

Full Length Research Paper

Conceptual framework and research method for personality traits and sales force automation usage

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This study began with an extensive literature review combined with a quantitative study and personality trait testing and involves the medical sales representatives of several multinational pharmaceutical companies which are members of the Taiwan Pharmaceutical Marketing and Management Association (TPMMA). Their sales forces range from 50 to 200 and all used automation systems in their daily sales operation. These systems were not the same for all companies, since they developed systems independently of one another; however they were very similar in function and design. The members of the sales force had different experience in using the systems and received different levels of support and training. Similarly, each sales force management group was free to develop and use sales force automation (SFA) systems based on their own business needs and financial standing. The product lines were different for each sample company as was their competitiveness in the market place.

Key words: Pharmaceutical company, personality traits, human factor, Taiwanese enterprises, sales force automation.

INTRODUCTION

Conceptual framework and research method for personality traits and sales force automation usage is an important topic. This quantitative study included 42 questions answered using the five-point Likert scale, designed to measure the frequency of hits and degree of agreement with sales force automation system usage by medical sales representative in their daily sales operations. These 42 questions were adopted from Engle and Barnes (2000) and were categorized into five usage grouping: planning and territory management, administration and information exchange, within company communication, active sales tools and passive sales tools. The personality traits testing tool used was a 120-item short version of the IPIP-NEO (International Personality Item Pool Representation of the NEO PI-R™). This is a public-domain tool for personality

measurement, available from the IPIP website (<http://ipip.ori.org>). The IPIP-NEO reports the individual level of personality under each of the five domains in the Five-Factor Model. Each domain is further broken down into six subdomains for personality description (Costa and McCrae, 1997; Goldberg, 1999a; Goldberg, 1999b; Goldberg et al., 2006).

Personality traits, planning and territory management

Planning and territory management tasks require conscientiousness individuals. It has been found in previous studies that conscientiousness is positively related to the efficient use of sales force automation (SFA) for planning and territory management.

Hypothesis 1a: Conscientiousness is positively related to the efficient use of SFA in planning and territory management.

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Hypothesis 1b: Neuroticism is not related to the efficient use of SFA for Planning and Territory Management.

Personality traits, administration and external information exchange

Given that customer training, customer education and customer service involves others, it stands to reason that sociable and gregarious individuals (like extroverts) are need to fill them. Extraversion is positively related to a passion for administration and external information. Agreeable individuals with good interpersonal skills would also be expected to have a positive relationship with administration and external information.

Hypothesis 2a: Extraversion is positively related to the efficiency use of SFA in relation to administration and external information exchange.

Hypothesis 2b: Agreeableness is positively related to the efficiency use of SFA in relation to administration and external information exchange.

Personality traits and within company communication

Given that the receipt or delivery of information from between the company and the customer takes a great deal of interpersonal involvement, it would expect that individuals with agreeable characteristics would be better at creating positive relations within company communication.

Extrovert-like people, who are talkative and active, would be expected to be better for the receipt or delivery of information.

Hypothesis 3a: Extraversion is positively related to the efficient use of SFA for within company communication

Hypothesis 3b: Agreeableness is positively related to the efficient use of SFA for within company communication.

Personality traits and active sales tools

Active sales tools include the use of computers for more direct sales activity. Conscientious individuals who are determined, strong-willed, and purposeful might be somewhat positively related to attractiveness for active sales tools. Openness in individuals, however, might mean they are bored with repetitive tasks, so well have a slightly negative relationship with attractiveness for active sales tools.

Hypothesis 4a: Conscientiousness is positively related to the efficient use of SFA as an active sales tool.

Hypothesis 4b: Openness is negatively related to the

efficient use of SFA as an active sales tool.

Personality traits and passive sales tools

Activities involving the utilization of computers for more passive selling purposes, such as the training of sales representatives, learning about new products and learning about competitor's products, may be more attractive to someone who is more conscientious. Conscientiousness may be positively related to the attractiveness of passive sales tools. Openness in an individual is negatively related to the belief in the importance of intellectual curiosity and preference for variety.

Hypothesis 5a: Conscientiousness is positively related to the efficient use of SFA as a passive sales tool.

Hypothesis 5b: Openness is negatively related to the efficient use of SFA as a passive sales tool.

