**The Socio-Structural Drivers of Strategic Improvisation in Emergency Services: An Exploratory Study of the Royal Malaysia Police**

**Abstract**

Improvisasi strategik sering berlaku dalam persekitaran pembuatan keputusan yang pantas. Namun begitu, improvisasi masih kurang mendapat perhatian dalam kajian pentadbiran awam dan pengurusan. Kekurangan pengetahuan ini membawa kepada persoalan kajian berikut: apakah yang mendorong improvisasi strategik dalam perkhidmatan kecemasan di negara membangun? Bagi menjawab persoalan kajian ini, artikel ini mengkaji laluan sosio-struktural ke arah improvisasi strategik dengan menggunakan data soal selidik yang dikumpul daripada pegawai polis yang sedang berkhidmat dalam Pasukan Polis Diraja Malaysia. Data dianalisis menggunakan analisis perbandingan kualitatif set-kabur (fsQCA) dan pendekatan konfigurasi ini mendedahkan resipi sosio-struktural utama bagi membolehkan improvisasi strategik dimaterialisasi. Secara khusus, analisis ini menunjukkan satu set teras keadaan sosio-struktural—sokongan pengurusan atasan serta pengumpulan dan perkongsian pengetahuan—yang boleh ditambah baik melalui dua cara berbeza, sama ada dengan (i) kehadiran kecekapan kendiri dalam kalangan pembuat keputusan atau (ii) melalui keupayaan teknologi komunikasi maklumat serta status pengurusan sebagai keadaan periferal, bagi improvisasi strategik.​

**Abstract**

Strategic improvisation often occurs in fast-paced decision-making environments. Yet, improvisation has received little scholarly attention in public administration and management. This knowledge gap leads to the study’s research question: what drives strategic improvisation in emergency services of a developing country? To answer this research question, the article examines the socio-structural pathways to strategic improvisation by drawing on survey questionnaire data collected from serving police officers in the Royal Malaysia Police. Data is analyzed using fuzzy-set Qualitative Comparative Analysis (fsQCA) and this configurational approach reveals key socio-structural recipes for strategic improvisation to materialize. Specifically, the analysis reveals a core set of socio-structural conditions—top management support and knowledge collecting and donating—that can be further augmented in two different ways, either by (i) the presence of self-efficacy among decision-makers or (ii) through an information communication technologies capability and management status as a peripheral condition, for strategic improvisation.

**Keywords:** Strategic improvisation, fsQCA, developing country, strategy, Police.

**Introduction**

The rational‒planning model is often heralded in public policy narrative as the key to effective strategic decision-making (George and Desmidt, 2018). While rational planning is “intended to be explicit, rigorous, and systematic” (Boyne, 2001: 75), for most decision-makers in public management, planning processes can be problematic due to intellectual and resource constraints, difficulty obtaining and interpreting data, and political problems (Boyne et al., 2004). The dynamic environments of developing countries in particular render many traditional planning techniques inadequate, thus improvisation is said to play a distinct role in such contexts (Cunha et al., 2022).

There is a rich interdisciplinary literature on improvisation, which is attracting increasing attention in the mainstream management literature particularly. Nevertheless, improvisation has received far less attention in public management but can be traced back to the seminal article by Arie Halachmi (1980). Despite this early acknowledgement, there is a lack of research to date on improvisation in public administration and management (I.R. Hodgkinson and Hughes, 2024, 2025), and the role it plays in emergency services specifically (Mamédio et al., 2025). To help address this void, we focus on a specific conceptualization of the phenomenon—strategic improvisation. This form of improvisation has been described as the substantive merger of planning and execution outside the formal cycle of planning (e.g., Sharkansky and Zalmanovitch, 2000) in the public administration field. In the mainstream management literature, the same conceptual treatment holds, whereby strategic improvisation refers to “combining unplanned but deliberate responses to relentlessly changing environments, in which strategy becomes increasingly improvised” (Mamédio et al., 2022: 24). Given the paucity of research on strategic improvisation in emergency services (Mamédio et al., 2025) as well as in developing country contexts (Cunha et al., 2022), we seek to answer the research question: what drives strategic improvisation in emergency services of a developing country?

To this end, we focus on policing as our research setting, which is deemed to provide rich insights from a public management perspective (Schröter et al., 2023). Policing like other emergency services involves inherent unpredictability and uncertainty, conditions that often require personnel to engage with intuition and improvisation (e.g. Fenton-O’Creevy et al., 2022; Halachmi, 1980). However, there is little empirical research investigating *how* strategic improvisation materializes in such organizations, or in other words, how organizations improvise strategically in the face of environmental dynamism (Mamédio et al., 2025). For instance, Masood and Nisar (2022) identify the need for new knowledge on how different implementation environments affect the ability of frontline service workers to improvise and respond to local concerns and contexts in developing countries. This lack of knowledge remains, in part, because much improvisation is often hidden due to it being a discouraged process (Macpherson et al., 2022).

The ‘how’ is likely to be at least in part explained by social and structural features, as according to Butterfield et al. (2005), the police service is both a dynamic social context as well as relying on highly structured systems and procedures. We, therefore, empirically examine how socio-structural conditions might influence the propensity for improvisation by drawing on mail survey data from 230 Royal Malaysia Police (RMP) personnel located in the police national headquarters at Bukit Aman, Kuala Lumpur. Data is analyzed using fuzzy-set Qualitative Comparative Analysis (fsQCA) to investigate the potential socio-structural pathways to improvisation in this emergency service.

In doing so, the study makes several contributions to public management theory and practice. First, at the beginning of the 21st century, Sharkansky and Zalmanovitch (2000) introduced strategic improvisation to the public management field, which serves as a foundation for scholarly work on this phenomenon. Thus far, however, strategic improvisation has received little attention from public administration scholars. In addressing this oversight, we contribute to the burgeoning body of literature on this specific form of improvisation (e.g. Mamédio et al., 2022). Second, by examining pathways to strategic improvisation, we address the need identified by Mamédio et al. (2025) to delve deeper into what makes an emergency service capable of strategic improvisation in the context of a developing country and, in turn, advance understanding on how strategic improvisation can materialize in this setting. We subsequently add much needed insights into strategic improvisation that has, to date, been overlooked as a viable research stream in developing countries despite its clear relevance (Cunha et al., 2022). Finally, to understand the socio-structural conditions that might drive improvisation, we employ fsQCA as “one of its’ major strengths is that it derives configurational combinations of attributes associated with an outcome” (Andrews et al., 2019: 1242). The adoption of fsQCA for our analysis advances the recent adoption of this new analytical approach to study configurations of public management phenomena, as called for by Andrews et al. (2019).

