Social Capital and Project Management Success in a Developing Country Environment: Mediating Role of Knowledge Management

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Abstract

Despite significant investments in projects by organizations, governments, and international development agencies in developing countries, many of the projects have failed and continue to fail due to budget overruns, inability to complete projects on time, and poor-quality outcomes. We draw on social capital theory and knowledge management to argue that individuals can leverage the resources embedded in the trust among other project participants, and the norms and values shared by the project participants and employees in an organization to enable them acquire, share and exploit knowledge for achieving project management success. Based on data collected from individuals engaged with projects in Ghana, this study tests a model in which knowledge management processes mediate the relationship between social capital and project management success. Our findings indicate that while trust is very important in the acquisition and sharing of knowledge, shared norms are very important in the sharing and exploitation of knowledge for project management success. Further, we find that the impact of norms and trust on project management success is mediated by knowledge sharing, and knowledge exploitation.

Keywords: Social capital; knowledge management; project management success; sub-Saharan Africa; structural equation modeling; bootstrapping techniques

1. Introduction

An important area of research in the project management literature is uncovering the antecedents of project management success (e.g., Ika, 2009; Ika & Donnelly, 2017; Joslin & Müller, 2016; Matta & Ashkenas, 2003). However, project failures abound despite the plethora of studies on factors engendering project management success (Judgev & Müller, 2005; Asiedu & Adaku, 2019; Moser, Narayanamurthy, Kusaba, & Kaiser, 2018). It has been observed that the proportion of successful projects among those undertaken by organizations, international development agencies, and governments around the world is disturbingly small and most of these projects do not meet expectations of the customers (Flyvbjerg et al., 2009; Judgev & Müller, 2005). Project management success (PMS) is generally defined as the on-time completion of the project within budget, while meeting or exceeding expectations of the customer regarding the project outcome. PMS differs from project success. Project Success (PS), on the other hand, focuses on the performance of a project over a longer time period and is related to the justification or the business case that is made for the project (Meredith, Mantel, Shafer & Sutton, 2014; Asiedu & Adaku, 2019).

The literature on project management also points to commonly identified factors that contribute to PMS. The factors include top management support, project planning, project leadership, involvement of
the users or stakeholders, clear and shared goals, effective communication, and the availability of adequate resources, among others. The availability of resources is normally thought of in terms of skilled personnel, adequate funding, and the timely release of allocated funds (Basten, & Pankratz, 2015; Nixon, Harrington & Parker, 2012; Saade & Nijher, 2016).

However, the mechanisms by which the factors influence PMS has not received much attention (Boonstra, 2013; Nixon et al, 2012, Williams 2016; Young & Poon, 2013). For example, researchers have suggested organizational culture and project governance as important mechanisms by which top management commitment influences PMS (Joslin & Müller, 2016). Others have pointed out the importance of identifying the range of contextual factors that could affect PMS (Galeazzo, Furlan, & Vinelli (2014). These mechanisms often focus more on how the structural characteristics of the organization and/or project context impact PMS. However, the impact of the social relationships among project participants on PMS has not received much attention from researchers, even though shared goals and effective communication have been identified as important factors. We draw on social capital theory and argue that a project participants’ ability to leverage the resources embedded in the trust among the participants of a project team and the norms and values shared by the participants and employees in an organization, can enable them to acquire, share and exploit knowledge to achieve PMS. Social capital is the benefit that accrues to individuals, groups, or organizations because of the network of relationships they develop within the firm and with external agents (Bourdieu, 1986; Nahapiet & Ghoshal, 1998).

We propose and test a model which examines how the relational resources embedded in the trust and norms among project participants influence PMS. The relational resources embedded in the trust among a group or employees and the norms and values (henceforth referred to as norms) they adhere to in the performance of their activities are part of social capital (Coleman, 1988; Nahapiet, & Ghoshal, 1998). We further suggest that social capital of individual project participants in the form of trust and norms, play an important role in PMS, but their influence on PMS is not direct. Rather, social capital’s influence on PMS is through its ability to enhance the acquisition, sharing, and exploitation of knowledge among project participants and/or from non-participants. This is because the acquisition, sharing and exploitation of knowledge (which we call knowledge management) are primarily social processes, and they are enhanced through the development of social relationships and interactions among groups of individuals (Pan et al., 2015; Chiu et al., 2006; Kogut & Zander, 1992). The social capital developed from the social relationships and the interactions among agents does not only provide access to information, resources, and knowledge, but also facilitates the acquisition, transfer, and utilization of knowledge and other resources (Acquaah, 2007; Adler & Kwon, 2002). Thus, social capital is instrumental in the exploration and exploitation of knowledge for PMS. Our model, therefore, suggests that social capital contributes to PMS because of its impact on knowledge management (KM) processes.
We tested our model with data collected from individuals who had engaged in project management activities in an African country. We focus on Africa because it has experienced an average annual growth rate of 5% in its economy over the past 15 years (World Economic Forum, 2015). This level of growth has led to the execution of different project types including infrastructure, information technology, education, agriculture and healthcare by national governments and international institutions such as the World Bank and the International Monetary Fund (Kunateh, 2013). However, the institutional and economic environments in Africa are considered “double-void contexts” (Ofori-Dankwa & Julian, 2011) because of the presence of institutional and resource voids. While institutional voids include the absence of market-supporting institutions, specialized intermediaries, and contract-enforcing mechanisms (Khanna & Palepu, 2006), resource voids depict the lack of appropriate human resources, financial resources, and other capabilities (Ofori-Dankwa & Julian, 2011). Both voids play critical roles in project management failures in the African context. At the same time, most African societies are highly collectivistic where interpersonal relationships are deeply imbedded in the social fabric. Thus, employees rely on the social capital through the relationships they have developed with other individuals both within and outside their organizations to help them obtain the necessary resources to navigate the institutional and resource voids necessary for executing projects.

International institutions such as the World Bank have been involved in social capital research in developing countries for decades because of the opportunity to leverage the collectivistic culture of those societies when executing social intervention programs. This is because the norms (and value system), and the nature of the connections embedded in the collectivistic culture enhance social capital within the communities that could be leveraged to overcome institutional voids (Grootaert & Narayan, 2004; Grootaert, Narayan, Jones, & Woolcock, 2004; Narayan & Cassidy, 2001). Furthermore, it has been argued that there is paucity of research that shed light on phenomena that organizations in Africa face, such that as “management scholarship expands its geographical interest from Western and Eastern developed economies to the rest of the world, it is time to bring Africa into our mainstream research and theories” (George et al., 2016, p. 379).

Our study makes three significant contributions to the literature. First, although relationship building plays an important role in how project participants approach their work activities, prior work examining the antecedents of PMS have not paid attention to how individual social capital could be used to improve project management success (Chang & Chuang, 2011). This study extends developments in social capital theory to examine the value that is created from the relationships and connections of individuals in project environments. We further focus on social capital because its components of trust and norms constitute important aspects of social relationships and ties that allow for the mobilization of goodwill (Kwon & Adler, 2014) necessary for KM processes (Nahapiet & Ghoshal, 1998; He et al., 2009).
Second, we test an integrated model that explicates how social capital influences PMS through three important KM processes – knowledge acquisition, knowledge sharing, and knowledge exploitation. Specifically, we investigate how two characteristics of social capital – norms and trust - enhance PMS through KM processes in project environments. By testing this integrated model, the study argues that knowledge management represents a mechanism through which the two social capital characteristics of trust and norms influence project management success. Third, we draw attention to the importance of norms which are prevalent in collectivistic cultural societies around the world in influencing PMS. We argue that the norms and values which are embedded in the collectivistic culture of African societies offer opportunity to enhance PMS in that environment. Project leaders and managers could leverage this valuable resource to engender the acquisition, sharing and exploitation of knowledge for successful project management. Moreover, the social relationships developed among parties (such as project participants) in African societies entail more social effort to maintain and thus generate a high level of trust which could be used for the mutual benefit of the parties involved (Lux, Lamont, Ellis, et al., 2016). The study contends that project leaders and managers could leverage the potential benefits from trust developed among project participants to seek ways of improving project outcomes in their environments.

2. Theoretical Background and Hypotheses

2.1. Social Capital

The concept of social capital provides a theoretical perspective to examine PMS because it is a valuable resource to individuals, groups, organizations, and communities (Adler & Kwon, 2002; Coleman, 1988; Putnam, 2002). Social capital has been used in the literature to refer to an individual’s or group’s ability to secure or obtain resources, knowledge, and information through relationships, ties, and networks with and among other individuals and groups. It has been defined as the resources, knowledge, and information that accrue to an individual, an organization or a community because of the network of social relationships within and between groups of individuals, organizations, institutions, and communities that otherwise would not have been possible without those relationships (Bourdieu, 1986; Nahapiet & Ghoshal, 1998; Robert, Dennis, & Ahuja, 2008; Chang & Chuang, 2011). These relationships can be among internal stakeholders of an organization (e.g., among employees) and between an organization and its external stakeholders (e.g., consumers, suppliers, regulators, and communities). Although social capital has been defined in multiple ways by several authors from different disciplinary areas (Adler & Kwon, 2002; Bourdieu, 1986; Coleman, 1988; Nahapiet & Ghoshal, 1998; Putnam, 1993), almost all the definitions include the following characteristics: social networks and networking with a focus on connections, trust, shared norms (of reciprocity), and shared values.
Nahapiet and Ghoshal (1998) argued that there are three dimensions of social capital: structural, relational, and cognitive. Structural social capital refers to “what people do (associational links, networks) which could be objectively verified (by observation or records)” (Harpham, 2008, p. 51). Structural social capital focuses on the structure or pattern of connections between and among actors – whom you reach, how you reach them, and how frequently you share resources and information (Nahapiet and Ghoshal, 1998). It is concerned with actors’ membership and position in a social network (Gargiulo & Benassi, 2000), and the frequency with which they interact with others (Leana & Pil, 2006). Structural social capital has been conceptualized in the literature in the form of social network characteristics (e.g., centrality, density, size, frequency, etc.) (Burt, 2000; Maurer, Bartsch, & Ebers, 2011; Yli-Renko et al., 2001), relationships or ties (Carey, Lawson, & Krause, 2011), degree of trust and strength of interactions (Oh, Chung, & Labianca, 2004; Tsai & Ghoshal, 1998).

