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An integration team's diagnosing of context, spanning boundaries and creating psychological safety within a multiteam system

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Abstract

Purpose: The purpose of this study is to explore how integration teams can build trusting relationships in component teams to enhance their leadership capability within multiteam systems to achieve common superordinate goals. The study investigates how an integration team diagnoses contextual dynamics to enhance understanding of goals in component teams and spans boundaries to create trusting relationships.

Design/methodology/approach: The proposed model was tested by surveying 396 respondents nested within component teams working within five South African manufacturing companies. Structural Equation Modeling was used to analyse the data.

Findings: The study reveals that by diagnosing the contextual dynamics within a multiteam system and through boundary spanning, an integration team builds trusting relationships, which will, ultimately, enable teams to achieve common superordinate goals.

Practical implications: This study offers organisations insights into how multiple component teams of different functional disciplines can work effectively towards achieving an overall or common superordinate goal. It offers insights on how to mitigate misalignment challenges by implementing an integration team within the multiteam system context.

Originality/value: Research participants were employees within a manufacturing context, which sets this study apart from many previous ones conducted in a simulated environment within a military context. The study investigates building trusting relationships among multiple component teams within a multiteam system through the implementation of an integration team, which has not been specifically addressed in previous studies.

Keywords: Teams; Leadership; Organizational effectiveness; Manufacturing systems; Team management

1. Introduction

Changes in technology spawn new challenges that compel companies to act smarter in the way they govern their operational activities, bringing with it a higher level of complexity (Kutz and Bamford-Wade, 2013). Typically challenges at this higher level of complexity are beyond the capacity of individual people or close-knit teams (Zaccaro et al., 2012). These complex challenges require multiple teams and individuals working interdependently to solve them. The challenge for leadership within organisations is how to get different teams to work interdependently over the long term.

The concept of multiple teams working interdependently as teams of teams, has been referred to in previous studies as a multiteam system (Zuofa and Ochieng, 2017; Cuijpers et al., 2016; Firth et al., 2015; Lanaj et al., 2013; Zaccaro et al., 2012). Multiteam systems are formally defined as "two or more teams that interface directly and interdependently in response to environmental contingencies toward the accomplishment of collective goals" (Marks et al., 2001, p.290). Multiteam systems are thus a hybrid organisational form that is larger than an individual team, but smaller than an organisation, potentially spanning across boundaries to other organisations (Rico et al., 2017; Shuffler et al., 2015). The criteria for a multiteam system include, individual teams within the multiteam system, called component teams, to work coherently to achieve a common or shared goal, or to address demands imposed by the external environment (Miles et al., 2015; Luciano et al., 2018). Zaccaro et al. (2012, p.7) highlight that, "A multiteam system brings together a complex variety of skills, knowledge and functions in adaptive structures that are especially suited to managing a highly complex environment".

This study suggests that a multiteam system approach could be advantageous for managing the degree of complexity in manufacturing processes, such as fast moving consumer goods (FMCG) processes or continuous chemical process operations. In these contexts, issues develop that require the introduction of a multiteam system with multiple input processes which rely on the interactions of various component teams and individuals to be resolved. Typical component teams found in such processes in the South African manufacturing environment, as the context for the current study are: production teams, engineering and maintenance teams, quality and process-technical teams, safety, health and environmental compliance teams, as well as sales and marketing teams. Each component team would have its own departmental reporting structures, team-specific targets and objectives, specialised skills, knowledge, aspirations and motivational drivers based on their organisational requirements.

The current study identified particular scenarios within each sampled manufacturing process, where departmental silos were creating conflict and preventing a particular objective from being met. Multiteam systems were introduced to resolve these issues. The resolution of the identified scenarios or pain points became the superordinate goals. For example, the company

where 83% of the respondents came from, experienced the following real-life scenario: Two final product assembly processes had common upstream feeder processes. They made similar products, however one was an automated process and the other was a labour intensive manual process. The pain point of concern was that there was destructive rivalry between these final assembly processes. The automated process would secure and demand upstream product to be delivered, without concern for the consequence to the manual process and vice versa.

The result was that the upstream process would become frustrated, because both assembly process departments would often complain of stock outs, due to either of them, which had booked and consumed the required upstream product. Prior to the implementation of an integration team to address this scenario, neither of the final processes had collectively addressed the issues, as each one focused only on their own proximal goals and targets. The integration team that was formed comprised eight members of different functions spanning both assembly processes, the upstream processes and some of the external planning departments. There were more than twenty component teams identified within the system that had to contribute to resolve the conflict. The component teams included 11 production teams, four logistics teams, two engineering teams and four quality assurance teams. Collectively 412 individual members made up this multiteam system.

The scenario described above illustrates that interaction within a multiteam system differs from traditional departmental interaction in the following manner: functional departments tend to work in psychological silos, focusing on their individual goals and objectives. These are driven by their own departmental priorities, targets or motivational incentives. Unfortunately, goal and objective misalignment between those departments regularly lead to conflict and discordance.

For business leaders, this complexity poses a challenge around which mechanisms they should employ to ensure that the multiteam system is appropriately aligned and functions coherently, thereby minimising conflict as well as creating an environment of psychological safety and trust, such that common superordinate goals are achieved (DeChurch et al., 2011). A typical superordinate goal in a complex manufacturing process could be to produce diverse, large volume, high quality, cost-effective products from multiple production facilities, resolving a recurring product specific quality defect, or resolving a particular conflict between functional departments. In obtaining multiteam system performance, relationships characterised by trust and mutual respect within the multiteam system are required (Luciano et al., 2018; Gerber et al., 2016; Millikin et al., 2010). Since trust is an important predictor of achieving positive multiteam system performance (Luciano et al., 2018; Gerber et al., 2016; Millikin et al., 2010), this cross-sectional study will focus on trusting relationships as a contribution to multiteam system performance.