**Background Theory**

For public organizations, “even the most carefully devised plans may have to be abandoned or modified in the face of unanticipated changes or challenges, and new actions improvised on the spur of the moment” (Sharkansky and Zalmanovitch, 2000: 322). The emergence of improvisation as a ‘legitimate’ management practice gained traction in the management literature of the 1990s (e.g., Crossan et al., 1996). It has since grown into a substantial body of scholarly work that has received increasing attention from a practitioner audience because of its association with agile organizations and apparent usefulness in an increasingly turbulent global environment.

Recent empirical insights on the phenomenon have extended the improvisation knowledge-base and revealed different forms that improvisation might take, based on the various treatments and respective operationalisations of the construct: (1) as learning process (e.g., Hughes et al., 2018a; Miner et al., 2001), (2) as decision-making process (I.R. Hodgkinson et al., 2025; Hughes et al., 2019; Nemkova et al., 2015), and (3) as strategy process (e.g. I.R. Hodgkinson et al., 2016; Hughes et al., 2018b, 2020; Sharkansky and Zalmanovitch, 2000). Each stream of improvisation research has substantial merit and is advancing the collective knowledge-base. This study focuses on strategic improvisation, which drawing on the definition offered by Mamédio et al. (2022) can be understood as an impromptu deliberate action stream that sustains the convergence of strategy and operation.

The simultaneous convergence between strategy and operation enables organizations to adapt to environmental dynamism in a deliberate even if unplanned way that contributes to strategy development and execution (Mamédio et al., 2022). It is this conceptual feature and role of temporality that distinguishes strategic improvisation from related management constructs such as agility, flexibility, and adaptation, as well as specific public management phenomenon such as street-level bureaucrats’ discretion (e.g. Lipsky, 2010). Moreover, the conceptual characteristics of strategic improvisation are proposed to be suitable for developing country contexts because of the “need to operate and continuously adapt to fast-changing and increasingly complex environments”, though puzzlingly it remains largely overlooked especially in developing countries of Asia specifically (Cunha et al., 2022: 351).

**Improvisation and Public Management**

The public sector operates under turbulence (e.g. from geopolitics, disruptive technologies, cultural and political misalignments, etc.) as well as having to face surprising and disruptive crisis events (e.g. financial crises, refugee crises, natural disasters, pandemics, etc.) (Carstensen et al., 2023). The baseline dynamism of the public sector, which can be amplified under crises, provides the type of context in which improvisation may occur (Macpherson et al., 2022). Sharkansky and Zalmanovitch’s (2000) seminal article was the first to address the role and relevance of strategic improvisation to public management as an alternative to conventional rational policy models. As done here, their treatment of improvisation was as a process rather than as a decision episode. The authors identify several antecedents at distinct levels, comprising personal (cognitions, heuristics, traits), cultural (supportive, national, or organizational), and environmental (turbulence, uncertainty, time-pressured). Despite Sharkansky and Zalmanovitch’s (2000) first steps mirroring the fledgling state of improvisation research in the management field at that time, the lack of any substantial scholarly attention since has subsequently led to the public management field falling behind in its knowledge-base, with few exceptions (e.g. Capano and Toth, 2023, 2024; I.R. Hodgkinson et al., 2025).

This is counter-intuitive as when we consider the psychology of decision-making, the default position in human information processing is to rely on intuition rather than rational models (G.P. Hodgkinson and Sadler-Smith, 2018). Such traits are centroids of the human condition and not specific to one sector, context, or culture (I.R. Hodgkinson and Hughes, 2023). Observations from the police service in the UK, for instance, suggests that “within a hierarchical structure policing involves wide discretion at lower levels” (Butterfield et al., 2005: 399); a description which supports the impromptu deliberate action stream of strategic improvisation (Mamédio et al., 2022).

Situating strategic improvisation in context, one would suggest it is particularly apt for public services in developing countries. Though there is significant variation between such countries, general reported characteristics of public services in developing countries include: uncertainty and ambiguity, lack of job security, limited formalization of working procedures, lack of managerial guidance and training, scarcity of basic resources, social inequality and poverty (see Campos and Peeters, 2022). All of which suggest relentlessly changing environments, under which strategic improvisation thrives (Mamédio et al., 2022). The level of environmental dynamism and need for strategic improvisation is likely exacerbated for emergency services, and indeed, improvisation has been observed to be critical to emergency responses as well as solving everyday problems faced by frontline service workers in developing countries (Masood and Nasir, 2021). More than this, however, emergency services are expected to adopt strategic perspectives ensuring reliability while operating in experimental, risky, and volatile task environments; in other words, such services adopt improvised actions guided by strategies (Mamédio et al., 2025).

**Study Proposition: Improvisation Ingredients**

The study posits that social and structural conditions will combine in some way as to drive strategic improvisation. No *a priori* expectations are held as to what such a combination may look like or indeed the number of combinations that may be present. Rather, we provide an overview of the social and structural drivers that are likely to play a combinative role and shape improvisation propensity based on insights from the extant improvisation literature. Specifically, we consider the social dimensions of self-efficacy and knowledge sharing (collecting and donating) and the structural dimensions of information communication technology (ICT) use, top management support, and management level; each condition is described below:

*Self-efficacy:* Self-efficacy or confidence in one’s judgment about one’s capability to effectively respond to a given situation to produce desired attainments (Bandura, 1989), is associated with improvised decision-making (e.g., Akinci and Sadler-Smith, 2012). It has been observed that individuals who are open to risk-taking improvise more than those who are not (Sharkansky and Zalmonovitch, 2000). As G.P. Hodgkinson and Sadler-Smith (2018) note, experiential Type 1 (intuitive) reasoning, which is closely associated with improvisation (e.g., Crossan and Sorrenti, 1997; Hughes et al., 2018b), is characterized by heuristics and mental shortcuts, where gut feelings and instinct drive action and which serves to increase improvisation (Hughes et al., 2020). Confidence to pursue these intuitions is thus a key social condition to improvisation given the inherent risk of failure.

