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Developing Knowledge Creation Capability: The Role of Big-Five Personality Traits and Transformational Leadership

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Abstract

Current research aims to develop and test a conceptual framework that poses attention to individuals' personality as a potential predictor of their knowledge creation capability, considering the mediating effect of transformational leadership. According to an estimate, poor knowledge management costs Fortune 500 companies' huge annual losses through taking a toll on their efficiency and productivity. Thus knowledge management is crucial for organizations, and various ways to improve knowledge creation and management need to be studied. In this regard, current research uses Nonaka's knowledge creation theory to study the knowledge creation capability in organizations as a consequence of managers' personality and leadership style. Cross-sectional data was collected from middle level managers working in thirteen different organizational sectors from Pakistan. Covariance based structural equation modeling was used to test hypotheses. All scales were found reliable; however, measurement models were re-specified to improve the construct validity. Through SEM, this research revealed that openness, agreeableness and extraversion have direct influence on knowledge creation capability. Furthermore, transformational leadership mediates the relationship between all the Big-Five personality traits and knowledge creation capability. Therefore, to develop knowledge creation capability of managers, organizations should rethink their organizational procedures to put in place such recruitment, selection, and training & development practices that are oriented towards managers' personalities and their leadership styles. To the best of our knowledge, this is the first study that identifies Big-Five personality traits as antecedents of knowledge creation capability, incorporates transformational leadership in the model, and tests these relationships empirically. It also provides valuable insights in the domain of knowledge management among middle level managers of various Pakistani firms.

Keywords: knowledge creation capability, openness to new experience, agreeableness, conscientiousness, extraversion, neuroticism, big-five personality traits, transformational leadership

1. Introduction

Twenty first century is known to be the age of information (Beetham & Sharpe, 2013). Importance of knowledge in this age can be understood through strategic resource based view (Lockett et al., 2009) which posits that organizational success can be achieved by embracing the development of new knowledge and capabilities. Organizational scholars argue that facilitating the development of knowledge creation capability (KCC) can be a source of competitive advantage for the organizations that is difficult for rivals to imitate (Torres et al., 2018), and it positively influences organizational innovation (Rhee, & Park, 2018). Others have contended that sharing of knowledge and information plays a pivotal role in innovation and development of new products and processes (Zamora & Senoo, 2013). In addition, knowledge creation capability aids the firms through enhancing their performance in times of high technological turbulence and competitive intensity (Su et al., 2016)

Organizations operate in various domains through its employees, and KCC of organizations depends upon employees' KCC (Sharkie, 2003). Studying the antecedents of employees' KCC becomes a crucial research issue because it can provide a complete picture on which basis organizations significantly differ in their KCC (Wang et al., 2011). The research has mainly focused on the knowledge creation capability of the organizations as a whole (Su et al., 2016). However, organizations' knowledge is largely embedded in its members and the interactions they have within the organization (Tsoukas, 1996). Organizational knowledge creation depends upon employees' capability to create knowledge through exchanging and combining information into new knowledge (Smith et al., 2005). Nonetheless, there is minimal research conducted about knowledge creation capability of employees, which is a major research gap. To address this research gap, current research pursues two main objectives. First objective is to study organizational managers' Knowledge Creation Capability as a consequence of their Big-Five personality traits. The second objective is to study the role of transformational leadership as a potential mediator between Big-Five personality traits and Knowledge Creation Capability. Nonaka's well-accepted knowledge creation framework of SECI (Oluikpe, 2015) and "learning organization theory" guides this research.

Leaders generally, and transformational leaders particularly, are considered catalysts and facilitators of knowledge creation process in organizations (Birasnav, 2014; Donate & de Pablo, 2015; Politis, 2002; Singh, 2008). Unfortunately, the study of leadership in this domain is underdeveloped (Herman & Mitchell, 2010). Thereby, the theoretical contribution of current research is to address this gap in literature through incorporating transformational leadership (TL) in the conceptual model, and collecting data from middle level managers who are working in leadership capacity. Secondly, the concept of knowledge management (KM) is generally conceptualized and used in research originating from developed countries in the West (Mohsin & Syed, 2018). Present research has contributed to literature by conducting research in South Asian developing

country Pakistan that has a different sociocultural and economic complex when it comes to implementing knowledge management practices (Hegde & Shapira, 2007).

Results through Structured Equation Modeling (SEM) indicated that personality traits of openness, agreeableness and extraversion significantly affect KCC of individuals. In addition, TL mediates the relationship of all Big-Five personality traits and KCC. Therefore, current research offers important practical implication for organizations through suggesting that the organizations can develop employees' knowledge creation capability by designing such strategies and procedures that focus on specific aspects of their personalities and leadership styles. The remainder of this paper consists of four sections. The first section establishes the theoretical links among knowledge creation, personality traits and TL. Based upon these theoretical underpinnings, research hypotheses have been presented afterwards. The second section sheds light on the methodology adopted to conduct this research and the participants selected for data collection. The third section includes a detailed account of analysis conducted. And finally, the fourth section discusses the results coupled with practical implications and conclusion.

2. Theoretical Background and Research Hypotheses

2.1 SECI Model of Knowledge creation

Knowledge creation is characterized by the development of novel ideas and replacement of existing ideas by the new ones (Papa, Santoro, Tirabeni, & Monge, 2018). Knowledge creation theory was presented by Nonaka (1994) in an effort to explore the continuous interplay of tacit and explicit knowledge for creation of new concepts. Explicit knowledge can be clearly stated and shared through manuals, databases and information systems. Conversely, tacit knowledge lies within people's experiences and comprises of values, beliefs and perceptions (Hislop et al., 2018). Nonaka's archetype of knowledge creation portrays an upward moving spiral flow of knowledge that starts at individual level and moves up to group, organizational and inter organizational level (Hussi, 2004). Nonetheless, at all levels, organizational members are the key actors for the creation of knowledge (Smith et al., 2005).

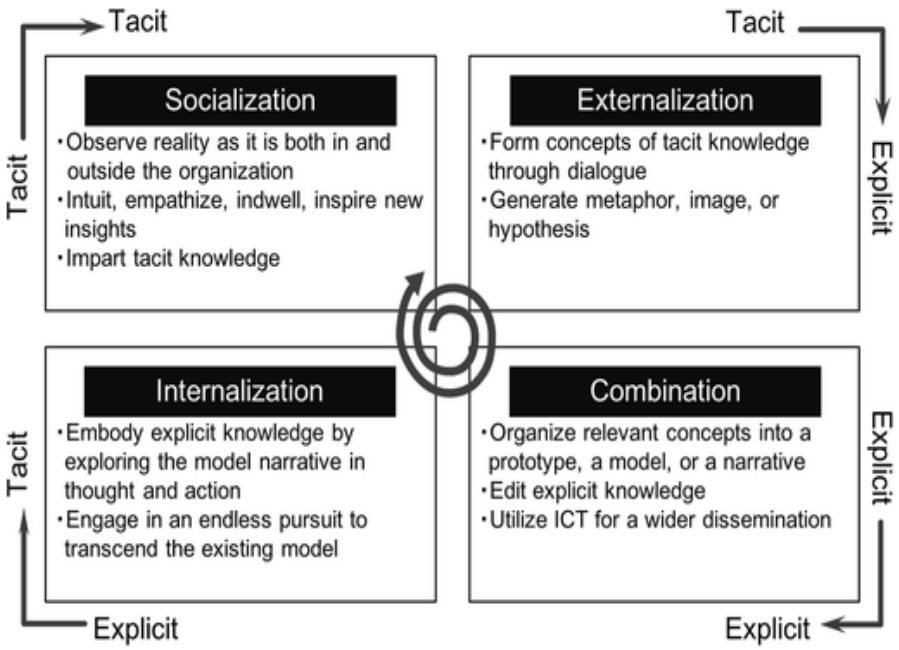

Figure 1: The Dynamic Triad Model

The relentless upward spiral of tacit knowledge, explicit knowledge, and phronesis.
Source: (Nonaka and Nishihara, 2018)

