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The Mediating Effect of Internal Service Quality on Employee Turnover – Empirical Evidence from Taiwanese Nurses

Jia-Yi Hung, Tzu Chi College of Technology, Taiwan
Ho Yin Wong, Deakin University, Australia
Yu-Li Lan*, Tzu Chi College of Technology, Taiwan
*Corresponding author, email: yuhli@fccn.edu.tw

ABSTRACT

The purpose of this paper is to empirically test the mediating effect of internal service quality (ISQ) on employee turnover of nurses in Taiwan. The main purpose of ISQ is to treat employees as internal customers to satisfy their needs. Consequently, they will deliver the expected products and services to external customers such as patients. While various studies have examined ISQ, research gaps exist in understanding its antecedents and consequence, especially in the nursing industry. A questionnaire survey with 241 samples was gathered from five hospitals in eastern Taiwan. Structural equation modelling (SEM) analysis was performed to test the theoretical model that consists of ISQ, leader-member exchange (LMX), Co-worker interaction, work atmosphere, and employee turnover. All major fit indices from SEM analysis indicate satisfactory results for both the measurement and structural models. The major contribution is the establishment of the mediating effect of ISQ on employee turnover. ISQ and LMX have direct impacts on employee turnover, while co-worker interaction and work atmosphere have only indirect impacts. To reduce employee turnover, management needs to put in effort on LMX. With greater level LMX, they can expect better co-worker interaction, work atmosphere and ISQ.

INTRODUCTION

Nurses, as employees, play an important role in hospitals. Internal marketing theory addresses the importance of treating employees as internal customers and satisfying their needs that brings in the concept of ISQ. In the service industry, employees play a key role in the provision of services (Newman, Maylor, & Chansarkar, 2001). Employees influence the quality of, and delivery of products and services to external customers (Newman et al., 2001). Organisations attempting to deliver service quality to their external customers must begin by serving the needs of their employees. With greater level of ISQ, the satisfaction of external customers and the profits of the organisation are more likely to increase. However, internal factors, such as leader-member exchange (LMX), co-worker interaction, work atmosphere, and employee turnover in relation to ISQ are not well addressed in the literature of nurse management. We therefore develop and test a model of ISQ from the Taiwanese nursing perspective, aiming to understand the antecedents and consequence of ISQ.

LITERATURE REVIEW

The concept of ISQ has attracted attention in the literature (White & Rudall, 1999). Empirical studies have found that ISQ is affected by psychosocial work environment (Edvardsson, Larsson, & Setterlin, 1997), employee satisfaction (Edvardsson et al., 1997), and organisational commitment (Boshoff & Mels, 1995). In a piece of Taiwanese nursing research, work atmosphere was rated the second most important factor to Taiwanese nurses’ job satisfaction (Tzeng, 2002). However, whether work atmosphere affects ISQ has not yet been investigated. This provides a great opportunity to embark on this study. In addition to the aforementioned antecedents, Paraskevas (2001) indicated that interpersonal relations had great impacts on ISQ in a hotel. However, the specific types of interpersonal relations were not identified in the study. Leader-member exchange (LMX) is a theory that suggests supervisors treat subordinates differently; thus, supervisors develop different types of exchange relationships with subordinates (Mueller & Lee, 2002). The impact of LMX on ISQ appears vague in the extant literature, as no research so far has addressed this issue. The relationship between LMX and ISQ thus needs to be investigated. The LMX relationship influences many organisational outcomes. Past research has indicated that LMX is negatively related to employee turnover (Ferris, 1985; Graen, Liden, & Hoel, 1982), job problems (Liden & Graen, 1980), management-by-exception leadership (Howell & Hall-Merenda, 1999), and higher authority strategies (Krishnan, 2004), and that it is positively related to job satisfaction (Borchgrevink & Boster, 1994; Epitropaki & Martin, 1999; Green, Anderson, & Shivers, 1996; Janssen & Van Yperen, 2004; Liden & Graen, 1980; McClane, Mento, & Burbridge, 1991; Sagas & Cunningham, 2004; Scandura & Graen, 1984; Varma & Stroh, 2001), to organisational commitment (Basu & Green, 1997; Borchgrevink & Boster, 1994; Epitropaki & Martin, 1999; McClane et al., 1991), and to intradyadic communication (Borchgrevink & Boster, 1997).

