THE RELATIONSHIP BETWEEN EMOTIONAL INTELLIGENCE, STRESS AND TRUST AMONG SOFTWARE DEVELOPERS

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Abstract

Agile information system development literature often regards project performance as meeting time, cost and quality and overlooked the importance of human skills and competency of software developers. This gap in agile information system development literature is problematic for several reasons. First, the relationship between software developers’ competency and project performance in agile information system development projects are overlooked, resulting in a partial understanding of agile information system development projects; Second, software developer competency has been shown to increase team performance and successful project outcomes; and finally agile information system development projects include the evident aspects of both meeting technical efficiency such as meeting time, cost and quality and also social aspect or human-side management to build a computer-based information system. Thus, in this research, we examine the role of emotional intelligence on team performance in agile information system development projects. In addition, we examine the mechanism underlying the relationship between emotional intelligence and team performance.

Keywords: Stress, Trust, Emotional Intelligence, Software Developer
Introduction

Agile information system development (ISD) projects have suffered from increased rates of failure (Windeler et al., 2017; Rezvani and Khosravi, 2019). In fact, only one out of every eight technology-based projects is completed by predetermined deadlines, according to budget and in line with specifications (Gingnell et al., 2014; Hughes et al., 2016). The failure of agile (ISD) projects, has been disastrous for many organizations. Therefore, the measurement of success and factors that lead to success are frequent research topics. The IS literature often regards agile ISD project performance as meeting time, cost and quality (Joosten et al., 2016). However, agile (ISD) projects include the evident aspects of both meeting technical efficiency such as meeting time, cost and quality as well as a social aspect or human-side management to construct an information system based on computers (Windeler et al., 2017). Hence, in order to build a system effectively, it is necessary to form constructive social relations between developers to induce their participation and collaboration, while simultaneously ensuring that the project’s goals are achieved (Ozer and Vogel, 2015).

Our review of the literature revealed that very limited attention has been paid to developer’s social skills and competency in agile ISD projects. More specifically, in terms of the effect or influence of skills and competency of software developer towards performance, existing results were limited. For instance, Rezvani et al. (2017) examined the influence of top management personal characteristics on team performance in small organisations. Windeler et al. (2017) examined the influence of empowerment leadership on IS software developers. Cruz et al. (2015) examined the influence of IS developers’ personality factors on the performance of pair programming teams. However, research shows that organizational theories and practices that are applicable to small teams such as pair programming and small projects may not generalize to large teams and projects (Rezvani et al., 2016). Although previous studies have integrated the joint effects of leadership behaviour on agile ISD team and project performance, the effectiveness of personal skills and competency of software developers was overlooked in the context of agile ISD project (Windeler et al., 2017). Investigating this issue is necessary, considering the importance of teamwork interaction in agile ISD project.

While IS departments are likely to assume significant responsibility to maintain performance in teams, software developers are responsible for the work of the agile ISD projects, there is an important gap in our comprehension of the social abilities and competencies of agile software developers that impact the performance of teams. In order to fill the aforementioned gap, the first research aim is to establish a theoretical rationale for the impact of the individual personal attributes and competency of agile software developers, namely emotional intelligence, on both personal and team performance. There is mounting support for the claim that in the context of projects, team members who exhibit strong emotional intelligence have the capacity to enhance overall performance (e.g., Clark, 2010; Rezvani and Khosravi, 2019).

We believe emotional intelligence, is well suited for understanding agile software developer personal characteristics and skills since agile ISD projects involving high ambiguity, risk and potential for high stress and mistrust. Because high emotional intelligence fosters the necessary skills and competency among employees to communicate effectively, increase trust and reliance to other team members via regulating negative emotions (Ashkanasy and Dorris, 2017; Rezvani et al., 2018). In addition, emotional intelligence has been determined to augment the ability of teams to devise solutions to unexpected situations (Christie et al., 2015), and has a significant correlation with the productivity and performance of such teams (Ashkanasy and Dorris, 2017; Rode et al., 2007). In general, based on affective events theory (Weiss and Cropanzano, 1996) we propose that emotional intelligence will be associated positively with trust and performance. According to Weiss and Cropanzano, trust as an attitude is influenced by the experience of emotions.

Additionally, the fundamental process that underpins the association between emotional intelligence and team performance in the context of agile ISD projects has not been thoroughly investigated. Academics who claim there is a need to concentrate more on the examination of the correlation between the capabilities of software developers and the overall performance of a project team also place em-
phasis on the necessity to incorporate both the probable mediators and moderators of this association (Windeler et al., 2017; Rezvani et al., 2018). Therefore, our second objective is to examine the mediator variables between emotional intelligence of software developers and performance in agile ISD projects.

