

Tacit Knowledge Acquisition in Organizations

Completed Research Paper

Shih-Jung Juan

Department of Management
Information Systems, National
Chengchi University

Taiwan

Email: 104356505@nccu.edu.tw

Woo-Tsong Lin

Department of Management
Information Systems, National
Chengchi University

Taiwan

Email: lin@mis.nccu.edu.tw

Eldon Y. Li

Chung Yuan Christian University

Taiwan

Tongji University

Shanghai, China

Email: eli@calpoly.edu; eli@nccu.edu.tw

Abstract

This study explores the factors affecting tacit knowledge acquisition (TKA) by knowledge seekers/receivers in organizations. It proposes the theoretical basis for an integrated model for the antecedents of TKA from the socio-cultural and psychological factors of knowledge seekers in organizations. The theoretical model was applied to a sample of 168 employees from the research and development units of a semi-conductor company in Taiwan. The research results show that both social interaction and learning orientation are determinants of TKA and the mediators. Agreeableness and learning need are drivers of TKA through social interaction. Learning orientation acts as the mediator between absorptive capability and TKA as well as between learning need and TKA. However, conscientiousness is a suppressor of TKA.

Keywords: Tacit knowledge acquisition, Social interaction, Learning orientation, Absorptive capability, Personality trait

Introduction

In the knowledge-based economy, tacit knowledge (TK) is a source of competitive advantage for a firm (Wu and Lin, 2013) and has attracted much research attention. In some professional organizations, much useful knowledge may be tacit in nature, and TK constitutes a “core capability” for companies (Johannessen et al., 2001). TK is intangible and in the minds of individual employees of an organization, making it difficult to imitate or duplicate. Thus, TK transfer between organizational employees is complex and difficult. A personalization knowledge strategy has been proposed with a focus on individual learning of organizational practice (Hansen et al., 1999). A further strategy has also been

defined to enable TK transfer through social interaction among individuals within organizations (Wipawayangkool and Teng, 2016).

Gupta and Govindarajan (2000) propose some guidelines for intra-corporate knowledge transfer within multinational corporations in terms of providers and receivers, with a particular concern for the absorptive capacity of the receivers. Specifically, knowledge transfer indicates organizational learning by receivers/members with their absorptive ability in self-regulation and exchange with providers/other members in an organizational context. Organizational learning refers to a transformation process for acquiring new knowledge with exchange and integration with learners' prior knowledge (Jerez-Gomez et al., 2005; Wu and Chen, 2014). Thus, organizational learning is related to tacit knowledge acquisition (TKA). It seems that exploring the antecedents facilitating TKA is critical.

This study considers which factors affect knowledge seekers/receivers to acquire successfully the TK of an organization. Understanding the antecedents of TKA can make the TK of an organization more easily acquired because TKA is always associated with effective performance (Ryan and O'Connor, 2013) or innovation (Terhorst et al., 2018) of employees. TKA occurs when an employee captures and utilizes knowledge acquired from a competent colleague to increase their competence for solving complex problems.

Literature review shows that two major factors closely related to the success of TKA are social interaction (Ryan and O'Connor, 2013) and learning orientation. Yang and Farn (2010) argued that social interaction is helpful for TKA, while Ryan and O'Connor (2013) found social interaction is a predictor for TKA and sharing. Thus, social interaction is appropriate for TKA. On the other hand, individuals with a learning orientation tend to hold an incremental theory about their own ability, viewing it as a malleable attribute that can be developed through effort and experience (Bell and Kozlowski, 2002). Learning orientation leads to persistent learning especially in difficult situations and thus is appropriate for TKA. Accordingly, social interaction and learning orientation are proposed as the influential factors of TKA.

To date, specific factors affecting TKA through social interaction and learning orientation are not clearly understood and the drivers of TKA may focus on the attributes of knowledge receivers/seekers and the processes of TKA. When individuals encounter difficulty in their work and feel that their knowledge cannot cope with a problem properly, they are aware of the need to acquire new knowledge (i.e. learning need) and identify who has this knowledge. In an organization, a competent senior employee with TK has solved this type of problem that a seeker/receiver is encountering. When a seeker perceives the value of this competent senior employee's knowledge, the seeker could interact with this senior employee (i.e. social interaction) or expend effort to learn (i.e. learning orientation) to acquire this TK. If the seeker has good social interactions with the competent senior employee, in turn this employee will be more willing to share experience and knowledge with the seeker. Better absorptive capability facilitates learning orientation. Moreover, most personality traits are the antecedents of knowledge sharing (e.g. Wang and Yang, 2007) or TKA (Fang and Zhang, 2014).

