organisations that emphasise safety. Due to years of workplace conditioning and the established thought process of the participants regarding strict adherence to procedures, the data collection process was difficult and unsettling. Despite claiming it to be an action that they performed for the betterment of the organisation and to make work procedures fit the practical work demand, respondents still found it hard to accept consciously introduced drifts in procedures.

My retrospective reflection on the process is that despite being experts of their field with multiple years of job role experience, most participants' understanding was limited to their organisation or sector. They often thought this form of drift or behaviour was restricted to their team, group or organisational function and thus felt uncomfortable discussing it. Their lack of understanding about the omnipresence of this phenomenon becomes a hurdle for further probing the deeper layers of the phenomenon. During the interviews, there were times when participants would discuss the event conservatively.

This could be because safety is a more widely understood construct in the industry than the routine change or evolution process. Organisational actors are not sufficiently exposed to the routine change literature's theoretical aspects and are unaware of routine change's positive, evolutionary and innovative dimensions.

Now, retrospecting my decisions, I feel that a Delphi style workshop could have helped research participants overcome the hesitation associated with the phenomenon. Hearing the experiences of others could have enticed participants to discuss the conscious decoupling of actions from prescribed procedures more

aggressively. A moderated discussion/ workshop of a Delphi expert group of engineers, operators, and managers from different industries, backgrounds and sectors can generate more profound and more nuanced insights about the phenomenon.

Reflecting upon my research journey and experience, I believe that adding step of the Delphi workshop will help generate a deeper degree of theorisation and add more value to the research.

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APPENDICES

Appendix A

A.1 Introductory Email Format

Dear (INSERT NAME)

I am writing this email to introduce myself and my research to you and to request you to share your knowledge and experience in an interview.

My name is Neha Tewari. I am a doctoral researcher, at Cranfield University, School of Management and I am researching on “Why and how some organisational routines/ procedures, over a period of time, drifts away from the recommended or prescribed procedures?”

With regards to this research, I would like to interview you and gain from your experience about the circumstances and factors responsible for the drifting away of organisational routines.

This interview will follow an innovative structured interview technique, called the Repertory Grids and is expected to take approximately 45 to 60 mins.

The interview is completely confidential. This research is being conducted in accordance with the Cranfield University Ethical Policy which guarantees complete confidentiality and anonymity. No such information would be collected or retained that could be traced to any living person or organisation.

With your permission, the interview will be recorded to capture and to replicate complete and accurate description of your views. This will allow me to refer to it later when I consolidate the results. At any time, you may stop the interview and all notes and records will be deleted immediately on your request.

Keeping in mind, the current situation of coronavirus, the interview will be conducted online.

I would like to request you any suitable date and time for the interview.

Thank you once again for your help with this research. I look forward to this interview.

Warm regards

Neha Tewari

A.2 Email Introducing the Process I

Dear (INSERT NAME)

I would like to thank you for agreeing to be interviewed about the phenomenon of organisational routines being drifting away from prescribed procedures.

My name is Neha Tewari. I am a doctoral researcher, at Cranfield University, School of Management. The purpose of this research is to examine how some organisational routines/ procedures, over a period of time, get drifted away from the recommended or prescribed template.

In the face-to-face interview, I would like to ask you about a number of occurrences that you might be aware of or have been involved in pertaining to the drifting away of organisational routines. This is to get your personal interpretation of the circumstances and factors responsible.

This interview is based upon an innovative structured interview technique, called the Repertory Grids. For the purpose of this interview, before the interview, I would like you to use your experience and knowledge and choose 4 to 8 routine processes that meet the following criterion;

(i) The chosen process should be a routine activity performed by the organisation either regularly or frequently.

(ii) There should be at least some people in the organisation, that you may be aware of, who drift away from the recommended or prescribed procedures on a regular basis.