Relational social capital “describes the kind of personal relationships people have developed with each other through a history of interactions” (Nahapiet & Ghoshal, 1998: 244). Relational social capital, further, focuses on the depth and quality of the relationships or interactions, and the resources that are created or leveraged through the relationships and connections. Relational social capital is characterized by trust, trustworthiness, respect, and friendship. Trust is regarded as one of the key attributes of the relational dimension of social capital (Leanna & van Buren, 1999; Leanna & Pil, 2006; Nahapiet & Ghoshal, 1998). Trust has been described as the goodwill that exists between actors (Burt, 2000). Fukuyama (1995, p. 26) defines trust as “the expectation that arises within a community of regular, honest and co-operative behavior, based on commonly shared norms.” He sees trust as the condition underlying the development of social cohesion which is facilitated by collective values, networking, and cultural traditions. Trusting relationships enable collaborative behaviors that can “improve the efficiency of society by facilitating coordinated action” (Putnam, 1993, p. 167). Developing trust in a relationship enables actors to experience deeper levels of interactions, which creates supportive relationships in the form of improved access to resources, knowledge, and information. Thus, trust provides the oil for social interaction and relationship building among members of a group or society.

Cognitive social capital refers to “what people feel (values and perceptions)” (Harpham 2008, p. 51). Cognitive social capital is a measure of the perception of the quality of the interactions between actors. Putnam (2000) argues that cognitive social capital is derived from mental processes and comprises norms, values, trust, and attitudes. Nahapiet & Ghoshal (1998) indicate that cognitive social capital represents resources obtained from a common set of goals, norms, shared vision, language, codes, and narratives. The resources obtained from cognitive social capital further provide shared representations, interpretations, and systems of meaning among actors (Nahapiet & Ghoshal, 1998). The perceptions and developments of shared language, vision, codes, narratives, and interpretations are functions of the shared norms and values.
of a network. Relationships that are developed with a foundation on shared norms and collective values are likely to be stronger and enduring than those without the shared norms (Moran, 2005). Coleman (1988) has further argued that the norms underpinning cognitive social capital engender mutual trust from the exchange of reciprocal relationships among individuals.

The goal of this research is to examine the indirect effect of social capital (trust and norms) on PMS through KM processes. We focus on the broader concept of social capital because the trust and norms characteristics have been used to measure all the three dimensions of social capital (e.g., Harpham, Grant & Thomas, 2002; Leanna & Pil, 2006, van Rijn, Bulte & Adekunle, 2012). Secondly, the pervasive type of social capital developed in most of sub-Saharan Africa is through relational ties and connections which are embedded in trust, and adherence to the norms and values of groups and society because of the collectivistic and relationship-oriented nature of those societies (Acquaah, 2007). Third, research has shown that social capital studies focusing on relational ties and connections have received little attention in the literature when compared with studies focusing on the pattern of connections among actors or an actors membership and position in a social network (Leanna & Pil, 2006). Our interest is studying the role of relational ties and connections instead of the network patterns among actors. The studies focusing on the pattern of connections, and membership and position in a social network usually take the position of structural social capital which are studies done through social network analysis and conceptualized in the form of centrality, density, size, and frequency (Burt, 2000; Gargiulo & Benassi, 2000; Maurer et al., 2011).

2.2. Knowledge Management

Knowledge management refers to efforts made, and processes used to acquire, share, transfer, and exploit information within organizations (Davenport, 1994; Cerchione & Esposito, 2016). Three key components can be abstracted from this definition of KM: acquisition, sharing, and exploitation. In a project environment, knowledge acquisition, which is sometimes referred to as knowledge gathering (Haas, 2006) is the extent to which project participants gather knowledge about the technical aspects of the project being executed. Individuals working on projects, in addition to their internal knowledge, seek and obtain further knowledge from others and integrate them with their existing knowledge. Knowledge sharing is the extent to which individuals in a team exchange knowledge and information with others inside and outside their teams and is a key contributor to the achievement of desirable outcomes (Mehta et al. 2014). Knowledge exploitation refers to the degree to which project participants use the internal and external knowledge they have acquired for project processes.

KM processes in project environments is important because of its potential to increase the competencies of employees, facilitate successful project management practices and , contribute to the
execution of strategic initiatives, and eventually enhance and sustain organizational competitiveness or viability (Alavi & Leidner, 1999; Grant, 1996; Grover & Davenport, 2001). Improving project management processes has long been recognized as one of the major benefits of KM within organizations because of KM’s potential to facilitate communication and achieve process efficiencies (Alavi & Leidner, 1999). Pan et al (2015) argue that facilitating knowledge acquisition and sharing are important in boosting productivity. Thus, it is important to understand what contributes to knowledge acquisition, sharing, and exploitation among project team members.

Managing the knowledge that resides in an organization effectively requires changes to the organization’s culture in ways that alter behaviors, values, norms, and expectations. Individuals will share knowledge if they perceive that there are no penalties associated with that sharing. Individuals may also share knowledge, if they reckon that there are punishments for not sharing the knowledge. Generally, knowledge sharing behavior, is driven by intrinsic and extrinsic benefits. Intrinsic benefits represent feelings of pleasure and satisfaction that people experience when they participate in knowledge sharing activities. On the other hand, extrinsic benefits for engaging in knowledge sharing emanate from outside the individual in the form of promotion, rewards, reciprocal benefits, recognition, and reputation (Yan et al., 2016). For example, within technology project environments, there might be individuals with specific know-how on the legacy system being replaced with the new technology. For such individuals, successful implementation of the new technology might imply loss of that knowledge and thus those individuals might have less incentive to share information important for the successful execution of the project. Others might also fear that giving away valuable information might lead to their ideas being stolen, which may result in personal loss of recognition. Hence, attention must be paid to the mechanisms that alter behaviors, values, norms and expectations to obtain desirable outcomes. Information and knowledge sharing do not always lead to positive outcomes for organizations. While sharing information and knowledge about a project’s progress can boost team morale, the sharing could also be detrimental if the information shared is mere rumors (Davenport, 1994). Information sharing facilitates fast access to documents such as forms, policy manuals, templates that might reside in a project management office which could be used to improve project management processes.

We argue that social capital provides the process that enables project participants to not only seek knowledge but share and utilize the knowledge acquired to ensure the successful management of the project. There have been studies that have examined knowledge sharing in project environments, while others have studied knowledge acquisition and exploitation (e.g., Mueller, 2012; Robert, Dennis & Ahuja, 2008). Our study is among the few to look at all three components of KM and its relationship with social capital in project environments.
2.3. Trust and Knowledge Management

Trust has been one of the vital ways of representing and conceptualizing social capital in the literature because of the importance of social interactions and relationship building (Coleman, 1990; Fukuyama, 1995; Gulati, 1995; Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998). Rousseau, Sitkin, Burt, and Camerer (1998, p. 395) define trust as “a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior”. Mayer, Davis and Schoorman (1995, p. 712) also define trust as “the willingness of a party to be vulnerable to the actions of another party based on the expectations that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party”. Thus, trust involves expectations that both parties would be truthful and behave in a way that is in accord with agreed upon norms. Trust involves a willingness to take risk or accept vulnerability, and the tendency to expect honest effort and cooperation from one another in order to achieve a team’s goals and intentions (Mayer et al, 1995; Weber & Weber, 2010).

The social capital literature recognizes different types of trust such as generalized trust, interpersonal trust, institutional trust, and inter-organizational trust (Nahapiet & Ghoshal, 1998; Mayer et al., 1995). In this study, we focus on interpersonal trust, which is defined as “an expectancy held by an individual or a group that the word, promise, verbal or written statement of another individual or group can be relied upon” (Rotter, 1967, p. 651). Thus, interpersonal trust is based on repeated social interactions between individuals who are familiar with each other. These individuals could be family members, friends, or members in the same team or group. Repeated interactions resulting in cumulative positive experiences enable project participants to develop interpersonal trust with each other which allows them to perform activities and achieve goals without relying on contractual arrangements. We argue that the interpersonal trust embodied in social capital will influence knowledge acquisition, sharing, and exploitation among participants in a project environment, and from other actors outside the team for the benefit of project outcomes.

The literature on social capital has shown that trust plays an important role in the acquisition of knowledge and information by parties in social or inter-organizational relationships (Chen, Lin, & Yen, 2014; Coleman, 1990; Maurer et al., 2011; Yli-Renko et al., 2001). Both Coleman (1990), and Nahapiet and Ghoshal (1998) have argued that trust facilitates actors’ access to resources, which includes the acquisition of knowledge. Trust creates the opportunity for participants in a project environment to experiment with knowledge search activities. Repeated interactions among team members enable them to develop interpersonal trust which strengthens the frequency of contacts and emotional closeness, thus facilitating members’ ability to transfer and acquire knowledge and information from one another. Trust, further, convalesces project participants’ ability to understand one another, thus enabling the transfer of
complex and tacit knowledge (Rindfleisch & Moorman, 2001). Without trust among project participants, the relationship among them cannot lead to value creation through the sharing of information (Lux, et al., 2016). Atuahene-Gima and Murray (2007) showed that trust among top management team members in Chinese high-tech organizations improved knowledge absorption through learning. Trust among participants therefore increases the absorptive capacity (Cohen & Levinthal, 1990) of participants by enhancing their existing knowledge bases and providing them with the ability to acquire new knowledge. We argue that when there is a high level of interpersonal trust among project participants or between participants and external parties, there will be opportunity and availability to acquire knowledge from other parties. The social interactions that trust enables team members to experience allow for the “structuring and mobilizing” (McEvily, Perrone, & Zaheer, 2003, p. 95, italics in original) of knowledge resources for the collective endeavor of the team. Based on the above, we state the following hypothesis:

Hypothesis 1a: Trust, as an element of social capital, will have a positive impact on knowledge acquisition in project environments.