EVALUATION OF THE EFFECT OF DEMOGRAPHIC VARIABLES

Demographic characteristics comprise one of the factors (other than personal and environmental) which play an important role in determining the timing of the adoption of an SFA system. Early adopters are usually younger, better educated, higher income, more risk taking and venturesome (Midgley and Dowling, 1983; Robertson et al., 1984; Rogers, 1983). In other words, we would expect that older, less well educated, risk averse, less venturesome sales people who have spent less time in the field and have less experience with computer technologies to be less likely to welcome the adoption of an SFA system and to underutilize it.

Age

There is a negative relationship between the age and SFA adoption (Buehrer et al., 2005; Keillor et al., 1997). It has been found that older sales reps are less or even negatively inclined towards technology adoption.

Gender

Gender and sex are two commonly understood definitions of gender in psychology. The first is a psychological construct while the later is consistent with biological sex (Bem, 1981). There have been a limited number of studies related to gender differences in relation to the decision making process and technology. The few large studies on gender differences have focused on mean differences between men and women with regards

to their abilities, traits and psychological constructs (Minton and Schneider, 1980). There has been a little research done examining gender differences in response to the decision making process (Barnett and Karson, 1989; Crow et al., 1991; Eccles, 1987; Tashakkori and Thompson, 1991). The impact of gender difference has been demonstrated in several large studies of student populations using the computer and the internet for different patterns and purposes. It has shown for example, that men engage in more counterproductive computer use than woman do (Cooper et al., 2000; Morahan-Martin, 1998). Venkatesh et al. (2000) examined gender differences in determining the adoption and sustained usage of technology. They found that men are more focused on the perceived usefulness of the adopted technology while women are more conscious of the perceived ease of use. Based on the Theory of Planned Behavior (TPB), gender is a key moderating variable in technology adoption and usage behavior.

Education

The findings across numerous product categories show that early adopters have had considerable experience with similar product categories and are already heavy utilizes (Danko and MacLachlan, 1983; Dickerson and Gentry, 1983; Frank et al., 1964; Peters and Venkatesan, 1973; Robertson, 1971; Taylor, 1977) Heavy utilizers tend to be more highly educated and to understand the systematic scientific method, and so they are able to make full use of its features (Parathasarthy and Sohi, 1997).

Experience

In general, the amount of experience one acquires affects performance (McDaniel et al., 1988; Schmidt et al., 1986). McEnrue (1988) identified organization tenure, job tenure and job experience as the three major dimensions to "experience". Organization tenure means the time the individual has spent in the current organization, while job tenure refers to the time spent in the current job in the current organization while job experience is the time spent within the profession. Of these three dimensions, job experience alone has been found to be a potential predictor of performance (McEnrue, 1988). This conclusion has been supported by other studies which have also determined job experience to be the "dominant experience-based predictor of job performance" ((McDaniel et al., 1988; Schmidt et al., 1986). However, contrary findings have also been found. One study related to software development projects concluded that job experience has no effect on effectiveness but does on efficiency (Faraj and Sproull, 2000). In the non-sales context, empirical findings have shown a consistent but

not strong and robust relationship. In the sales context, job tenure has been found to impact on customer selling orientation (O'hara et al., 1991), which in turn affects sales performance (Saxe and Weitz, 1982). Since this is a study of pharmaceutical sales representatives, therefore, "experience" in this study predominantly refers to job tenure, as in the length of time at the current job in the current organization, rather than job experience itself.

Knowledge seekers with different levels of experience have different needs and expectations (Markus, 2001). Inexperienced knowledge-seekers have greater need to improve their job-related organizational, contextual and domain know-how. They are therefore most likely to use or rely on SFA system to improve their performance by internalizing knowledge and for assistance with uploading customer records, drafting plans and other sales works. In contrast, experienced sales representatives already have extensive experience and broad organizational, contextual and domain knowledge. They are thus keen to contribute knowledge to the SFA system rather than use the system to acquire knowledge (Markus, 2001; Zack, 1999). This conclusion is supported by Keillor et al. (1997), who found that more experienced salespeople are less likely to be interested in the successful implementation of a technology based sales program.

Hypothesis 6a: Younger medical representatives are more likely to engage in more overall use of SFA systems than are older medical sales representatives.

Hypothesis 6b: Male medical representatives are more likely to engage in more efficient use of SFA systems than are female medical sales representatives.

Hypothesis 6c: More highly educated medical sales representatives are more likely engage in more overall use of SFA systems than are less well educated medical representatives.