In his knowledge creation model (SECI), Nonaka (1994) has identified four conversion patterns of tacit and explicit knowledge namely socialization, externalization, combination and internalization (Nonaka & Nishihara, 2018). As portrayed in Figure 1, socialization is about converting tacit knowledge into new tacit knowledge. Externalization is the conversion of tacit knowledge into explicit knowledge. Furthermore, explicit knowledge is converted into new explicit knowledge through combination. And lastly, explicit knowledge conversion into tacit knowledge is named as internalization (Hussi, 2004; Nonaka, 1994).

Nonaka (1994) provides valuable insights to the process of knowledge creation in which the role organizational members can be clearly understood. He posits that knowledge creation process starts with socialization when a field of interaction is developed where individuals can share their experiences. On the basis of successive rounds of dialogue, where individuals might use metaphors to express hidden tacit knowledge, externalization mode is triggered (Nishihara et al., 2017a). The concepts formed as a result of externalization are combined with existing knowledge, and data is documented in combination mode. Through continuous experimentation of trial and error, internalization mode is activated. Then individuals learn by doing, and explicit knowledge is slowly converted into tacit knowledge (Nishihara, Matsunaga, Nonaka, & Yokomichi, 2017b). The organizational routines to create and exploit knowledge are the key to creative renewal of knowledge that resides in the context called “ba” (Nonaka & Reinmoeller, 2017). Although SECI model was introduced almost two decades ago, but it

is still relevant due to current social and economic challenges where organizations have to foster their KCC to compete in market (Giudice & Maggioni, 2014).

KCC is pivotal for organizations because it can be continuously developed, shaped and reconfigured to seize opportunities as they arise (Teece, 2009). Researchers have recently studied various mechanisms that capture the process of knowledge creation in organizations (Huang & Wang, 2002; Huang & Wang, 2003; Novak, 2017; Perrée et al., 2019; Shamim et al., 2016). Most of these studies do not provide empirical evidence of the findings as they review the literature about knowledge creation (Novak, 2017; Shamim et al., 2016). A few studies that are empirical in nature focus on knowledge creation on team level and its effect on team's learning and innovation (Huang & Wang, 2002; Huang & Wang, 2003). The focus on individuals' knowledge creation capability is seriously lacking although the transfer and sharing of tacit as well as explicit knowledge requires intensive interaction and socialization between organizational members (Laursen et al., 2012). To address this gap, and to study SECI model developed by Nonaka, we have focused on individuals' capability of socialization, externalization, combination and internalization. We have also proposed antecedent of knowledge creation capability at individual level i.e., individuals' personality traits. As knowledge creation capability is mainly dependent upon the interactions of individuals, we have proposed that certain personality traits make it easy for them to interact, while other traits restrain them to interact and effectively create knowledge. Additionally, knowledge creation is impeded in undisciplined interactions where participants lack trust on each other (Eapen, 2012), thus individuals working at leadership positions have to facilitate interactions, discussions, and dialogues of other organizational members for effective knowledge creation. Accordingly, leadership styles become relevant to knowledge creation. Thus, we have incorporated transformational leadership as a mediator in our model because such leadership style is known to influence, motivate and intellectually stimulate the followers (Bass, 1985). The next section discusses various personality traits as facilitators or obstacles for knowledge creation capability of individuals.

2.2 Big-Five Personality Traits as Antecedents of Knowledge Creation Capability (KCC)

Skills and knowledge become obsolete quickly in the current digital era, thus future success requires responsiveness, flexibility and new capabilities (Edmondson & Moingeon, 1998). In developing new capabilities and creating new knowledge, many psychological and organizational factors can play their role either as enablers or hurdles. Learning organization theory tends to explore the sources of resistance and strategies to overcome them (Stata, 1989; Argyris, 1982). Guided by learning organization theory, Edmondson & Moingeon (1998) presented a model in which cognition of organizational members is the prime factor for developing learning organizations. Therefore, research about conditions and factors that enable individuals' learning within organizations has gained importance. In this regard, we have studied personality traits of individuals as predictors of their knowledge creation capability.

Personality of an individual comprises of emotions, behaviors, patterns of thought and psychological mechanisms (Perugini et al., 2016). Extant research considers personality a major influencer of one's behavior (Li & Armstrong, 2015). In personality literature, Big-Five traits model is the most common model discussed (Vedel, 2016). The Big-Five model taps into five personality traits namely conscientiousness, neuroticism and openness to experience, agreeableness and extraversion. All the traits are found to

positively affect knowledge creation in organizations (Agyemang et al., 2016; Matzler et al., 2008). We propose that conscientiousness, openness to new experiences, agreeableness and extraversion enhances employees' knowledge creation capability, while neuroticism acts as a hindrance.

The first trait in Big-Five model called conscientiousness refers to people who are dependable, careful and self-disciplined (Cianci et al., 2010). Conscientious employees tend to share plentiful information with others more often (Gupta, 2008). They consider dissemination of knowledge as a part of their duties (Cabrera et al., 2006). Matzler et al. (2008) argued that employees with high levels of conscientiousness engage in sharing and documentation of knowledge to benefit organizations. As knowledge sharing during dialogue and interactions is a major activity in all stages of Nonaka's knowledge creation model (Nonaka & Nishihara, 2018), therefore, conscientious individuals are expected to possess KCC. Based upon the literature discussed above, following hypothesis emerges.

- **H_1:** Conscientiousness enhances the knowledge creation capability of individuals.

The second trait in Big-Five personality model namely neuroticism refers to low emotional stability and insecurity. Individuals with high neuroticism tend to be depressed, anxious, indecisive, and subject to mood swings. Being tense, easily upset and suspicious (Borges, 2012), it is difficult for them to engage in knowledge creation activities. As they experience negative emotions frequently, they get inhibited to share what they know, particularly tacit knowledge (Raducanu, 2012). Additionally, a field of interaction has to be created for knowledge creation, however, neuroticism is found unrelated to social activity and social interactions (Watson & Clark, 1992). Contrary to this, Berry and Hansen (1996) found that neuroticism is positively related to social interaction when interactions are with close friends where they can share distressing events and feelings. Such individuals tend to hoard their knowledge (Agyemang et al., 2016). Argyris (1993), who has contributed a lot to expand learning organizational theory, posits that organizational members fail to communicate information and learn when they face difficult or threatening conversation from each other. As neurotic individuals' interactions are characteristically unpleasant (Agyemang et al., 2016), others might get intimidated leading to low level of knowledge sharing. Based on the literature discussed above, one can argue that neuroticism can hinder a person's KCC, so the next hypothesis is:

- **H_2:** Neuroticism inhibits the knowledge creation capability of individuals.

