

I Exploring the Knowledge-Sharing Intention of Research and Development Personnel in the Electronics Industry

Stephen H. Chan

email: stephen@mail.toko.edu.tw

Yin-Tsuo, Huang

email: 2009hm02@mail.toko.edu.tw

Abstract: With the rapid change and development of technology in the twenty-first century, worldwide economies are now interlinked. In the global-economy era, no country can remain outside of this trend; people in countries worldwide must compete with one another. Under these circumstances, only by advancing away from the conventional thinking that businesses must hold advantages in capitals, resources, and manufacturing techniques, and becoming imaginative, inspirational, innovative thinkers can firms maintain their competitiveness and play a crucial role in the industries of the new era. Knowledge capital has replaced land capital and financial capital, becoming the new driver of industry innovation, and knowledge-value-based firms have become the new elites in their industries. In this knowledge-based-economy era, knowledge is the DNA of all valuable things.

Through questionnaire surveys and empirical research analysis, this study focused on four personality-trait perspectives: attitude toward knowledge sharing, intention for knowledge sharing, knowledge sharing, and subjective norms. The main research subject was three science parks in Taiwan. In total, 320 questionnaires were administered and 203 completed questionnaires were retrieved, yielding 199 valid questionnaires, 4 invalid questionnaires with incomplete responses, and a recovery rate of 62.18%. We analyzed and verified the collected samples by using statistical methods such as descriptive statistics analysis, factor analysis, reliability analysis, variance analysis, and a regression model.

Keywords: Knowledge-sharing, subjective norm, intention, research and development.

I. INTRODUCTION

In the field of knowledge management, “knowledge” refers to knowledge with asset values, rather than general knowledge. In short, not all techniques and experiences are viewed as beneficial knowledge; only those that can contribute to a firm’s management are deemed as having asset values. Peter Drucker, a management expert, also considered knowledge to be the main resource of both individuals and the entire economy. The purpose and function of an organization are integrating professional knowledge into one that facilitates productivity and thus rendering the integrated knowledge the most crucial strategic resource and the main source of competitive advantage for the organization. A knowledge-based firm is the most valued type of business in the twenty-first century. Consequently, the most crucial management topic is adequate management of knowledge in an organization [16; 12; 20].

Because of governmental policies, increased education

popularity, and the diligence of private enterprises, Taiwan became a global leader in the high-tech industry, which comprises a large portion of Taiwan’s export trade volume. The electronics industry is classified as a capital- and knowledge-intensive industry. High-tech industry involves structuralized research and development (R&D) activities and emphasizes industry development and technology innovation [21]. Because of these factors, this study adopted R&D personnel in the electronics industry as the research subject. The research findings of this study are expected to provide strategy-formulation reference for the high-tech industry and enable business owners to understand the type of employees they should hire to improve management performance and how an organization’s internal system can operate to encourage employees to actively share knowledge with each other. Hopefully, the research results can positively benefit firms.

Based on the research background and motivation, this study focused on a knowledge-intensive industry (i.e., the electronics industry) and adopted R&D personnel as the main research subject to explore the factors that influence R&D personnel’s intention for and attitude toward knowledge sharing. We employed the theory of reasoned action (TRA) as the theoretical basis and confirmed the influencing factors of knowledge sharing through a literature review. The research scope and objectives are listed as follows :

- (a) To explore the effects of personality traits on attitude toward knowledge sharing.
- (b) To explore the effects of personality traits on subjective norms concerning knowledge sharing.
- (c) To explore the effects of organization’s subjective norms on attitude toward knowledge sharing.
- (d) To explore the effects of organization’s subjective norms on intention for knowledge sharing.
- (e) To explore the effects of attitude toward knowledge sharing on the intention for knowledge sharing.

II. REVIEW OF LITERATURE

A. Theory of Reasoned Action

In the late 1950s, Ajzen and Fishbein conducted several studies on behavioral theories to elucidate and predict individual behavior. After more than a decade of study, Ajzen and Fishbein proposed a behavioral prediction theory in 1967, which was subsequently revised, further developed, and tested until 1975, when the TRA, a theory based on social psychology, was formally introduced [2].

By developing and verifying the interrelations among attitude, intention, and behavior, Ajzen and Fishbein reported that the antecedent of behavior is behavioral intention, which is influenced by behavioral attitude and subjective norms. Consequently, a positive behavioral attitude increases the level of behavioral intention; conversely, a negative behavioral attitude lowers the level of behavioral intention.