*Knowledge sharing (collecting and donating):* knowledge sharing is the activity through which knowledge is exchanged between people (Becerra-Fernandez et al., 2004). In the organizational context, this refers to the process of transferring knowledge from one person to another in an organization (Noor and Salim, 2012). By sharing their knowledge (Wasko and Faraj, 2005), employees can resolve problems through enhanced learning (Ong et al., 2011). This knowledge sharing may be informal without the specific intention to do so or through formal channels (Amayah, 2013). Knowledge collecting and donating are particularly pertinent to improvisation, as knowledge plays a critical role in improvisation as a continuous and circular process that occurs as improvisation occurs, being used extemporaneously (Chelariu et al., 2002). In highly uncertain and unpredictable situations, if information and data are not readily available, this can hamper improvisation (e.g., Hughes et al., 2020). For example, given the knowledge-intensive and time-critical environment of police investigations, they are dependent on efficient and effective knowledge sharing owing to the immeasurable amount of knowledge that police officers need (Dean et al., 2006).

*ICT use:* The implication of developed ICT systems for public managers’ improvisation is unclear. This is partly because improvisation both departs from existing knowledge and builds on that knowledge (Cunha et al., 1999). To explore the implications of this nuance, the cognitive foundations of decision-making provide a helpful lens. Behavior and conscious thought contend to be a joint function of two cognitive systems, Type 1 (intuitive) and Type 2 (rational), which occur in parallel (G.P. Hodgkinson and Sadler-Smith, 2018). ICT, by its very nature, is rule-based and developed through conscious information processing, i.e. it is analytical, explicit, systematic, intentional, and rational. These characteristics are captured by Type 2 processing, whereas Type 1 involves more rapid processing geared toward immediate action. Nevertheless, information access can enable decisions to be taken in real time, suggesting information communication is a critical feature of improvisation. This points to an interactive element between the formalized Type 2 information processing used in constructing and maintaining ICT systems and the action-oriented approach to information processing under Type 1 (e.g., G.P. Hodgkinson and Sadler-Smith, 2018). Intuitive skills (i.e. Type 1) “enable individuals to cut rapidly and effortlessly through large quantities of information” (G.P. Hodgkinson and Sadler-Smith, 2018: 475). The more established and embedded the ICT in public organizations, the easier it becomes for the rapid, action-oriented decision-making that comprises improvisation under this logic.

*Top management support:* At the organizational level, it is essential to recognize that while infinite resources, such as human capital, financial resources, infrastructure and so on, would certainly not impede improvisation, the reality is far different. It is under resource-poor contexts where improvisation is expected to flourish, enabling organizations to do more with less. So, while the availability of resources is an important consideration, “a wealth of resources is not needed for strategic improvisation to occur, but, by the same token, a greater abundance and ability to *[re]deploy* capital and capability, by definition, increases one’s ability to exercise strategic improvisation” (Hughes et al., 2020: 490 *[emphasis added]*). Therefore, an internal organizational climate that accepts the unconventional and decisiveness supports strategic improvisation (Hughes et al., 2020) and this manifests through top management support.

*Management level:* As public managers progress through hierarchical levels throughout their careers and within organizations, they gain vital professional experience. The experience gained typically translates to the level of management individuals are employed at, such that greater professional experience is closely matched to higher management roles. The improvisation literature has identified professional experience as an antecedent of improvisation (e.g., I.R. Hodgkinson et al., 2016). Conversely, when the management level has been explicitly examined, an alternative logic has been presented, which contends that higher levels of management rely much more on rational‒planning. In comparison, lower levels of management are much more likely to improvise. Hughes et al. (2018b: 456), for instance, identify from the management literature how mid-level managers’ (e.g., general managers, project managers) decision-making is “a continuous activity to mediate between divergent inputs, situational demands, and the existing strategy during implementation”. Policy implementation can be impacted by unforeseen events requiring an ability to adapt on the fly (Howlett et al., 2018), much more so than the policy designers who typically sit far higher up the political hierarchy. Hence, one would expect less improvisation at higher levels of management or police rank.

The socio-structural conditions to be examined, therefore, comprise self-efficacy, knowledge collecting and donating, ICT, organizational support, and management level, while the outcome variable in this analysis is strategic improvisation.

**Research Methods**

**Data collection and sample**

A national police force provides an apt research setting for investigating the socio-structural configurations that might drive improvisation. This study focuses on the RMP, a federal institution led by the Inspector General of Police. The service functions of the force primarily involve law enforcement, order maintenance, and broader policing services (Kadir and Jusoff, 2009). The RMP headquarters are located at Bukit Aman, Kuala Lumpur. The target population was individuals with management responsibilities and who held strategic decision-making responsibilities. Within the RMP headquarters there are approximately 546 Management and Professional Group (MPG) officers with the ranks of Inspector, Assistant Superintendent, Deputy Superintendent, and Superintendent. These officers are split across three departments: the Criminal Investigation Department (n = 224), the Commercial Crime Investigation Department (n = 192), and the Narcotics Crime Investigation Department (n = 130).

Two members of the author team who are based in Malaysia employed stratified random sampling to the target population to determine an appropriate sample for the study. A self-completion survey questionnaire was then physically distributed by the two members of the author team with a sample of 300 respondents. Instruction for survey questionnaire completion specified five days for completion and return and identified one of the author team in Malaysia as the point for questionnaire return. Data collection occurred prior to the global pandemic. In total, 230 completed questionnaires were received from the 300 questionnaires administered, resulting in an overall response rate of 77%.