Trust further plays an important role on knowledge sharing among participants in a project environment (van den Hoof & Huysman, 2009; Nahapiet & Ghoshal, 1998; Ridings, Gefen, & Arinze, 2002). Nahapiet and Ghoshal (1998) argue that trust stimulates the exchange of intellectual capital. Ridings et al (2002) have shown that trust leads to knowledge sharing in virtual communities. Because trust is also based on the benevolence and integrity of project participants (Mayer et al., 1995), it encourages the transfer and sharing of knowledge among the participants. Moreover, since trust could strengthen the relational embeddedness among participants working on a project (Granovetter, 1973), it would increase the sharing of knowledge and information within a project team. In fact, McEvily et al (2003) argue that trust engenders openness in the transfer and sharing of knowledge among parties, thus facilitating cooperation and joint problem solving. In a project environment where participants trust each other, they will be willing to share knowledge that would enable the team to solve problems related to the project (Uzzi, 1997). Trust is likely to contribute to knowledge sharing because project participants would regard others as colleagues as opposed to competitors who are likely to steal ideas from them (Mueller, 2012). Nonaka (1994) argued that interpersonal trust is critical for knowledge sharing among project participants. Consequently, trust provides the environment that facilitates the transfer and sharing of complex and tacit knowledge among project team members (Wu, 2008; Zhang & Wu, 2013). High levels of trust would reduce perceptions of free riding by participants and thus enhance knowledge sharing efforts. We, therefore, present the following hypothesis:

Hypothesis 1b: Trust, as an element of social capital, will have a positive impact on knowledge sharing in project environments.
In addition to its role in facilitating knowledge acquisition and sharing among project participants, trust also enhances the exploitation of knowledge by the project participants (Maurer et al., 2011; Yli-Renko et al., 2001). When people working on a project trust one another, they will be more willing to use the knowledge and information they have acquired and/or shared with those members for the benefit of the project’s goals or objectives. Because trust leads to close social relationships among participants, it enhances the depth, effectiveness and efficiency with which the knowledge acquired and shared is exploited (Lane & Lubatkin, 1998). Trust facilitates the exploitation of knowledge during collaborative processes such as occur in project environments. The absence of trust will endanger the integrity and credibility of any knowledge exchanged and exploited among participants in the project team environment. Moreover, it has been shown that trust influences an individual’s knowledge quality and exploitation in virtual communities (Chiu, Hsu, & Wang, 2006). Mehta et al (2014) indicate that higher performing teams draw on trust and make use of expertise in their network to reduce uncertainty and develop innovative solutions to the collective endeavor. Thus, the trust embodied in social capital will provide project participants with the confidence and commitment to use the acquired knowledge for the achievement of the goals of the project. We, therefore, hypothesize that:

Hypothesis 1c: Trust, as an element of social capital, will have a positive impact on knowledge exploitation in project environments.

2.4. Norms and Knowledge Management

The shared norms among individuals define the behavioral expectations of the project participants. The shared norms of the project participants allow them to develop collective goals, adhere to a common vision, and develop approaches for the attainment of the project goals. The development of shared norms allows for the goals, vision, and aspirations of the project team to be shared by the members (Tsai & Ghoshal, 1998). A shared vision is a “bonding mechanism that helps different parts of an organization to integrate or to combine resources” (Tsai & Ghoshal, 1998, p. 467). Thus, the shared norms embedded in social capital will facilitate the development of common understandings and collective mindset among team members which would encourage the acquisition of the relevant knowledge and information the team requires for its activities (Coleman, 1998; Harpham, 2008; Nahapiet & Ghoshal, 1998). Villena, Revilla and Choi (2011) have argued that in addition to the role of shared norms of behavior in governing relationships among members of a group, the congruent goals engendered by such relationships leads to a “common understanding and approach to the achievement of common tasks and outcomes” (p. 562). When norms are shared by members of a team, the continuous interactions would result in sense-making (Weick, 1995) and understanding of the goals of the team, resulting in the combination and integration of ideas to
create knowledge. The emphasis on shared norms among team members could stimulate them to surmount the barriers to the acquisition of tacit and complex knowledge, and further enhance the process of sharing the knowledge within the team. This is because when members in a team share the same vision, aspirations, and goals, they would be less likely to behave opportunistically, and are more likely to work with other members to create new knowledge. Moreover, shared norms will enhance awareness of knowledge sources and facilitate the desire of team members to seek and acquire those knowledge resources for the benefit of project execution (Mehta, 2015). We, therefore, hypothesize that:

_Hypothesis 2a: Norms, as an element of social capital, will have a positive impact on knowledge acquisition in project environments._

Since the norms shared by a group encourages the development of strong social relationships and ties among team members, it will also enhance the sharing of knowledge among project participants. One of the important outcomes of shared norms is the expectation of reciprocity among project participants (Tsai & Ghoshal, 1998). Reciprocity involves “actions that are contingent on rewarding reactions from others and that cease when these expected reactions are not forthcoming” (Blau, 1964, p. 6). The expectation of reciprocity encourages the sharing of knowledge and information among participants (Wasko & Faraj, 2005). Rindfleisch and Moorman (2001) argue that reciprocity and closeness among parties that is engendered by norms of a group can improve the efficiency with which knowledge is transferred or shared. Furthermore, because shared norms facilitate common understanding of the collective goals of the team, it engenders members’ identification with the team. Identification with participants of a team will foster loyalty, and enhance the sharing of information, knowledge and learning among team participants (Chiu, et al., 2006). Nahapiet and Ghoshal (1998) argue that identification is a resource that could be used to encourage the combination and exchange of intellectual capital and knowledge. Thus, we hypothesize that:

_Hypothesis 2b: Norms, as an element of social capital, will have a positive impact on knowledge sharing in project environments._

Norms further facilitate the exploitation of knowledge by project participants. Norms will encourage participants to internalize the knowledge they have acquired from the external environment and/or from other participants. Consequently, it is expected that individual participants would be willing to share their own knowledge which would in turn facilitate the use of that knowledge for the benefit of other individuals working on the project. Thus, the norms shared by project participants provide the environment within which the knowledge acquired and shared among participants could be exploited. Research has shown that shared norms and values in an organization do not only lead to the sharing of knowledge within
the organization, but also re-orient employees’ attitudes to exploit the knowledge acquired (Bock, Zmud, Kim, & Lee, 2005; Liu & Phillips, 2011). Thus, we argue that developing a common perspective and mutual understanding through shared norms within a team will not only create a sense of tightly-knit identity for the participants, but also encourage and inspire the individual participants to exploit the knowledge they have acquired from both internal and external sources (Horn, Scheffler, & Schiele, 2014). We follow the argument by Nahapiet and Ghoshal (1998) that the social capital in the form of shared norms will facilitate not only the acquisition, but also the exploitation of knowledge. Thus, we hypothesize that:

Hypothesis 2c: Norms, as an element of social capital, will have a positive impact on knowledge exploitation by team members.

2.5. Knowledge Management and Project Management Success

Knowledge acquisition, sharing, and exploitation by individuals engaged in project activities among themselves, and between external parties such as members of different project teams, and/or the organization’s top management are expected to bring efficiencies to project processes, and thus contribute to PMS. PMS consists of the ability of an organization to complete the project on-time, complete the project within budget, and meet or exceed the expectations of the customer regarding the quality of the project outcome. The knowledge acquired and shared in the form of skills set, experiences, and competencies within the project team and from external sources enables the participants to bring to the project environment knowledge that can be synthesized into decisions and actions that contribute to the successful attainment of project goals (Mehta, 2015). Therefore, knowledge acquisition, sharing and exploitation provide an environment for project participants to identify project-related problems such as technical difficulties, become aware of challenges, brainstorm about possible solutions, and make effective decisions in the successful management of the project (Robert et al., 2008). This line of thought is consistent with arguments in the literature on the use of knowledge management to enhance competitiveness and sustainability by organizations (Cerchione & Esposito, 2016).

Knowledge acquisition and sharing among project participants increase the depth and breadth of knowledge available to individual participants or groups engaged in the project. The knowledge will, thus, enable individual members of the team to mobilize the necessary resources in managing projects successfully through the efficiency and effectiveness with which knowledge is used. As individuals acquire and share knowledge among themselves, it broadens the knowledge base of each member which can be exploited to execute the project successfully (Hanson, Mors, & Løvås, 2005; Horn, Scheffler & Schiele, 2014). Project team members would further have accurate knowledge and information that would enable them to complete the project on time. The acquisition, sharing and exploitation of knowledge that may be specific to a project, would enable project participants to understand customer requirements and
expectations, and how to manage the project successfully. When knowledge exists within members of a project team, they would have the opportunity to transfer and use that knowledge in an efficient and effective manner (Yli-Renko, et al., 2001). Thus, exploiting the knowledge within the project team will further enhance the success of the project as participants would be leveraging the integrated and combined knowledge resources the team has accumulated to satisfy the expectations of customers with respect to the quality and outcome of the project. Shao, Feng, and Liu (2012) reported that knowledge sharing among members of teams improved the success of an ERP implementation project in China. Maurer et al (2011), defining knowledge transfer broadly to include knowledge mobilization (acquisition), assimilation and exploitation, and using data from 218 projects in 144 German firms showed that knowledge transfer enhances organizational growth and innovation performance. Therefore, we hypothesize that:

*Hypothesis 3:* Knowledge acquisition will be positively related to project management success.

*Hypothesis 4:* Knowledge sharing will be positively related to project management success.

*Hypothesis 5:* Knowledge exploitation will be positively related to project management success.

In Hypotheses 1 and 2 we posited that social capital in the form of trust and norms will have positive influences on KM processes of acquisition, sharing, and exploitation among project participants. Furthermore, for Hypotheses 3, 4 and 5 we argued and contended that the KM processes of acquisition, sharing and exploitation will positively influence PMS. Social capital in the form of trust and norms provides the opportunity for participants in a project environment to gain access to knowledge management processes. Trust among participants in a project team allows them to acquire knowledge from one another (Chin et al., 2014), facilitates access to knowledge resources (Nahapiet & Ghoshal, 1998), and enables the transfer of explicit, complex and tacit knowledge (Roberts et al., 2008). Trust further facilitates the sharing of knowledge among participants in a project team by strengthening the relational embeddedness among project participants. Several studies have shown that trust accelerates the sharing of knowledge (Chang & Chang, 2011; Ridings et al., 2002; Wu, 2008; Zhang & Wu, 2013). In addition to engendering the acquisition and sharing of knowledge, trust further assists in the exploitation of knowledge. This has been confirmed by other studies (Chiu et al., 2006; Maurer, et al., 2011; Mehta, et al., 2014; Yli-Renko et al., 2011). Thus, trust is an effective way of acquiring, sharing, and exploiting knowledge among participants in a project team.