Hypothesis 6d: Experienced medical sales representatives are less likely to engage in overall use of SFA systems than are less experienced medical sales representatives.

MATERIALS AND METHODS

The medical representatives enrolled in this study were convenient sampling from the member company of Taiwan Pharmaceutical Marketing and Management Association (TPMMA). The questionnaires were provided by company sales assistants to every medical sales representative in a meeting and were collected soon the form was completed. In order to keep confidentiality and privacy, the purposes and limitation of the study was annotated in the cover page, no critical or specific personal information needed and managers do not involve in the process of completing the form. After double checked and rejected those incomplete surveys, a total of 139 questionnaires were valid for this research.

Key assumptions

1. SFA (one of the CRM initiatives) has been adopted by industries

for more than a decade.

2. Respondents (vendor reps) must have experience with the use of SFA whether they accept it or not. (Chen et al., 2011a,b)
3. Some respondents (professional sales representative) may refuse to use SFA or be afraid of using it.
4. Respondents are member companies of the Taiwan Pharmaceutical Marketing and Management Association (TPMMA).

Key concepts

1. Combined Technology Acceptance Model (TAM) and Theory of Planned Behaviors (TPB), Performance Model of DeLone and McLean (1992).
2. Personality theories: Traits Theory, the 'Big 5', and the Five Factor Model'.

Research design

1. Sample source and size: 130 to 150 medical sales representatives from foreign-origin pharmaceutical companies who are members of the Taiwan Pharmaceutical Marketing & Management Association (TPMMA)
2. Sample Method: convenient sampling.
3. Questionnaire design: personality trait scale, sales force automation usage scale, demographic modulator scale, content validity (Lawsh's Content Validity Ratios) and reliability test (Cronbach's alpha).
4. Data analysis: principle component analysis (PCA) is used to extract CSFs; the structural equation model (SEM) is used to establish models; T-testing is used to test the hypotheses; logistics regression.

RESULTS: RESEARCH TOOLS AND MEASUREMENT VARIABLES

The questionnaire used in this study consisted of three main parts; Part A, Demographic Data; Part B, SFA Usage; and Part C, Personality Trait Survey Form.

Demographic questionnaire

The demographic variables included the following: gender, age, marital status, spouse in possession, sales experience before entering the pharmaceutical industry, major in college, years of experience in using SFA systems, origin of the company they work for, for example, American, European, Japanese, etc.

Personality trait questionnaires

A revised version of Costa and McCrae's (1999) NEO-PI (NEO PI-R™) is used which consists of 240 items and is considered to be the best five-factor model (FFM) for measuring personality traits. The traits in the five factor model (FFM) are assumed to be life-long personality

traits (Costa and McCrae, 1991). Table 2 shows the domains of NEO-PI used to discriminate between different personality traits assembled by Costa and McCrae (1998).

The personality trait test used in this study is the short form of the IPIP-NEO (International Personality Item Pool Representation of NEO-PI-R™) which has a 120-item inventory. The items were created by Dr. John A. Johnson, Professor of Psychology, Pennsylvania State University. The latest IPIP-NEO contains 2,414 items assembled by Goldberg et al. (2006).

This personality testing report describes individual levels of personal feelings, thoughts or behaviors in each of the five broad personality domains of the FFM followed by six more detailed descriptions of subdomains. The computer program for this free public-domain personality measure tool classifies individuals as scoring low, average or high for a trait in accordance with the following: lowest 30%, middle 40% or highest 30%. The numerical score is reported as a percentile estimate. For example, a score of "40" means that individual level on that trait is in the middle range at 40% of persons of similar age and sex. The descriptions of high and low scores are usually accurate. However, the average scoring individuals could be misclassified, especially if their average scores are close to the low or high groups. These "low" "average" and "high" scores should not be equated with the good, the bad, and the ugly. The five domains and thirty subdomains are described in Table 1.