2. Theoretical Background

2.1 The role of leadership in multiteam systems

The value proposition of a multiteam system is the achievement of a common superordinate goal through multiteam system performance (Rico et al., 2018). Gerber et al. (2016) confirms the notion that common overarching goals can be achieved through a multiteam system built on trusting relationships (Gerber et al., 2016).

However, Rico et al. (2017) noted that multiteam systems by their very nature and purpose contain divisional seeds among their component teams that threaten the stability of the entire multiteam system over time (Rico et al., 2017). Some of these divisional seeds include: differences in goal hierarchy and goal prioritisation among component teams, differences in

team structure as well as misalignment and inadequate coordination among component teams (Rico et al., 2017). Other divisional seeds that may threaten the stability of the multiteam system are the component team members' self-efficacy, social identification and disparity between work and personal values (Osborn and Marion, 2009), or collective emotion regulation (van den Berg et al., 2014). This suggests that should these divisional seeds go unquenched, the level of trusting relationships within the multiteam system may be negatively impacted.

The potential for division, highlights the important role of leadership of the multiteam systems. In this regard, DeChurch et al. (2011) describe leadership functions that impact multiteam systems, including: cognitive processes, such as situational analysis, roles and responsibility establishment; developing plans; and behavioural processes, such as initiative. They suggest that these leadership functions, or leader strategies, are critical mechanisms to achieve successful multiteam system performance (DeChurch et al., 2011).

For leaders to manage multiteam systems effectively, several leadership strategy actions should be considered. They include; coordination (establishing roles and responsibilities) (De Vries et al., 2016), mindful teaming (Weaver, 2016), planning (Lanaj et al., 2013), learning processes (Sessa, London and Wanamaker, 2018), goal alignment (prioritisation), boundary spanning (Rico et al., 2018), inclusivity, and diagnosing context (analysing the situation) (Kutz, 2008).

Davison et al. (2012) propose the concept of the leadership of **an integration team** as a vertical coordination mechanism in a multiteam system. An integration team comprises boundary-spanning representatives (team leaders) from each component team, and roles with system-wide responsibilities within the multiteam system. These integration teams form part of the multiteam system structure and are responsible for ensuring effective coordination between specialised component teams and the achievement of the common superordinate multiteam system goals (De Vries et al., 2016). This implies that integration teams are central to the flow of work with members dedicated to spanning boundaries between component teams. This role enables integration teams to develop a holistic contextual view of the broader system (Davison et al., 2012). Bienefeld and Grote (2014) identify boundary-spanning leadership as a key success factor for positive performance in the multiteam system.

Osborn and Marion (2009) note that followers' self-efficacy, social identification and concordance between work and personal values are important for performance. Applying this to the multiteam system context, a key leadership strategy for the integration team is to establish a superordinate social identity that the integration team itself could aspire to, and to bridge the social identities of the relevant component teams' social identities. This will ensure component team members feel psychologically safe, respected and included in the superordinate social form (Glynn et al., 2010). Establishing this superordinate social form would enhance both horizontal and vertical coordination within the multiteam system.

Aligned interaction among component teams on the same hierarchical level, referred to as horizontal coordination (De Vries et al., 2016), enables component teams to integrate their unique skill sets and knowledge contributions permitting the multiteam system to achieve a common superordinate goal. Factors that may influence the success of this horizontal coordination include; misunderstanding of component teams' languages, routines, and thought-worlds (De Vries et al., 2016), frame-of-reference (Miles et al., 2015), locus of planning (Lanaj et al., 2013), inter-team conflict, measurement and metrics (Cuijpers et al., 2016), intra-teamwork quality (Cha et al., 2015), goal hierarchy and prioritisation (Rico et al., 2017), goal discordancy and differentiation (Luciano et al., 2018), social identification (Osborn and Marion, 2009), collective emotion regulation (van den Berg et al., 2014) and leadership style (Li et al., 2016).

Horizontal coordination is particularly important in highly stressful contexts such as emergency situations or disaster recovery scenarios where different response teams need to coordinate seamlessly to address the situation effectively. Similarly, in a manufacturing context, sudden changes in the system like unplanned breakdowns or unforeseen short supply of raw materials require teams of different disciplines to function cohesively to avoid fatal outcomes that could jeopardise critical business objectives. Horizontal coordination amongst component teams in such situations becomes critical (De Vries et al., 2016).

Developing component teams as cross-functional teams to become broad functional generalists rather than narrow specialists, through cross-training, could improve horizontal coordination in a multiteam system (De Vries et al., 2016). In a manufacturing context, this entails upskilling production personnel with engineering skills or vice versa. Such cross-functional upskilling enhances the contextual intelligence of the different component teams' members and improves their cohesive interdependence. Contextual intelligence is a leadership competence that incorporates diagnosing context and knowledge utilisation (Kutz, 2008).

2.2 An integration team building trusting relationships within multiteam systems

The Rousseau et al. (1998) seminal study on trust in the workplace, emphasises the importance of followers trusting the benevolence of leaders, which could be achieved by leaders including them in decisions which impact them. Trust between leaders and followers leads to trusting relationships which are critical for achieving multiteam system performance (Millikin et al., 2010). It is the role of leadership to create meaning for a situation that assists team members to align to a common goal in a way that builds trust (Ruben and Gigliotti, 2016). Authentic leadership theory claims that the attitude and work behaviour of team members is derived from the trusting relationship and social identification between the leader and team members (Alavi and Gill, 2017). Trust plays a critical role, because transparency enhances leader and follower perceptions of each other, thus impacting the quality of the bi-directional engagement (Alavi and Gill, 2017). Linking this to a multiteam system, it is imperative that the component teams experience having a good relationship with the integration team, since team members' attitudes and work behaviour is derived from this trust relationship (Millikin et al., 2010). This infers that if an integration team can build and facilitate trusting relationships between component teams within the multiteam system, a common superordinate goal is achievable. It was therefore important for this study to investigate the experience of mainly the component team members of their working relationship with the integration team and with other component teams. Since Rousseau et al. (1998) note that employees have to feel included in decision making to develop trusting relationships with leadership, the current study investigated whether the component teams felt entrusted to the extent of being included in decision making. Since the integration team is an important element in a multiteam system, the respondents from the integration teams' perceptions were also important in this study.