Organisations often perceive employee turnover as a costly behaviour that must be kept to a minimum because of the costs associated with hiring and training replacement employees. Since the
turnover rate amongst Taiwanese nursing staff has remained high (Lai et al., 2008; Lee, Yang, & Chen, 2000), employee turnover is of special concern for health care service administrators in Taiwan and is an important factor to measure for the sector. Past research has examined the impact of LMX on employee turnover. Graen et al. (1982) found that LMX is a more effective predictor of employee turnover than the average leadership style and that it is negatively related to employee turnover in a U.S.A. public utility. Replicating Graen et al. (1982), Ferris (1985) also found that LMX is a stronger predictor of employee turnover than average leadership style, and noted a negative relationship between LMX and employee turnover in a U.S.A. hospital setting. McClane et al. (1991) suggested a strong positive relationship between LMX and a member’s intent to remain with the organisation in a U.S.A. government facility. However, Stepina et al. (1991) found insignificant relationship between LMX and employee turnover in a U.S.A. state government fiscal unit. Similar to Stepina et al. (1991), Vecchio and Norris (1996) found insignificant relationship between LMX and employee turnover in a U.S.A. private hospital. The relationship between LMX and employee turnover seems inconsistent; thus, the area is worth further investigating.

Research has shown that Taiwan reflects a collective culture (Hofstede, 1980; Hofstede & Hofstede, 2005), and its people value human interactions (Wang, Chang, & Chu, 2006; Yeh, Liu, Ke, Chen, & Wang, 2004). In particular, Taiwanese nurses reveal that support from supervisors and colleagues is an important ingredient in their nursing career (Yin & Yang, 2002). This suggests that Taiwanese nurses may put much emphasis on the relationships with supervisors and colleagues. LMX, which describes various types of supervisor-subordinate relationships, and co-worker interaction, which portrays an employee’s encounter with specified colleagues, represent such relationships. Research by Sherony and Green (2002) found that when two co-workers had a similar type of relationship with their supervisor, the pair would develop a close relationship. This suggested that LMX may be an antecedent of co-worker interaction. However, Sherony and Green (2002) focused on only two co-workers, rather than specified colleagues as defined in this study. Additionally, although part of Sherony and Green’s (2002) data were collected from employees at a health services facility, it is unclear whether nurses in that facility participated in their study. Therefore, the relationship between LMX and co-worker interaction for nursing professionals remains vague, thus needs further investigation.

When employees come to work, they would want to work in a pleasant and supportive environment, so that they feel comfortable working in the unit and maintain a good mood at work. Sundin, Bildt, Lisspers, Hochwalder, and Setterlund (2006) noted that deterioration of the psychosocial work environment was related to pressure, stress and sickness-related absenteeism at work. Since nursing staff face a great deal of work stress, a pleasant work atmosphere may be especially important for them. Dunegan, Tierney, and Duchon (1992) noted that managers and colleagues influenced employee perceptions of climate, suggesting that there may be a relationship between LMX/co-worker interaction and work atmosphere. So far the relationships between LMX/co-worker interaction and work atmosphere have not been examined in the literature; hence, there is a need to explore these relationships. Other studies have identified outcomes of ISQ, such as external customer satisfaction (Hallowell, Schlesinger, & Zormitsky, 1996), trust (Peltier, Boyt, & Westfall, 1997), financial performance (Loveman, 1998), and profit (Xu & Heijden, 2005). Hallowell, Schlesinger, and Zormitsky (1996) found a positive impact of ISQ on external customer satisfaction within two U.S.A. insurance companies. Peltier et al. (1997) suggested that rural health care organisations provide good ISQ to establish trust with its physicians. Keller and Ozment (1999) identified that dispatcher responsiveness was the only factor that significantly decreased driver turnover in the motor carrier industry. However, the correlation between ISQ and employee turnover was not assessed. In a similar study, Keller (2002) found that higher driver pay, more time home and greater dispatcher responsiveness were highly related to lower driver turnover rate. The author identified factors that would decrease driver turnover, but how ISQ may affect employee turnover was not examined. The relationship between ISQ and employee turnover appears unclear in the extant literature; hence, there is a need to examine the relationship.