Openness to experience is the third trait in Big-Five model. It refers to the extent people are sensitive, flexible and creative (Costa & McCrae, 1992). They engage in new experiences and have positive attitude towards learning (Woods et al., 2016). Openness to experience is considered a strong predictor of knowledge sharing (Matzler et al., 2011). One of the qualities of such individuals is that they have flexible thinking and they value new ideas and perspectives (Matzler et al., 2008). They have depth, breadth, and variability of novel ideas (Shamim et al., 2016) and are more willing to share knowledge (Gharanjik & Azma, 2014; Matzler et al., 2008). As knowledge sharing is a prime activity in all stages of Nonaka's knowledge creation model (Nonaka & Nishihara, 2018), therefore, openness is expected to enhance KCC. Learning organizational theory explains that organizational members hold back important information when they feel threatening

situations (Argyris, 1993). As open individuals are curious to know more, welcome other people's opinions and encourage conversations (Cabrera et al., 2006), their KCC tends to enhance. Hence, the next hypothesis is:

- **H_3**: Openness to new experience enhances knowledge creation capability of individuals.

Agreeableness is the next trait in Big-Five personality model. Agreeable individuals are cooperative, warm and kind (Liao & Chuang, 2004). They have satisfying and pleasant relationships with others (Organ & Ryan, 1995). They motivate people for producing positive outcomes of tasks (Judge & Zapata, 2015). They strive for cooperation rather than competition (Liao & Chuang, 2004). According to Matzler et al. (2008), as agreeable individuals develop stronger social ties with other individuals, they can transfer tacit knowledge that is explains difficult to store in data bases. Scholars of organizational research argue that agreeable individuals are more willingly involved in knowledge sharing (Gharanjik & Azma, 2014; Gupta, 2008). Learning organization theory also explicates that to enhance learning capability, engaging individuals in reflection and development of their thinking processes is crucial (Senge, 1990; Argyris, 1993). As agreeable individuals encourage imparting of knowledge through dialogues and interactions (Nonaka et al., 2018), they are expected to possess KCC. Subsequently, following hypothesis has been proposed.

- **H_4:** Agreeableness enhances the knowledge creation capability of individuals.

The last trait in Big-Five model is extraversion. Extravert individuals are outgoing, sociable, talkative and assertive (Craig et al., 2015). Extraverts feel comfortable in social situations (Cain, 2013). The extraversion of individuals is necessarily related to their knowledge sharing activities (Costa & McCrae, 1992). As extraverts are emotionally positive while working with others, they enhance knowledge sharing in their team to guarantee team's viability (the et al., 2017). Starting from socialization to internalization, the process of knowledge creation is based upon interactions among individuals where they tend to share knowledge with each other (Nonaka et al., 2000). As extraverts share knowledge whether or not they are rewarded for that (Wang et al., 2011), they are expected to possess KCC. Based on extant literature, following hypothesis has been presented.

- **H_5:** Extraversion enhances knowledge creation capability of individuals.

In current research, Transformational Leadership (TL) is studied as a mediator i.e., on one hand, we propose that various traits of personality predict TL (Bass & Riggio, 2006). On the other hand, it's proposed that leadership style influences the KCC of individuals (Birasnav, 2014; Donate & de Pablo, 2015; Politis, 2002; Singh, 2008) (Birasnav, 2014; Donate & de Pablo, 2015; Politis, 2002; Singh, 2008).

2.3 Transformational Leadership (TL)

Several descriptions of TL can be found in literature, but most of them include four common dimensions. These dimensions are idealized influence, inspirational motivation, intellectual stimulation and individualized consideration (Bass & Avolio, 1990; Bass & Riggio, 2006; Judge & Piccolo, 2004; Rafferty & Griffin, 2004). Idealized influence refers to the admirable ways of leaders due to which their followers identify with them. They use emotional talks to motivate followers to give up personal interests for the

success of teams (Hurd, 2012). Inspirational motivation is the propensity of the leader to articulate an appealing and inspiring vision (Bass, 1985, Judge & Piccolo, 2004). Intellectual stimulation means that leader encourages and stimulates creativity among followers (Bass, 1985; Judge & Piccolo, 2004), and lets followers look at the problem in new ways and develop a better understanding of the problem (Liang & Chi, 2013). Therefore, followers develop the ability to conceptualize, analyze problems and generate quality solutions (Balyer, 2012). Finally, individualized consideration points towards the individual attention that is given to followers by transformational leaders (Judge & Piccolo, 2004). It means that they respect their followers, respond to their personal needs and show support for their efforts (Jung & Avolio, 2000).

2.4 Transformational Leadership and Knowledge Creation

It can be claimed that transformational leaders have the capability to create knowledge on the basis of various research works conducted in the field of management. Transformational leaders can create knowledge through communication, dialogue and experimentation (Sanoubar & Shoaran, 2017; Senge et al., 1994). TL is found to have a significant positive impact on knowledge creation (Hoon et al., 2012; Mumford & Licuanan, 2004). Delegating style of leadership was found as a predictor of knowledge creation and management in South Asian organizational context (Singh, 2008). Transformational leader is in a better position to analyze information for problem solving due to intellectual stimulation (Birasnav, 2014).

Some other aspects of TL like encouragement, enabling others for action, modeling the way and inspiring by shared vision also have positive correlation with knowledge creation (Noor, 2011). If knowledge is taken seriously by the leaders, other individuals working with them will automatically follow (Kluge et al., 2001). Transformational leader acts as a role model due to which employees get inspired to share and use knowledge (Bass & Riggio, 2006). Thereby, the process of knowledge creation is facilitated. According to Bryant (2003), TL is even more relevant for the knowledge workers as they have more tacit knowledge that can facilitate the knowledge creation process. As a crux of above discussion, Singh (2008) posits that there is a general consensus among academicians and practitioners about the importance of leadership in knowledge creation and management in organizations.

The theoretical links between TL and knowledge creation have been established above. In the following section, we discuss the relationship of TL with Big-Five personality traits and develop hypotheses.

2.5 Transformational Leadership and Big-Five Personality Traits

Self-discipline is a major component of conscientiousness (Judge & Bono, 2000). Self-determination, on the other hand, is a major characteristic of TL (Bass, 1985). Based upon the common characteristics of the two concepts, we argue that conscientious individuals are expected to exhibit the qualities of transformational leaders. However, empirical evidence about this relationship is lacking. Current research tends to hypothesize the mediation of TL on exploratory basis.

- **H_6:** Transformational leadership mediates the relationship between conscientiousness and the knowledge creation capability of individuals.

Highly neurotic individuals lack self-esteem and self-confidence (McCrae & Costa, 1991). However, to be a transformational leader, one needs to have high self-esteem and self-confidence (Ng et al., 2008). Transformational leaders challenge the status-quo and take risks that is not possible without self-esteem and self-confidence (Bartram & Casimir, 2007). Therefore, following hypothesis is presented.

- **H_7:** Transformational leadership mediates the relationship between neuroticism and knowledge creation capability of individuals.