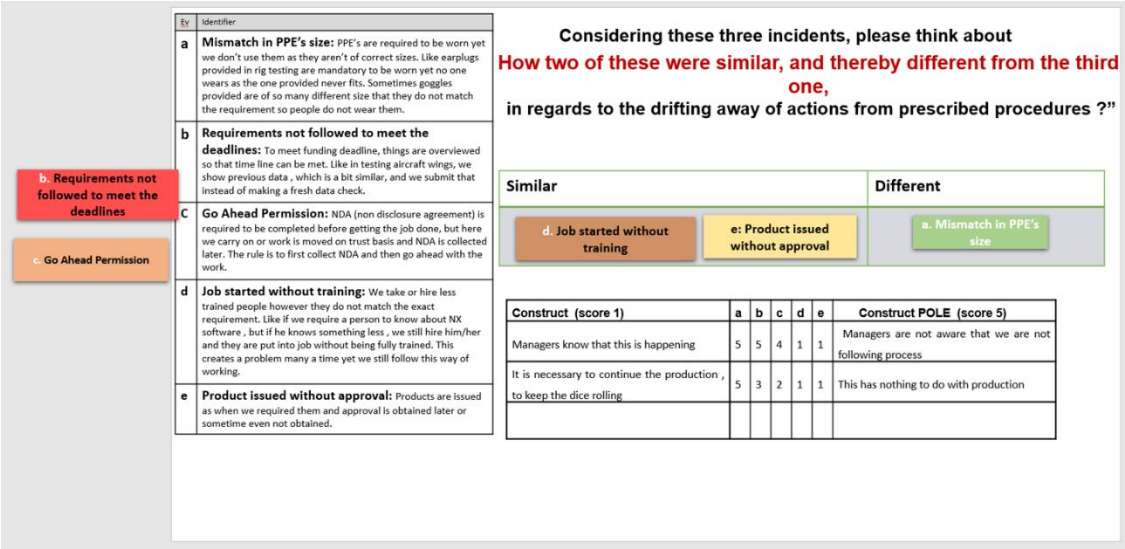
The objective of this interview would be to get your personal views about these selected events, regarding: What happened, how it occurred, and the things that may have influenced the people involved to act as they did. During the interview I will ask you to compare and contrast these selected events using a structured approach of selection and contrasting, as defined in Repertory Grid process; details to it are provided later. The interview is expected to take approximately 45 to 60 mins.

The interview is completely confidential. This research is being conducted in accordance with the Cranfield University Ethical Policy which guarantees complete confidentiality and anonymity. No such information would be collected or retained that could be traced to any living person or organisation.

With your permission, the interview will be recorded to capture and to replicate complete and accurate description of your views. This will allow me to refer to it later when I consolidate the results. At any time, you may stop the interview and all notes and records will be deleted immediately on your request.

Thank you once again for your help with this research. I look forward very much to meeting and working with you.

A.3 Exemplary Online RepGrid Interview Form



Ey	Identifier
a	**Mismatch in PPE's size:** PPE's are required to be worn yet we don't use them as they aren't of correct sizes. Like earplugs provided in rig testing are mandatory to be worn yet no one wears as the one provided never fits. Sometimes goggles provided are of so many different size that they do not match the requirement so people do not wear them.
b	**Requirements not followed to meet the deadlines:** To meet funding deadline, things are overviewed so that time line can be met. Like in testing aircraft wings, we show previous data , which is a bit similar, and we submit that instead of making a fresh data check.
c	**Go Ahead Permission:** NDA (non disclosure agreement) is required to be completed before getting the job done, but here we carry on or work is moved on trust basis and NDA is collected later. The rule is to first collect NDA and then go ahead with the work.
d	**Job started without training:** We take or hire less trained people however they do not match the exact requirement. Like if we require a person to know about NX software , but if he knows something less , we still hire him/her and they are put into job without being fully trained. This creates a problem many a time yet we still follow this way of working.
e	**Product issued without approval:** Products are issued as when we required them and approval is obtained later or sometime even not obtained.