PROPOSED CONCEPTUAL MODEL

Nursing employees play an important role in the delivery of health care services. They represent the majority of employees in a hospital (Lan, Hsul, Chen, & Chang, 2006). However, the turnover rate of nursing staff has been high in Taiwan (Lai et al., 2008), which has posed human resource management problems for health care service administrators (Archibald, 2006). In order to ease this problem, health care service managers are suggested to treat nursing employees as internal customers and to satisfy their needs; that is to ensure good ISQ, for achieving operational success. Previous studies have found that ISQ has an impact on organisational outcomes, such as external customer satisfaction (Hallowell et al., 1996), financial performance (Loveman, 1998), and profit (Xu & Heijden, 2005), which are all significant to the success of a service organisation. LMX theory proposes that leaders distinguish among their subordinates and develop different types of exchange relationships with each subordinate (Mueller & Lee, 2002). This differentiated relationship has an impact on organisational factors such as job satisfaction (Borchgrevink & Boster, 1994), organisational commitment (Basu & Green, 1997), trust (Wech, 2002), and employee turnover (Graen et al., 1982). It might also influence ISQ in the health care service industry, as mentioned
above. The purpose of this study is to investigate the antecedents and consequence of ISQ to the health care service industry. As mentioned earlier, the quality of LMX relationship and ISQ are important in predicting work outcomes that are substantial to the health care service industry. Hence, the impact of LMX on ISQ will be explored. Additionally, the relationships between LMX and co-worker interaction/work atmosphere/employee turnover will be examined. The relationships between ISQ and work atmosphere/employee turnover will also be investigated within the health care service industry setting. Moreover, the relationship between co-worker interaction and work atmosphere will be explored. Figure 1 illustrates the proposed model of this study.

**Figure 1:** Proposed Conceptual Model

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**EVELOPMENT OF HYPOTHESIS**

■ The Relationship between Co-worker Interaction and Work Atmosphere

After working for a while, an employee could become friends with some colleagues. They may have lunch together, discuss work methods and problems, share personal feelings, and hang out after work. This close relationship among colleagues creates a pleasant and friendly work environment which Chow and Crawford (2004) described as work atmosphere. Employees interact with each other not only on personal subjects, but also on business issues. With the understanding and willingness to help out each other to complete their duties, work atmosphere has become more positive. Colleagues are considered more supportive and approachable and they feel like part of a family. Therefore, it is argued that co-worker interaction can have a positive impact on work atmosphere. Accordingly, a hypothesis is proposed that:

\[ H1: \text{Co-worker interaction is a positive determinant of work atmosphere.} \]

■ The Relationship between Work Atmosphere and Internal Service Quality

A positive work atmosphere can affect internal service quality in various manners. For example, when employees are friendly to each other, they would not mind putting in extra effort to accommodate special requests and needs of their team-mates. The family-like atmosphere at the workplace gives employees a sense of belonging that encourages them to provide the best service they can offer (Jong, Ruyter, & Lemmink, 2005; Lewisohn & Reynoso, 1995). The supportive and approachable atmosphere also promotes effective and appropriate communication, and quick responses among the employees. These behaviours can make the employees known to be very reliable at work. Therefore, good work atmosphere can have a significant positive impact on ISQ. As a result, a hypothesis is proposed that:

\[ H2: \text{Work atmosphere is a positive determinant of ISQ.} \]