The ability to embrace change is the main characteristic of TL (Bass, 1985). Individuals open to new experience also have a strong tendency to accept change, and they listen to other people's perspectives (Atwater & Brett, 2005). Since open individuals are creative, they are likely to score high in intellectual stimulation and this can ultimately have an impact on their transformational leadership behavior (McCrae, 1996). Since open individuals have a vivid imagination and insight, they can create a long term vision for the organization. Thus, their openness is positively related to TL. Judge and Bono (2000) also found strong positive association between openness to experience and TL. Subsequently, we propose the following hypothesis.

- **H_8:** Transformational leadership mediates the relationship between openness to new experience and knowledge creation capability of individuals.

Judge and Bono (2000) found that agreeableness was the strongest predictor of TL. Transformational leaders are empathetic as they give special attention to each follower and appreciate their efforts (Jung & Avolio, 2000). Agreeable individuals are also altruistic (Liao & Chuang, 2004) and empathetic for conditions of other people (Teng et al., 2012). We argue that agreeable individuals are expected to be transformational leaders. Ross and Offermann (1997), in their empirical research, found positive relationships between several aspects of agreeableness and TL. Thus, following hypothesis has been developed.

- **H_9:** Transformational leadership mediates the relationship between agreeableness and the knowledge creation capability of individuals.

Emotional expressiveness and dominance are considered important characteristics of TL i.e., they are the ones who introduce people to each other and start discussions (House & Howell, 1992). Extraverts are also found to be sociable and dominant (Larson, 2005). Extraversion and TL are strongly related according to extant literature (Avolio et al., 2004; Bartone et al., 2009; Hildmann & Higgins, 2016; Judge & Bono, 2000; Ployhart et al., 2001). Thus, following relationship has been proposed.

- **H_{10}**: Transformational leadership mediates the relationship between extraversion and knowledge creation capability of individuals.

Subsequent to above reviewed literature, a theoretical model for this research has been developed and presented in Figure 2.

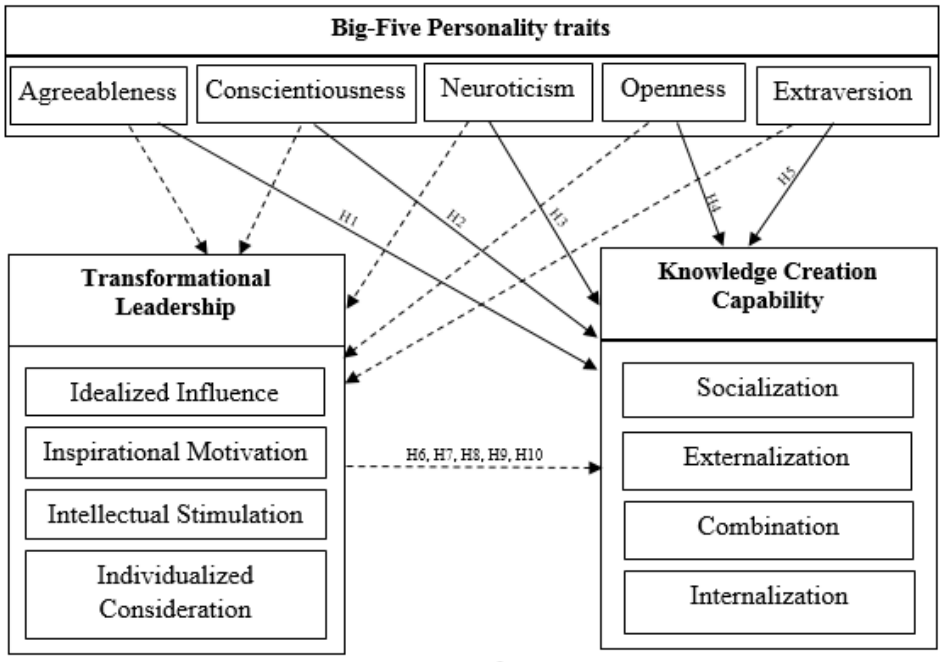

Figure 2: Theoretical Model

Note. Thick black lines indicate the relationship of Big-Five Personality Traits and Knowledge Creation Capability, and H_1 to H_5 hypothesize these relationships. Dotted black lines indicate indirect paths between Big-Five personality traits and Knowledge Creation Capability through transformational leadership, and H_6 to H_{10} hypothesize these indirect relationships.

3. Methodology

3.1 Subjects

The sample for current research is middle level managers working in a diverse range of organizational sectors in South Asian developing country, Pakistan. The concept of knowledge management (KM) has mostly been studied in research conducted in developed countries of West (Mohsin & Syed, 2018). With the up-gradation of knowledge in developed countries, Pakistani companies also have to improve their knowledge absorption and creation capabilities (Rafique et al., 2018). However, knowledge creation practices in Pakistan are significantly different from those of developed countries because they are more open in sharing knowledge than developing countries (Sumbal et al., 2017). Therefore, to understand the patterns and influencers of knowledge creation in a developing country like Pakistan, it is crucial to conduct a research study in this context.

Middle level managers are the research sample of current research because of their prime position in knowledge creation as their hands-on experience contributes to accumulation of tacit knowledge (Cantu & Mondragon, 2016). Second, Nonaka (1994) considers middle level managers as knowledge engineers. In his SECI model, middle level

managers synthesize the knowledge for front-line employees and top management. They convert it into explicit knowledge that is, in turn, transformed into products and technologies. Third, in Asian most admired knowledge enterprises 2000, the critical factor for success was management leadership (Jayasingam et al., 2010). Especially in Pakistan's context, maximum information is handled/accessed by the middle level managers (Rafique et al., 2018). Therefore, middle-managers qualify as a suitable sample for our research.

In Pakistan, as per Higher education commission's requirement, the students who are enrolled in executive business education programs must be positioned from middle to top level managerial positions. We identified seventeen W4 category business schools operating in Punjab (population-wise largest province of Pakistan) out of which, twelve were offering executive education. Based on alphabetic order, we systematically chose 50% of 12 business schools (6 schools) for data collection. We requested the executive students (middle level managers) to fill out the questionnaires, and received 430 responses. Keeping in view that direct interaction between individuals is crucial for knowledge creation, and it is weaker in groups of more than thirty (Nonaka, 1994), only those middle level managers were selected as a sample who had less than thirty subordinates (Table 1). After initial screening of data, we were left with 422 responses for data analysis.

Final sample for present research comprised of middle level managers who were working in multiple organizations operating in various sectors. Collecting data from a range of organizations help to understand the phenomenon of interest at a wider level (Bolino & Turnley, 2003) In addition, various authors in the domain of knowledge management have suggested to collect data from a diverse sample of companies to enrich findings and make research implications more universal (Donate & Canales, 2012; Donate & Guadamillas, 2011; O'Donohue et al., 2007; Zamora & Senoo, 2013).