As an influential factor of TKA, social interaction involves complex concepts. Social interaction reflects the three dimensions of trust, communication and coordination (Chen and Huang, 2007; Huang and Li, 2009). Social interaction is conceptualized as a second-order reflective construct. Accordingly, by exploring the antecedents of TKA and their roles, this study proposes a model with a personalization strategy for the mediating effects of social interaction and learning orientation on the relationships from personality traits and personal attributes to two mediators to TKA to complement the research gaps lain in the relationships between learning orientation and TKA as well as between individual traits and attributes and the mediators.

Literature Review and Research Hypotheses

Tacit Knowledge Acquisition

Koskinen et al. (2003) noted that TK is rooted in an individual's experience, consisting of schemas, beliefs, and perceptions stored so deeply in the worldview of an individual, which is taken for granted. Discussing how TK is learned, Polanyi (1962) noted that by observing experts and imitating their

efforts in the presence of their example, a learner unconsciously picks up the rules of the art. Tsoukas (2003) noted that learners engage in practical activities through their participation in social practices, under the guidance of people who are more experienced and people who, by drawing learners' attention to certain things, make learners see connections. Tsoukas further noted that new knowledge happens when skilled performance is produced in new manner through social interaction. Thus, a learner acquires TK through perception, intuition and experience (Ryan and O'Connor, 2013).

Hypotheses: the Relationship Links from the Mediators to Tacit Knowledge Acquisition

Social interaction

Wang and Chiang (2009) noted that social interaction refers to a link established through reciprocal behavior between two actors or to the overall pattern of connections among actors. In the KM domain, social interaction mainly refers to interpersonal interaction. This study adopts a comprehensive view in which social interaction refers to "the extent to which organizational members interact with each other in terms of trust, communication, and coordination" (Huang and Li, 2009).

Janowicz-Panjaitan and Noorderhaven (2009) noted that trust is defined as the expectation that things or people will not fail us, without overlooking the possibility of failure, even if there are perceived opportunities and incentives for it. Trust relationships lead to greater knowledge exchange (Levin and Cross, 2004). Regarding communication, Hoegl et al., (2003) suggested that in intra-organizational settings, having wider or more communication channels might facilitate the acquisition of critical information and knowledge. Organizational coordination refers to integrating or linking different departments of an organization (Tsai, 2002). Coordinative behaviors blur the boundaries among organizational units and stimulate the formation of common interests that support sharing and utilization of knowledge needed within the organization (Chen and Huang, 2007).

In practice, a team member often relies on other members for knowledge and advice rather than accesses a database (Lin, 2011). In team and group work contexts, individual team members have different professions and backgrounds (Chen and Huang, 2007), and they tend to seek knowledge from trusted and capable colleagues (Koskinen et al., 2003). Knowledge within the project can be revealed or perceived through interaction (Koskinen et al., 2003). Previous research has found that social interaction among organizational members positively and substantially affects the sharing and use of knowledge (Chen and Huang, 2007). Accordingly, it is contended that social interaction can enhance a seeker's TKA from coworkers.

H1: Social interaction positively facilitates tacit knowledge acquisition.

Learning orientation

Learning orientation refers to "an individual's desire to develop himself by acquiring new skills, mastering new situations, and improving his competence" (Lee et al., 2015). With a learning orientation, effort is viewed as a means for activating current ability for task achievement and for developing the ability needed for future task mastery (Bell and Kozlowski, 2002). A learning orientation implies persistence and increasing effort and engagement in solution-oriented self-instruction when an individual encounters task difficulty or failure. Individuals with high learning orientation tend to engage in deep processing, which involves the integration of new information with prior knowledge and experience (Bell and Kozlowski, 2002). Thus, H2 hypothesizes that:

H2: Learning orientation positively facilitates tacit knowledge acquisition.

Hypotheses: the Relationships between Drivers and Their Mediator

Personality traits

Although the previous literature mostly concerns the effect of personality on knowledge sharing, Fang and Zhang (2014) focused on how enterprise managers' personalities affect TKA. There is reasonable doubt that personality traits may have other roles in the process of TKA. Personality is considered a stable and cross-situational individual difference. There is a broad consensus that the Big Five model

represents a unified and parsimonious theoretical framework for personality (Wang and Yang, 2007). The Big Five traits are agreeableness, conscientiousness, neuroticism, extraversion, and openness. Following Wang and Yang (2007) and Fang and Zhang (2014), neuroticism is not considered because their research results showed that neuroticism is not related to knowledge sharing or negatively affects TKA. Therefore, the Big Five traits considered in this study are agreeableness, conscientiousness, extraversion, and openness.