2.3 Diagnosing context in building trusting relationships within multiteam systems

Context is the circumstances in which events take place. Diagnosing context is defined as knowing the specifics of the context to accurately interpret or diagnose an event (Kutz, 2008). An important element of the context is clarity on which goals have to be achieved. Sound diagnosis of the contextual variables thus enables the integration team's ability to formulate actions and strategies to achieve the superordinate goal. Successful vertical coordination requires that the integration team members, firstly understand the superordinate goals themselves, then to break it down into proximal goals and ensure component team members understand the superordinate goals, as well as their own proximal team goals. These goals (proximal and superordinate goals) have to be aligned to one another. A sound diagnosis of the context or circumstances within which the multiteam system operates, is required to be able to

have adequate insight to align these proximal team goals to the superordinate goals. The comprehension of the bigger picture context, enables the appropriate prioritisation of goals. A thorough diagnosis of the contextual variables within the complex manufacturing environment is thus critical to prioritising goals accurately, which maintains interdependent harmony.

For this reason, the current study investigated the perception of component team members and integration team members' understanding of their proximal or own team's goals, as well as the superordinate goals, called company goals, as well as the extent of the alignment between their own team or proximal goals and the superordinate goals.

As component teams have their own proximal goals and priorities that may differ from the common superordinate goals, the integration team must analyse the contextual impact when prioritising superordinate goals over proximal goals. Failure to do so could lead to unforeseen consequences in the future if inappropriately diagnosed. Kutz (2008) suggests that being contextually aware involves being able to detect the attitudes, motivations and values of the stakeholders impacted by a particular situation (Kutz, 2008). Linking this competence to a multiteam system, this study posits that contextual variables such as demographics, social structures, social background, culture and stereotyping could impact component teams' willingness to engage (Davison et al., 2012). If inappropriately diagnosed by the integration team, these contextual variables could negatively impact the trusting relationships among component teams if inappropriately acted upon. Members of the integration team must analyse these contextual variables and implement appropriate measures to manage them in order to build trust in their competence and benevolence. For example, in cases where the integration team members would prioritise their own team's proximal goals, above the superordinate or company goal, it will break down the trust relationship between the component teams and the integration team.

This suggests that the direct relationship between successfully diagnosing context, (which leads to an understanding of how team goals are aligned to superordinate goals), and enabling the building of trusting relationships, will in turn positively impact multiteam system performance. The current study therefore proposes that the integration team members' successful diagnosis of context will allow them to create the environment in which the individual members of the component teams, as well as the integration team will understand their own proximal goals, their superordinate goals as well as the alignment between these goals. This understanding will thus contribute to trusting relationships. Therefore, the diagnosis of context will positively impact trusting relationships within a multiteam system. The first hypothesis focuses on this relationship:

H1: Diagnosing context positively impacts trusting relationships

2.4 Boundary spanning in building trusting relationships within multiteam systems

Boundary spanning is defined as the bridging of functional boundaries by individuals within an organisation in order to formulate a broader perspective, and therefore is a key enabler to successful multiteam performance (Bienefeld and Grote, 2014), further supported by Davison et al., (2012) and Marrone (2010). DeChurch et al. (2011) find that within context diagnosis, often the process of gathering information includes boundary spanning, not only across component teams, but outside the multiteam system as well, which enables the development of an accurate picture of the problem. Since integration team members are responsible to create a climate where information gathering includes input from outside their own teams, boundaries have to be spanned. To this end, the integration team has to be open to the input of the members of the component teams as well as their own integration team members' input. The boundaries have thus to be stretched to allow input from various sources. For these reasons, the current

study was interested in the perception of the component team members, whether their input was indeed welcomed when they offer input to other component teams; and whether they have received input by other teams. The study also included integration team members, since these integration team members also need to experience that their input is welcomed by their own team members and other component teams.

To enhance the integration team's contextual intelligence, boundary spanning is critical to effectively coordinate and prioritise goals for component teams within the multiteam system (DeChurch et al., 2011). Coordination and alignment can be achieved through mutual trust among component teams, supplementing the achievement of a common superordinate goal (Weaver, 2016). Through boundary spanning, the integration team members become knowledgeable about the collective functions within the multiteam system, thus equipping them to appropriately diagnose the contextual variables that positively or negatively impact the multiteam system's performance. Additionally, boundary spanning would facilitate the multi team system learning process, enhancing the ability of the integration team to achieve the superordinate goal (Sessa et al, 2018). This would suggest that through boundary spanning the integration team is better aligned at channelling information flow down to component teams, thus cultivating more accurate decision making. Furthermore, boundary spanning would build stronger social networks, thereby advancing the cohesive trusting relationships within the multiteam system (Marrone, 2010). This study thus proposes that boundary spanning would contribute to building trusting relationships between the component teams and with the integration team within the multiteam system. The integration team would therefore create the climate where the input of component team members are valued, in this sense boundaries of the teams are spanned to allow information flow and contribute to building trusting relationships within the multiteam system. The study thus proposes the following second hypothesis on this relationship:

H2: Spanning of boundaries positively impacts trusting relationships

2.5 Psychological safety in building trusting relationships within a multiteam system

A climate where people feel safe, due to mutual respect, is defined as a work environment where psychological safety exists (Baer and Frese, 2003). Psychological safety is required for sound interdependent coordination and positive team interaction. Environments that are non-threatening and supportive are more likely to enhance team members' willingness to engage and collaborate, thus impacting positively on organisational performance (Baer and Frese, 2003). Furthermore, a climate of trust, due to psychological safety is an important enabler for successful interdependent relationships (Weaver, 2016). Since an integration team positively impacts multiteam system coordination and interdependence towards achieving a common superordinate goal, it is proposed that the creation of a climate of psychological safety by an integration team aids in building trust, further enhancing multiteam system performance (Gerber et al., 2016).