Table 1: Sample Characteristics

Universities	**Frequency**	**Percentage**	**Organizational Sectors**	**Frequency**	**Percentage**
Forman Christian College	97	22.98 %	Tourism	34	8.05 %
Imperial College of Business Studies	98	23.22 %	Telecom	42	9.95 %
Lahore School of Economics	85	20.14 %	Pharmacology	27	6.39 %
Minhaj University	69	16.35 %	Agriculture	30	7.10 %
University of Central Punjab	37	8.76 %	Banking	50	11.84 %
University of Lahore	36	8.53 %	Textile	37	8.76 %
Tenure of managers	**Frequency**	**Percentage**	Real Estate	28	6.63 %
			Pesticides	20	4.73 %
1-5	125	29.62 %	Information Technology	46	10.90%
6-10	151	35.78 %	Food and beverages	36	8.53 %
11-15	85	20.14 %	Construction	30	7.10 %
15-20	40	9.47 %	Retail sales	24	5.68 %
21 and above	21	4.97 %	Mass media	18	4.26 %

Note. N = 422

3.2 Measures

Structured questionnaires were used as a tool for data collection as they are convenient to respond, cheaper and quicker to administer, and they remove interviewer variability (Bryman, 2015). We used 44-item scale developed by John and Srivastava (1999) to measure Big-Five traits. Questionnaire developed by Bass and Avolio (1997) was used to measure TL. Huang and Wang (2002) developed a scale to measure knowledge conversion ability of team members on the basis of knowledge creation theory presented by Nonaka (1994). We have used this 21-item scale to measure the knowledge creation capability (KCC) of managers. This scale has also been used in various other studies (Begnini, 2015; Dos Santos et al., 2015; Masrek & Zainol, 2015; Popadiuk & Ricciardi, 2011).

3.3 Common Method Variance

Use of self-report measures for all constructs is considered problematic because it enhances common method variance that, in turn, affects the results. We used two of the methods used by Acosta et al. (2018) to assess common method bias. First, "unmeasured latent factor method" was used to extract common variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). We added an additional unmeasured latent factor to the measurement model during CFA. It included all indicators from all other latent factors. We constrained the indicator loadings on this common latent factor to be equal. Hence, unstandardized loadings for all indicators on the common latent factor were equal (.113). The square of unstandardized loading provided the percent of common variance across all indicators in the model (0.0127). "Unmeasured latent factor method" showed that only 1.27% of the total variance could be because of common method bias. Second, the highest correlation in our data set was between agreeableness and TL (-0.69). However, correlations above 0.90 provide evidence of common method bias (Bagozzi et al., 1991). Based upon these two statistical methods, we can argue that the relationships among focal variables in the analysis would not arise from common method bias.

4. Results

SEM has been used in current research based upon several reasons. First, multivariate empirical framework is considered appropriate research strategy for examining personality traits (Reeve et al., 2015). Second, traditional regression approaches do not account for measurement errors, however, SEM is considered powerful tool because this technique accounts for them (Kline, 2015). Third, SEM allows to estimate direct and indirect paths in the model (Kline, 2015; Zhang & Zhang, 2018). Kurtosis is considered a major concern in SEM because SEM is based on analysis of covariance structures (Byrne, 2001), and robust corrections are required for SEM if the data is continuous but non-normal (Rhemtulla et al., 2012). However, we ensured in our analysis that the values of kurtosis lied between -3 to 3 for all the items (Tan & Wong, 2015).

In this research, the theoretical model was tested using two-step SEM approach, in which measurement model and structural model were evaluated separately (Hair et al., 2010). To empirically evaluate the model through SEM, it must be over-identified i.e., the number of estimable parameters should be less than the number of data points (i.e., variances and co-variances of the observed variables) (Byrne, 2001). To start with, our model had 3003 distinct sample moments (data points), and 207 distinct parameters to be

estimated. We had an over-identified model with 2796 degrees of freedom; therefore, this model could be empirically evaluated using SEM.

4.1. Assessment of Measurement Model through Confirmatory Factor Analysis

SEM allows to analyze the discrepancy function between the covariance matrix of the hypothesized model and that of sample data (Hu & Bentler, 1999). Thereby, determining the goodness-of-fit between the hypothesized model and the sample data is considered primary task in SEM (Byrne, 2001). Fit indices for initial measurement model were CMIN/DF =2.19, IFI = 0.77, CFI = 0.78, RMSEA= .05, PCLOSE= .001, SRMR= .06 and HOELTER = 201. The acceptable thresholds for model fit indices, however, are CMIN/DF < 3 (Byrne, 2001), IFI > 0.9 and CFI > 0.9 (Kline, 2005), RMSEA < 0.05 (Browne & Cudeck, 1993), PCLOSE > 0.50 (Joreskog & Sorbom, 1996), SRMR < 0.09 (Hooper, Coughlan, & Mullen, 2008) and HOELTER (0.05) > 200 (Byrne, 2001). It can be observed that the fit indices of IFI, CFI, RMSEA and PCLOSE in our model do not provide evidence of construct validity in current research context. Hence, we re-specified the model using the guidelines provided by Hair et al. (2010). Problematic items were dropped based on three main grounds: cross loadings, low standardized loadings (which should be at least 0.5 and ideally 0.7), and high standardized residuals (which should be less than |2.5|) (Ali et al., 2018; Ford et al., 2015; Hair et al., 2010). It can be observed from Table 2 that elimination of each respective item leads to a better fitting model.

Table 2: Confirmatory Factor Analysis of Measurement Model

CFA	CFI	RMSEA	SRMR	Item Deleted	Reason For Elimination
1	.782	.053	.0649	II3	Cross loading
2	.795	.051	.0622	Open8	Cross loading
3	.800	.050	.0610	IC1	Cross loading
4	.804	.050	.0590	Inter2	Cross loading
5	.807	.050	.0590	Extra8	Cross loading
6	.809	.050	.0584	Consc2	Cross loading
7	.811	.050	.0583	IS2	Cross loading
8	.812	.050	.0581	Inter1	SRC= 4.84, SL= .56
9	.816	.050	.0581	Soc1	SRC= 4.20, SL= .62
10	.818	.050	.0576	Com4	SRC= 3.51, SL= -.62
11	.829	.049	.0567	Neu3	SRC= -3.45, SL= .57

12	.832	.049	.0564	Consc6	SRC= 3.43, SL= .67
13	.834	.049	.0562	Consc4	SRC= -3.29, SL= -.66
14	.835	.049	.0560	Agree3	SRC= -3.18, SL= .62
15	.836	.049	.0559	Open2	SRC= 3.19, SL= .52
16	.837	.050	.0558	Agree1	SRC= -3.14, SL= .47
17	.842	.049	.0553	Exter2	SRC= 3.22, SL= .55
18	.847	.049	.0553	Exter1	SRC= -3.09, SL= .57
19	.852	.048	.0549	Neu2	SRC= 3.08, SL= -.66
20	.855	.048	.0548	Extra5	SRC= 3.00, SL= -.63
21	.857	.048	.0544	Agree8	SRC= -3.01, SL= -.51
22	.859	.048	.0544	Com3	SRC= -3.02, SL= .60
23	.864	.048	.0531	Exter3	SRC= -2.96, SL= .50
24	.870	.047	.0530	Consc5	SRC= -2.93, SL= -.64
25	.877	.046	.0530	Consc8	SRC= -2.65, SL= .65
	.878	,046	.0530	Soc2	SRC= -2.61, SL= .66
26	.879	.047	.0530	Open10	SRC= -2.60, SL= .52
27	.882	.047	.0530	Open6	SRC= 2.54, SL= .61
28	.886	.047	.0530	Extra6	SRC= -2.51, SL= .50
29	.887	.048	.0530	Exter4	SRC= 3.75, SL= .64
30	.890	.048	.0530	Consc7	SRC= 3.29, SL= .64
31	.891	.048	.0530	Agree9	SRC= 2.90, SL= .64
32	.892	.048	.0529	Extra1	SRC= 2.56, SL= .62

33	.894	.048	.0529	Open3	SRC= 2.52, SL= .57
34	.897	.048	.0529	Com6	SL= .595
35	.898	.048	.0528	Consc9	SL= -.598
36	.900	.048	.0528		

Note. SRC: Standardized residual covariance, SL: Standardized loading

4.1.1 Convergent Validity

After conducting CFA, goodness of fit statistics provided support for convergent validity. Furthermore, the standardized regression weights of all factors were statistically significant which suggested their significant correlation (Table 3). Therefore, high convergence was evident (Anderson & Gerbing, 1988; Naim & Lenka, 2017).