B. Knowledge Sharing

A knowledge-based economy emphasizes that knowledge innovation is the key to creating product value and economic growth. This new economic environment forces managers to focus on establishing a management system that facilitates knowledge creation, knowledge sharing, and knowledge learning; to train organization members to become knowledge workers; and to stimulate the learning and creation abilities of an entire organization. Davenport and Prusak [7] mentioned knowledge can be understood as a flowing complex containing structuralized experiences and values, written information, and experts' unique viewpoints. Knowledge originates from thoughts of experts. In an organization, knowledge not only exists in documents, files, and storage systems, but is also incorporated in daily work, processes, implementation, and norms.

Knowledge can be divided into tacit knowledge and explicit knowledge. Tacit knowledge refers to knowledge that cannot be explained, verbalized, or formalized (e.g., instincts, values, fundamental assumptions, skills, and professional knowledge). Explicit knowledge refers to knowledge that can be explained, compiled, and objectively understood and has linguistic features and structures (e.g., an event, theory, tip, or procedure). Knowledge sharing is the process of code sharing, classification, cognition, and paradigm conducted in social networks [13]. Knowledge sharing enhances the mutual understanding of an organization's collective goal and strengthens organization members' ability to learn from previous failures and avoid making the same mistakes in future decision-making processes. In addition, sharing past experiences and memories can strengthen organizational identity.

C. Behavioral Intention

The TRA posits that humans are relatively rational and are able to systematically use adequate information. The intention model proposes that behavioral intention is closer to behavior than to attitude, belief, and affection; therefore, understanding behavioral intention is necessary to predict a behavior and explain reasons for certain behaviors. "Behavioral intention" refers to the subjective probability of an individual performing certain behavior. Thus, a person with a strong behavioral intention is likely to perform the behavior [2]. Numerous studies have shown that, in certain circumstances, behavioral intention serves as the optimal method for predicting individual behavior, and that behavioral intention and behavior are highly correlated [1].

D. Behavioral Attitude

In the field of behavior research, numerous scholars have reported that attitude influence behavior [14]. According

to Heberlein & Black [10] attitude and behavior exhibiting a high level of specificity indicates a high correlation between the two factors. If the measured attitude is more specific and the related behavior is more concrete, then the two factors have a higher probability of being closely related. In addition, because behavior is categorized as a spontaneous intuitive attitude, using such attitude to predict behavior is more accurate. Based on this logic, this study determined that when people participate in knowledge sharing, they can acquire happiness. Moreover, people who share knowledge perceive knowledge sharing to be highly valuable, suggesting that these people exhibit positive attitude toward knowledge sharing, which increases their behavioral intention, prompting them to frequently share knowledge with others [3; 9].

E. Subjective Norm

Subjective norms refer to social norms and the social stress a person feels when he or she performs actions. In other words, subjective norms are defined by the people or the groups that substantially influence individual behavioral decision. In this study, we assert that subjective norms are the effects that the external environment, people, groups, or social pressure has on a person. A person follows such norms and adheres to certain decisions expected based on an environment or social stress. For example, when employees believe that their supervisor expects them to share knowledge, they tend to seek advice from their coworkers; if their coworkers suggest them to behave as such, and they are likely to follow their coworkers' advice. Consequently, subjective norms can substantially positively influence a person's behavior.

F. Personality Traits

Personality traits are created through the process of humans' mental growth and development [15]. Personality is a set of persisting and stable traits and tendencies that can be used to determine similarities or differences between people [8]. In an organization, when individuals interact with the environment, a unique and constantly changing organizational climate is created; in such a slowly changing environment, individuals therein gradually develop distinct traits in terms of needs, motivations, interests, attitudes, values, temperaments, aptitude, appearance, and physiology while adapting to the environment. The unique personalities demonstrated by people toward others, themselves, events, and the entire environment, are composed of physical and mental characteristics, which are derived from interacting factors such as inheritance, environment, maturity, and learning. In addition, these characteristics are an integration of various features and are persistent. Personality is a dynamic combination of physiological systems and is uniquely formed through adaption to the physical environment. A trait is a persistent facet (e.g., sociability, independence, the need for achievement) used to explain a person's consistent behavior in different circumstances [4].

Behavior reflects a person's unique characteristics, such as shyness, obedience, loyalty, or timidity. If these characteristics appear continually in several different

contexts, they are viewed as personality traits. Consequently, personality traits are stable and are the main factors defining a person's life [6]. In summary, personality traits refer to the different and unique attitudes a person has toward the environment.