**Measures**

All measurement items used to capture the variables of interest are derived from previous studies published in academic journals. There are three social variables: knowledge self-efficacy (KSE) has two items, which are adapted from Spreitzer (1996) and Lin (2007); knowledge donating (KD) has three items, which are adapted from Lin (2007); and knowledge collecting (KC) has four items, which are adapted from Lin (2007). There are three structural variables: top management support (TMS) has four items, which are adapted from Tan and Zhao (2003); ICT use has four items, which are adapted from Lee and Choi (2003), and there are six management levels that create the management level dummy variable. The outcome variable, strategic improvisation (Improv), has five items informed by studies of improvisation by Vera and Crossan (2005), Trotter et al. (2013) and Mamédio et al. (2022) among others. All measures are presented in Table 1 and responses were recorded using a Likert five-point scale (except for management level). The five-point scale was adopted because it is the most common scaled-response form used in recent research and can provide the most accurate measurement (Hair et al., 2017).

<<Insert Table 1 about here>>

**Configurational analysis**

It is well established that different configurations of organizational characteristics will result in different organizational outcomes, and it follows, therefore, that multiple perspectives can arise on the same organization (Andrews and Beynon, 2011). For this very reason, fsQCA is the adopted methodological tool to reveal the potential for different socio-structural pathways to improvisation in the examined emergency service. Indeed, as observed by Andrews and Beynon (2024: 591):

Configuration thinking forms the bedrock for understanding fsQCA, including the notions of conjunction (the possible co-occurrence of two or more attributes in producing an outcome), equifinality (different combinations of attributes may be equally effective in bringing about an outcome), and asymmetry (different combinations of attributes may bring about an outcome compared to a non-outcome).

There are four assumptions of configurational analysis: conjunction, equifinality, asymmetry, and casual asymmetry (Misangyi et al., 2017; Mostafiz et al., 2024). The conjunction in configurational analysis indicates that different combinations or configurations of causal variables may lead to a desirable outcome. Mostly, not a single condition but combinations of different conditions lead to a particular outcome (Misangyi and Acharya, 2014). Thus, in our study, rather than a single condition, a combination of social and structural conditions may be necessary or sufficient (Mostafiz et al., 2024) to lead to strategic improvisation.

Contrary to a single path for an outcome, equifinality in configurational analysis suggests that multiple paths or configurations can lead to the same outcome (Misangyi et al., 2017; Mostafiz et al., 2024). Equifinality also allows the functional substitution of different conditions or configurations for alternative paths for the same outcome (Fainshmidt et al., 2021). Thus, in our study, multiple configurations of socio-structural conditions may lead to strategic improvisation. Asymmetry in configuration analysis suggests that conditions leading to an outcome may differ from those without those conditions (Furnari et al., 2021). Thus, asymmetry allows non-linear relationships between conditions and outcomes; a condition or conditions may be necessary for an outcome but may not be sufficient. Causal asymmetry is an extension of asymmetry, indicating that the configurations that lead to higher outcomes are not a mirror image of those that lead to lower outcomes (Fiss, 2011). Thus, configurational analysis differs from correlation-based symmetric analysis (Fiss, 2011).

**Validity and reliability**

Table 1 presents the descriptive statistics of our data. The skewness values are between + 2 and -2, and the kurtosis values are between +7 and -7, indicating a normal distribution of our data (Byrne, 2013). We used Cronbach’s Alpha and composite reliability to test the validity and reliability of our data (Table 2). Cronbach’s Alpha values are between 0.716 and 0.789, whereas composite reliability values are 0.78 and 0.885. All these values are well above the threshold of 0.7 (Goldsmith and Hofacker, 1991). The AVE values are between 0.577 and 0.774, higher than the threshold of 0.5 for convergent validity (Hair et al., 2019). The VIF values are less than 5, and thus, there are no collinearity issues to report.

<<Insert Table 2 about here>>

**Results**

**fsQCA results**

We performed a contrarian case analysis to validate the need for fsQCA analysis (Mostafiz et al., 2024; Pappas and Woodside, 2021). This analysis helps us to identify the cases in our sample that are not explained by the main effects and, hence, those are not included in a variance-based (correlation and regression) analysis. To perform this analysis, we first calculated each variable's mean score and then split them into quantiles (five equal groups). We cross-tabbed the quantiles for each independent variable with the dependent variable to gauge the degree of associations between these variables. The grey area in Table 3 represents the contrarian cases. The analysis highlights the different relationships between variables and, hence, the need for fsQCA analysis (Pappas and Woodside, 2021).

<<Insert Table 3 about here>>

For fsQCA analysis, we calibrated the data to fuzzy sets with values ranging from 0 to 1 (Ragin, 2008), where 1 represents full membership in the fuzzy set, and 0 represents full nonmembership. 0.5 represents the intermediate point where a case may be a member or non-member of the fuzzy set. We chose 95, 50, and 5 percentiles to calibrate our data. We selected the truth table algorithm based on the calibrated scores and eliminated the configurations with minimum consistency cutoff points of 0.8 (Ragin, 2009). The truth table is given in Table 4. We performed a standard analysis, and the result is shown in Table 5. Consistency and coverage are two parameters to explain the results of the fsQCA analysis (Ragin, 2009). We chose 0.75 as the minimum consistency threshold (Rihous and Ragin, 2009) and identified eight different configurations for strategic improvisation. The analysis configurations varied from 0.931 to 0.833 (satisfactory consistency levels), and the coverage ranged from 0.296 to 0.429 (adequate coverage for analysis). Thus, in our model, multiple configurations exist, and a single configuration is insufficient to explain strategic improvisation. Moreover, the consistency of all the models is more than 0.8, which following convention suggests their validity.

<<Insert Table 4 about here>>

<<Insert Table 5 about here>>

Each solution represents a combination of socio-structural conditions that is sufficient to produce the positive outcome (high strategic improvisation), though not necessary. Considering both ‘consistency’ and ‘raw coverage’, Figure 1 visualises solution 1 and solution 5 that score high on consistency and have the greatest levels of coverage (>0.40) across the observed cases.