Table 3: Model Fit Indices to Assess Convergent Validity, CR and Cronbach's Alpha to Assess Reliability and Internal Consistency

Scales	**Items Retained After CFA**	**SL Of Retained Items**	**CR**	**α**	**Model Fit Indices**
Conscientiousness	Consc1	0.64	0.78	0.70	CMIN=1205.19 DF=633 CMIN/DF =1.90, IFI = 0.90, CFI = 0.90, RMSEA= .046, PCLOSE= .936 SRMR- .0525 HOELTER (.05) = 242
	Consc3	0.81			
Neuroticism	Neu1	0.66	0.96	0.81	
	Neu4	0.61			
	Neu5	-0.74			
	Neu6	0.61			
	Neu7	-0.64			
	Neu8	0.66			
Openness	Open1	0.60	0.89	0.72	
	Open4	0.57			
	Open5	0.91			
Agreeableness	Agree2	0.66	0.96	0.79	
	Agree4	0.74			
	Agree5	0.73			
	Agree6	-0.50			
	Agree7	0.73			
Extraversion	Extra2	0.74	0.91	0.78	
	Extra3	-0.63			
	Extra4	-0.59			
	Extra7	0.71			
Transformational Leadership	II1	0.64	0.98	0.84	
	II2	0.63			
	IM1	0.61			
	IM2	0.81			
	IM3	0.67			

	IS1	0.73			
	IS3	0.63			
	IC2	0.73			
	IC3	0.61			
Knowledge creation capability	Inter3	0.67	0.98	0.81	
	Inter4	0.60			
	Exter5	0.69			
	Exter6	0.60			
	Com2	0.70			
	Com5	0.71			
	Soc3	0.71			
	Soc4	0.76			
	Soc5	0.73			
Note. SL = Standardized loadings, CR = Construct reliability, α =Cronbach's Alpha					

4.1.2 Internal Consistency and Construct Reliability

Before conducting confirmatory factor analysis, the values of Cronbach's Alpha and Construct reliability were not acceptable. However, Table 3 shows that after conducting CFA, Cronbach's Alpha of all scales is above 0.7 that indicates internal consistency of scales. Additionally, CR of all scales is also above 0.7 that points towards their construct reliability (Hair et al., 2010).

4.1.3 Discriminant Validity

To assess discriminant validity of the constructs, Fornell and Larcker criterion was used (Fornell and Larcker, 1981). According to this criterion, the square root of AVE for each construct should be greater than the correlation of that construct with all others (Gefen and Straub, 2005). Correlations between Big-Five personality traits and square root of AVE have been reported in Table 4 that provides an evidence of discriminant validity.

Table 4: Correlations between Big-Five Personality Traits and Square Root of AVE to Assess Discriminant Validity (Fornell & Larcker Criterion)

	Consc	**Neu**	**Open**	**Agree**	**Extra**	**Square root of AVE**
Consc	1					0.65
Neu	0.23	1				0.71
Open	0.15	-0.01	1			0.67
Agree	0.55	0.28	0.22	1		0.67
Extra	-.33	-0.17	-0.17	-0.43	1	0.68
Note. Consc=Conscientiousness, Neu=Neuroticism, Open=Openness, Agree=Agreeableness, Extra=Extraversion						