2  Theory and Hypotheses

2.1  Emotional intelligence

Although a variety of different definitions have been proposed for the concept of emotional intelligence in the literature, the definition suggested by Salovey et al. (1997) has become the most broadly acknowledged and popular definition (Ashkanasy and Daus, 2005). According to Mayer and Salovey (1997), emotional intelligence is the “the ability to monitor one’s own and others’ emotions, to discriminate between them, and to use the information to guide one’s thinking and actions”. Following this, Ashkanasy and Daus (2005) determined that the research into emotional intelligence comprises three distinct streams. Stream 1 consists of the utilisation of the Mayer-Salovey emotional intelligence test employing MSCEIT measures (Mayer et al., 2003). Stream 2 incorporates self-report measures founded on the definition that Mayer and Salovey proposed for emotional intelligence (e.g., Schutte et al., 1998; Wong and Law, 2002; Rezvani et al., 2016a). Lastly, Stream 3 includes additional measures of emotional intelligence that fall outside the definition of Mayer and Salovey. The latter stream was most effectively characterised by Goleman (2000), who described emotional intelligence as a broad range of proficiencies and abilities like those related to personality, which may have no direct relation to emotional intelligence, such as social responsibility (Ashkanasy and Daus, 2005; Rezvani et al., 2016c). Those who advocate for the model developed by Mayer and Salovey assert that emotional competence consists of acquired abilities that it is possible to develop and improve. When emotional intelligence is conceptualised as an ability, as Mayer and Salovey (1997 recommended, it is perceived as a form of intelligence comprised of four aspects, which are reflections of the capability to 1) precisely distinguish emotion; 2) utilise emotion as a facilitator of thought; 3) comprehend emotion; 4) control emotion. Mayer et al. (2003) contended that the abovementioned four abilities inform each other, meaning that when combined, they comprise a singular, generalised emotional intelligence factor, a theory that has been supported by empirical research. In the current research, the Stream 2 approach is employed, as the objective is to capture the ability to discern, utilise, comprehend, and manage the emotions of members of a project team (Rezvani et al., 2016b). Additionally, the ability model comprises the critical attributes of understanding and regulating the emotions of oneself and those of others, which facilitates the ability to develop beneficial behaviours and thoughts (Bratton et al., 2011; Mayer et al., 2008).

Emotional intelligence also has the capacity to enhance group cooperation and connectedness and is an important factor in overall performance (Troth et al., 2012). Studies have generally ignored emotional intelligence as it develops within particular environments (Müller and Turner, 2010). Jordan et al. (2010) contended that it is necessary to examine the effects of emotional intelligence and its resulting impact on different levels and outcomes in distinct settings. In the context of agile ISD projects, in the event that software developers are confronted with a given scenario, their capacity to comprehend, control and balance emotions enables them to control their feelings and behaviours on the basis of their perceptions of the feelings and emotions of other team members (e.g., testers, systems analysts and managers). As emotions are pivotal factors in collaborative behaviours, a person’s capacity to comprehend and manage their own emotions can be significantly beneficial in constructing effective relations with others (Ashkanasy and Dorris, 2017). This is specifically important in the context of agile ISD projects since software developers are components of complicated networks of co-workers and clients. As a result of their particular nature, project teams are frequently characterised by positive or negative emotions. Positive emotions facilitate the effective performance of members of the team in work conditions marked by increased levels of ambiguity and uncertainty; nevertheless, negative emotions like interpersonal tensions, annoyance, and exasperation can sometimes hinder the real-time
transferal of information, which can deteriorate the team’s performance (Troth et al., 2012; Rezvani and Khosravi, 2019a). Hence, effective communication and cooperation with others have particular importance in the enhancement of user satisfaction as well as team and business performance (Windeleer et al., 2017).

2.2 Emotional intelligence and performance in agile ISD project

Rezvani et al. (2016c) identified that emotional intelligence has particular significance in the establishment of a positive environment in which teams are characterised by strong support, productive communication and increased levels of performance. Consequently, it can plausibly be concluded that software developers who have increased emotional intelligence have the capability to strengthen collaboration among members of agile ISD project teams, which presents certain challenges such as the management of resources, the alignment of individual objectives with overall goals, the resolution of complicated endeavours in periods of crisis, effective communication, and the coordination of information transfer between team members. In this respect, Rezvani et al. (2018) determined that the emotional intelligence of individuals (demonstrated by the capacity to control and comprehend team members’ moods, feelings and emotions) is a determinant in the performance of large-sized constructions projects. This can be explained by the fact that people with strong emotional intelligence foster a supportive emotional environment that facilitates effective performance and unity (Mazur et al., 2014; Rapisarda, 2002). In other research, Jordan et al. (2010) found that is influenced by the degree of emotional competence the team members possess because, in the process of distributing materials and resources, increased team emotional intelligence encourages empathetic and supportive perceptions, which subsequently cause improved team cooperation (see also Ayoko et al., 2008; Jordan and Troth, 2004; Law et al., 2004; Rezvani and Khosravi, 2019a). Additionally, research has demonstrated that members of a project team with enhanced emotional intelligence engender positivity within the work environment (see Ashkanasy and Dorris, 2017) and reduce problems related to emotions, like burn-out and stress, which can also augment overall performance (Greenidge et al., 2014). On the other hand, Sheldon et al. (2014) stated that perceptions of diminished emotional intelligence reduce performance and increase interpersonal conflicts and stress. These findings reveal that emotional intelligence can be regarded as a beneficial attribute as team members utilise it to collect and share information in regard to their objective as well as to exceed expectations when performing their duties to accomplish group performance (Barczak et al., 2010). In summary, these contentions indicate that emotional intelligence is a significant determinant of performance. Thereby, we hypothesize:

H1&2. Developers’ emotional intelligence is positively related to individual and team performance.

2.3 Stress

Stress is defined as the perception of a threat that emerges from both emotional and cognitive factors (Lazarus, 1966). It is dependent on the person’s judgement of whether they have the capability to perform a duty related to their work that involves a particular level of complexity or difficulty. There is a significant correlation between stress and job satisfaction, organisational dedication and team performance, whereas it has a significant and positive association with non-productive work behaviours, disengagement, alcohol and drug abuse, intention to resign and depression (Bowen et al., 2014; Harris et al., 2016; Windeler et al., 2017). In a similar manner, the sustained impact of stress on behavourial, psychological and physical consequences has been extensively recorded (Harvey et al., 2017). For instance, in the event that the stress-response mechanism is initiated for extended periods without any form of effective resolution, the physiological elevated alert reaction can cause a variety of cardiovascular, immune and metabolic conditions as well as cognitive reductions in terms of memory, learning and overall functioning (Khamisa et al., 2015; Love et al., 2010). Additional ramifications are deficient psychological wellbeing, depression, suicidal thoughts and increased substance abuse as a coping mechanism (Brooks et al., 2017; Baumert, et al., 2017; Thomson and Gomez, 2014).
2.4 Mediating role of stress

Stress impedes the individual’s ability to self-regulate their emotions, cognition and motivation to perform an activity effectively and can have a negative impact on project accomplishments (Graziotin et al., 2017; Nakata, 2017; Thiel et al., 2015). Research studies into the impacts of stress on software developers participating in agile projects have determined that stress is frequently observed by developers and presents significant problems (Arsenio and Loria, 2014; Windeler et al., 2017). Furthermore, developers’ stress can affect performance of individuals because of the reciprocal, interdependent nature of agile ISD work. The presence of stress creates symptoms such as substandard communication reduced morale, aggression, annoyance and exasperation, the requirement to revise software programs and a reduction in the ability to solve problems, coordinate and cooperate among software developers (Arsenio and Loria, 2014; Liu et al., 2011; Lovalto, 2015; Rezvani et al., 2012). Hence, the management of stress throughout the duration of a project is significantly important for the successful completion of agile ISD projects (Windeler et al., 2017). Nevertheless, existing empirical findings on the effect of individual abilities and attributes in agile ISD projects on alleviating stress have not presented definitive conclusions. In such projects, effective social relations facilitate the widening of restricted, individual resources external to those that are presently contained within the self. When significant investment is made in these robust workplace relationships, there is an increased likelihood that resource gain will be enhanced, while stress and worry among employees will be prevented (Rezvani et al., 2018). We anticipate that the comprehension, management and regulation of one’s own emotions and those of others can impact the degree of stress suffered by software developers in the work environment. This has importance as a correlation has been established between software developers’ stress and levels of discontent, depression, absenteeism, and various different physiological measures like heart rate, blood pressure and cholesterol, which are correlated with diseases and mortality rates (De Clercq et al., 2018; Graziotin et al., 2017). According to Rezvani and Khosravi (2019a) and Gilboa et al. (2008) and Nakata (2017), stress debilitate performance by rerouting an employee’s emotional and cognitive work-related performance resources toward work-related coping. Therefore, we hypothesis that:

**H3**: The relationship between developers’ emotional intelligence and individual performance is mediated by stress.

2.5 Mediating role of trust in team

Research has additionally verified that trust has an association with productive communication and the performance of project teams, as well as the ability to solve problems, take risks, and collaborate effectively (e.g., Khosravi et al., 2013; Rezvani et al., 2017; Wu et al., 2017). In the context of agile ISD projects, teams are often comprised of members who have conflicting opinions, perspectives and goals, which enhances the possibility of there being conflict, misconceptions and misperceptions (Liu et al., 2011). In situations where the levels of trust are high, team members have an increased likelihood of complying and recognising the perspectives and ideas of others (Hogg and Terry, 2014; Pinjani and Palvia, 2013). Therefore, people who have increased trust of each other are more likely to collaborate and to engage in cooperative relationships when faced with challenging situations, characteristics that are critical in achieving effective outcomes that generate elevated performance levels (De Jong et al., 2016; Pinjani and Palvia, 2013). Where there is insufficient trust in agile ISD teams, this can lead to defensive behaviours, a reduction in collaboration, elevated transaction costs and can also impede the transferal of information (Colquitt et al., 2007). Additionally, when there is a lack of trust, although it is still possible to communicate and cooperate, interpersonal communication will not achieve the desired levels (Rezvani et al., 2018).