<<Insert Figure 1 about here>>

In solution 1, strategic improvisation emerges when TMS is combined with strong KD, KC, and high SE. These conditions all present as core elements and suggest a socio-structural capability-driven pathway where leadership support and robust knowledge behaviors collectively enable firms to improvise in dynamic contexts. This solution yields a consistency score of 0.93, indicating high reliability in producing the outcome, and its coverage score of 0.42 indicates the pathway accounts for just under half of the observed instances of strategic improvisation. Solution 5 reveals a slightly different route to the same outcome; the importance of TMS, KD, and KC as core conditions remain, but this solution is marked by the contrasting ‘do not care’ impact of SE, combined with the presence of ICT use capability and the peripheral condition of ML. This alternative path suggests that strategic improvisation can still arise irrespective of self-efficacy, provided there is enabling technology and relevant management levels involved. With a consistency of 0.89 and a similar coverage of 0.40 to solution 1, this solution highlights a valid and conventional pathway.

Finally, solution 2 warrants a note insomuch that it is a different route to the same outcome, with a high consistency of 0.92 but a far more modest coverage of 0.26, which suggests it is an empirically valid but unconventional mechanism accounting for about a quarter of the observed instances of strategic improvisation. This solution shows how strategic improvisation can still arise in the absence of social conditions (KD, KC, SE), provided the structural conditions of TMS and enabling technology are present.

**Necessity analysis**

We performed a necessity condition analysis since researchers (e.g. Fainshmidt et al., 2020) outline that fsQCA provides sufficient conditions but may neglect independent conditions for a particular outcome. We selected strategic improvisation as an outcome and selected different conditions (both the presence and absence of social and structural conditions). We set a consistency threshold of 0.9 (Mostafiz et al., 2024; Soto et al., 2023), and none of the conditions on their own are found to be necessary to the materialization of strategic improvisation (Table 6). Thus, it is only through the identified configurations (i.e. solutions) of socio-structural conditions that improvisation materializes.

<<Insert Table 6 about here >>

**Robustness analysis**

For robustness testing, we followed convention (e.g., Mostafiz et al., 2024; Emmenegger et al., 2014) and changed the calibration membership criteria. We selected 90, 50, and 10 percentiles to calibrate the data for full, intermediate, and full nonmembership. Similar to the previous analysis, we developed a truth table algorithm based on the calibrated scores and eliminated the configurations with minimum consistency cutoff points of 0.8. The standard analysis is shown in Table 7. There was some variation in the robustness analysis, but most configurations remained similar to our previous fsQCA analysis, as shown.

<<Insert Table 7 about here >>

**Discussion**

**Theoretical contributions**

The findings testify to the significance of fsQCA for investigating public service management phenomena and revealing relevant causal configurations for outcomes to emerge. In emergency services, strategic improvisation has been observed to play a key role and one that co-exists with preparation (Mamédio et al., 2025). The study provides new insights into the socio-structural pathways that enable strategic improvisation by shedding light on how diverse configurations, some human-centric others more technology-driven, can drive strategic improvisation. For instance, and as evidenced, none of the social or structural conditions examined alone result in strategic improvisation; improvisation materializes only through combinative effects. To address the question: what drives strategic improvisation in emergency services of a developing country, we sought to reveal the specific configurations of social and structural conditions required for high strategic improvisation and, conversely, those that might explain its absence in organizational decision-making. In doing so, we uncover the specific pathways to high improvisation, and the findings reveal two stand-out solutions to this end from the seven available (see solutions 1 and 5 in Table 5), but note that the configurations revealed do not capture the whole landscape of causal recipes.

There is commonality across both solutions 1 and 5 insomuch that top management support and knowledge sharing (i.e., knowledge collecting and knowledge donating) are core necessary conditions. In the strongest of the two solutions for explaining high improvisation (solution 1), self-efficacy is a necessary condition that combines with top management support and knowledge sharing to form a pathway to high strategic improvisation. While in the slightly weaker solution in terms of explanatory power (solution 5), self-efficacy becomes a ‘do not care’ condition, playing no role in the pathway to high improvisation. However, ICT becomes a core condition and plays a vital role in this pathway. What these findings reveal then are a required core set of socio-structural conditions—top management support and knowledge collecting and donating (knowledge sharing)—that can be further augmented in two different ways, by either (i) the presence of self-efficacy among decision-makers or (ii) through an ICT use capability. The insights revealed directly contribute to advancing understanding and knowledge on how strategic improvisation materializes in emergency services of developing countries, which has been missing from the extant literature (Mamédio et al., 2025). More than this, however, we suggest that the findings here hold value to other public services in developing countries that are often confronted with high degrees of environmental dynamism, such is the recognized role and relevance of strategic improvisation for these country contexts (Cunha et al., 2022).

A closer inspection of the seven solutions uncovered reveals further relevant secondary insights. Specifically, while top management support is one of the main conditions across solutions for strategic improvisation in emergency services, management level in contrast has less impact on strategic improvisation. Though the former is consistent with our theorization, the latter is surprising as it differs from observations across extant studies. This suggests, then, that despite our theorization that higher management levels will be less likely to engage with improvisation relative to lower levels of management (e.g., Hughes et al., 2018b), this is not so clear-cut in the public emergency service examined. One explanation for this is that the training officers receive equips all personnel irrespective of management level to engage with strategic improvisation. Thus, the insights garnered go some way to addressing Cunha et al.’s (2022) observation for the need for more improvisation insights from the Asian context. Specifically, we reveal that the antecedent role of managerial level uncovered in private sector firms in Asia (e.g. Hughes et al., 2018b) holds at most a peripheral role for emergency services (solution 5) and in some cases no role (solution 1); suggesting this is less relevant for dynamic public services in Asia.

Also, in the absence of the social conditions of knowledge sharing and self-efficacy, the structural conditions of top management support and ICT can facilitate the materialization of strategic improvisation (see solution 2 in Table 5), but albeit at lower levels than that of the two solutions described above that combine social *and* structural conditions for optimal pathways to the outcome examined. This observation that structural conditions influence decision-maker behavior is consistent with contingency theories of organization design (e.g., Donaldson 2001) and insights revealed in government departments from past studies (e.g., Andrews et al., 2016). From the findings presented, then, we add new knowledge on how structural conditions specifically play a role in strategic improvisation occurrence in public service organizations, which further extends the interdisciplinary strategic improvisation literature (e.g. Mamédio et al., 2022).