b. Requirements not followed to meet the deadlines

c. Go Ahead Permission

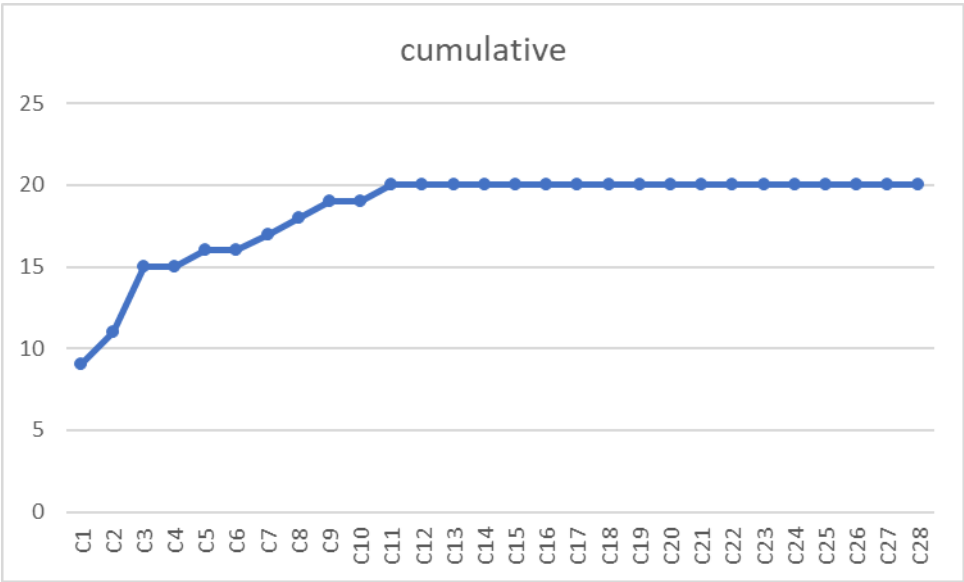
Considering these three incidents, please think about
How two of these were similar, and thereby different from the third one,
in regards to the drifting away of actions from prescribed procedures ?"

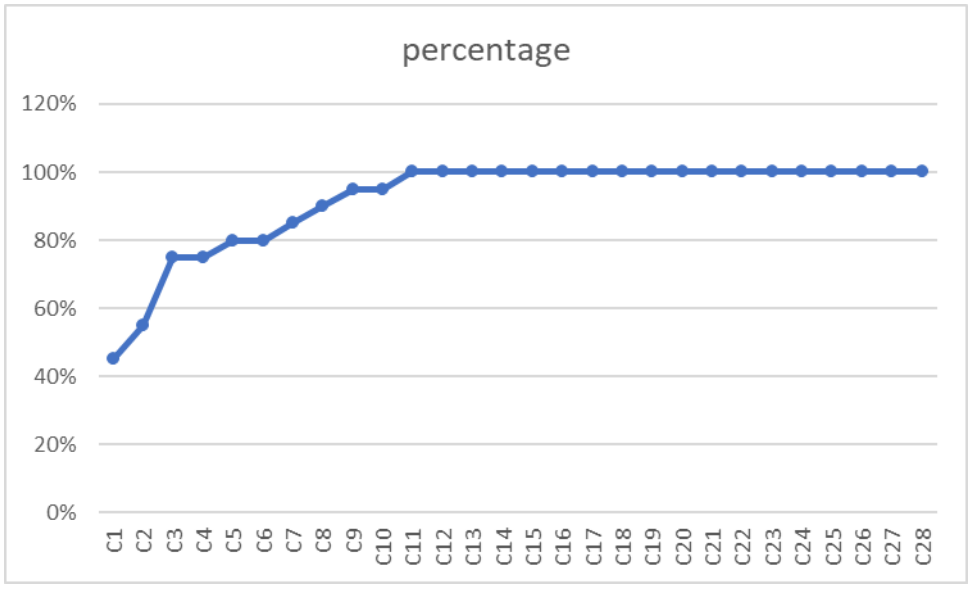
Similar		Different
d. Job started without training	e: Product issued without approval	a. Mismatch in PPE's size

Construct (score 1)	a	b	c	d	e	Construct POLE (score 5)
Managers know that this is happening	5	5	4	1	1	Managers are not aware that we are not following process
It is necessary to continue the production , to keep the dice rolling	5	3	2	1	1	This has nothing to do with production