G. Personality Traits

According to the TRA, personality traits are exogenous factors essential for explaining individual behaviors. By adopting the TRA, Constant [5] and Kolekofski and Heminger [11] reported that egoism is a factor influencing attitude. In the field of trait studies, scholars have reported that a relatively stable and consistent relationship exists between organization members' personality traits and behaviors. In other words, personality traits, in numerous circumstances, strongly influence the attitudes and behaviors that organization members demonstrate. In this study, we focused on the Big Five personality traits, deconstructing personality into agreeableness, extroversion, and openness. Based on the aforementioned assertions, personality traits are correlated with attitude and subjective norms. Therefore, this study proposed the following hypotheses:

H1: Personality traits significantly influence attitude toward knowledge sharing.

H2: Personality traits significantly influence subjective norms concerning knowledge sharing.

"Behavioral intention" refers to the subjective probability of a person performing a certain behavior. This intention is influenced by attitude and subjective norms. Shaoyi et al. [17], in their study on customers' intention to use virtual banking, focused on four banking services distinct from traditional counter service: ATMs, telephone banking, home banking, and internet banking. Their results showed that the research participants' intention to use virtual banking was influenced by attitude, and that subjective norms exhibited low explanatory power. Shirley and Peter [19] analyzed customers' intention to use new products, demonstrating that their research data were supported by the TRA. In addition, Shirley and Peter found that customers' intention to use new products is strongly influenced by attitude and subjective norms, and that the explanatory power of attitude and subjective norms is high. Based on the literature review, this study proposed the following hypotheses:

H3: Attitude toward knowledge sharing significantly influences intention for knowledge sharing.

H4: An organization's subjective norms significantly influence intention for knowledge sharing.

The research results of previous TRA-related studies have indicated the causal relationship among other dimensions: subjective norms concerning behavior directly and positively influenced behavioral attitude [18]. Therefore, behavioral attitude and subjective norms are not independent variables. Based on the foregoing discussion, this study proposed the following hypothesis:

H5: An organization's subjective norms significantly influence attitude toward knowledge sharing.

III. RESULTS AND DISCUSSIONS

To verify H1, this study conducted a regression analysis by adopting the factors of agreeableness, openness, and extroversion as independent variables and knowledge sharing as the dependent variable. The analysis results were as follows: the explanatory power (R^2) was 28.6%, the adjusted R^2 was 25.6 %, the F value was 9.495, and the Durbin-Watson (D-W) was 1.858. Among these factors, age, length of service, and agreeableness significantly influenced attitude toward knowledge sharing, whereas extroversion, openness, gender, job position, and educational attainment exerted no substantial effect on attitude toward knowledge sharing. These regression results indicated that personality traits significantly but partially influenced attitude toward knowledge sharing. Consequently, H1 was partially supported.

To verify H2, this study conducted a regression analysis by adopting the factors of agreeableness, extroversion, and openness as independent variables and the factors of organizational norms and supervisor norms concerning knowledge sharing as dependent variables. The analysis results for organizational norms as a dependent variable were as follows: the explanatory power (R^2) was 27.7%, the adjusted R^2 was 24.7 %, the F value was 9.111, and the D-W was 1.815. Among these factors, age, length of service, agreeableness, and openness significantly influenced subjective norms concerning knowledge sharing, whereas extroversion, gender, job position, and educational attainment exerted no significant effects. These regression results indicated that personality traits significantly but partially influenced subjective norms concerning knowledge sharing. Therefore, H2 and H2-1 were partially supported. The analysis results for supervisor norms were as follows: the explanatory power (R^2) was 14.1%, the adjusted R^2 was 10.4 %, the F value was 3.886, and the D-W was 1.878. Particularly, agreeableness significantly influenced subjective norms concerning knowledge sharing, whereas age, extroversion, length of service, gender, job position, educational attainment, and openness exhibited no significant influence. Thus, H2-2 was partially supported.

To verify H3, this study conducted a regression analysis by adopting attitude toward knowledge sharing as an independent variable and intention for knowledge sharing as a dependent variable. The analysis results were as follows: the explanatory power (R^2) was 43.9%, the adjusted R^2 was 42.1 %, the F value was 25.036, and the D-W was 1.689. Among the investigated factors, intention for knowledge sharing and job position exhibited significant relationship, whereas age, length of service, gender, and educational attainment exerted no significant effect on intention for knowledge sharing. Therefore, H3 was supported.