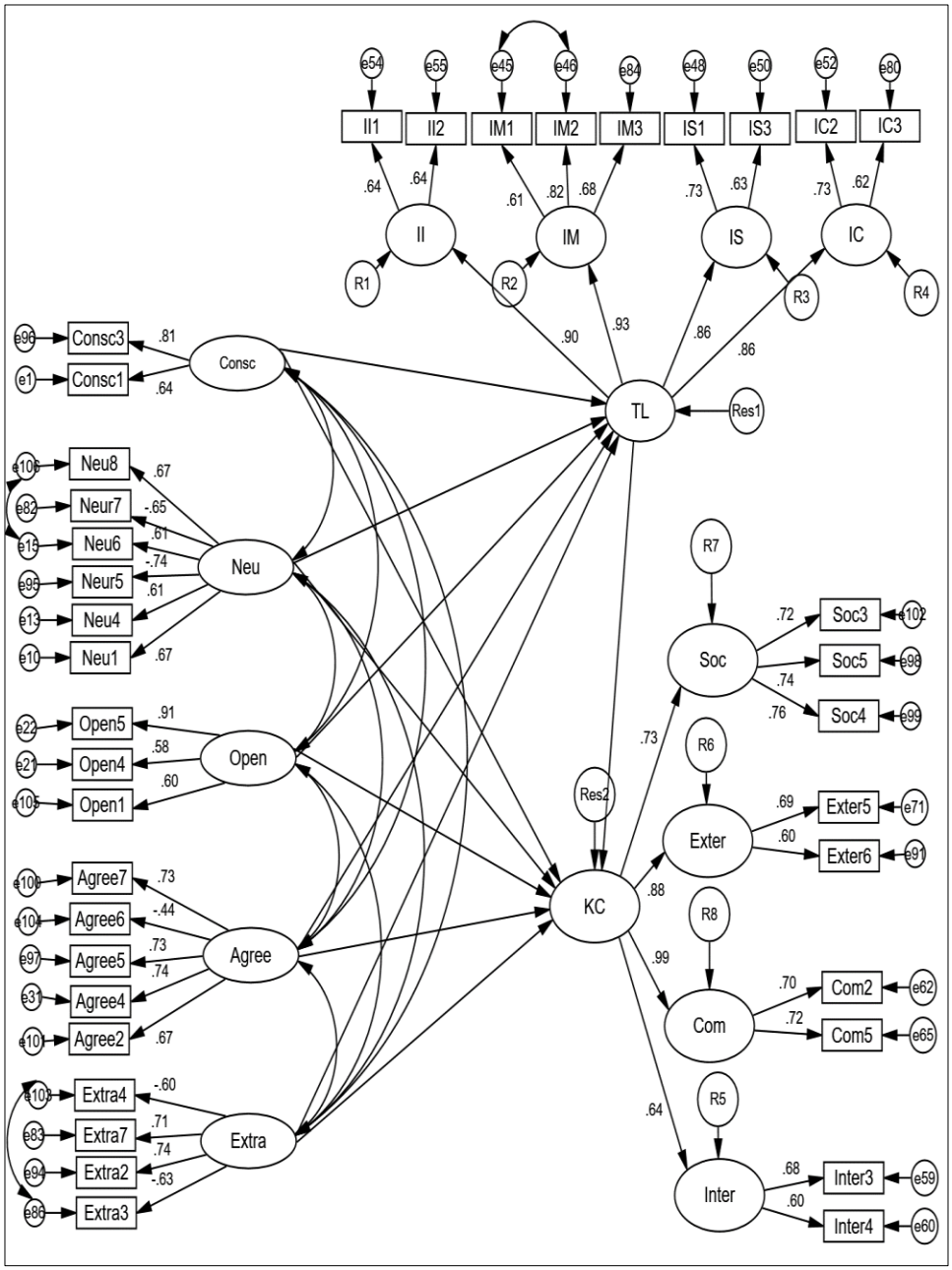

Figure 4: Structural Model

Note: Paths from unobserved variables to observed variables show the standardized loadings. Regression weights for hypothesis testing have been reported in Table 5 and Table 6 for parsimony. Consc=Conscientiousness, Neu=Neuroticism, Open=Openness, Agree=Agreeableness, Extra=Extraversion, TL=Transformational Leadership, II=Idealized Influence, IM=Idealized Motivation, IS=Intellectual Stimulation, IC=Individualized Consideration, KC=Knowledge Creation Capability, Soc=Socialization, Exter= Externalization, Com=Combination, Inter=Internalization

4.2 Assessment of Structural Model for Hypotheses Testing

After conducting CFA and establishing the validity and reliability of the scales, full structural model was constructed with retained items based upon CFA of scales (Figure 4). The structural model was used to assess the relationships among latent variables, and to test hypothesized relationships.

To test first five hypotheses, we constructed measurement model using AMOS that consisted of independent variables (personality traits) and dependent variable (knowledge creation capability). The coefficients and ρ-values of regression paths have been reported in Table 5.

Table 5: SEM Based Analysis of Structural Model

Paths	B	P-Value	Hypotheses Testing
Conscientiousness → KCC	-0.04	.413	H_1 not supported
Neuroticism → KCC	-0.08	.106	H_2 not supported
Openness → KCC	0.12	.000	H_3 supported
Agreeableness → KCC	-0.18	.003	H_4 supported
Extraversion → KCC	0.11	.044	H_5 supported
Note. $R^2 = 0.51$			

In Table 5, squared multiple correlation shows a strong impact on KCC (51.8%). H_1 and H_2 have not been supported as the effect of conscientiousness and Neuroticism on KCC is not significant. H_3 has been supported because openness significantly impacts KCC (B = 0.12, $\rho < 0.01$). H_4 and H_5 are also supported as agreeableness (B = -0.18, $\rho < 0.01$) and extraversion (B = 0.11, $\rho < 0.05$) significantly affect KCC.

4.3 Mediation Analysis

To test the mediation of TL between Big-Five personality traits and the KCC, we added mediator in the structural model (Figure 4). Bootstrapping was used with 2000 bootstrap samples and 90% bias corrected confidence intervals to calculate total, direct and indirect effects, and their significance (Hayes, 2009; Williams & MacKinnon, 2008). The result of mediation analysis has been reported in Table 6.

Table 6: Total, Direct and Indirect Effects Based Upon Bootstrapping Through AMOS

Path	Total Effect	Direct Effect	Indirect Effect	Hypotheses Testing
Conscientiousness → TL → KCC	0.05	-0.04	0.09*	H_6 supported
Neuroticism → TL → KCC	0.09**	-0.08	0.17**	H_7 supported
Openness → TL → KCC	0.19**	0.12*	0.07**	H_8 supported
Agreeableness → TL → KCC	-0.03	-0.18*	0.15**	H_9 supported
Extraversion → TL → KCC	-0.11**	0.11	-0.22**	H_{10} supported
Note. **$\rho < 0.01$, * $\rho < 0.05$				

In can be observed in Table 6 that on the addition of mediator in the model, the effects of conscientiousness and neuroticism on KCC become significant, that were insignificant earlier. These results lend support to H_6 and H_7 that conscientiousness and neuroticism indirectly affect KCC through transformational leadership. On addition of mediator in the model, the indirect effects of openness and agreeableness on KCC are also significant providing support to H_8 and H_9 i.e., transformational leadership mediates the effects of openness and agreeableness on KCC. However, the direct effects of openness and agreeableness are also significant that show that the mediation is partial in these cases. Finally the indirect effect of extraversion on KCC is significant, thus H_{10} is also supported i.e., transformational leadership mediates the relationship of extraversion and KCC. However, the direct effect of extraversion on KCC became insignificant on the addition of mediator that shows that it is full mediation.

The significant mediating effect of transformational leadership in all relationships can be understood in the light of institutional theory that posits that social interactions are shaped and guided by institutions and cultures which provide the norms and rules (Scott, 1995). Organizational scholars have emphasized on studying personality based organizational determinants of transformational leadership in Asian context, as well as inhibitors and facilitators of employees' participation in innovation and knowledge creation (Puffer, & McCarthy, 2011). Based on institutional theory, Thornton (2004) proposes that individuals give meaning to their social reality based on historical pattern of material practices, values, assumptions and beliefs. The role of firm-specific managerial vision and strong leadership for knowledge creation has been found crucial in South Asian countries other than Pakistan, including India (Kale, 2017; Singh, 2008), and Vietnam (Le, & Lei, 2018). Present research explicates that in South Asian country Pakistan, transformational leadership has emerged as a prime entity that is trusted by the followers due to which information is shared with the leader and other organizational members (Moran, 2003; Le, & Lei, 2018).

Institutional theory focuses on the points of convergence and divergence between various cultures and contexts. Therefore, it is pivotal to compare our results with the studies conducted in other settings. Importance of leadership styles for knowledge management has previously been found in the context of Middle Eastern countries including Iran (Sanoubar & Shoaran, 2017; Noruzy et al., 2013), Bahrain (Birasnav, 2014), and Jordan (Elrehail et al., 2018). Similarly, in East Asian countries such as China (Jiang, & Chen, 2018) and Mongolia (Chi et al., 2012), the effect of transformational leadership has been found on knowledge management practices. Identical relationships have been found in the studies conducted in Australia (Politis, 2001; Politis, 2002; Nam, & Mohamed, 2011), European country France (Naqshbandi, & Jasimuddin, 2018), African country Kenya (Gathii & K'Obonyo, 2018), and United States of America (Crawford, 2005). Therefore, we have found convergence of our results with the studies conducted in similar as well as different contexts.

5. Discussion and Conclusion

In this research, we set out to highlight the influence of middle level managers' personality traits on their KCC. Current research found that Big-Five traits of openness, agreeableness and extraversion positively influence KCC of individuals. Moreover, TL mediates the relationship of all Big-Five personality traits and KCC.

In current research, H_1 is not supported i.e., conscientiousness doesn't enhance KCC. One may need to challenge the status quo and established ways of thinking for creation of new knowledge (Nonaka, 1994). Contrary to this, conscientiousness makes individuals control their impulses, achieve predetermined goals and follow rules (George, 2001). Additionally, conscientious individuals' need to follow socially prescribed norms and to behave in a consistent fashion (Roberts et al., 2009) may enhance in Pakistan's context. They become extra meticulous and orderly (Costa and McCrae, 1992), therefore, conscientiousness might not have enhanced KCC in current research. H_2 is also not supported in current research i.e., influence of neuroticism has not been found on KCC. Previous literature has also established that highly neurotic people are skeptical, dominating, rude and more critical, therefore, they tend to hoard knowledge (Agyemang et al., 2016). Therefore, personality trait of neuroticism also doesn't contribute in enhancing knowledge creation capability of individuals.