Sales force automation usage questionnaire

The questionnaire for medical sales representative utilization of sales force automation usage was primarily adopted from Engle and Barnes (2000), the "Sales Representative Sales Automation Survey". The reasons for adopting this survey form are to extend their research and the sample subjects of both studies are the same, medical sales representatives of multinational pharmaceutical companies. The survey questionnaire has two parts, Part A: Ease of Use of SFA Technology and Part B: Perceived Usefulness of SFA Technology in Improving Job Performance. Moncrief's (1986) used factor analysis to classify the data for 48 sales activities into 10 activity dimensions. Engle and Barnes (2000) further narrowed these into 35 sales activities applied to the pharmaceutical industry under 5 task groups: Group 1, Planning and Territory Management, which refers to areas where the representative are required to call on customers, plan sales calls, prepare calls, and identify the most important customers; Group 2, Administration and External Information Exchange, which is related to administration, customer training, customer education and servicing the customer; Group 3, Within Company Communication, containing items like receipt or delivery of information from the company; Group 4, Active Sales

Table 1. Domains and subdomains in the revised NEO personality inventory.

Openness	Fantasy, aesthetics, feelings, actions, ideas, values
Conscientiousness	Order, dutifulness, competence, achievement striving, self-discipline, deliberation
Extraversion	Warmth, gregariousness, assertiveness, activity, excitement
Agreeableness	Trust, straightforwardness, altruism, compliance, modesty, tender-mindedness
Neuroticism	Anxiety, angry hostility, depression, self-consciousness, impulsiveness, vulnerability

Adopted from Costa and McCrae (1997).

Table 2. Domain and subdomains by IPIP-NEO (120-item short version).

Openness	Imagination, artistic, emotionality, adventurous, intellect, liberalism
Conscientiousness	Self-efficacy, orderliness, dutifulness, achievement-striving, self discipline, cautiousness
Extraversion	Friendliness, gregariousness, assertiveness, anxiety level, excitement seeking, cheerfulness
Agreeableness	Trust, morality, altruism, cooperation, modesty, sympathy
Neuroticism	Anxiety, anger, depression, self-consciousness, immoderation, vulnerability

Tools, involving items that indicate more computer use directly related to sales-related activities; Group 5, Passive Sales Tool, which consists of items indicating computer use for more passive selling, include sales representative training. In this study, the number of sales activities has been narrowed to 27 classified into 5 activity dimensions or task groups in accordance with selling practices and the usage of SFA systems in the current Taiwan pharmaceutical environment. The revised sales activities and activity dimensions or task groups are summarized in Table 3.

Instrument and data analysis

The sample was restricted to medical sales representatives (MR) whose companies have adopted sales force automation to manage daily sales operations. The companies should also be foreign-based multinational companies, for example, American, European or Japanese who are also member companies of the TPMMA. There were a total of 150 questionnaires distributed, with 144 completed and retrieved. The overall rate of return was 96%. However, 5 questionnaires were removed from the sample due to incomplete data, leaving a total of 139 (51 American, 23 European and 65 Japanese) to be used in the study analysis.

DISCUSSION

There were two kinds of instruments used in this study. The short form of the IPIP-NEO and the Sales Force Automation Usage Survey adopted from Engle and Barnes (2000). Since most of the medical sales representatives could only read Chinese, the instruments

were translated and by Prof. Hung, a professor of business management at a local university. Both English and the Chinese translation were included in the survey form. The bilingual questionnaire was given to ten managers who are members of the TPMMA. These subjects completed the IPIP-NEO and Sales Force Automation usage and demographic instruments in the range of 13 to 15 min. The reliability and validity of the results were evaluated. After the evaluation of the pilot tool, several questions were deleted and modified. The bilingual questionnaire also submitted to the UMUC IRB board for approval. The medical representatives involved in this study were sampled from member companies of the TPMMA. The questionnaires were distributed by company sales assistants to every medical sales representative in a meeting and were collected as soon as the form was completed. In order to maintain confidentiality and privacy, the purpose and limitations of the study were noted on the cover page. No critical or specific personal information was asked for and managers were not involved in the process of completing the form. After double checking and rejecting incomplete surveys, a total of 139 questionnaires were retained as valid for this research.

Conclusions

Recently, advanced techniques in information theory has been successfully applied to various fields, such as managements on leisure and tourism industries (Yildirim et al., 2009; Zhao et al., 2009; Tsai et al., 2008; Yang et al., 2008b; Yeh et al., 2008; Chen and Chen, 2010a; Chen et al., 2010e,g,h; Lee et al., 2010a,b; Chiang et al., 2010; Tsai and Chen, 2010; Tsai and Chen, 2011), engineering application (Lu, 2003; Chen, 2006; Chen et

Table 3. Summary of activities and task groups in sales force automation usage.