Moreover, norms play an important role in the acquisition, sharing and exploitation of knowledge by participants working on a project. Norms facilitate understanding and shared values among the project participants, which allows the acquisition and absorption of information and knowledge from one another (Mehta, 2015). Furthermore, because norms facilitate participant identification, they enhance the sharing
of information and knowledge among project participants (Chiu et al., 2016). Norms have also been found to boost the exploitation of knowledge by project participants (Horn et al., 2014; Liu & Phillips, 2011). Thus, norms shared by project participants is a potent force in fostering the acquisition, sharing and exploitation of knowledge in a project environment.

The knowledge management literature has also shown that knowledge management processes in the form of acquisition, sharing and exploitation affect organizational outcomes. Mehta (2015) and Roberts et al. (2008) have demonstrated that knowledge acquisition influences project management outcomes. When participants working on a project acquire knowledge, they are more likely to share the knowledge which would then be used to successfully improve the project outcome (Maurer et al., 2011; Shao et al., 2012). Furthermore, studies have shown that knowledge exploitation enhance organizational and project outcomes (Maurer, et al., 2011; Roberts et al., 2008; Yli-Renko et al., 2001).

Therefore, consistent with the arguments above and in the hypotheses linking social capital to KM processes, and KM processes to PMS, we postulate that KM processes will mediate the relationship between social capital and PMS. In other words, since trust and norms contribute to KM processes, and KM processes are in turn linked to PMS, an indirect effect via KM processes is likely to exist between social capital (trust and norms) and PMS. Consequently, we suggest that while norms and trust might influence PMS, the relationship might not be direct. Norms and trust’s influence on PMS might be dependent on the ability of project participants to integrate and exploit knowledge within the project environment. The ability of participants working on a project to communicate and share acquired information and utilize knowledge to execute project processes and activities will facilitate norms and trust to influence PMS. We, therefore, present the following hypotheses:

**Hypothesis 6a:** Knowledge acquisition will positively mediate the relationship between trust and project management success.

**Hypothesis 6b:** Knowledge sharing will positively mediate the relationship between trust and project management success.

**Hypothesis 6c:** Knowledge exploitation will positively mediate the relationship between trust and project management success.

**Hypothesis 7a:** Knowledge acquisition will positively mediate the relationship between norms and project management success.

**Hypothesis 7b:** Knowledge sharing will positively mediate the relationship between norms and project management success.

**Hypothesis 7c:** Knowledge exploitation will positively mediate the relationship between norms and project management success.
The research model is shown in Figure 1. Hypotheses 6 and 7 are omitted from the diagram for the sake of clarity.

**********INSERT FIGURE 1 ABOUT HERE**********

3. Methods

3.1. Data Collection

This study was carried out in Ghana using a survey of managers in various organizations who have had some involvement with the execution of projects. The survey items were adapted from previously validated measures obtained from the literature for the different constructs (see Table 1). The sample consisted of managers who were participants in a series of workshops on project management, operations, and general management at a local public university in Accra, Ghana. These respondents from different organizations had been members of project teams and/or served in various project management roles such as team leaders, project managers, sponsors, and team members and thus were deemed as appropriate respondents for a study on PMS in that environment. The respondents were also given additional questionnaires to give to other members in their organizations with project management experience. One hundred and eight-five (185) questionnaires were distributed, and we received 145 completed surveys representing a response rate of 78.4%. One hundred and forty-one (141) of the responses were found to be usable for further analysis. The others were not included in the study because of incomplete or inappropriate responses. About 43% of the respondents have had some project management leadership role such as team leader, project manager, or project sponsor, while the rest reported their roles as project participants. About 56% of the respondents were male. Ninety-one percent (91%) of the respondents had a bachelor’s degree and 9% had a master’s or higher degree. About 59% had been with their current organizations for one to five years and the others had been with their organizations for six or more years. The demographic characteristics of the respondents are summarized in Table 1.

**********INSERT TABLE 1 ABOUT HERE**********

The unit of analysis is the individual and his/her experiences within a project management context and his/her assessment of the success of those project engagements. We checked for non-response bias by testing the gender and role of early respondents against late respondents and found no statistical differences on those measures (Lambert & Harrington, 1990; Malhotra & Grover, 1998). The late respondents served as a proxy for those who did not respond to the surveys (Klein, Rai, & Straub, 2007). We also took steps to address potential common method bias. First, different pages of the four-page questionnaire had different groups of questions representing the different constructs and demographic measures (Chang, van Witteloostuijn, & Eden, 2010). Second, we used Harman’s (1967) one-factor test post-hoc to assess the extent of potential bias (Podsakoff, MacKenzie, Lee & Podsakoff, 2003). We factor-analyzed all the trust,
norms, KM processes, and PMS items together and found six factors with eigenvalues greater than 1.0 to be present. The six factors explained about 69% of the total variance with no one factor explaining more than 16% of the total variance indicating that no serious concern about common method bias occurs in our study.

3.2. Measurement of Variables

The six main constructs in this study were all measured with multiple items. The items and their sources are shown in Table 1. Likert-type scales with responses ranging from 1 (strongly disagree) to 7 (strongly agree) were used. Two social capital constructs were measured in this study: Trust, and Norms; while KM processes comprised of three elements: knowledge acquisition, knowledge sharing, and knowledge exploitation.

3.2.1. Trust

We used five (5) items to assess trust among project team members, and they reflected the respondent’s perception of the honesty and reliability of their colleagues, and whether the respondent felt other project participants could be trusted to solve project related problems.

3.2.2. Norm and Values

We measured norms and values with four (4) items that assessed the extent to which project participants subscribed to the project vision, were committed to the project goals, and felt a sense of agreement with others working on the projects.

3.2.3. Knowledge Acquisition

Knowledge acquisition was measured using three (3) items on the extent to which project participants relied on other participants within and outside the organisation, and clients for valuable technical and non-technical knowledge.

3.2.4. Knowledge Sharing

We measured knowledge sharing with four (4) items dealing with the extent to which project participants engaged in open and honest communication with each other, the extent to which they willingly shared information with other team members, and always kept others informed without any hidden agendas.

3.2.5. Knowledge Exploitation

We measured knowledge exploitation with four (4) items which assessed how project members used information acquired from other project participants, and other individuals (within and outside the organization) to execute project management activities.

3.2.6. Project Management Success

We measured project management success with four (4) items dealing with project completion time, completion within budget, planned performance, and customer satisfaction.
3.2.7. Control variables.

Accounting for controls will lead to a better explanation of the impact of the social capital elements and KM processes on project management success. Thus, in this study, we test the impact of five control variables: gender, participants role in a project, project type, and project duration on the relationships among social capital, KM, and PMS. It is possible that relationships between the social capital constructs, KM, and PMS might be influenced by the gender of the participants in the project environment. Thus, we included gender as a control variable to parcel out any potential effects of gender on the structural relationships. Gender was measured as a dummy variable, with males coded as 0 and females coded as 1. The role that an individual play in a project environment might have an impact on the ability of the individual to tap into the prevailing social capital to acquire, share and exploit knowledge and thereby impact PMS. Different players within a project environment might relate, communicate, exchange information, seek, and use information differently. Thus, we used participant’s role as a control variable in this study. Participant’s role was measured as a dummy variable with individuals who had been supervisors, leaders, managers or higher were coded one (1), while other project participants were coded as zero (0). The relationships among the study variables might be different for different types of projects and thus we included project type as a control variable. Project type was measured as a dummy variable where information technology and service projects were coded as one (1) while manufacturing and construction projects were coded as zero (0). It is possible that the impact of social capital on KM processes as well on as PMS might be influenced by the duration of the project. We therefore included project duration (the length of time it took to complete a typical project) as a control variable; project duration was measured in months.

3.3. Measurement Analyses

We empirically examined the hypotheses of our study using confirmatory factor analysis and a covariance-based structural equation modeling (CB-SEM) approach. Confirmatory factory analysis provides a more robust test of discriminant and construct validity than other approaches. Also, as noted by Iacobucci et al. (2007), structural equation models are superior to regression models when testing for mediation. Data analyses were conducted with LISREL 9.2 software. All our constructs were measured reflectively and thus we evaluated our measurement model through assessments of the reliability and validity of the constructs. Though this study adopted previously validated measures, we pretested the instrument with a sample of project participants as recommended in the literature (Malhotra & Grover, 1998; Straub, 1989). Fifteen (15) project participants were made to complete the survey instrument after which a debriefing session was held with the researchers to capture feedback regarding the ease or difficulty in completing the instrument. The instrument was subsequently modified by the researchers based on the
feedback obtained from the debriefing session. Internal consistency reliability was measured using the Cronbach alpha, which measures the extent to which the items for each construct are related to one another. All the Cronbach alpha coefficients were above 0.70 (see Table 2), the generally accepted minimum threshold for research in relatively new environments (Nunnally & Bernstein, 1994). At the same time, given that the Cronbach alpha underestimates the scale reliability and is dependent on the number of items used to measure the construct, we used the Composite Reliability (CR) measure to provide further evidence of internal consistency reliability. The CR considers the different outer loadings of the indicator variables as opposed to Cronbach alpha’s implicit assumption that all indicator items have equal outer loadings on the construct (Hair, Hult, Ringle, & Sarstedt, 2014). As evident in Table 2, the CR for each construct is greater than 0.70, indicating good internal consistency. Furthermore, none of the CR for the constructs was higher than 0.95 indicating that there were no redundant items for each of the constructs.