Although conscientiousness, and neuroticism do not directly influence KCC, but with the mediation of TL, the effect is significant and positive (H_6 and H_7 supported). Transformational leaders analyze information for problem solving due to intellectual stimulation and intelligence (Birasnav, 2014). They understand the patterns of information that can enhance their KCC (Groff & Jones, 2012). Additionally, academicians and practitioners have consensus about the importance of leadership in knowledge creation and management in organizations (Singh, 2008). Accordingly, TL might compensate for the insignificant effects of conscientiousness and neuroticism, leading to enhanced KCC.

Extant literature has studied knowledge management as a whole, and has established that it is positively influenced by openness to new experience (Agyemang et al., 2016). Current research extends the literature of knowledge management by posing attention to knowledge creation specifically. As H_3 and H_8 have been supported, therefore, current research has found that KCC is enhanced directly by openness to new experience, and indirectly through TL. Open individuals are imaginative, flexible in their ways and more receptive to change and new ideas (Rothmann & Coetzer, 2003). They continuously seek more knowledge and develop comparatively more expertise (Matzler et al., 2008). Accordingly, KCC is developed in managers who are more open to new experience. Moreover, openness to new experience helps managers to develop characteristics of TL (Judge & Bono, 2000), that in turn, lead to development of KCC (Sanoubar & Shoaran, 2017).

Another interesting finding of this research is that agreeableness negatively influences the KCC (H_4 supported), however, with the mediation of TL, this influence becomes positive (H_9 supported). The focus of agreeable individuals is on maintaining pleasant relationships with others (Perrée et al., 2019). However, for the creation of new knowledge, one must challenge employees' assumptions to stimulate creativity in them (Judge and Piccolo, 2004) which might entail confronting others during discussions. Therefore, it makes sense that agreeable individuals may just listen to other members, show compliance and mitigate their conflicts (Judge & Ilies, 2002) without creating any useful knowledge. However, if the managers are transformational leaders along with being agreeable, they are in the best position to create knowledge due to two main reasons. First, due to their willingness to involve in knowledge sharing activities as a

transformational leader (Gharanjik & Azma, 2014; Gupta, 2008). Second, due to their ability to easily maintain positive interpersonal relationships with others being agreeable (Barrick, Stewart, & Piotrowski, 2002). Thus, it clearly emerges why TL acts as a mediator to enhance KCC of agreeable individuals.

Current research has found that extraversion of individuals enhances KCC (H_5 supported). In the extant literature, extravert individuals are considered comparatively more motivated for knowledge sharing (Amayah, 2011) because they possess good social skills (Gupta, 2008). Although H_{10} has been supported i.e., TL mediates the relationship between extraversion and KCC of leaders, but it has been found that the indirect effect is negative. In our research, the research sample was the middle level managers who were working at leadership positions. Being at a leadership position, one needs to listen more and talk less for encouraging others to contribute in knowledge creation (Sutton, 2010). However, transformational leaders as well as extraverts are dominating and have strong conviction about righteousness of their beliefs (Grant, 1996; Kuhnert & Lewis, 1987). This might be the reason that extravert transformational leader has negative effects on KCC.

5.1 Theoretical Implications

Current research has various theoretical contributions to the domain of knowledge creation, specifically in light of Nonaka's well-accepted knowledge creation framework of SECI (Oluikpe, 2015). First, studying the antecedents of knowledge creation in organizations is considered significant (Wang et al., 2011) because new knowledge created today develops into organizations' core knowledge in future (Zack, 1999). Additionally, organizational knowledge creation is largely dependent upon the knowledge creation capability of the individuals as they are the main entities who interact to share and create knowledge (Smith et al., 2005). However, scant research has been conducted about organizational members' knowledge creation capability. Thus, our framework addresses this gap through shedding new light on the antecedents on Nonaka's SECI model of knowledge creation.

Moreover, it is considered crucial for the organizations to develop a forward looking strategic approach based upon creative and intuitive insights from middle level managers (Dogan, 2017). Nonaka has also placed great emphasis on the role of leaders in knowledge creation process (Nonaka & Takeuchi, 2011). Nonetheless, the study of leaders' role in knowledge creation domain is underdeveloped (Herman & Mitchell, 2010). Thereby, second theoretical contribution stems from studying the middle level managers' role in knowledge creation who are working in leadership capacity.

Institutional theory posits that social interactions are shaped and guided by institutions and cultures which provide the norms and rules (Scott, 1995). Similarly, knowledge management styles across various cultures, institutions and histories vary considerably due to which the universal concept of knowledge management has become counterproductive, unrealistic and undesirable (Zhu 2004). Most of the research about knowledge management (KM) is generally conducted in developed countries of the West (Mohsin & Syed, 2018). Therefore, the third theoretical contribution of our study is that it sheds light upon knowledge creation in the context of South Asian developing country Pakistan. As discussed earlier, a convergence of results has been found among similar as well as different contexts.

Finally, our research integrates the organizational theories that have been developed in different eras of organizational theory. Various dimensions of knowledge management are largely conceptualized and studied in recent years, however, concepts of Big-Five traits and TL have been developed in previous decades (Bass, 1997; Trapnell & Wiggins, 1990). Through our research, it clearly emerges that Big-Five traits theory and TL are relevant to the contemporary concept of knowledge creation in organizations.

5.2 Practical Implications

Our research provides insights on how KCC of managers can be developed. Practical implications of current study can be extended to organizations belonging to a broad range of sectors because findings of this research are based on the data collected from a diverse range of organizations functioning in various sectors. To reap the benefits of knowledge creation, organizations should rethink about their organizational strategies snd procedures to put in place such recruitment, selection, and training & development practices that are oriented towards managers' transformational leadership style. The reason for this suggestion is that we have found no matter what personality traits managers have, if they are transformational leaders, they do possess knowledge creation capability. Therefore, during recruitment and selection, organizations should assess through widely available tests whether the applicant has qualities of a transformational leader. It can also be assessed through interviews whether they have potential to become a transformational leader. Even if one argues that it is quite difficult to transform employees' personality, organizations can still enhance knowledge creation process through developing qualities of transformational leaders in the managers during training and development sessions over time.

5.3 Limitations and Future Research Directions

Our research is subject to a few limitations that provide avenues for future research. We have studied one dimension of knowledge management namely knowledge creation. Future researchers are encouraged to consider other areas under the umbrella of knowledge management as well. They can incorporate knowledge sharing, knowledge dissemination, knowledge acquisition, knowledge utilization and knowledge application in the proposed framework. In addition, organizational variables of culture and structure can also be incorporated as possible moderators. Psychological safety can also be hypothesized as a moderator after transformational leadership variable, rendering the model as mediated moderation. Though followers share knowledge with the leader and other peers due to their trust on transformational leader, but it is also important for them to feel safe while sharing their views. Furthermore, we collected the data for all of variables from managers. Future research can look into TL characteristics of managers from the perspective of their subordinates.

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