Group	Activities
Planning and territory management	(7) How frequently you make alternative customer calls when planned calls are not possible?
	(13) How frequently do you identify the most important customers from your list of potential customers?
	(14) How frequently do you identify key opinion leaders within your territory?
	(1) How frequently do you plan selling activities?
	(11) How frequently do you record and retrieve customer call information?
Administration and external information exchange	(10) How frequently do you plan travel and territory management activities?
	(19) How frequently do you train or educate customers?
	(16) How frequently do you learn about your company's existing products?
	(8) How frequently do you participate in local sales meetings?
Within company communication	(4) How frequently do you obtain work-related information from non-company databases
	(2) Do you receive information from managers?
	(3) How frequently do you receive information from the head office?
	(5) How frequently do you provide information to managers?
Active sales tools	(6) How frequently do you provide information to the head office?
	(27) Overall, how important is your computer as a tool to help you improve sales results?
	(25) How important is your computer in sales presentations?
	(20) How important is your computer for drafting call plans?
Passive sales tools	(26) How important is your computer for analyzing sales results?
	(24) How important is your computer as a tool for developing your sales training skills?
	(22) How important is your computer for providing and receiving product and technical information?
	(17) How frequently do you learn about new products?
	(23) How useful is your computer in conferences, exhibits or customer group meetings?
	(18) How frequently do you learn about competitive products

Adopted from Robert et al. (2000)

al., 2008d,e; Trabia et al., 2008; Tu et al., 2008; Yang et al., 2008a; Shih et al., 2010b; Yeh and Chen, 2010), architectural engineering (Chen et al., 2004, 2010i; Hsieh et al., 2006; Chen, 2010a, b,c; Hsu et al., 2010; Chen, 2011c, d; Chen et al., 2011c, d; Liu et al., 2011; Tang et al., 2011), satellite observations (Lin et al., 2009a, b; Lin and Chen, 2010b; Lin and Chen, 2011; Yeh et al., 2011), marine research (Chen et al., 2005a, b; Chen et al., 2006a, b, c; Chen et al., 2007a, b,c,d,e, f; Chen et al., 2008a, b, c; Tseng et al., 2009; Chen, 2009b, c; Chen et al., 2009c; Chen, 2010d; Chen, 2011a, b, c), network optimization (Chen et al., 2009g; Chen and Chen, 2010b; Shih et al., 2010a, c; Kuo et al., 2010; Kuo et al., 2011; Kuo and Chen, 2011a, b), system development (Chen, 2009a; Chen et al., 2009a, b, d, e, f; Chen, 2010c; Chen et al., 2010a, c, d, f; Lin and Chen, 2010a; Shih et al., 2011d; Tseng et al., 2011), educational improvement (Chen et al., 2010b; Shih et al., 2010d; Shen et al., 2011; Shih et al., 2011c) and robot manipulation (Hsiao et al., 2005a, b, c,d, e; Chen et al., 2011a, b; Chen and Huang,

2011; Shih et al., 2011a, b; Lee et al., 2011). This study contributes to a better understanding of the relationship of personality traits to SFA usage. However, the work is not without limitations. First, the information was obtained from more than eight different organizations that adopted different sales force automation systems, so generalization beyond the specific setting could be difficult and must be done with caution. Results from an organization with a high level of user training and support for SFA adoption might be quite different than those from one without (Tanners et al., 2005). The study should be conducted in two or three organizations that have the similar SFA systems in terms of function, design, competitiveness and product line.

Secondly, the present study was administered to medical sales representatives whose sales and customer relationships are quite unique, so the findings cannot be generalized to other types of selling situations that might have different types of customer-sales relationships. Although more than 150 surveys were collected, each

would generate only one to two of the five personality facets, meaning we might not have enough personality traits to generalize the findings.

Thirdly, this study uses self-reporting measurement to assess the experiences/feelings of the medical sales representative in relation to their use of SFA systems. Doubtless, there will be a subjective bias. However, this bias has been substantially minimized and self-report's validity enhanced due to the confidentiality agreement (Singh, 2000).

It is anticipated that this study will help understand the impact of personality traits on technology utilization by studying the psychological aspects of users as defined by the FFM. Additional work needs to be done focusing on moderating factors such as the spouse in possession, marital status and so on, that could affect the time that users spend on technology adoption and long time usage. Perhaps, this study will inspire others to explore whether personality trait management will enhance the willingness of sales representatives to buy into the process early.

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