Convergent validity is the extent to which the measures for each construct are related to each other. The convergent validity was assessed by means of the Average Variance Extracted (AVE). Table 1 shows the AVE for four of the six constructs in our model are above 0.50 indicating that each construct explains more than 50% of the variance of its indicators (Hair et al, 2014). The AVEs for Trust and PMS are 0.40 and 0.43 respectively but are acceptable given that the composite reliability of each one is greater than 0.6 (Fornell & Larcker, 1981). To test for convergent validity of the multi-item constructs, we examined the standardized factor loadings for all our items and found that they were all above the recommended minimum of 0.40 (Ford, MacCallum & Tait, 1986) with most them close to or above 0.70. Finally, the positive correlations among the two social capital constructs provides an indication that they represent different dimensions of the same concept.

The next validity test was the discriminant validity. Establishing discriminant validity provides an indication that each construct is uniquely different from other constructs in a research model and that each construct captures a phenomenon not captured by the other constructs. We used the Fornell and Larcker (1981) criterion to assess discriminant validity. The Fornell and Larcker (1981) criterion compares the square root of the AVE values of each construct with the construct’s correlations with other constructs. If the square root of each construct’s AVE exceeds its correlation with any other construct, then discriminant validity exits. As shown, by comparing the square root of the AVEs and the correlations among constructs in Table 3, the square root values (diagonally bolded) are greater than the correlations among constructs (off-diagonals). This indicates that all constructs share more variance with their measures than with other constructs in the same model, thus providing evidence of discriminant validity. Table 4 presents the means, standard deviations, and correlations among the variables in the study.
4. Results

4.1. Structural Analysis

We used a covariance-based structural equation model (CB-SEM), LISREL 9.2, to test the relationships among the constructs in the study. We chose CB-SEM because of the desire to test our hypothesized model against alternate models and to identify the model that best fits our data. In addition, our constructs were measured reflectively, and our structural model had non-recursive relationships (Hair, et al, 2014). The structural tests represent the second phase of the two-stage process consisting of measurement analysis, and structural analysis (Anderson & Gerbing, 1988). The measurement results have already been presented above.

We present in Table 5 results of the four models we compared based on sequential chi-square difference tests. The Null model is a model that assumes no relationships among the constructs measured in the study. The Direct model looks at the direct effects of the of trust, and norms on PMS. This model represents the best constrained model. The Specified (mediation) model is our hypothesized model and looks at the indirect effects of Norms, and Trust on PMS mediated by the KM processes of acquisition, sharing, and exploitation. The fourth model is the Saturated model which includes both direct and indirect effects of social capital on PMS.

The sequence in which the tests were conducted is presented in Table 6. In the first test, we compared the Direct Model with the Null Model. The fit indices shown in Table 4, and the chi-square difference results in Table 6 show that a Direct Model is a better fit than the Null Model which specifies no relationships among the constructs. We next compared the Saturated Model with the Direct Model. The chi-square difference tests show that the two models are significantly different from each other and the Saturated Model has a lower Normed chi-square value than the Direct Model and thus the Saturated Model is preferred over the Direct Model. We do not compare the Specified Model with the Direct Model since the two models are not nested. The last test compared our Specified Model with the Saturated Model. The fit indices are almost identical for the two models and the chi-square difference test shows that the two are not statistically different from each other. However, the Specified Model represents a more parsimonious one and thus, represents the best fit for our data. Thus, we used the Specified Model to test our hypotheses.

***************INSERT TABLES 5 & 6 ABOUT HERE***************

4.2. Direct Hypotheses Tests

The structural model diagram, the standardized maximum likelihood path coefficients, and their significance levels are shown in Figure 2. Among the five controls, only participant’s role and project
duration were significant. Project leaders, supervisors, and managers were more likely to think that the projects were successful compared to participants who had regular team member roles on the projects. Moreover, projects that took longer were generally considered to be unsuccessful. Hypothesis 1 suggests that significant relationships exist between Trust and the KM processes in project environments. The results in Figure 2 show that Trust is positively related to Knowledge acquisition ($\beta = 0.33$, $p < 0.01$), providing support for H1a. Likewise, Trust is also positively related to Knowledge sharing ($\beta = 0.56$, $p < 0.01$) among project participants in project environments, thus supporting H1b. However, our data did not support a significant relationship between Trust and Knowledge exploitation ($\beta = 0.07$, ns), which means no support was found for H1c. Hypothesis 2 focuses on the relationships between Norms and the KM processes. H2a suggests that Norms will have a positive impact on Knowledge acquisition by project participants. Our data did not provide support for this hypothesis ($\beta = 0.16$, ns). On the other hand, we found support for a positive impact of Norms on Knowledge sharing ($\beta = 0.22$, $p < 0.05$), and Norms on Knowledge exploitation ($\beta = 0.46$, $p < 0.001$). Thus, H2b and H2c were supported.

The next set of hypotheses (H3, H4, H5) examines the impact of the KM processes on PMS. Hypothesis 3 suggests that Knowledge acquisition will be positively related to PMS. The relationship between Knowledge acquisition and PMS was not significant ($\beta = -0.05$, ns), and thus no support was found for H3. H4 posited that Knowledge Sharing will be positively related to PMS. Knowledge sharing was found to be significant and positively related to PMS ($\beta = 0.44$, $p < 0.001$). The result indicates that the higher the level of Knowledge sharing among project participants, the higher the PMS, providing support for H4. Similarly, we found support for H5 which predicts that Knowledge exploitation will be positively related to PMS. The results presented in Figure 2 indicate that the relationship between Knowledge exploitation and PMS is positive and significant ($\beta = 0.39$, $p < 0.001$).

4.3. Mediation Hypotheses Tests

Hypothesis 6 suggests that KM mediates the relationships between Trust and PMS. Similarly, Hypothesis 7 predicts that KM mediates the relationship between Norms and PMS. We present our findings on these hypotheses jointly. Our nested model results presented earlier (see Table 6) provided support that our Specified mediation model was the best fit for our data. Thus, while a model of direct effects of Norms and Trust on PMS is plausible, a mediation model provides a better explanation of the relationships between social capital and PMS. Consequently, we proceeded to use the Preacher and Hayes (2004) bootstrapping approach to test the specific mediation effects of the KM constructs on the Social Capital-PMS relationship. The bootstrapping approach can handle multiple independent variables simultaneously (Ko, 2014). Each
specific assessment of the mediation effect involves the running of three regressions: (a) the independent variables (social capital components) to predict the PMS; (b) the independent variables to predict the mediator variables (KM processes); and (c) the independent and mediator variables to predict PMS. Thus, the Preacher and Hayes approach also provides data that can be used to assess the Barron and Kenny (1986) criteria for mediation. However, the bootstrapping approach is preferred because it has been argued by Zhao et al. (2010) that the indirect effect is a product of two parameters, and as a result the sampling distribution of the product is not normally distributed. Thus, the bootstrapping approach provides a robust test of the indirect effects without the need for the multivariate normality assumption (Efron & Tibshirani, 1986; Hayes, 2009). We conducted the analysis by using Hayes (2009) MEDIATE Macro in SPSS with 10,000 bootstrap data samples generated by randomly sampling with replacement from the original data set. Mediation is established if the 95% confidence interval of the coefficient of the indirect effect does not contain zero.

The results of the mediation tests as well as the bootstrapping tests of the indirect effects are shown in Tables 7 and 8, respectively. We omit the complete results of the bootstrapping procedure here for the sake of brevity and rather focus on the assessment of the indirect effects of the social capital components on PMS through the KM processes. This is particularly important as the assessment of indirect effects do not require a significant direct effect of the social capital constructs on PMS. It is possible to find a significant indirect effect even in the absence of a significant direct effect (Preacher & Hayes, 2004; Zhao et al., 2010).

We did not find support for our hypothesis that Knowledge acquisition mediates the relationship between Trust and PMS. The 95% confidence interval (-0.350, 0.218) contains zero and thus H6a is not supported. H6b suggested that Knowledge sharing will mediate the relationship between Trust and PMS. The 95% confidence interval (0.0334, 0.2224) did not contain zero, implying that the indirect effect was significant, and that Knowledge sharing mediates the relationship between Trust and PMS, thus, H6b is supported. H6c was not supported as the indirect effect of Trust on PMS through Knowledge exploitation was not significant. The 95% confidence interval contains zero (-0.0506, 0.0479). The results shown in Table 8 indicate that Knowledge acquisition does not mediate the relationship between Norms and PMS as the indirect effect was not significant at the 95% confidence interval (-0.0105, 0.1097). However, both Knowledge sharing (95% CI: 0.0439, 0.2292) and Knowledge exploitation (95% CI: 0.0214, 0.2479) mediate the relationships between Norms and PMS. The indirect effects were significant, providing support for H7b and H7c, respectively.

***************INSERT TABLES 7 & 8 ABOUT HERE***************
5. Discussions

This study focuses on how social capital could be used to enhance PMS. Social capital represents a set of resources embedded in relationships among actors as individuals or as groups within organizations (Adler & Kwon, 2002; Bolino, Turnley & Bloodgood, 2002; Putnam 1993). It provides the opportunity to gain access to resources that are otherwise not possible outside of the network of relationships among the actors. We posited and found that social capital, specifically in the form of Trust, and Norms impact PMS indirectly through KM processes. Consequently, Trust and Norms are important in project environments because of their impact on the KM processes during project execution. Trust and Norms are important for achieving project management success because they enhance Knowledge acquisition, Knowledge exploitation and Knowledge sharing within project environments. Specifically, Trust is significantly related to Knowledge acquisition and Knowledge sharing while Norms have a significant impact on Knowledge sharing and knowledge exploitation in project environments.