Collectively, by revealing the different combinations of socio-structural conditions associated with strategic improvisation, we can advance knowledge on both the relevance and complexity of its materialization in emergency services. We also simultaneously demonstrate the value of fsQCA as a methodological tool to investigate public service management phenomena, contributing further validation to this methodological approach and extending its application beyond previously examined contexts like local government, government departments, infrastructure services, and healthcare (e.g., Andrews and Beynon, 2011, 2019, 2024; Andrews et al., 2016, 2019) to public sector emergency services of a developing country.

**Managerial implications**

Increasing societal stressors as well as pressures “from fiscal austerity, demographic change and value shifts both in society and in their organizations” are being felt by police forces and their leaders (Schröter et al., 2023: 1634). This service context is, thus, an epitome of the change, turbulence, ambiguity, and uncertainty that have come to characterize many public services (Capano and Toth, 2023; George et al., 2018) and highlights the relevance and value of strategic improvisation. The identified socio-structural pathways to strategic improvisation enable policing services to exploit this approach in a planned and organized way. Moreover, we expect these pathways to hold relevance in other fast-paced decision-making environments, beyond the police research setting examined. Such environments have been observed in organizations such as firefighting services, hospitals, armed services, transport services and other types of safety-critical organizations (Macpherson et al., 2022).

Improvisation has become a central feature of mainstream management studies but it does not replace rational‒planning models, rather it can exist alongside planning in public service management (e.g. I.R. Hodgkinson et al., 2023). To illustrate this point in the policing context, the National Decision Model that forms a central tenant of policing curricula in the UK serves as a framework “to consider multiple relevant facets of a decision and its role in recording of a defensible basis for decisions” (Fenton-O’Creevy et al., 2022: 24); it is not a tool, however, that should detract from intuition in decision making, indeed, as the college of policing—an independent non-departmental public body in the UK—states, it can be applied to planned operations as well as *spontaneous* incidents. The question then becomes how to cultivate and foster strategic improvisation. The findings of this study thus provide clear insights on the socio-structural configurations for strategic improvisation and make clear that a focus on conditions in silo is not sufficient to drive strategic improvisation.

**Limitations and future research**

The study is not without its limitations. First, while a multi-informant approach is taken in data collection, the study relies on a single survey instrument at one point in time. This cross-sectional design holds limitations and does not permit observations over time. Second, the study focuses on the RMP, which is a government agency of an East Asian country, and therefore, caution will need to be taken when generalizing the findings across markedly different populations. Thirdly, and linked to the previous point, it might be expected that cultural factors and conditions also play a role in pathways to improvisation. Such conditions were not accounted for in the current study. Finally, we do not account for the ‘success’ or ‘failure’ of strategic improvisation in the public service examined, as this was beyond the scope of the study. Nevertheless, this is an important consideration.

From the above limitations, two key avenues for future research emerge: (i) there is a need to extend strategic improvisation insights across different public service contexts and in different country settings. Such research would provide contextually varying insights into both the prevalence of improvisation as well as the different pathways to its materialization; (ii) investigating the direct and indirect effects of strategic improvisation for public service management is a worthy pursuit and will be necessary to overcome the negative connotations that remain closely attached to improvisation in public management scholarship.

**Concluding Remarks**

Improvisation remains somewhat of an oddity in public service management scholarship, largely owing to unfair negative connotations such that “those who improvise may be perceived as not having prepared well in advance; improvisation is used by actors who have not memorized the part and therefore resort to gimmicks” (Capono and Toth, 2023: 96). The reality is far from this as strategic improvisation goes together with preparedness (Mamédio et al., 2025) and we outline how strategic improvisation materializes through a set of socio-structural pathways revealed through fsQCA. As others have, we urge the scholarly community and practitioners to view improvisation favourably and as a valid approach both in dynamic environments (e.g. Macpherson et al., 2022) as well as for solving everyday problems that arise in public services in developing countries (e.g. Masood and Nasir, 2021) and elsewhere.

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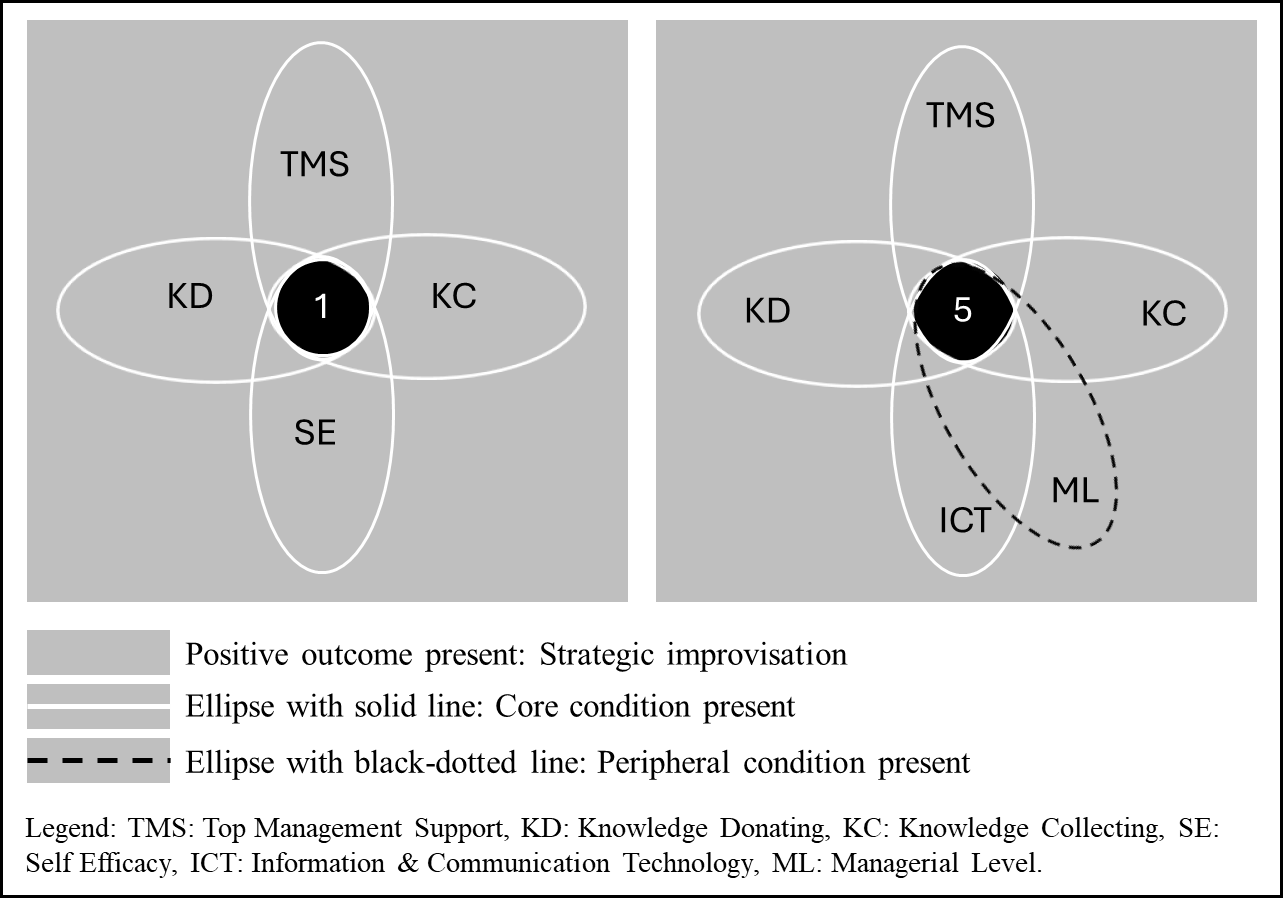
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**Figure 1:** Venn diagram ofcausal recipes: solutions 1 and 5