To verify H4, this study conducted a regression analysis by adopting organizational norm and supervisor norms (subjective norms) concerning knowledge sharing as independent variables and by employing intention for knowledge sharing as a dependent variable. The analysis

results were as follows: the explanatory power (R^2) was 28.4%, the adjusted R^2 was 25.8 %, the F value was 10.810, and the D–W was 1.845. Among the factors, organizational norms and job position exerted significant influence, whereas age, length of service, gender, educational attainment, and supervisor norms exerted no significant effects. Therefore, H4 was partially supported.

To verify H5, this study conducted a regression analysis by using organizational norm and supervisor norms (subjective norms) concerning knowledge sharing as independent variables and knowledge sharing attitude as a dependent variable. The analysis results were as follows: the explanatory power (R^2) was 17.9%, the adjusted R^2 was 14.9 %, the F value was 5.958, and the D–W was 1.811. Among these factors, organizational norms and job position demonstrated significant effects on attitudes toward knowledge sharing, whereas age, length of service, gender, educational attainment, and supervisor norms exerted no significant influences. Thus, H5 was partially supported.

IV. CONCLUSION AND SUGGESTIONS

In this study, we adopted regression analyses to empirically analyze the research hypotheses and examine the relationship among the variables. The findings of this study are described as follows:

Personality traits exerted a partially significant influence on individuals' attitudes toward knowledge sharing. Among the personality traits, agreeableness exerted significant influence on attitude toward knowledge sharing, whereas extroversion and openness generated no significant influence on knowledge-sharing attitudes. Thus, personality traits exhibited a certain degree of influence on attitude toward knowledge sharing. In other words, agreeable employees had a more positive attitude toward knowledge sharing and were more willing to share knowledge with others. Thus, H1 was partially supported.

Personality traits partially significantly influenced subjective norms concerning knowledge sharing. Among the personality traits, agreeableness and openness had a significant influence on organizational norms, whereas extroversion did not exert significant effect on organizational norms. Agreeableness significantly influenced supervisor norms, whereas openness and extroversion exhibited no significant influence on supervisor norms. Therefore, personality traits exerted a certain degree of influence on subjective norms concerning knowledge sharing. In other words, employees exhibiting agreeableness were most likely to be influenced by subjective norms concerning knowledge sharing. Therefore, H2, H2-1, and H2-2 were partially supported.

A significant influence was observed between attitude toward knowledge sharing and intention for knowledge sharing, indicating that employee attitude toward sharing knowledge determines their intention to share knowledge. Therefore, H3 was supported.

An organization's subjective norms significantly influenced individuals' intention for knowledge sharing. Specifically, organizational norms significantly influenced

knowledge-sharing intention, whereas supervisor norms exerted no significant effect. An organization's subjective norms influenced employees' intention to share knowledge with others. Therefore, H4 was partially supported.

An organization's subjective norms significantly influenced individuals' attitudes toward knowledge sharing; specifically, organizational norms exhibited significant effect on attitude toward knowledge sharing, whereas supervisor norms exerted no significant influence. Therefore, H5 was partially supported.

V. RECOMMENDATIONS

The research results indicated that personality traits directly influenced attitude toward and subjective norms concerning knowledge sharing. Firms must therefore recruit people who demonstrate agreeableness because employees with this trait are more likely to share knowledge with their coworkers. Employees in the high-tech industry must share knowledge and experiences because this industry is technologies intensive; only through knowledge being shared can firms establish unique features with which others cannot compete. Additionally, because the precision techniques of the high-tech industry undergo rapid changes and developments, firms generally engage in industry–academic cooperation or recruit talent from other corporations or businesses to remain competitive. However, recruiting talent has a potential risk; if the recruited employee is unwilling to share knowledge, this can lead to internal conflicts within the organization, which affect organizational operation, generate management risks, and cause resources to be wasted. Therefore, this study recommends that the human resource department of a firm should carefully examine the personality traits of potential employees during recruitment processes and employ those exhibiting traits beneficial to the organization. An employee willing to share knowledge can help a business become successful, whereas an employee unwilling to share knowledge may negatively influence a firm.