Appendix B

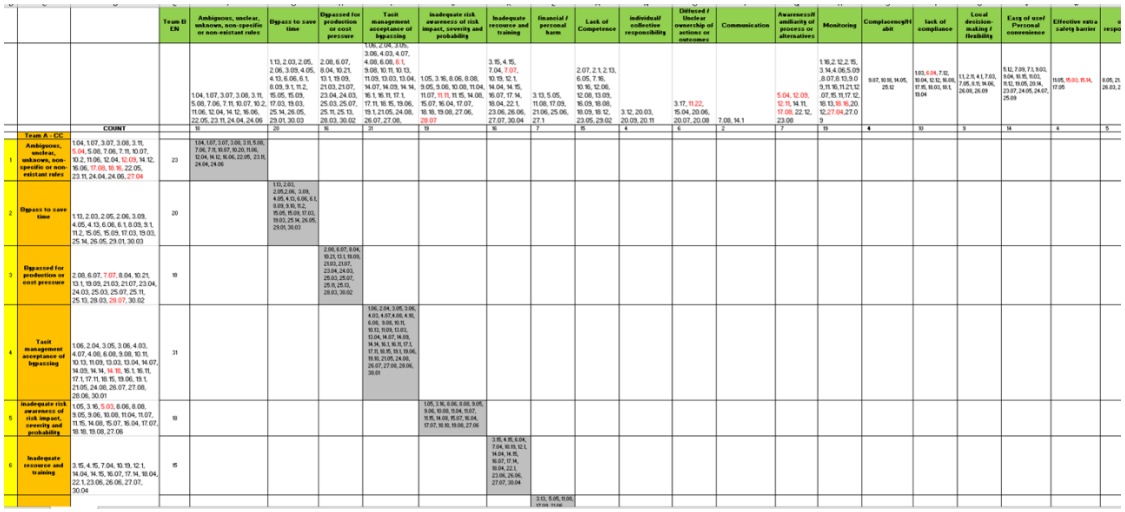
B.1 Data Saturation Table



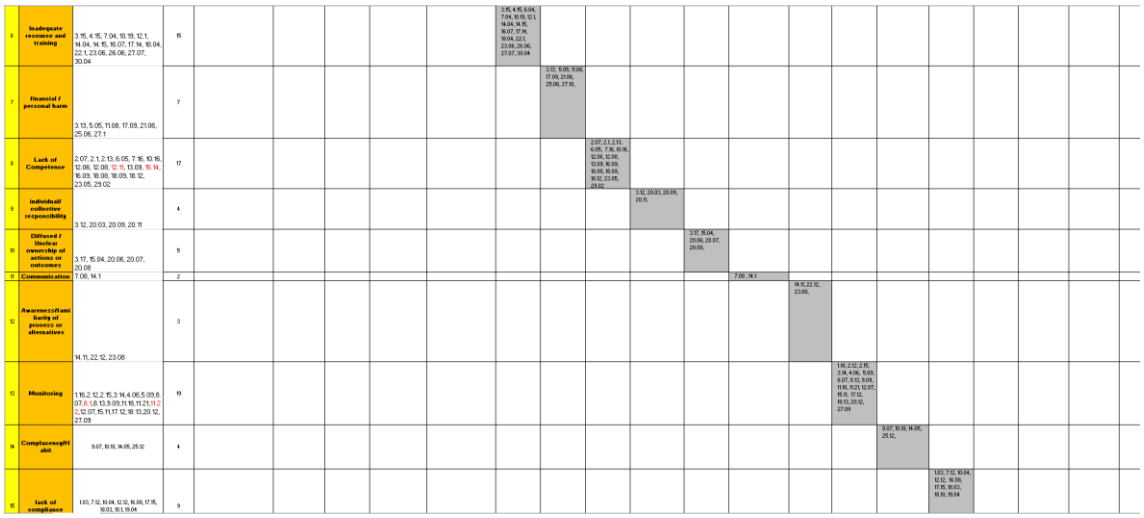


B.2 Reliability Table:

B.2.1 Page 1

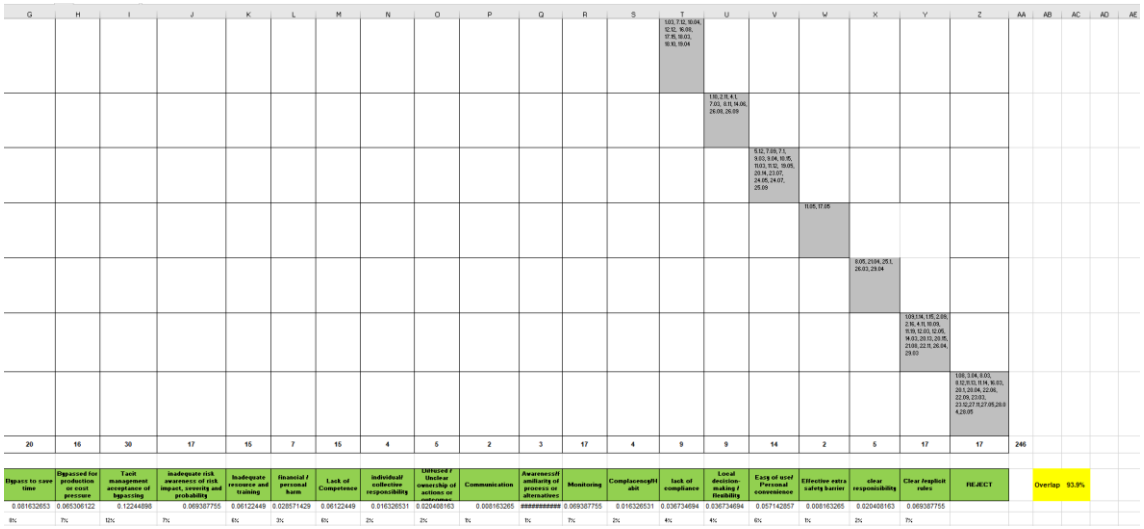


B.2.2 Page 2



B.2.3 Page 3

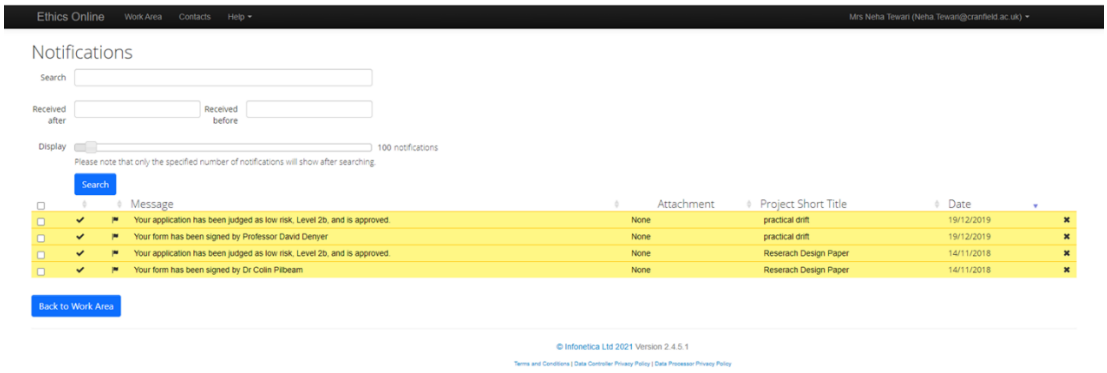
Demonstrating a 93.9% reliability



Bypass to save time	Bypassed for production or cost pressure	Tacit management acceptance of bypassing	Inadequate risk awareness of risk impact, severity and probability	Inadequate resource and training	Financial / personal harm	Lack of Competence	individual/ collective responsibility	Diffused / Unclear ownership of actions or outcomes	Communication	Awareness/familiarity of process or alternatives	Monitoring	Complacency/ habituation	lack of compliance	Local decision-making / flexibility	Easy of use/ Personal convenience	Effective extra safety barrier	clear responsibility	Clear /explicit rules	REJECT		
0.081632653	0.065306122	0.12244898	0.069387755	0.06122449	0.028571429	0.06122449	0.016326531	0.020408163	0.008163265	##########	0.069387755	0.016326531	0.036734694	0.036734694	0.057142857	0.008163265	0.020408163	0.069387755		Overlap	93.9%
8%	7%	12%	7%	6%	3%	6%	2%	2%	1%	1%	7%	2%	4%	4%	6%	1%	2%	7%			

Appendix C

C.1 Research Ethics Policy



D donotreply@infonetica.net
Thu 19/12/2019 12:47
To: Tewari, Neha
Cc: Denyer, David

Dear Neha

Reference: CURES/9459/2019
Title: Dimensions of Practical Drift: A Routine Perspective

Thank you for your application to the Cranfield University Research Ethics System (CURES).

Your proposed research activity has been confirmed as Level 2b risk in terms of research ethics. Your letter of approval will be sent by email within 24 hours. If you do not receive this, please contact CURES Support.

Please remember that CURES occasionally conducts audits of projects. We may therefore contact you during or following execution of your fieldwork. Guidance on good practice is available on the research ethics intranet pages.

If you have any queries, please contact cures-support@cranfield.ac.uk

We wish you every success with your project.

Regards

CURES Team

May we remind you of the importance of addressing health and safety issues in your research. Templates and further guidance are available here.