■ The Relationship between Internal Service Quality and Employee Turnover

Good ISQ can significantly lower employee turnover. With a real interest in their jobs, employees are more reluctant to search for a new job. When the employees feel that they are doing the right things and doing things right, they tend to be more satisfied with the status quo, thus leading to the consequence of staying at the organization (Lai et al., 2008). The initial performance of a service in the right manner reduces the need to make corrections at a later stage, and can make the employees feel that they perform their duties competently. Thus, they would be more enthusiastic about their jobs. Consequently, they are less likely to look for another job. As a result, a hypothesis is proposed that:

\[ H3: \text{ISQ is a negative determinant of employee turnover.} \]

■ The Relationship between Leader-Member Exchange and Employee Turnover

When subordinates gain a high degree of exchange relationship with their supervisor, the supervisor to a great extent recognises the subordinate’s potential. The subordinate thus feels valued, in turn resulting in the intention to remain with the employer (Yin & Yang, 2002). The understanding of the problems and needs, and the recognition of the employees by the supervisors can make the employees feel important, which can make them want to stay with the employer. Reid and Levy (1997) have suggested that there is evidence of an association between the quality of the line manager/staff relationship and subordinate retention. Therefore, it is argued that a high degree
of exchange in the supervisor-subordinate relationship could significantly lower employee turnover. As a result, a hypothesis is proposed that:

**H4: LMX is a negative determinant of employee turnover.**

- The Relationship between Leader-Member Exchange and Co-worker Interaction
  When a supervisor has a nice personality, subordinates will find him/her caring and approachable, in turn leading to good relationships between the supervisor and subordinates. The supervisor’s nice personality would therefore shape subordinates’ behaviours toward each other so that the subordinates care about each other and support each other. In other words, good relationship with the supervisor leads to more interactions with colleagues. Sherony and Green (2002) indicated that LMX quality influenced the development of subordinate relationships. Thus, it is argued that good LMX can have a significant positive impact on co-worker interaction. As a result, a hypothesis is proposed that:

**H5: LMX is a positive determinant of co-worker interaction.**

- The Relationship between Leader-Member Exchange and Work Atmosphere
  When a supervisor establishes a close relationship with a subordinate, the supervisor would be friendly to the subordinate and show his/her concern toward the subordinate. The supervisor may also use his/her power to help the subordinate when necessary. The supervisor’s caring and supportive actions will therefore cultivate a positive and supportive work environment, which Sundin et al. (2006) described as supportive work atmosphere. The closeness of the employees and their supervisor can make the employees feel affiliated at the workplace and have a positive effect on the perception of the work atmosphere. Thus, it is argued that LMX can have a significant positive impact on work atmosphere. Accordingly, a hypothesis is proposed that:

**H6: LMX is a positive determinant of work atmosphere.**

- The Relationship between Leader-Member Exchange and Internal Service Quality
  Paraskevas (2001) suggested that interpersonal relations had great impacts on internal service encounters. LMX, a supervisor-subordinate relationship, is a type of interpersonal relations. A high degree of exchange in the supervisor-subordinate relationship (high LMX) can have a significant positive impact on ISQ. High LMX indicates a greater extent of supervisor understanding of subordinates’ needs and work problems, and the supervisor is more inclined to use his/her power to help the subordinate solve work problems. A caring supervisor can provide employees with stimuli to give extra effort to deliver better service. Once subordinates sense personal attention and receive assistance from their supervisors, their needs and expectations are fulfilled. Therefore, high LMX can have a significant positive impact on ISQ. Consequently, a hypothesis is proposed that:

**H7: LMX is a positive determinant of ISQ.**

**RESEARCH METHODS**

Participants were nurses from five hospitals in eastern Taiwan. Permission to undertake this study was sought from the management of the hospital in which the survey was conducted. A total of 292 surveys were distributed to the participants, and 241 were returned, yielding an 82.5% response rate. Of the 241 employees in the sample, 97.5% of the participants were female (2.5% missing data), 73.9% were between 26-35 years old, 48.5% held a junior college degree, while 46.9% held a bachelors’ degree. 65.6% of the participants worked on a contract basis, and 73.4% had tenure between 5-15 years.