For there to be an element of trust and a cohesive working relationship among component team members, individuals need to feel psychologically safe and that their contributions are valued and taken seriously (Gerber et al., 2016). This study therefore included items that point to how safe respondents feel that their suggestions are taken seriously and that their integration team is open to their ideas and suggestions. To cultivate this, a climate of psychological safety is important (Somech and Drach-zahavy, 2013). The integration team should therefore, create a climate where component teams do not feel threatened and where they have a place to speak up and engage with other component teams and do not feel threatened when engaging with the integration team (Baer and Frese, 2003). This suggests that integration team members themselves, if they are to cascade a climate of psychological safety downwards to component

teams, should feel psychologically safe to engage with members from other functions without the threat of ridicule or subversion.

Furthermore, it is proposed that without a climate of psychological safety, component teams will retract and disengage, choosing to focus on their proximal goals rather than committing towards the achievement of the common superordinate goal (Luciano et al., 2018). Such an environment would breed resentment, distrust and conflict within the multiteam system. This would result in negative multiteam system performance, or failure to achieve a common superordinate goal. This suggests that the direct relationship between a climate of psychological safety and building trust and mutual respect positively impacts multiteam system performance (Gerber et al., 2016). This study therefore proposes that the integration team members' creation of a climate of psychological safety positively impacts trusting relationships between component teams and with the integration team within a multiteam system. The third hypothesis pays attention to this relationship:

H3: Creating psychological safety positively impacts trusting relationships

This research suggests that enabling information flow and prioritising goals through vertical coordination by means of an integration team, appears to be the optimal solution for effectively managing a multiteam system towards achieving a common superordinate goal through influencing component teams.

Moreover, it is evident that an integration team positively impacts the interdependent interactions between component teams within a multiteam system through coordinating vertically, and enabling information flow that builds trust within the multiteam system. This cross-sectional study proposes that the measure of multiteam performance is the strength of the trust relationship among component teams within the multiteam system, leading to the achievement of a common superordinate goal.

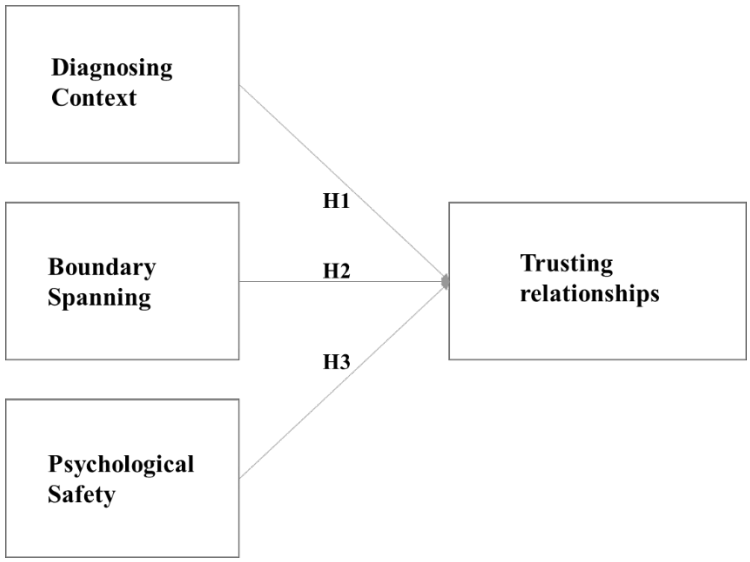


Figure 1: A conceptual model of an integration team's impact on trusting relationships leading to positive multiteam system performance

The conceptual model depicted in Figure 1 above illustrates the direct relationships between diagnosing context, boundary spanning and creating a climate of psychological safety, which contribute to a trusting relationship, which ultimately positively impacts multiteam system performance (Gerber et al., 2016 ; Luciano et al., 2018; Millikin et al., 2010), which in turn stimulate the achievement of a common superordinate goal (Davison et al., 2012). In Figure 1

the highlighted section is the focus of this study, which is the impact of diagnosing context, boundary spanning and creating a climate of psychological safety on trusting relationships in the multiteam system. The study is not measuring the performance of the multiteam system and not measuring the ultimate achievement of a superordinate goal.

3. Methods

3.1 Sample

Five South African manufacturing companies were sampled where a particular pain point was identified in each company and where the implementation of an integration team was introduced to resolve the pain point by interacting with the various component teams that exist within the departments concerned. The resolution of the pain point became the superordinate goal to be achieved for each integration team. The population consisted of individuals that form part of mostly component teams and a limited number of integration teams, that had influence or could contribute towards resolving the identified pain point (superordinate goal) within the manufacturing companies. In total 652 questionnaires were distributed across the five South African manufacturing companies and 400 responses were returned (overall response rate of 61.35%). Four respondents did not answer all the questions in the questionnaire and their completed questionnaires were therefore discarded, leaving a total of 396 responses for analysis. The sample comprised 278 male (70.2%) and 118 female (29.8%) respondents. The majority (52.2%, SD = 0.832) of the respondents were between 31 and 40 years of age. 93.9% of the respondents were African, 3.3% were Caucasian, 1.5% were Indian, and 1% were of mixed race. 22.5% of the respondents occupied management positions and 77.5% were staff members. The sample consisted of seven different functional disciplines (production = 75.3%, engineering = 7.3%, health and safety = 1%, quality and technical = 9.1%, planning = 0.5%, logistics = 6.3% and training = 0.5%). The example that the researchers mentioned in the introduction on the manufacturing context, will be called company A. The identified goal in this company A was to resolve destructive rivalry between two parallel assembly processes with a common upstream feeder process. For company B, the goal was to resolve a longstanding recurring quality defect on a particular product. For company C, the goal was to resolve a high rate of safety related incidents. For company D, the goal was to resolve the inability to meet the customer specification requirement for a particular raw material, and finally for company E, it was to resolve a conflict issue between a production process and its supporting departmental structures.