Lounsbury et al. (2005) noted that agreeableness means that an individual is agreeable, participative, helpful, cooperative, and inclined to interact with others harmoniously. Individuals with agreeableness are liable to be cooperative with others, so they can easily obtain other's help or knowledge. Mooradian et al. (2006) found that agreeableness first positively and significantly affects interpersonal trust between peers, and then affects knowledge sharing within a team or across teams. Interpersonal trust is one dimension of social interaction in this study. Thus, H3 postulates that:

H3: Agreeableness is positively related to social interaction.

An extravert tends to be sociable, outgoing, gregarious, warm-hearted, expressive, and talkative (Lounsbury et al., 2005). Owing to their sociability and talkativeness, extraverts would be liable to communicate or coordinate more with their colleagues and thereby obtain TK more easily. Harari et al. (2014) found that only extravert has significant and positive effect on knowledge transfer (i.e. knowledge sharing) from the supervisor's view. Thus, it is contended that extravert could acquire TK through social interaction, so H4 postulates that:

H4: Extraversion is positively related to social interaction.

Conscientious individuals are reliable, trustworthy, orderly, and rule-following (Lounsbury et al., 2005), and tend to do what is expected of them (Liao and Chuang, 2004). Thus, conscientious individuals would be liable to interact with knowledge providers in order to fulfill duties. Moreover, because conscientious people do not give up in the face of difficulty, they can employ learning strategies to improve their performance (Harris et al., 2005). Accordingly, conscientious individuals score high in learning orientation (Harris et al., 2005). Matzler and Mueller (2011) found that conscientiousness is positively and significantly related to learning orientation. Thus, H5a and H5b postulate that:

H5a: Conscientiousness is positively related to social interaction.

H5b: Conscientiousness is positively related to learning orientation.

Openness is receptivity to change, innovation, new experiences, and learning (Lounsbury et al., 2005). Blickle (1996) noted that people with openness use learning strategies to improve their performance, and openness is associated with motivational skills for learning (Harris et al., 2005). Thus, H6 postulates that:

H6: Openness is positively related to learning orientation.

Learning need

Learning need is the concept that humans have a basic motivation to obtain information (Mowen, 2000). Wang (2011) proposed three key elements enabling a learner's e-learning in the workplace: an organization that aligns organizational and individual learning needs, a social context supporting social interaction and knowledge transfer, and the learning content. Employees have different learning needs due to personal or organizational factors, so employees with learning needs could facilitate learning through social interaction with their peers, including TKA.

H7a: Learning need is positively related to social interaction.

The innate need for learning can inspire individuals to focus on increased knowledge and improved abilities as a valued target (Harris et al, 2005). Harris et al. (2005) found that learning need positively and significantly affects learning orientation. Therefore, H7b considers that:

H7b: Learning need is positively related to learning orientation.

Absorptive capability

Absorptive capability is also referred as “learning capability”, and it is argued that the premise of absorptive capacity is that the individual needs prior related knowledge to assimilate and use new knowledge (Cohen and Levinthal, 1990). Absorptive capability is very important for TKA because knowledge acquisition depends heavily on the behavior of knowledge seekers. Hau and Evangelista further found that learning capability significantly and positively affects TKA. It is argued that individuals with better absorptive capability will be willing to expend more effort in the learning process.

H8: Absorptive capability is positively related to learning orientation.

Control Variables

To reduce the possibility that sociodemographic differences in the predictor and dependent variables might bring about spurious relationships (Lee et al., 2015), the analyses controlled for the position and experience of an employee in the studied company. Thus, the position and experience of an employee in the studied company were considered to be control variables.

Research Design

A survey was conducted to collect empirical data, and research design is described below. The analysis unit is the employee in organizations.

Instrument

The instrument comprises a two-part questionnaire. The first part uses a nominal scale and the other part uses a 5-point Likert scale (ranging from 1 = strongly disagree to 5 = strongly agree). Most measurement items in this research are adapted from the extant literature. The first part collects information about the respondent’s background, including age, gender, academic degree, major, related research and development (R&D) experience overall, R&D experience in the studied company, and position.