**measures**

**Internal Service Quality (ISQ)**

The ISQ instrument by Edvardsson et al. (1997) was used to assess ISQ for this study; hence, ISQ refers to fulfiling employee needs and expectations. The instrument has twelve items, and respondents answered the questions on a 7-point Likert scale ranging from 1=definitely true to 7=definitely not true. 1. In our workplace, communication is appropriate, accurate, clear and concise. 2. In our work environment, there is sincere interest in and a real desire to solve problems within the organisation. 3. In our workplace, we are sincerely concerned about problems that may occur. 4. In our workplace, we respond quickly and efficiently. 5. Our work environment is comfortable and attractive. 6. In our workplace, we have modern, up-to-date, equipment. 7. In our workplace, we give each other personal attention. 8. In our workplace, we have our co-workers’ interests in mind. 9. In our workplace, we are very willing to accommodate special requests and needs. 10. In our workplace, we are service-oriented and aim to please. 11. In our workplace, we are known to be very reliable. 12. In our workplace, we perform the service right initially so as to avoid having to make corrections.

**Leader-Member Exchange (LMX)**

LMX describes different kinds of exchange relationships developed between supervisors and subordinates and explains what the supervisor and the subordinate give to and receive back from the relationship. The LMX instrument consists of ten items. The first seven items were from Mueller and Lee (2002), while the last three items were developed based on the work of other works (Hung & Wong, 2008, 2009). Respondents indicated the extent to which they agreed with each item on a 7-point Likert scale ranging from 1=to a very little extent to 7=to a very great extent. 1. To what extent do you know how satisfied or dissatisfied your immediate supervisor is with what you do? 2. To what extent does your immediate supervisor understand your work problems and needs? 3. To what extent
do you feel your immediate supervisor recognises your potential? 4. Regardless of how much formal authority your immediate supervisor has built into his/her position, to what extent would he/she be inclined to use his/her available power to help you solve problems in your work? 5. Again, regardless of how much formal authority your immediate supervisor has, to what extent can you count on him/her to "bail you out" at his/her expense when you really need it? 6. To what extent do you have confidence in your supervisor's decisions such that you would defend and justify them even if he or she were not present to do so? 7. To what extent would you characterise your working relationship with your supervisor effective? 8. To what extent are you close to your supervisor? 9. To what extent would you describe your supervisor as caring? 10. To what extent would you characterise your supervisor with a warm personality?

**Employee Turnover (ET)**

The six-item instrument in Brasheer, Manolis, & Brooks (2005) was used to assess the extent a staff member intended to leave the organisation in the near future. 1. I often think about quitting my present job. 2. I intend to quit my present job. 3. I often think about an alternative line of work (an activity other than my present line of work). 4. During the next 12 months, I intend to search for an alternative role (another job, full-time student, etc.) to my present job. 5. I have searched for a new job. 6. I am constantly searching for a better job. Respondents rated the degree to which they agreed with each item on a 7-point Likert scale ranging from 1=strongly disagree to 7=strongly agree.

**Co-worker Interaction (CI)**

Co-worker interaction was assessed by fourteen items, with ten items (Number 4-13) from Seers, Petty, and Cashman (1995) and four items (Number 1-3, 14) developed based on other works (Hung & Wong, 2008, 2009). 1. I hang out with certain colleagues after work. 2. I become friends with some of my colleagues. 3. I am close to some of my colleagues. 4. I often make suggestions about better work methods to other team members. 5. Other members of my team usually let me know when I do something that makes their jobs easier. 6. I often let other team members know when they have done something that makes my job easier. 7. Other members of my team recognise my potential well. 8. Other members of my team understand my problems and needs well. 9. I am flexible about switching job responsibilities to make things easier for other team members. 10. In busy situations, other team members often ask me to help out. 11. In busy situations, I often volunteer my efforts to help others of my team. 12. I am willing to help finish work that has been assigned to other members of my team. 13. Other members of my team are willing to help finish work that has been assigned to me. 14. I talk about personal issues with some of my colleagues. Respondents indicated the degree of closeness between oneself and their colleagues, and the response scale ranged from 1=strongly disagree to 7=strongly agree.