The sample comprised of respondents from 5 integration teams and the rest from component teams and they were from different functions across the five South African companies. Of the respondents, 83.1% worked for company A, 1.5% worked for company B, 6.6% worked for company C, 5.3% worked for company D, and 3.5% worked for company E. For the sake of confidentiality, the names of the five South African companies and the specific details of the identified superordinate goals were omitted from the study to ensure anonymity.

3.2 Procedure

After ethical clearance was given by the university's committee, the questionnaires were distributed manually across five different South African manufacturing companies, all within the same geographic location (Gauteng province). While their products and processes are quite different, all represent complex systems. The reason the questionnaires were distributed manually was because many of the respondents, did not have access to the internet or their computer literacy and internet skills were limited. In addition, the majority of the individuals do not speak English as a first language. Many early mornings and late nights were spent

meeting with each of the different teams, since many of their members worked shifts. Approximately 15 minutes was spent introducing the purpose of the research. All the teams showed willingness to assist and many of them completed the questionnaires there and then.

A pilot test of the questionnaire was conducted in company B prior to meeting the teams of the other companies. There were some challenges around understanding the academic wording of some of the questions as English is not the mother tongue of many respondents and for many, matric in a rural school was their highest level of education. As a result, some of the questions from the scales were simplified or omitted for ease of understanding. For example, *proximal goals* was changed to *departmental team goals* and *superordinate goals* was changed to *company goals.*

3.3 Measures

A questionnaire was developed by amalgamating questions from several scales that showed high reliability and validity in their original studies. The reason for amalgamating the scales was that some questions did not fit a manufacturing context, or would have been difficult to understand. The scales were further simplified based on learnings from the pilot conducted prior to the full-scale data-gathering exercise.

Diagnosing context

The reliability and validity of the original scale was high with a Cronbach's Alpha reported of .91 by Kutz and Bamford-Wade (2013), "Understanding contextual intelligence – A critical competence for today's leaders". For the manufacturing context, the items have been adapted, for instance, the original item of Kutz and Bamford-Wade (2013): "*I am familiar with the mission of my organisation*", was adapted to speak to the superordinate goal, which was called the goals of the company for the respondents in the current study. The item in the current study was, "*I understand my company (superordinate) goals*." (DC2) An item of Kutz (2008) on " *I am aware of my context*", was adapted for the manufacturing environment as follows: "*I understand my team or proximal goals*" (DC3). The alignment aspect was added to the items, to assess whether the respondent comprehends the link between the team or proximal goals and the superordinate or company goals as part of the Diagnosing Context items (DC1).

These scales were relevant to establish the understanding of the integration team and component team respondents of their goals as it formed their context within the multiteam system. As noted by Kutz (2008) and Kutz and Bamford-Wade (2013) successfully diagnosing context is a critical leader strategy.

Boundary spanning

Under boundary spanning, the current study adapted items from Van der Vegt et al. (2001), "Patterns of interdependence in work teams: A two-level investigation of the relations with job and team satisfaction". They reported acceptable statistical analysis of the original scale: CFI = .97, GFI = .94, SRMSR = .04 (Van der Vegt et al, 2001). The item in the original scale, namely "*In order to complete their work, my collegues have to obtain information and advice from me*" (Van der Vegt et al, 2001), was adapted for the current study for application in the manufactoring context, as follows: BS1 – "*I often give input into other teams in my company that have a different function to my team".* The next item, BS2 – "*I often receive input from other teams in my company that have a different function to mine",* was adapted from Van der Vegt et al. (2001). The original item was: "*I have to work closely with my collegues to do my work properly*" (Van der Vegt et al, 2001). The "work closely" was adapted to indicate "receive input from other teams" to illustrate the reciprocating relationship of giving input into other teams and to receive input from other teams within a multiteam system.

These scales were relevent in terms of understanding the extent to which boundary spanning occurs within the multiteam system as noted by Beinefeld and Grote (2014) and Marrone (2010).

Psychological safety

The items for psychological safety were sourced from Baer and Frese (2003), "Innovation is not enough: climate for initiative and psychological safety, process innovations, and firm performance". The reliability and validity of the original scale reported a Cronbach's Alpha of 0.82 (Baer and Frese, 2003). The items in the original scale included, "*In our company one is free to take risks*" and "*As an employee in our company one is able to bring up problems and tough issues*" (Baer and Frese, 2003). In the current study, these items were adapted for the manufacturing context where the integration team must be open when respondents want to raise problems and tough issues as in the original scale used. The current study adapted these items as follows, PS2 – "*The integration team is open to new ideas and suggestions".* In the multiteam system it is important that when component team members raise issues and make suggestions, that the integration team would take them seriously, and thus the item for the current study was formulated as, PS1 – "*I feel that my suggestions are taken seriously by the integration team*".

These items are relevant in terms of understanding the extent to which a climate of psychological safety exists within the multiteam system which is a critical leader strategy as noted by Baer and Frese (2003) and Gerber et al. (2016).