**Table 1:** Construct Reliability and Validity

|  |  |  |
| --- | --- | --- |
| Constructs and items | Loading | VIF |
| **Knowledge Self-Efficacy (KSE) (⍺ = 0.716, CR = 0.78, AVE = 0.774)** |  |  |
| I am confident in my ability to provide knowledge that others in my department consider valuable. (KSE1) | 0.834 | 1.452 |
| I have the expertise required to provide valuable knowledge for my department. (KSE2) | 0.923 | 1.452 |
| **Top Management Support (TMS) (⍺ = 0.789, CR = 0.885, AVE = 0.597)** |  |  |
| Top managers think that encouraging knowledge sharing with colleagues is beneficial. (TMS1) | 0.62 | 1.621 |
| Top managers always support and encourage employees to share their knowledge with colleagues. (TMS2) | 0.789 | 1.858 |
| Top managers provide most of the necessary help and resources to enable employees to share knowledge. (TMS3) | 0.867 | 1.775 |
| Top managers are keen to see that the employees are happy to share their knowledge with colleagues. (TMS4) | 0.795 | 1.863 |
| **Information and Communication Technology use (ICT) (⍺ = 0.782, CR = 0.786, AVE = 0.577)** |  |  |
| Employees make extensive use of electronic storage (such as online databases and data warehousing) to access knowledge. (ICT1) | 0.62 | 1.486 |
| Employees use knowledge networks (such as groupware, intranet, virtual communities, etc.) to communicate with colleagues. (ICT2) | 0.789 | 1.672 |
| My department uses technology that allows employees to share knowledge with other people inside the organization. (ICT3) | 0.867 | 1.771 |
| My department uses technology that allows employees to share knowledge with other people outside the organization. (ICT4) | 0.795 | 1.568 |
| **Knowledge Donating (KD) (⍺ = 0.741, CR = 0.749, AVE = 0.657)** |  |  |
| When I have learned something new, I tell my colleagues about it. (KD1) | 0.788 | 1.494 |
| When they have learned something new, my colleagues tell me about it. (KD2) | 0.823 | 1.643 |
| Knowledge sharing among colleagues is considered normal in my department. (KD3) | 0.82 | 1.381 |
| **Knowledge Collecting (KC) (⍺ = 0.883, CR = 0.887, AVE = 0.74)** |  |  |
| I share information I have with colleagues when they ask for it. (KC1) | 0.845 | 3.162 |
| I share my skills with colleagues when they ask for it. (KC2) | 0.884 | 3.532 |
| Colleagues in my department share knowledge with me when I ask them to. (KC3) | 0.873 | 3.584 |
| Colleagues in my department share their skills with me when I ask them to. (KC4) | 0.838 | 3.325 |
| **Strategic Improvisation (IMPROV) (⍺ = 0.803, CR = 0.815, AVE = 0.56)** |  |  |
| We respond in the moment to unexpected problems. (IMPROV1) | 0.655 | 1.387 |
| We often improvise in carrying out actions. (IMPROV2) | 0.8 | 1.68 |
| Improvisation is vital for decision success. (IMPROV3) | 0.728 | 1.653 |
| We can improvise most of our decisions. (IMPROV4) | 0.766 | 1.757 |
| We sometimes improvise while making decisions. (IMPROV5) | 0.785 | 1.871 |

**Table 2:** Descriptive Statistics

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Measures** | **Minimum** | **Maximum** | **Mean** | **Standard Deviation** | **Skewness** | **Kurtosis** |
| KSE1 | 2 | 5 | 4.283 | 0.607 | -0.587 | 1.254 |
| KSE2 | 1 | 5 | 4.043 | 0.709 | -0.8 | 1.713 |
| TMS1 | 1 | 5 | 4.413 | 0.691 | -1.317 | 2.851 |
| TMS2 | 2 | 6 | 4.291 | 0.744 | -0.977 | 1.238 |
| TMS3 | 1 | 5 | 3.548 | 0.882 | -0.586 | 0.296 |
| TMS4 | 1 | 5 | 3.804 | 0.835 | -0.476 | 0.243 |
| ICT1 | 1 | 5 | 3.817 | 0.881 | -0.634 | 0.019 |
| ICT2 | 1 | 5 | 3.87 | 0.937 | -0.98 | 0.858 |
| ICT3 | 1 | 5 | 3.735 | 0.93 | -0.82 | 0.637 |
| ICT4 | 1 | 5 | 3.396 | 0.935 | -0.449 | -0.135 |
| KD1 | 1 | 5 | 4.065 | 0.685 | -1.39 | 4.956 |
| KD2 | 1 | 5 | 3.73 | 0.806 | -0.726 | 1.202 |
| KD3 | 1 | 5 | 3.974 | 0.785 | -1.038 | 2.118 |
| KC1 | 1 | 5 | 4.022 | 0.805 | -1.048 | 1.45 |
| KC2 | 1 | 5 | 4.1 | 0.771 | -1.263 | 2.441 |
| KC3 | 1 | 5 | 4.022 | 0.731 | -0.975 | 1.976 |
| KC4 | 2 | 5 | 4.043 | 0.721 | -0.836 | 1.287 |
| IMPROV1 | 1 | 5 | 3.917 | 0.708 | -0.766 | 1.542 |
| IMPROV2 | 1 | 5 | 4 | 0.632 | -0.727 | 2.515 |
| IMPROV3 | 1 | 5 | 3.804 | 0.819 | -0.772 | 1.029 |
| IMPROV4 | 1 | 5 | 3.948 | 0.795 | -0.794 | 0.882 |
| IMPROV5 | 1 | 5 | 4.013 | 0.788 | -0.934 | 1.565 |
| Rank | 1 | 4 | 3.317 | 0.899 | -1.141 | 0.3 |
| Mgt Level | 1 | 6 | 4.043 | 1.617 | -0.71 | -0.79 |