Measurement scales

The second part consists of all constructs in this model. The measurement of TKA was adapted from Bock et al. (2005) and Yang and Farn (2010). Social interaction includes three sub-constructs: trust, communication and coordination whose items were adapted from Chen and Huang (2007). Learning need is measured with two items, the first one is self-developed by authors and the second one was adapted from Mowen (2000). Learning orientation was adapted from Matzler and Mueller (2011). Absorptive capability was adapted from Hau and Evangelista (2007). Conscientiousness and openness were adapted from Matzler and Mueller (2011). Agreeableness and extraversion were measured with Multi-Construct IPIP inventories: Goldberg’s (1992) Big-Five Factor Markers. There are 37 items in the second part of questionnaire.

Subject

To test relationships among the constructs, data was collected from employees in the R&D units of one semi-conductor firm in Taiwan. The studied corporation is a leading global semiconductor company that provides advanced technology and manufacturing for applications in every major sector of the IC industry. This company has over 20,000 employees worldwide and offices in Taiwan, Japan, Korea, China, Singapore, Europe, and the United States. There are a number of R&D units affiliated with the R&D department or other departments in the focal firm and its branches, from process technology to design support, including advanced nanometer technology, embedded high voltage, power management ICs, embedded non-volatile memory, IOT, sensor, testing, package, mask, silicon, etc.

300 standardized self-administered questionnaires were distributed averagely to every sector of the R&D units of the focus firm in Taiwan to obtain a variety of sampling. The purpose of the study was purely academic as well as ensured anonymity and confidential treatment of the responses were stated in the preface of the questionnaire. A total of 242 responses were collected, for a response rate of 80.67%.

After eliminating 68 incomplete cases with missing value and 6 careless cases with all the same scores, there were 168 respondents to analyze. Most respondents are 25-40 (91.16%), male (76.97%), master (68.54%), Electronics (53.98%), 1-5 years related experience, 3-10 years in this studied company, and engineers (92.09%).

Scale Validation

Initially, the scales were carefully examined for wording, structure and content by four professors of three universities and one manager in this studied company and then were made some revision. Accordingly, content validity of the scale should be acceptable.

Measurement Model

This study uses structural equation modeling with Smart PLS 3.2.8 to estimate the research model. This study contains complex model, thus PLS software is more appropriate to analyze data. This study follows a two-step approach to analyze and interpret the PLS-SEM results: (1) assess measurement model, and (2) test the structural model. PLS algorithm is implemented at the first stage.

Scale refinement

It was verified whether the items of each variable clearly represent the content domain of the underlying construct. In CFA (confirmatory factor analysis) using SEM, the recommended threshold value of factor loading is 0.6 or 0.7. Two items (i.e. the first item of extraversion and the third item of absorptive capability) were deleted and not in the final analysis, thus the factor loadings in the final analysis are all above 0.7.

Reliability and validation

Hair et al. (2017) consider that composite reliability is a more appropriate measure of internal consistency reliability than Cronbach's alpha. The composite reliability values of all constructs range from 0.825 to 0.926 which are satisfactory with the threshold value 0.7 (Hair et al., 2017).

Scale validation proceeds in the two phases of convergent validity and discriminant validity analyses. Convergent validity of scale items was assessed using the criterion that average variance extracted (AVE) for each construct should exceed 0.5 (Fornell and Larcker, 1981). The AVE values of all constructs range from 0.581 to 0.862, so convergent validity is satisfactory.

Discriminant validity between constructs was assessed with Fornell and Larcker's (1981) recommendation that the square root of AVE for each construct should be greater than its correlations with all other constructs. The lowest square root of AVE 0.762 (corresponding to Agreeableness) is higher than the highest correlation between any pair of constructs 0.599 (between Trust and Communication). Hence, the discriminant validity also meets the criterion.

Data Analysis and Results

Structural Model: Path Analysis and Direct Effects

In this phase, the bootstrapping algorithm was run with 500 re-samplings (Hair et al., 2017, p. 97, p. 195). The analysis results of structural model are shown in Figure 1.