Within agile ISD projects, which are marked by high levels of ambiguity and uncertainty, when participants trust the team, this can potentially lead to improved social interactions, communication and collaboration (De Clercq et al., 2018; Nakata, 2017; Ostberg et al., 2017). In order to make deductions about the level of reliability of other members of the project team, individuals are dependent on communication and social interactions, where the latter is directly related to emotional intelligence as a
primary ability (Christie et al., 2015). In other words, software developers with strong emotional intelligence have an increased likelihood of engaging in more cooperation and communication, which will enhance the levels of trust within the team (Barczak et al., 2010; Christie et al., 2015; Graziotin et al., 2017). Resultantly, in this paper, it is proposed that emotionally intelligent software developers, namely those that can manage interpersonal relationships, are sensitive to their own emotions as well as those of others and are cognizant of their own and other’s objectives, will project the universal perceptions of the reliability and trust of the team over time (Chun et al., 2010; Mayer et al., 2008; Nakata, 2017; Rezvani et al., 2019). Hence, members of a project team should have a greater inclination to coordinate interactions and communication, as this can enhance the engagement and sense of belonging of the members, which facilitates the distribution of resources in the aim of achieving shared objectives (Dirks and Skarlicki, 2009; Khosravi et al., 2012; Rezvani and Khosravi, 2018). Hence, we next hypothesis that:

**H4:** The relationship between developers’ emotional intelligence and agile team performance is mediated by trust in team.

### 3 Current Research Direction

This research-in-progress will be carried out in software development organizations that use agile methods. The data collection sites would be large firms specializing in the development of software for technologies used in consumer electronics, networking and telecommunications equipment, and computer systems. This study will apply a qualitative approach and survey to collect data. In order to assess performance at the individual level, we use adaptability of individuals (Griffin et al., 2007). Adaptability refers to the extent to which individuals react to the challenging events that occur in difficult situations. At the team level, we use team communication. We will be using four item questionnaires tested and developed by Pinto (2009) to assess team communication. We argue that, in agile information system projects, effective team and individuals are those who communicate effectively and adapt to unpredictable and uncertain work situations. Software developers are the target of this study. Hierarchical Linear Modelling (HLM) is the main analysis methods used to test the hypotheses and to identify the direct and indirect effects between the constructs of our study.

### 4 Anticipated Research Contributions

This study contributes to the IS literature in different ways. First, this study contributes to the IS project management literature by uncovering the effects of software developers’ personal skills and competency more specifically emotional intelligence on performance at individual and team levels in agile ISD project. We argue that emotional intelligence as a means to manage negative emotions and reduce developer stress in agile ISD project, responding to calls for better contextualization in agile ISD project setting (Khosravi et al., 2019; Rezvani et al., 2017; Tsang and Williams, 2012). Second, by identifying trust as a mediator between emotional intelligence and team performance in agile ISD project this study uncover the underlying mechanism by which a critical component of software developer skill – emotional intelligence – is linked to team performance in agile ISD project setting. By understanding the effect of emotional intelligence on both stress and trust, better stress management approaches incorporating social support systems can be established. This study extent Rezvani et al. (2018) and Rezvani and Khosravi (2019b) via both investigating EI and its impact on performance at multiple levels and determining the fundamental mechanism that underlies the relationships in agile ISD projects. The present research represents the first attempt in the IS-related literature to extend the previous research on the impact of EI on trust, stress and performance at separate degrees of analysis utilizing HLM. In general, in line with multilevel studies (e.g., Klein & Kozlowski, 2000), the individual and team levels of IS research are integrated and a positive correlation is established between individual EI, stress and performance at the individual level, and a positive correlation between EI, trust and performance at the team level. In particular, the focus is on showing the significance of the types of interpersonal abilities people and teams may require extending the levels of performance in agile ISD projects. Additionally, senior management can assist software developers in their efforts to under-
stand, manage and regulate emotions in order to alleviate stress and foster trust by creating stress management strategies, to prevent adverse effect of stress from developing, or intervening before it can escalate and damage software developers’ wellbeing, project outcomes, software quality, staff shortage and ongoing working relationships.

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