We used survey data collected from 141 managers who had engaged in various project activities in organizations in Ghana to test our hypotheses. The unit of analysis was the individual, his/her interactions with others within the project environment, and how that impacted his/her ability to acquire, share and exploit knowledge within a project environment, and the individual’s perception of the impact on project management success. The empirical findings generally support our theoretical model by showing that: (1) social capital influences KM processes; (2) KM processes impact PMS; and (3) social capital influences PMS indirectly through its impact on KM processes. Specifically, the results indicate that the relationship between Trust and PMS is mediated by Knowledge sharing within project environments. In other words, Knowledge sharing enhances the potential impact of Trust on PMS. On the other hand, the relationship between Norms and PMS is mediated by both Knowledge sharing and Knowledge exploitation. These are significant contributions to the literature on social capital, knowledge management, and project management. We contribute by answering the question: what are the mechanisms by which social capital might enhance project management success? The findings show that the value of Trust to PMS materializes as a consequence of Knowledge sharing, while Norms impact on PMS is manifested through both Knowledge sharing and Knowledge exploitation. However, Knowledge acquisition plays no role on the relationship between social capital and PMS. The findings provide empirical evidence to corroborate the theoretical argument in the social capital literature that KM processes (especially, Knowledge sharing and Knowledge exploitation) are essential mechanisms linking social capital to organizational outcomes (Adler & Kwon, 2002). These nuanced findings provide opportunities for theory building by project management researchers as they point to the specific instances by which KM mediates the relationship between social capital and PMS.
For project managers and other leaders, the findings emphasize the utility of Knowledge sharing in enhancing PMS, while benefiting from both elements of social capital – Trust and Norms. Therefore, leveraging both Trust and Norms to share and exploit knowledge among project participants has the potential to contribute to the attainment of project management objectives. Project managers’ efforts at building trust in their project environments must be encouraged as it will enhance knowledge sharing among project participants. This is important in that Trust stimulates Knowledge sharing, more-so than Knowledge acquisition and Knowledge exploitation, for achieving project management success.

Knowledge creation and transfer exist when individuals acquire and share knowledge they recognize as potentially useful for the tasks they need to perform (Weber & Weber, 2010). Therefore, our findings demonstrate that trust among team project participants matters in project environments because it strengthens knowledge sharing which is important for achieving PMS. Our finding is consistent with the work of Davison, Ou, and Martinson (2018), who found that guanxi influences knowledge exchange in Chinese professional service firms. In a project environment where there is a high level of trust among participants, the actions of the participants are influenced by the relationships they have developed with others in the project environment. Thus, project participants will be more willing to share knowledge because they are assured their colleagues would trust their ability to provide requisite knowledge for the successful management of projects (Chang & Chuang, 2011; Yli-Renko et al, 2001).

Strong interactions among project participants increases the likelihood that the participants will not only contribute to the knowledge base but also share and use the knowledge with other members in the organization. Individuals who trust others in the project environment are more likely to exchange and use the unique knowledge held by other project participants. A possible reason why we did not find a significant relationship between Trust and Knowledge exploitation might be found in the arguments of Nahapiet and Ghoshal (1998) who suggested that it is not unusual to find different dimensions of social capital (relational, structural, and cognitive) operate in a manner that diminishes the influence of the other dimensions. Trust might encourage project participants to acquire and share knowledge, but the same members might not have the ability to exploit that knowledge to enhance project processes (Yli-Renko et al, 2001). In a project environment, Knowledge acquisition and mobilization is more likely to occur at the individual level while the exploitation of the knowledge for the benefit of other participants might be dependent on those participants. Most of the respondents of the survey have had experience with public sector project environments. In most developing countries (such as in Ghana), there are undue political interferences in public sector projects by governments due to the parochial interests of political figures or parties. Such interferences could potentially militate against exploitation of knowledge and demotivate project participants from exploiting the knowledge acquired for the benefit of the project.
We found support for our hypotheses that Norms will be positively related to Knowledge sharing and Knowledge exploitation. Norms refer to what people feel, having a sense of shared vision, and shared representations, interpretations, and systems of meaning (Harpham, 2008). Norms facilitates cooperation and strengthens relationships among individuals working together. The findings showed that project participants who share the same vision about the aspirations and goals of a project are likely to share and exploit the knowledge resources necessary to execute the project activities. This finding is consistent with the results from the work of Chang and Chuang (2011) who found that social capital in the form of shared language among individuals who have participated in virtual communities positively influences Knowledge sharing.

At the same time, we did not find support for a relationship between Norms and Knowledge acquisition. An environment in which there are high levels of shared goals and aspirations might create a sense of complacency where project participants might feel that there is less necessity to acquire knowledge from other members, and/or other individuals outside those directly involved with the project. Thus, a high level of Norms might not actually increase Knowledge acquisition. It is also possible, as argued by Yli-Renko et al (2001), that the shared goals, aspirations, and visions about a project might reduce the need to rely on others for knowledge mobilization, and hence the absence of a relationship between shared Norms and Knowledge acquisition.

On the other hand, Norms is positively related to knowledge sharing and knowledge exploitation in project environments. Furthermore, both knowledge sharing and knowledge exploitation mediate the relationships between Norms and PMS. With these findings we state that Norms matter in project environments because they strengthen both Knowledge sharing and Knowledge exploitation leading to PMS. The collectivist nature of the Ghanaian culture (and for that matter sub-Saharan African culture in general) suggests that the sense of agreement on the project visions, goals and objectives provides an impetus for togetherness and cooperation that leads to increased levels of sharing and exploitation of the knowledge present in the environment (Porter & Lyon, 2006; Ika 2012; Horn et al., 2014). These knowledge processes are further leveraged to enhance project management success. Most projects in Ghana are in the public sector, initiated by the government, and very often funded with resources from donor agencies (e.g., World Bank, International Monetary Fund, European Union, KfW Development Bank, Japan International Cooperation Agency, DANIDA, etc.). The subscription to the shared vision and benefits surrounding the projects as resources for the community pushes the need for conformance to expected norms of behavior. Project participants might feel peer pressure to work hard to make sure the project succeeds and thus might recognize the importance of Knowledge sharing and Knowledge exploitation, and their impact in the execution of projects.
5.1. Implications for Theory and Practice

The findings of our study contribute to social capital and KM research in three significant ways. While previous studies have examined the relationship among social capital, some aspect of KM and organizational level outcomes (e.g., Maurer et al., 2011; Yli-Renko et al., 2001), knowledge sharing in virtual communities (Chang & Chuang, 2011), knowledge integration among software teams (Mehta et al., 2014), interpersonal knowledge exchange in professional service firms (Davison et al., 2018), and decision quality in digitally-enabled teams (Robert et al., 2008), none has examined how social capital in the form of trust and norms influence KM processes to improve PMS.

Second, most studies examining the relationship between social capital and KM, lump the various components of KM processes into only one variable or use only one of the components – knowledge integration (Mehta, 2014; Robert et al, 2008), knowledge acquisition (Yli-Renko et al., 2001), knowledge exchange (Davison et al., 2018), or knowledge transfer (Maurer et al., 2011). For example, Yli-Renko et al (2001) studied how knowledge acquisition mediates the relationship between social capital and knowledge exploitation (which was conceptualized as new product development, technological distinctiveness, and sales cost). The study by Maurer et al. (2011) lumped KM processes together as knowledge transfer, while Robert et al. (2008) combined the KM processes into knowledge integration. Furthermore, Davison et al., (2018) combined interpersonal knowledge seeking (acquisition) and knowledge sharing into interpersonal knowledge exchange. Similar to the work of Horn et al. (2014) who studied different components of social capital in a supply chain integration environment, our study unpacks KM processes into three components and thus, allows us to examine the unique effects of the social capital dimensions of Trust, and Norms on the different components of KM processes of acquisition, sharing, and exploitation. By studying two social capital elements and three KM processes at the same time, we were able to examine the relationships in a more comprehensive manner. Our findings show that social capital’s influence on PMS through KM processes is dependent on the specific social capital component and the specific knowledge management processes. This is important for theory building in that we did not observe a situation where norms and trust were cancelling out the effects of their individual contributions to improving project management success. Further, it points out the importance of examining specific characteristics of social capital on organization processes.

Third, Trust and Norms played different complementary roles in influencing the KM processes to improve PMS. While Trust allows project participants to acquire and share knowledge for effective and efficient project execution, Norms permits the sharing and exploitation of knowledge for stimulating PMS. These findings imply that in societies where the culture is collectivistic, project leaders should tap into the societal culture to create trust among team members to encourage the acquisition or mobilization of knowledge among project team members and/or other parties. Thus, project leaders and managers must
utilize the mutual trust developed among the project participants to inspire them to share knowledge among themselves. The findings indicate that trust improves interactions among participants and facilitate not only learning from one another, but also the sharing of knowledge. The knowledge that is shared could be exploited to improve project management success. One of the specific ways of building trust among team members, particularly in collectivistic cultures, is for project leaders or managers to create an atmosphere of honesty and support in project environments. This is because in most collectivist cultures, individuals are often not straightforward with issues and normally pretend or position themselves in ways that tend to please other people. Thus, when project leaders and managers are honest and supportive, the quality of knowledge that is acquired and shared from trusting relationships in a project environment could potentially be enhanced.

Moreover, project leaders could rely on the same societal culture with a strong emphasis on adherence to cultural norms, values, belief systems and customs to foster the development of team norms and values. Specifically, project leaders and managers must leverage the cohesiveness inherent in the collectivistic culture in the Ghanaian society to tap the norms that are developed among project participants to facilitate knowledge sharing, which is important for project management success. Project managers should find ways to translate the norms into capabilities which could be used or exploited to improve quality of outcomes on-time while meeting project budgets. Project participants enthusiasm about the project could encourage them to share and use their knowledge. When project participants subscribe to the same norms, values and expectations about the usefulness of a project, they would be enthusiastic about the project and this would encourage them to share their knowledge and more likely to use that knowledge to help each other to achieve the objectives of the project.

5.2. Limitations and Future Research

This study was confined to Ghana and thus one might question the generalizability of the findings to other environments. However, it will be hard to imagine that Trust and Norms and their impact on KM will not be important in other collectivist societies during the execution of projects. Given the preponderance of project failures in African economies (Ika, 2012; Rwelamila, & Purushottam, 2012) it will be worthwhile for future studies to test the research hypotheses in this study in other collectivist cultural environments to bolster the findings presented in our study. We also looked only at selected elements of social capital and do demonstrate that those components (Trust, and Norms) influence KM in different ways to impact PMS. Thus, despite the numerous studies on social capital and project management in the literature, it will be worthwhile for future studies to examine other dimensions such as bonding, bridging, and linking social capital and their associated strong and weak ties, and how they impact KM in ensuring PMS. In Ghana, those in authority or leadership roles are often reluctant to share their knowledge with
subordinates for fear that they may lose the authority they have and thus this might impact how KM processes are utilized during project execution. In fact, such a study might also consider the examination of additional covariates such as educational level and age of project participants. It is entirely plausible that educational level and age of project team members impact how and when these individuals utilize KM for PMS.