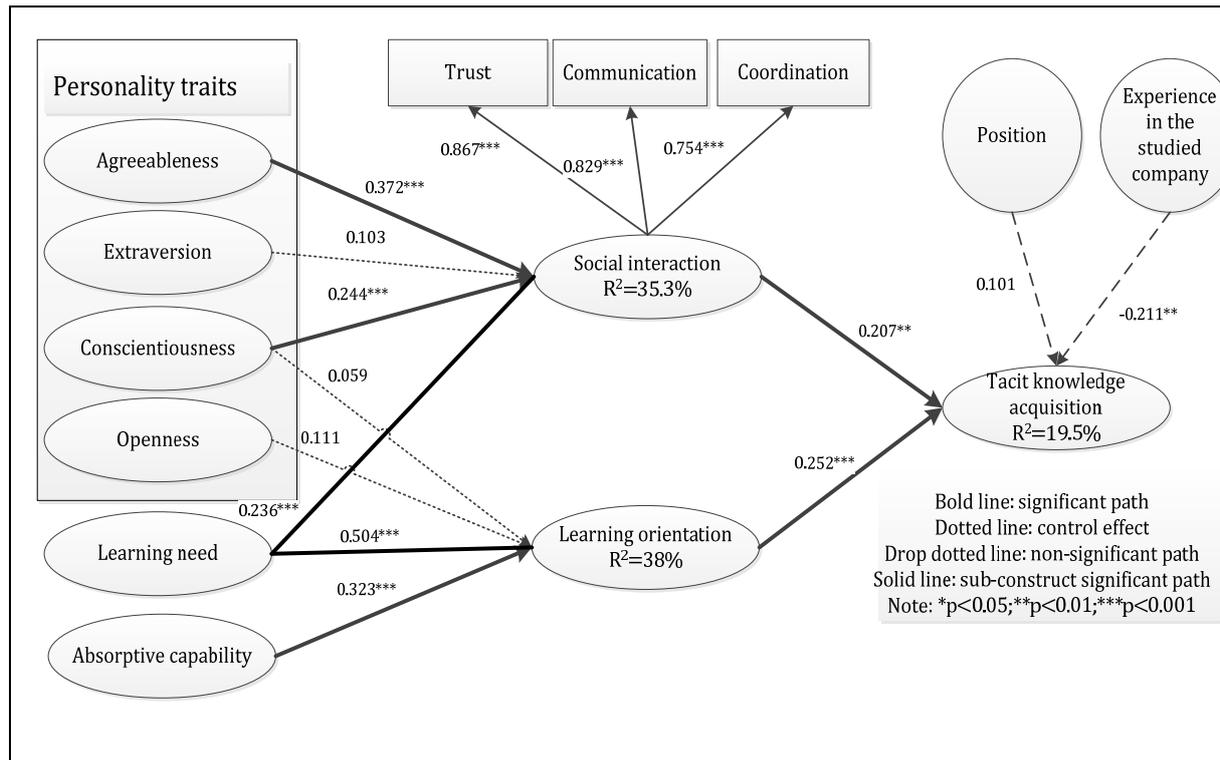


Figure 1. Structural Model

For the path between sub-construct and construct, trust, communication and coordination all show high predominant loadings, reflecting social interaction (Factor loadings = 0.867, 0.829 and 0.754). For dependent variables, social interaction ($\beta=0.207$, path coefficient) and learning orientation ($\beta=0.252$) have significant and positive impacts on TKA, so H1 and H2 are supported. Experience of employee in the studied company ($\beta=-0.211$) has a significant effect on TKA but the effect is negative. TKA has 19.5% of its variance explained. Agreeableness ($\beta=0.372$), conscientiousness ($\beta=0.244$) and learning need ($\beta=0.236$) all have significant and positive impacts on social interaction supporting H3, H5a and H7a. Extraversion ($\beta=0.103$) has insignificant effect on social interaction, so H4 is not supported. They jointly explain 35.3% of the variance in social interaction.

Both learning need ($\beta=0.504$) and absorptive capability ($\beta=0.323$) are notable and positive predictors of learning orientation. Thus, H7b and H8 are supported. Conscientiousness ($\beta=0.059$) and openness ($\beta=0.111$) have insignificant effect on learning orientation, so H5b and H6 are not supported. Learning orientation has 38% of its variance explained.

Conclusions and Suggestions

Theoretical Contributions

The analysis results contribute theory with four aspects as follows. First, social interaction as an antecedent of TKA is more comprehensive than affect-based trust (Yang and Farn, 2010) and more self-activating than coworker support (Lee et al., 2015). Second, according to the rule of motivation and ability (Bell and Kozlowski, 2002), learning need as one type of motivation and social interaction regarded as one type of ability are the indirect and direct factors of TKA. Another path lies from absorptive ability to learning orientation to facilitate TKA. Third, agreeableness is a determinant of social interaction and a driver of TKA but conscientiousness is a suppressor of TKA.