**Table 3:** Cross Tabulation Analysis

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Constructs |  | Strategic improvisation | | | | | Total | Effect |
|  |  | 1 | 2 | 3 | 4 | 5 | count | Size (Phi) |
| Technology and Management Service (TMS) | 1 | 16 | 4 | 9 | 5 | 3 | 37 | 0.359 |
| 2 | 14 | 7 | 17 | 11 | 7 | 56 |  |
| 3 | 8 | 6 | 19 | 15 | 6 | 54 |  |
| 4 | 7 | 4 | 5 | 6 | 3 | 25 |  |
| 5 | 8 | 0 | 21 | 14 | 15 | 58 |  |
| Total | 53 | 21 | 71 | 51 | 34 | 230 |  |
| Count |  |  |  |  |  |  |  |
| Information and Communication Technology  (ICT) | 1 | 18 | 10 | 9 | 10 | 5 | 52 | 0.365 |
| 2 | 13 | 5 | 19 | 11 | 8 | 56 |  |
| 3 | 6 | 1 | 16 | 5 | 5 | 33 |  |
| 4 | 11 | 4 | 12 | 15 | 5 | 47 |  |
| 5 | 5 | 1 | 15 | 10 | 11 | 42 |  |
| Total | 53 | 21 | 71 | 51 | 34 | 230 |  |
| count |  |  |  |  |  |  |  |
| Knowledge  Donating  (KD) | 1 | 19 | 6 | 5 | 2 | 3 | 35 | 0.523 |
| 2 | 7 | 1 | 13 | 1 | 4 | 26 |  |
| 3 | 9 | 7 | 37 | 24 | 8 | 85 |  |
| 4 | 9 | 5 | 8 | 15 | 6 | 43 |  |
| 5 | 9 | 2 | 8 | 9 | 13 | 41 |  |
| Total | 53 | 21 | 71 | 51 | 34 | 230 |  |
| count |  |  |  |  |  |  |  |
| Knowledge  Collecting  (KC) | 1 | 29 | 1 | 5 | 4 | 4 | 43 | 0.653 |
| 2 | 4 | 9 | 8 | 6 | 6 | 33 |  |
| 3 | 7 | 7 | 41 | 28 | 12 | 95 |  |
| 4 | 10 | 2 | 1 | 4 | 4 | 21 |  |
| 5 | 3 | 2 | 16 | 9 | 8 | 38 |  |
| Total | 53 | 21 | 71 | 51 | 34 | 230 |  |
| count |  |  |  |  |  |  |  |
| Knowledge  Self-Efficacy  (KSE) | 1 | 17 | 5 | 11 | 9 | 5 | 47 | 0.28 |
| 2 | 11 | 5 | 11 | 6 | 4 | 37 |  |
| 4 | 19 | 9 | 41 | 25 | 15 | 109 |  |
| 5 | 6 | 2 | 8 | 11 | 10 | 37 |  |
| Total | 53 | 21 | 71 | 51 | 34 | 230 |  |
| count |  |  |  |  |  |  |  |
| Management  Level  (ML) | 1 | 6 | 5 | 12 | 6 | 5 | 34 | 0.326 |
| 2 | 24 | 5 | 32 | 20 | 15 | 96 |  |
| 4 | 18 | 2 | 10 | 16 | 4 | 50 |  |
| 5 | 5 | 9 | 17 | 9 | 10 | 50 |  |
| Total | 53 | 21 | 71 | 51 | 34 | 230 |  |
| count |  |  |  |  |  |  |  |

**Table 4:** Truth Table Algorithm

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Management**  **Level** | **TMS** | **ICT** | **KD** | **KC** | **KSE** | **# of officers** | **Strategic Improv.** | **Consistency** |
| 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0.960757 |
| 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0.955832 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.950599 |
| 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0.930747 |
| 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0.927669 |
| 0 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0.922849 |
| 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0.915449 |
| 0 | 0 | 1 | 0 | 0 | 1 | 2 | 1 | 0.913325 |
| 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0.902019 |
| 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0.899241 |
| 1 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0.891906 |
| 1 | 1 | 1 | 1 | 1 | 0 | 5 | 1 | 0.878359 |
| 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0.878201 |
| 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0.853628 |
| 1 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0.770294 |

**Table 5:** fsQCA Results

**A graph of a number of black dots

Description automatically generated with medium confidence**

**Table 6: Necessary Condition Analysis**

|  |  |  |
| --- | --- | --- |
| **Conditions** | **Consistency** | **Coverage** |
| Management Level (~) | 0.756 (0.582) | 0.667 |
| TMS (~) | 0.701 (0.649) | 0.749 |
| ICT (~) | 0.689 (0.669) | 0.749 |
| KD (~) | 0.781 (0.624) | 0.756 |
| KC (~) | 0.714 (0.689) | 0.788 |
| KSE (~) | 0.646 (0.737) | 0.796 |

Note: Outcome condition: strategic improvisation

**Table 7:** fsQCA Robustness Results