This study focused on PMS and not project success. The incorporation of project success into the research model will require longitudinal studies which obviously will be a huge challenge given the data collection difficulties in environments such as the one studied here. A longitudinal study that examines the impact of social capital on the long-term success of projects will contribute significantly to social capital theory while providing managers with insights on which social capital dimensions provide lasting benefits. The unit of analysis in this study was the individual. It will be interesting and useful to ascertain if the conclusions reached here will be different if teams were studied instead. Such a study might require the use of different methods such as case studies or laboratory experiments.

The mediator that was studied in this paper was KM processes. However, we did not study the relationships among the different KM processes and their resulting impact on PMS. For example, while knowledge acquisition might not have a direct impact on PMS, acquisition might have an indirect impact on PMS through knowledge sharing or exploitation. Future research could examine whether knowledge acquisition, sharing and exploitation interact with each other in project environments and further ascertain if they strengthen or diminish each other’s impact on PMS. Further work might also look at additional mediators such as the self-efficacy of project team members, and organizational culture. The study of such mediators would allow researchers to gain a better understanding of how and when social capital impacts PMS. In that regard the study of mediators will allow researchers to provide explanations for mixed findings and contribute to theory building.

6. Conclusion

Managing projects successfully is a *sine qua non* for the growth and success of public and private organizations in sub-Saharan Africa. However, many projects in the developing world (including sub-Saharan Africa) have failed and continue to fail due to budget overruns, inability to complete the projects on time, and poor-quality outcomes. We demonstrated in this study that social capital in the form of Trust and Norms (and values) could be used to mobilize, share, and exploit knowledge in a project environment to improve PMS in sub-Saharan Africa. We suggest that to improve project management success managers should find ways to improve trust among project participants and strengthen the norms and values that are associated with the projects. Project team members are more likely to use knowledge management systems to facilitate project success when they subscribe to the same norms and values about the project being
executed. Our study, therefore, informs this fascinating area of research by demonstrating that in collectivistic societies such as those in sub-Saharan Africa, social capital could be used to enhance PMS. Nevertheless, different characteristics of social capital impact KM processes differently to improve PMS. We hope that this study facilitates and encourages research on how social capital could support PMS in other parts of the world.

NOTES ON CONTRIBUTORS


Moses Acquaah is Professor of Management and Head of the Department of Management at the University of North Carolina at Greensboro, NC, USA. He received his PhD from the University of Wisconsin-Milwaukee, USA. His research interest includes strategic management, international business, entrepreneurship, and family business. His research has been published in several internationally recognized journals including the Strategic Management Journal, Journal of Business Research, Human Relations, International Journal of Production Research, and the International Journal of Production Economics.

Ebenezer Adaku is a Senior Lecturer in Operations and Project Management at the Graduate School of Business, Ghana Institute of Management and Public Administration (GIMPA), Ghana and currently a Marie Skłodowska Curie Research Fellow at the University of Wolverhampton, UK. He received his PhD from University of Stuttgart, Germany. His research interest includes causes of construction project cost and time overruns; social capital and its effects on project performance in developing economy environments; and occupational safety and health (OSH) management on construction projects. His research has been published in International Journal of Managing Projects in Business, International Journal of Production Economics, and Production Planning & Control.

Samuel Famiyeh is an Associate Professor in Operations and Supply Chain Management at the Graduate School of Business, Ghana Institute of Management and Public Administration (GIMPA), Ghana. He is currently the Acting Dean of the Business School. He has a PhD in Business Administration from the Technical University of Mining and Technology from Freiberg, Germany. His research interest is in the areas related to project stakeholder management, environmental impacts assessment of projects, factors influencing project time and costs, service quality, environmental management systems. His research appears in top international journals in management such as International Journal of Managing Projects in Business, Journal of Manufacturing and Technology Management, International Journal of Production Economics, and Production Planning & Control.
References


Figure 1: Research Model

Trust

H1a

H1b

H1c

Norms

H2a

H2b

H2c

Knowledge Acquisition

H3

Knowledge Sharing

H4

Knowledge Exploitation

H5

Project Management Success

Figure 2: Results of Specified Model

Trust

0.33*

0.56***

0.16

Knowledge Acquisition

R² = 0.20

Knowledge Sharing

R² = 0.51

Project Management Success

R² = 0.43

Norms

0.07

0.22*

0.46***

Knowledge Exploitation

R² = 0.25
## Table 1: Demographic Characteristics of Respondents

<table>
<thead>
<tr>
<th>Demographic Characteristic</th>
<th>N</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>79</td>
<td>56.03</td>
</tr>
<tr>
<td>Female</td>
<td>62</td>
<td>43.97</td>
</tr>
<tr>
<td>Total</td>
<td>141</td>
<td>100</td>
</tr>
<tr>
<td><strong>Participants’ Role</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Team leader</td>
<td>31</td>
<td>21.99</td>
</tr>
<tr>
<td>Project manager</td>
<td>22</td>
<td>15.60</td>
</tr>
<tr>
<td>Sponsor</td>
<td>8</td>
<td>5.67</td>
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<tr>
<td>Team member</td>
<td>80</td>
<td>56.74</td>
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<tr>
<td>Total</td>
<td>141</td>
<td>100</td>
</tr>
<tr>
<td><strong>Educational Level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelors</td>
<td>128</td>
<td>90.78</td>
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<tr>
<td>Masters</td>
<td>6</td>
<td>4.26</td>
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<tr>
<td>PhD</td>
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<td>4.96</td>
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<tr>
<td>Total</td>
<td>141</td>
<td>100</td>
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<tr>
<td><strong>Organizational Tenure (Years)</strong></td>
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<td></td>
</tr>
<tr>
<td>1-5</td>
<td>83</td>
<td>58.87</td>
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<tr>
<td>6-10</td>
<td>27</td>
<td>19.15</td>
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<tr>
<td>11-15</td>
<td>21</td>
<td>14.89</td>
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<tr>
<td>16-20</td>
<td>8</td>
<td>5.67</td>
</tr>
<tr>
<td>21-25</td>
<td>2</td>
<td>1.42</td>
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<tr>
<td>Total</td>
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<td>100</td>
</tr>
<tr>
<td><strong>Project Type</strong></td>
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<td></td>
</tr>
<tr>
<td>Service/Information Technology</td>
<td>97</td>
<td>78.23</td>
</tr>
<tr>
<td>Construction/Manufacturing</td>
<td>27</td>
<td>21.77</td>
</tr>
<tr>
<td>Total</td>
<td>124</td>
<td>100</td>
</tr>
<tr>
<td>Factor [Source of Items]</td>
<td>Measurement Items</td>
<td>Standardized Loadings*</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Knowledge Sharing</td>
<td>IS1. I have no have no hidden agendas or issues when working on projects.</td>
<td>0.70</td>
</tr>
<tr>
<td>[Leana &amp; Pil (2006); Cheng et al (2008); Cai et al, (2013); Chiu et al (2006)]</td>
<td>IS2. I provide and accept constructive criticisms without making it personal</td>
<td>0.71</td>
</tr>
<tr>
<td></td>
<td>IS3. I willingly share information with other project participants</td>
<td>0.77</td>
</tr>
<tr>
<td></td>
<td>IS4. I and other participants always keep each other informed</td>
<td>0.83</td>
</tr>
<tr>
<td>Knowledge Acquisition</td>
<td>KA1. I obtain tremendous amount of knowledge and information from other participants within and outside the organization because of my relationships with them.</td>
<td>0.69</td>
</tr>
<tr>
<td>[Yli-Renko et al (2001); Teo &amp; Bhattacharjee (2014)]</td>
<td>KA2. I seek valuable information about how to execute the project from the clients we serve.</td>
<td>0.69</td>
</tr>
<tr>
<td></td>
<td>KA3. I seek a great deal of technical knowledge from other participants within the organization and from our clients.</td>
<td>0.86</td>
</tr>
<tr>
<td>Knowledge Exploitation</td>
<td>KE1. I use the knowledge and information I acquire from other project participants and our clients to improve the project outcomes.</td>
<td>0.71</td>
</tr>
<tr>
<td>[Teo &amp; Bhattacharjee (2014)]</td>
<td>KE2. I use the knowledge and information I obtain from our clients to increase productivity on the project.</td>
<td>0.75</td>
</tr>
<tr>
<td></td>
<td>KE3. I share the knowledge and information from other participants and our clients with others to encourage experimentation and creativity.</td>
<td>0.79</td>
</tr>
<tr>
<td></td>
<td>KE4. I use the knowledge and information from clients to improve the efficiency of project activities.</td>
<td>0.84</td>
</tr>
<tr>
<td>Norms &amp;Values</td>
<td>NV1. Project participants and I share the same ambitions and vision</td>
<td>0.68</td>
</tr>
<tr>
<td>[Leana &amp; Pil (2006); Chiu et al. (2006)]</td>
<td>NV2. Project participants and I enthusiastically pursue collective goals and mission</td>
<td>0.91</td>
</tr>
<tr>
<td></td>
<td>NV3. There is a commonality of purpose among project participants</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td>NV4. Project participants are committed to the goals of the team.</td>
<td>0.72</td>
</tr>
</tbody>
</table>

* All standardized loadings are significant with p<0.001; ** all Z -statistic are significant with p<0.001
### Table 2 Continued

<table>
<thead>
<tr>
<th>Factor [Source of Items]</th>
<th>Measurement Items</th>
<th>Standardized Loadings*</th>
<th>Z statistic**</th>
<th>Composite Reliability</th>
<th>Average Variance Extracted (AVE)</th>
<th>Cronbach Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Management Success</strong> [Meredith et al (2014) Jiang et al (2002) Pinto (2013), Brinkhoff, Özer &amp; Sargut (2014)]</td>
<td>PMP1. The projects have typically been completed within the planned time</td>
<td>0.60</td>
<td></td>
<td>0.75</td>
<td>0.43</td>
<td>0.78</td>
</tr>
<tr>
<td></td>
<td>PMP2. The projects have typically been completed within the planned budget</td>
<td>0.76</td>
<td>6.60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PMP3. The projects have typically achieved the planned objectives</td>
<td>0.68</td>
<td>4.74</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PMP4. The customers of the projects have generally been satisfied with the outcomes of the projects</td>
<td>0.57</td>
<td>4.31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Trust</strong></td>
<td>TR1. Individuals working on projects are willing to help each other out</td>
<td>0.53</td>
<td>fixed</td>
<td>0.76</td>
<td>0.40</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td>TR2. Project participants are honest</td>
<td>0.77</td>
<td>9.76</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TR3. The project participants that I work with are reliable</td>
<td>0.79</td>
<td>10.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TR4. I trust the project participants to help me solve problems on the project</td>
<td>0.46</td>
<td>5.19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TR5. Most of the project participants can be trusted</td>
<td>0.54</td>
<td>6.29</td>
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</tbody>
</table>