Trusting Relationships

The original scale of McAllister (1995), "Affect- and Cognition-based trust as foundations for interpersonal cooperation in organizations", reported Cronbach Alphas of 0.91 and 0.89. Items in the original scale included, "*Other work associates of mine who must interact with this individual consider him/ her to be trustworthy*". Another item from the original scale, which was relevant to the current study was, "*We have a **sharing** relationship. We can both freely share our ideas, feelings, and hopes. I can talk freely to this individual about difficulties I am having at work and know that (s)he will want to listen*" (McAllister, 1995). The current study used this item and adapted it to refer to the integration team and instead of "sharing relationship", the current study reformulated the item to read "a working relationship" because it was more fitting to a manufacturing context, as follows: TR1 – "*I have a good working relationship with the integration team*". As explained in the literature review, Rousseau et al. (1998) note that employees have to feel included in decision making to develop trusting relationships with leadership. Being entrusted to the extent of being included in decision making was therefore important to the current study. We then added the item on being included in decision making, as it was a good indication whether there was a trusting relationship, as follows: TR2 – "*I feel that I am included in team decision making*". These items resorted under one factor and was called trusting relationships. Trusting relationships is the dependent variable in this study as these trusting relationships are proposed to ultimately leading to multiteam system performance. These items are relevant in determining the strength of the trust relationship as noted by Ruben and Gigliotti (2016). This study focused on the strength of trusting relationships at the component team level and relationships with the integration team. The study did not measure the performance and did not measure the achievement of a superordinate goal at the multiteam system level. Responses were recorded on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

A test for normality on all the items was conducted, followed by a Cronbach's Alpha test on the finalised amalgamated scales, as well as composite reliability (CR), which yielded the

following results: for Diagnosing context: α = 0.847, Boundary Spanning: α = 0.890, Climate of Psychological Safety: α = 0.782 and Trusting relationships: α = 0.718. Adaptability and flexibility was initially added as a construct but was later discarded following a Cronbach's Alpha result of 0.542 for the revised scale. The descriptive statistics is shown in Table 1, namely mean, standard deviation, as well as the factor analysis and Cronbach Alpha results.

Table 1: Scales, items and descriptive statistics

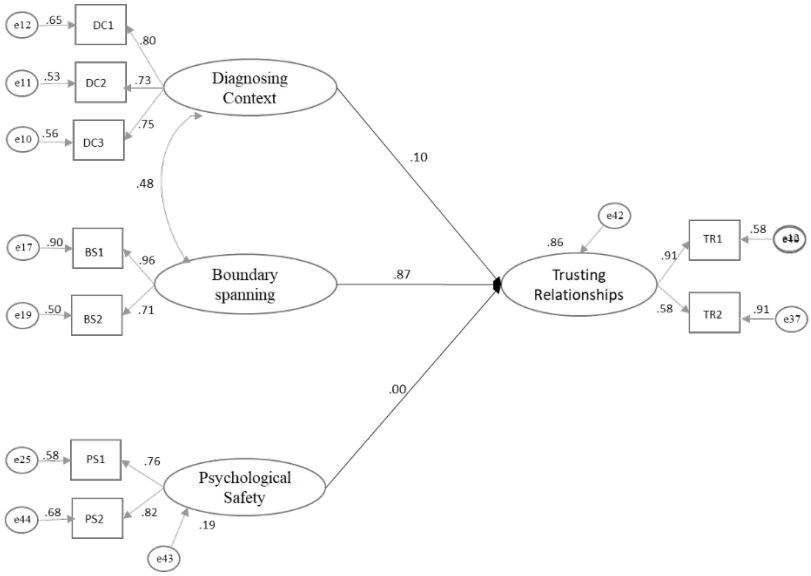
Items	M	SD	Factor loadings	Cronbach Alpha
Diagnosing context				.804
DC1: My team (proximal) goals and company (superordinate) goals are aligned	3.70	1.047	.802	
DC2: I understand my company (superordinate) goals	3.643	.9287	.729	
DC3: I understand my team (proximal) goals	3.582	1.0158	.749	
Boundary spanning				.803
BS1: I often give input into other teams in my company that have a different function to my team	3.495	.9314	.950	
BS2: - I often receive input from other teams in my company that have a different function to mine	2.940	1.288	.706	
Psychological safety				.771
PS1: I feel that my suggestions are taken seriously by the integration team	3.820	.8795	.762	
PS2: The integration team is open to new ideas and suggestions	3.369	.9340	.823	
Trusting relationships				.666
TR1: I have a good working relationship with the integration team	3.188	1.1291	.583	
TR2: I feel that I am included in team decision making	2.940	1.288	.908	

A single questionnaire was given to all respondents, which leads to common method bias. We conducted the Harman's test for Common Method Variance (CMV) to assess the extent of the impact of common method bias. The results showed it was acceptable, below 50%, which indicated that the CMV was not substantial and did not pose a serious threat to the validity of the results.

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was performed as well as the Bartlett's test for sphericity. The KMO indicated .871 for Boundary spanning; .848 for Diagnosing context; .754 for Psychological safety and .729 for Trusting relationships. The Bartlett's test for sphericity was also acceptable for all the scales.

Structural Equation Modelling (SEM) was used for the data analysis that included all the hypothesised paths, which is consistent with other studies conducted on multiteam system performance (Cuijpers et al., 2016; Cha et al., 2015). SEM was appropriate for investigating the interrelations among the set of variables, as it offers advantages over multiple regression, accounting as it does for measurement error (Strasheim, 2014). SEM is a second generation multivariate method used to assess the reliability and validity of the model measures holistically, whereas first generation multivariate methods, like multiple regression, are appropriate for evaluating constructs and relationships between constructs (Tabachnick and Fidell, 2001, p. 111). A measurement model was developed in AMOS 24.0 for the four constructs to be tested. A confirmatory factor analysis was conducted to test for construct validity of the amalgamated scales using the measurement model. Maximum likelihood estimation was used to estimate the parameters of the model. Factors were reduced until a

strong model fit was achieved, following construct convergent and divergent validity. Cronbach's Alpha test for reliability, an instrument's ability to measure consistently (Tavakol and Dennick, 2011), was conducted on the four constructs of the remaining factors. A structured model was constructed to formulate the standardised regression estimates (See Figure 2).