After hiring employees, firms must establish a reward and penalty system to encourage employees to share knowledge. A firm can adopt an extrinsic approach such as salary raise or promotion to reward those who share knowledge. To increase the intrinsic motivation of employees, firms can praise those who share knowledge either on a bulletin board or in a meeting. This can enhance employees' intention to continue knowledge sharing and motivate other employees' to share knowledge. This phenomenon is called the multiplier effect. Conversely, if employees demonstrate a passive attitude toward knowledge sharing, supervisors should verbally instruct them to

engage in knowledge sharing, which would pressurize employees to obey their supervisors' request and subsequently share their knowledge with others. Employees who fail to comply should be punished. Gradually over time, the need to engage in knowledge-sharing behavior will be ingrained and internalized in the employees. Subsequently, an organizational culture in which knowledge sharing is emphasized will be established in the firm.

REFERENCES

- [1] I. Ajzen, (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, pp. 179-211.
- [2] I. Ajzen, & M. Fishbein, *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley, 1975.
- [3] I. Ajzen, & M. Fishbein, (1977). Attitude-Behavior Relations: A Theoretical Analysis and Review of Empirical Research. *Psychological Bulletin*, 84, PP. 888-918.
- [4] G.W. Allport, *Pattern of growth in personality*. NY: Holt, Rinehart and Winston, 1961.
- [5] D. Constant, S. Keisler, L. and Sproull, (1994). What's Mine Is Ours, Or Is It? A Study of Attitudes about Information Sharing." *Information Systems Research* (5:4), 42, PP. 400-421.
- [6] P. T. Costa, R. R. McCrae, & D. A. Dye, (1992). Facts scales for agreeableness and conscientiousness: A revision of the NEO personality inventory. *Personality and Individual Differences*, 12, pp. 887-898.
- [7] T. H. Davenport, & L. Prusak, *Working Knowledge: How Organizations Manage What They Know*. Boston: Harvard Business School Press, 1998.
- [8] V. David, "Spring 1989 Personality And Job Performance: Evidence of Incremental Va," *Personality Psychology*, Durham, 1989.
- [9] R. H. Fazio, How Do Attitudes Guide Behavior? in R.M. Sorrentino and E.T. Higgins(Eds.), *Handbook of Motivation and Cognition: Foundations of Social Behavior*. New York: Guilford Press, 1986.
- [10] T. A. Heberlein, & J. S. Black, (1976). Attitudinal Specificity and the Prediction of Behavior in a Field setting. *Journal of Personality and Social Psychology*, 33, pp. 474-479.
- [11] K. E. Kolekofski, and A. R. Heminger, (2003). Beliefs and Attitudes Affecting Intentions to Share Information in An Organization Setting. *Information & Management* (40), pp. 521-532.
- [12] M. Polanyi, *The Tacit Dimension*. New York: Anchor Doubleday Books, 1966.
- [13] S. P. Robbins, *Organizational behavior*. Prentice-Hall, inc. 6th.ed., 1993.
- [14] R. C. Scott, (1975). Productivity Improvement through better Management of Human Resources. *Cost and Management*. 49(1), pp. 14-24.
- [15] P. Senge, *The fifth discipline: the art and practice of the learning organization*. New York: Doubleday, 1990.
- [16] L. Shaoyi, P. S. Yuan, W. Huaiqing, and C. Ada, (1999). The Adoption of Virtual Banking: an Empirical Study? *International Journal of Information Management*, 19, pp. 63-74.
- [17] T. A. Shimp, and K. Alican, (1984). The Theory of Reasoned Action Applied to Coupon Usage. *Journal of Consumer Research*, 11(3), pp. 795-809.
- [18] T. Shirley, and T. Peter, (1995). Ecomposition and Crossover Effects in Theory of Planned Behavior: A Study of Consumer Adoption Intentions?" *International Journal of Research in Marketing*, 12, pp. 137 - 155.
- [19] T. A. Stewart, *Intellectual capital: the new wealth of organizations*. New York: Doubleday, 1997.
- [20] C. Watanabe, (1995). The Feedback Loop Between Technology and Economic Development: An Examination of Japanese Industry. *Technological Forecasting and Social Change*, 49, pp. 127-145.

AUTHORS PROFILE



Stephen H. Chan (stephen@mail.toko.edu.tw) is an Associate Professor in the Department of Animation and Game Design at Toko University (TOKO), Taiwan. His research current research and teaching interests are information security, human resource management, executive coaching, and management.



Yin-Tsuo, Huang (2009hm02@mail.toko.edu.tw) is an Assistant Professor in the Department of Hospitality Management at Toko University (TOKO), Taiwan. His research current research and teaching interests are Management and Marketing.