Implications for Practice

This research model has several implications for practitioners. First, the results indicate that social interaction significantly influences TKA. Managers can promote activities to support interactive opportunities, such as coffee breaks or employee trips so that employees can interact and share their

knowledge more readily. Second, persons with good absorptive capability and learning orientation should be hired for the tasks where knowledge must be acquired but conscientious individuals would need more discretion.

Limitations of This Study and Future Work

There are a number of limitations to be considered. First, the data is only from employees of the R&D units of a single semi-conductor corporation in Taiwan. Since this limits the ability to generalize about other hi-tech industries in Taiwan, future researchers may collect data from more corporations and other industries to examine this research model. Finally, as TK is usually generated through long-term and accumulated learning (Wu and Lin, 2013), future longitudinal studies are needed.

Acknowledgement

This research is partially supported by Ministry of Science and Technology in Taiwan (Grant Nos. 108-2410-H-004-205 and 108-2410-H-033-042-MY3).

References

- Bell, B. S., and Kozlowski, S. W. J. 2002. "Goal Orientation and Ability: Interactive Effects on Self-Efficacy, Performance, and Knowledge," *Journal of Applied Psychology* (87:3), pp. 497-505.
- Blickle, G. 1996. "Personality Traits, Learning Strategies, and Performance," *European Journal of Personality* (10:5), pp. 337-352.
- Bock, G. W., Zmud, R. W., Kim, Y. G., and Lee, J. N. 2005. "Behavioral Intention Formation in Knowledge Sharing," *MIS Quarterly* (29:1), pp. 87-111.
- Chen, C. J., and Huang, J. W. 2007. "How Organizational Climate and Structure Affect Knowledge Management: The Social Interaction Perspective," *International Journal of Information Management* (27), pp. 104-118.
- Cohen, W. M., and Levinthal, D. A. 1990. "Absorptive Capacity: A New Perspective on Learning and Innovation," *Administrative Science Quarterly* (35), pp. 128-152.
- Fang, H., and Zhang, S. 2014. "A Structural Model of Enterprise Managers' Tacit Knowledge and Personality Trait," *Social Behavior and Personality* (42:5), pp. 783-798.
- Fornell, C., and Larcker, D. F. 1981. "Evaluating Structural Equations with Unobservable Variables and Measurement Error," *Journal of Marketing Research* (18), pp. 39-50.
- Gupta, A., and Govindarajan, V. (2000). "Knowledge Flows within Multinational Corporations," *Strategic Management Journal* (21), pp. 473-496.
- Hair, J. F., Hult, G. T. M., Ringle, C. M., and Sarstedt, M. 2017. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, 2nd ed., Los Angeles: SAGE Pub.
- Hansen, M., Nohria, N., and Tierney, T. 1999. "What's Your Strategy for Managing Knowledge?" *Harvard Business Review* (77:3), pp. 1-10.
- Harari, M. B., Jain, N. K., and Joseph, T. 2014. "The Five-factor Model of Personality and Knowledge Transfer in the United Arab Emirates," *International Journal of Selection and Assessment* (22:4), pp. 399-410.
- Harris, E. G., Mowen, J. C., and Brown, T. J. 2005. "Re-Examining Salesperson Goal Orientations: Personality Influencers, Customer Orientation and Work Satisfaction," *Journal of the Academy of Marketing Science* (33:1), pp. 19-35.
- Hau, Le N., and Evangelista, F. 2007. "Acquiring Tacit and Explicit Marketing Knowledge from Foreign Partners in IJVs," *Journal of Business Research* (60), pp. 1152-1165.
- Hoegl, M., Parboteea, K. P., and Munson, D. L. 2003. "Team-Level Antecedents of Individuals' Knowledge Networks," *Decision Sciences* (34:4), pp. 741-770.
- Huang, J. W., and Li, Y. H. 2009. "The Mediating Effect of Knowledge Management on Social Interaction and Innovation Performance," *International Journal of Manpower* (30:3), pp. 285-301.
- International Personality Item Pool 2019. "Big-Five Factor Markers," available at: <http://ipip.ori.org/newBigFive5broadkey.htm> (accessed 10 September 2019).
- (Full reference list is available upon request from the corresponding author.)