Notes: n = 396; Diagnosing Context (β = 0.210); Psychological Safety ((β = 0.295) and Boundary Spanning ((β = 0.407); model fit: RFI = 0,961 CFI = 0,990 RMSEA = 0.042; $p < 0.05$

Figure 2: The study's SEM structural model

4. Results

The factor loadings against the four constructs: diagnosing context, boundary spanning, psychological safety and trusting relationships (dependant variables) were above 0.7 which is desirable (Anderson and Gerbing, 1988), except for "I have a good working relationship with the integration team". Factors that loaded below 0.5 were therefore discarded from the measurement model. Composite reliability, construct validity and discriminant validity were achieved for the remaining factors. A limitation was that several of the items from the amalgamated scales loaded below 0.5, leaving a total of nine items across the four constructs. Several indices were used for the analysis including the goodness of fit statistic (X^2) which assesses the magnitude of discrepancy between the sample and fitted covariance matrices (Hu and Bentler, 1999), supplemented by the Chi-square minimum/ degrees of freedom (CMIN/DF), the Tucker Index (TLI), Comparative Fit Index (CFI), Normed Fit Index (NFI), Incremental Fit Index (IFI), Relative Fit Index (RFI), and the root mean squared error of approximation (RMSEA). Table 2: column 2 tabulates the strong model fit values for the measurement model.

Table 2: Model fit indices, standardised coefficients and hypotheses

Fit indices	Measure-ment Model	Structural Model	Estimate	Standar-dised Estimate	C.R.	P
X^2	36.957	37.035				
p-value	.170	.023				
df	21.000	22.000				
CMIN/DF	1.760	1.683				

RMSEA	.044	.042
TLI	.982	.984
IFI	.990	.990
CFI	.989	.990
RFI	.959	.961
NFI	.976	.976

Hypothesis one Diagnosing Context	→	Trusting relationships	.146	.063	2.322	.02
Hypothesis two Boundary Spanning	→	Trusting relationships	1.269	.095	13.301	***
Hypothesis three Psychological Safety	→	Trusting relationships	.003	.073	.037	.97

Table 2, column 3 tabulates the results for the structured model which achieved a strong model fit. For the model fit indicators; $X^2 = 37.035$, df = 22, p-value = 0.023, CMIN/DF = 1.683, RMSEA = 0.042, TLI = 0.984, IFI = 0.990, CFI = 0.990, RFI = 0.961 and NFI = 0.976. These results are regarded as a strong model fit for CMIN/DF values < 2, RMSEA values < 0.06 and TLI, IFI, CFI, RFI and NFI values > 0.95 (Hu and Bentler, 1999). The structured model fit indices were marginally better than the model fit indices produced by the measurement model, indicating that the structural model had improved in terms of model fit.

Table 2 also tabulates the significance levels for the hypothesised paths for the structural model. From the regression weights the path between psychological safety and trusting relationships was not significant (0.97), the path between boundary spanning and trusting relationships was significant (0.00), the path between diagnosing context and trusting relationships was significant (0.00).

The standardised regression weight estimates for the hypothesised paths of the structural model indicate that the structural model boundary spanning estimate was 0.86, indicating that boundary spanning is a significant predictor for building trusting relationships. The diagnosing context estimate was 0.10 indicating that diagnosing is a relatively low predictor for building trusting relationships that leads to multiteam system performance yet it is still significant. As the path between psychological safety and trusting relationships was not significant (0.97), the estimate for this path is 0.00. This would suggest that psychological safety is not a strong predictor for impacting positive multiteam performance through building trusting relationships. In summary the findings are: successfully diagnosing the contextual dynamics by the integration team positively impacts trusting relationships between component teams and with the integration team within a multiteam system and thus Hypothesis 1 can be accepted. Hypothesis 2 can also be accepted as the study shows boundary spanning members of the integration team positively impact trusting relationships between component teams and with the integration team within the multiteam system. Creating a climate of psychological safety by the integration team did not impact trusting relationships between component teams and with the integration team within a multiteam system however, and Hypothesis 3 is thus rejected.

5. Discussion

This study explored some of the leadership strategies that integration teams within organisations employ to ensure that component teams within a multiteam system are well-coordinated, appropriately aligned and work coherently within a psychologically safe and trusting environment. Much of the research on multiteam system performance in the past has focused on simulation within a military context (De Vries et al., 2016; Firth et al., 2015; Davison et al., 2011; Murase et al., 2014) or a simulated laboratory experiment (Guchait, 2016; Cuijpers et al., 2016). A simulated study allows a specific multiteam system superordinate goal to be created and the success or failure to achieve it to be accurately measured. Several research articles have cited examples of a multiteam system in extreme contexts or in finite situations such as disaster response and recovery contexts (Bienefeld and Grote, 2014; DeChurch et al., 2011), or project implementations (Hoegl et al., 2004).

The current study makes an important contribution, as it is a cross-sectional study in a typical real manufacturing context. However, setting a common superordinate goal and measuring its success or failure was a challenge in this cross-sectional study, due to the complexity of the continual interactions within the multiteam system and the allowable time frame given to conduct the study. Nonetheless, several studies have indicated that trusting relationships are an important enabler of the achievement of a common superordinate goal, the ultimate measure of multiteam system performance (Gerber et al., 2016; Luciano et al., 2018; Millikin et al., 2010). This cross-sectional study focused on measuring the level of trusting relationships as a means to predict multiteam system performance, since the outcome of each superordinate goal could not be completely measured.

Within a manufacturing context, teams from different departmental functions need to work coherently to achieve superordinate objectives. Several seeds for division exist within a multiteam environment that may hinder coherence and trusting relationships among component teams. Ensuring these divisional seeds are minimised depends upon the integration team's ability to anticipate and mitigate them as quickly as possible. This requires this team to have sufficient understanding of the contextual dynamics permeating the multiteam system and the impact thereof.