### Table 3: Discriminant Validity Results

<table>
<thead>
<tr>
<th></th>
<th>Knowledge Acquisition</th>
<th>Knowledge Exploitation</th>
<th>Knowledge Sharing</th>
<th>Norms &amp; Values</th>
<th>Project Management Success</th>
<th>Trust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Acquisition</td>
<td><strong>0.75</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge Exploitation</td>
<td>0.59</td>
<td><strong>0.77</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge Sharing</td>
<td>0.48</td>
<td>0.36</td>
<td><strong>0.75</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norms &amp; Values</td>
<td>0.26</td>
<td>0.42</td>
<td>0.49</td>
<td><strong>0.78</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Management Success</td>
<td>0.32</td>
<td>0.38</td>
<td>0.45</td>
<td>0.41</td>
<td><strong>0.66</strong></td>
<td></td>
</tr>
<tr>
<td>Trust</td>
<td>0.33</td>
<td>0.21</td>
<td>0.48</td>
<td>0.47</td>
<td>0.19</td>
<td><strong>0.63</strong></td>
</tr>
</tbody>
</table>

1 Values on the diagonal represent the square root of the AVEs while values inside represent the bivariate correlations
### Table 4: Descriptive Statistics and Correlations

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Participant Role</td>
<td>-0.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Project Type</td>
<td>0.24**</td>
<td>-0.23**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Project Team size</td>
<td>-0.07</td>
<td>-0.02</td>
<td>0.06</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Project duration (Months)</td>
<td>-0.24**</td>
<td>0.20*</td>
<td>-0.33***</td>
<td>0.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6. Knowledge Acquisition</td>
<td>-0.01</td>
<td>0.10</td>
<td>-0.02</td>
<td>0.11</td>
<td>0.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Knowledge Exploitation</td>
<td>0.13</td>
<td>0.03</td>
<td>0.01</td>
<td>0.04</td>
<td>-0.08</td>
<td>0.59***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Knowledge Sharing</td>
<td>-0.02</td>
<td>0.03</td>
<td>-0.08</td>
<td>-0.09</td>
<td>0.03</td>
<td>0.48***</td>
<td>0.36***</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>9. Norms &amp; Values</td>
<td>-0.06</td>
<td>0.08</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.02</td>
<td>0.26**</td>
<td>0.42***</td>
<td>0.49***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Trust</td>
<td>-0.10</td>
<td>0.09</td>
<td>-0.21*</td>
<td>0.08</td>
<td>0.19*</td>
<td>0.33***</td>
<td>0.21*</td>
<td>0.48***</td>
<td>0.47***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Project Management Success</td>
<td>0.13</td>
<td>0.11</td>
<td>0.09</td>
<td>0.08</td>
<td>-0.20*</td>
<td>0.32***</td>
<td>0.38***</td>
<td>0.45***</td>
<td>0.41***</td>
<td>0.19*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean: Mean value
Standard Deviation: Standard deviation
Minimum: Minimum value
Maximum: Maximum value
N: Sample size

Significance tests (2-tailed): *p < 0.05; **p < 0.01; ***P < 0.001.

1 Gender: Male = 0; Female = 1; 2 Participant role: Project Participant = 0; Project Leadership = 1; 3 Project type: Service/IT related = 1; Construction/Manufacturing = 0
Table 5: Structural Equation Model Statistics

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>d.f.</th>
<th>Normed $\chi^2$</th>
<th>GFI</th>
<th>RMSEA</th>
<th>CFI</th>
<th>IFI</th>
<th>NNFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommended Values</td>
<td></td>
<td></td>
<td></td>
<td>≤3.0</td>
<td>≥0.90</td>
<td>≤0.08</td>
<td>≥0.93</td>
<td>≥0.90</td>
</tr>
<tr>
<td>1. Null Model</td>
<td>653.53</td>
<td>251</td>
<td>2.60</td>
<td>0.71</td>
<td>0.11</td>
<td>0.89</td>
<td>0.89</td>
<td>0.87</td>
</tr>
<tr>
<td>2. Direct Model (Best constrained)</td>
<td>466.65</td>
<td>237</td>
<td>1.97</td>
<td>0.80</td>
<td>0.06</td>
<td>0.94</td>
<td>0.94</td>
<td>0.93</td>
</tr>
<tr>
<td>3. Specified (Mediation) Model</td>
<td>451.91</td>
<td>236</td>
<td>1.91</td>
<td>0.81</td>
<td>0.08</td>
<td>0.94</td>
<td>0.94</td>
<td>0.93</td>
</tr>
<tr>
<td>4. Saturated Model</td>
<td>448.85</td>
<td>234</td>
<td>1.92</td>
<td>0.81</td>
<td>0.08</td>
<td>0.94</td>
<td>0.94</td>
<td>0.93</td>
</tr>
</tbody>
</table>

GFI = Goodness of Fit Index; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; IFI = Incremental Fit Index; Residual; NNFI = Non-Normed Fit Index; and Normed $\chi^2$ = Chi square divided by degrees of freedom.

Table 6: Nested Model Testing and Difference Tests

<table>
<thead>
<tr>
<th>Model Comparison</th>
<th>$\chi^2$</th>
<th>d.f.</th>
<th>$p$</th>
<th>Model Preference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 2 vs. 1 Direct vs. Null</td>
<td>186.88</td>
<td>14</td>
<td>&lt; 0.001</td>
<td>2</td>
</tr>
<tr>
<td>Model 4 vs. 2 Saturated vs Direct</td>
<td>17.80</td>
<td>3</td>
<td>&lt; 0.001</td>
<td>4</td>
</tr>
<tr>
<td>Model 4 vs. 3 Saturated vs specified</td>
<td>3.06</td>
<td>2</td>
<td>&gt; 0.10</td>
<td>3</td>
</tr>
</tbody>
</table>
Table 7: Test of Mediation: Comparison of the Standardized Path Coefficients for the Direct, Specified, and Saturated Models

<table>
<thead>
<tr>
<th>Path</th>
<th>Direct model</th>
<th>Specified model</th>
<th>Saturated model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trust → Project Management Success</td>
<td>0.16</td>
<td></td>
<td>-0.22</td>
</tr>
<tr>
<td>Trust → Knowledge Acquisition</td>
<td>0.36**</td>
<td>0.33*</td>
<td>0.34*</td>
</tr>
<tr>
<td>Trust → Knowledge Exploitation</td>
<td>0.10</td>
<td>0.07</td>
<td>0.08</td>
</tr>
<tr>
<td>Trust → Knowledge Sharing</td>
<td>0.60***</td>
<td>0.56***</td>
<td>0.57***</td>
</tr>
<tr>
<td>Norms → Project Management Success</td>
<td>0.43**</td>
<td></td>
<td>0.21</td>
</tr>
<tr>
<td>Norms → Knowledge Acquisition</td>
<td>0.15</td>
<td>0.16</td>
<td>0.15</td>
</tr>
<tr>
<td>Norms → Knowledge Exploitation</td>
<td>0.45***</td>
<td>0.46***</td>
<td>0.45***</td>
</tr>
<tr>
<td>Norms → Knowledge Sharing</td>
<td>0.21*</td>
<td>0.22*</td>
<td>0.21*</td>
</tr>
<tr>
<td>Knowledge Acquisition → Project Management Success</td>
<td>-0.05</td>
<td>-0.01</td>
<td></td>
</tr>
<tr>
<td>Knowledge Sharing → Project Management Success</td>
<td>0.44**</td>
<td></td>
<td>0.50**</td>
</tr>
<tr>
<td>Knowledge Exploitation → Project Management Success</td>
<td>0.39**</td>
<td></td>
<td>0.31**</td>
</tr>
</tbody>
</table>

***p \leq 0.001  ** p \leq 0.01  * p \leq 0.05  + p \leq 0.10

Table 8: Bootstrap Results for Indirect Effects

<table>
<thead>
<tr>
<th>Path</th>
<th>β*</th>
<th>SE</th>
<th>LL 95% CI</th>
<th>UL 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trust → Knowledge Acquisition → Project Management Success</td>
<td>-0.066</td>
<td>0.145</td>
<td>-0.350</td>
<td>0.218</td>
</tr>
<tr>
<td>Trust → Knowledge Sharing → Project Management Success</td>
<td><strong>0.115</strong></td>
<td>0.049</td>
<td><strong>0.0334</strong></td>
<td><strong>0.2224</strong></td>
</tr>
<tr>
<td>Trust → Knowledge Exploitation → Project Management Success</td>
<td>0.003</td>
<td>0.024</td>
<td>-0.0506</td>
<td>0.0479</td>
</tr>
<tr>
<td>Norms → Knowledge Acquisition → Project Management Success</td>
<td>0.032</td>
<td>0.031</td>
<td>-0.0105</td>
<td>0.1097</td>
</tr>
<tr>
<td>Norms → Knowledge Sharing → Project Management Success</td>
<td><strong>0.122</strong></td>
<td>0.048</td>
<td><strong>0.0439</strong></td>
<td><strong>0.2292</strong></td>
</tr>
<tr>
<td>Norms → Knowledge Exploitation → Project Management Success</td>
<td><strong>0.106</strong></td>
<td>0.059</td>
<td><strong>0.0214</strong></td>
<td><strong>0.2479</strong></td>
</tr>
</tbody>
</table>

* Beta values in bold are significant as the 95% Confidence Interval (CI) values do not contain zero