The integration team is thus a means of bridging the gap between the intra-team and the inter-team dynamic, and shifting the focus from the proximal to the superordinate. The results indicate that the integration team needs to understand the intra-team dynamics intimately and what sparks these dynamics within the different functional areas of an organisation. Contextual intelligence thus becomes a critical enabler in understanding these intra-team dynamics (Kutz, 2008). This study found that successfully diagnosing context as a key factor of contextual intelligence (Kutz, 2008), impacts the ability of an integration team to build trusting relationships.

This study found that if members of the integration team were involved in other departmental activities (hypothesis two on boundary spanning), this allows individuals the opportunity to immerse themselves within another context that potentially complements their own; the learnings from this new context can enhance the learnings of the core context (Marrone, 2010). Bringing the boundary spanning dynamic into an integration team widens the scope of the team, culminating in synergetic appreciation for each member's contribution and thus building trusting relationships among component teams.

This research found that a climate of psychological safety, where team members do not feel threatened, was not a strong predictor of building trusting relationships, in contrast to Weaver's (2016) study which indicates that psychological safety influences trusting relationships.

Instead, in this context of multiteam systems, the welcoming of other teams' input (boundary spanning) and understanding company goals (diagnosing context) were significant influencers on building the required trusting relationships.

6. Implications for organisations

Traditional team dynamic theory focuses on the team as an individual entity and team member identification within the team (Murase et al., 2014 ; Glynn et al., 2010), for example on how team diversity contributes to more dynamic and effective teams (Van der Vegt and Janssen, 2003). From this perspective it is all about the team as the centre of attention. Many organisations focus on team building and growing the bond within the team. Departments will attend strategy sessions that focus on how the department can perform better, but rarely do these sessions involve other departments or investigate how other departments could impact their performance.

What is missing from this focus is that the team or department forms part of a bigger complex system (Murase et al., 2014). The current findings prompts organisations to take note of and focus on the larger complex system. Here, the focus is less on the individual and more about the collective, where teams interact with other teams (Gerber et al., 2016).

Many organisations are plagued with departmental discordance, misalignment and psychological silo mentality. They tend to focus on the team as an individual entity but neglect the engagements between teams; particularly engagements between different functional teams (Guchait, 2016). This neglect often results in conflict and distrust between teams or departments within organisations (Luciano et al., 2018).

The current study shows that implementation of an integration team can enable organisations to overcome departmental discordance and misalignment, resulting in a more harmonious working environment. The term *silo mentality* is often used in business to describe virtual or psychological boundaries within which departments or teams cocoon themselves (Cilliers and Greyvenstein, 2012). This narrow mindedness leads to distrust and misalignment between departments or teams (Christa and Abdullahi, 2012). An integration team that can successfully diagnose the contextual dynamics of the business environment will be better equipped to detect such virtual barriers. Through boundary spanning the integration team can dismantle these virtual barriers and begin to forge interdependent relationships that build trust and mutual respect by mitigating this silo mentality.

7. Limitations and future direction

The study was cross-sectional and focused on a short period of time; it could therefore not track the fluctuations in performance that would have been observed in a longitudinal study. It could not focus on the achievement of the specific common superordinate goals identified, but focused on the impact of the integration team's ability to build trusting relationships within the multiteam system among the component teams that would ultimately lead to achieving the superordinate goal. Other potential limitations to the study were that 93.9% of the respondents were African which could have created cultural bias and 75.3% were from the same function within the five companies, namely production, which may have skewed responses and created the potential for common method variance, since all the respondents had to respond to all the questions in the questionnaire at the same point in time.

A further limitation was that several of the items from the amalgamated scales loaded below 0.5, leaving a total of only nine items across the four constructs which could have diminished the reliability and validity of the findings. This outcome is related to the fact that SEM measures the model holistically. A test using multiple regression included many more of the scales

however this method only measures the direct relationship between each independent variable and the respective dependent variable and would not have been wholly appropriate for a study of this kind. The multiteam system deserved attention in this study and further studies are required to contribute to an understanding of the dynamics between teams where the focus shifts from the proximal to the superordinate (DeChurch and Zaccaro, 2010). Unfortunately, Cuijpers et al. (2016) noted that drivers of multiteam system performance remains under-studied.

A point for further research would be to look at other dynamics that enhance or diminish the trusting relationship between component teams, such as leadership style or emotional intelligence (Li et al., 2016); team empowerment (Barczak et al., 2010); organisational culture; language barriers as well as stereotyping. As a case in point, consider the emergency or disaster recovery situation in which an integration team is formed to effectively deal with the coordination effort of multiple teams to respond accordingly. Who would be the most effective members from the different teams to make up this integration team? Would it be most effective to integrate the most experienced members of the component teams, or to integrate those that can remain calm and logical in such a scenario, or the most effective leaders of each component team? Each of these characteristics would bring different dynamics into an integration team that would either hinder or enable the team to respond to the situation accordingly. Exploring these characteristics in more detail could reveal new insights. Future studies could thus focus on the composition of the integration team and what characteristics of boundary spanning representatives would be most suitable to maximise their effectiveness in advancing multiteam system performance.

8. Conclusion

This study reveals that with the implementation of an integration team made up of influential boundary spanning representatives from different functional component teams, trusting relationships can be built among component teams and with the integration team, within a multiteam system. By building these trusting relationships, component teams will be more willing to collaborate and work interdependently towards achieving a common superordinate goal. Through successfully diagnosing the contextual dynamics and spanning the boundaries between the teams, integration teams are better equipped to align component teams to achieve a common superordinate goal, thus positively impacting multiteam system performance. Multiteam system dynamics remain an integral function to the success of any organisation with trusting relationships being crucial to a sustainable future.

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