**Work Atmosphere (WA)**

Work atmosphere was measured with seven items—three of which (Number 1-3) were based on our earlier work (Hung & Wong, 2008, 2009), two (Number 4-5) were developed based on Chow and Crawford (2004), and the last two (Number 6-7) were created based on Moorkamp (2005). 1. We have a positive work atmosphere. 2. Staff in our department are like family to me. 3. We usually work individually on our tasks, but we will work as a team when it is necessary. 4. The atmosphere in our department is intolerable. 5. Staff are friendly to each other. 6. Colleagues are supportive and approachable. 7. The atmosphere in our department seems much pleasanter than that in other departments. The items assess employees' perceptions of the spirit and the partnership within the unit they work using a 7-point Likert scale ranging from 1=strongly disagree to 7=strongly agree.

**Results**

Table 1 shows the means, standard deviations, and intercorrelations among the variables. Before testing the hypothesised model, we first examined the measurement model, as recommended by Anderson and Gerbing’s (1988) two-step approach. For the measurement and structural models, the analyses were conducted with AMOS 17. All analyses used the covariance matrix and maximum likelihood estimation.

**Descriptive Statistics**

The profiles of the five variables in terms of mean scores standard deviations (SD) and correlations are presented in Table 1.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISQ</td>
<td>5.053</td>
<td>.943</td>
<td>.71</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LMX</td>
<td>4.094</td>
<td>1.193</td>
<td>.437</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ET</td>
<td>3.416</td>
<td>1.466</td>
<td>-.434</td>
<td>-.449</td>
<td>.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CI</td>
<td>5.217</td>
<td>.869</td>
<td>.325</td>
<td>-.223</td>
<td>.224</td>
<td>-.312</td>
<td>.630</td>
</tr>
<tr>
<td>WA</td>
<td>4.977</td>
<td>1.085</td>
<td>.591</td>
<td>.380</td>
<td>-.312</td>
<td>.630</td>
<td></td>
</tr>
</tbody>
</table>

N=241

**Correlation is significant at the 0.001 level (two-tail).**

Reliability of the items was tested by Cronbach's Alpha test. Items with low item-total correlation were taken out of the analysis. All Alphas are above 0.7 which indicates satisfactory
internal consistency reliability (Francis, 2001; Robinson, Shaver, & Wrightsman, 1991). Table 2 shows the results of the Cronbach’s Alpha tests of all the variables.  

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Initial Number of Items</th>
<th>Initial Alpha</th>
<th>Items Deleted</th>
<th>Revised Number of Items</th>
<th>Revised Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISQ</td>
<td>12</td>
<td>.93</td>
<td>n.a.</td>
<td>12</td>
<td>.93</td>
</tr>
<tr>
<td>LMX</td>
<td>10</td>
<td>.95</td>
<td>n.a.</td>
<td>10</td>
<td>.95</td>
</tr>
<tr>
<td>ET</td>
<td>6</td>
<td>.92</td>
<td>n.a.</td>
<td>6</td>
<td>.92</td>
</tr>
<tr>
<td>CI</td>
<td>14</td>
<td>.92</td>
<td>CI1 to CI9</td>
<td>5</td>
<td>.89</td>
</tr>
<tr>
<td>WA</td>
<td>7</td>
<td>.75</td>
<td>WA3 &amp; WA4</td>
<td>5</td>
<td>.93</td>
</tr>
</tbody>
</table>

■ Validity Tests
The results of the Bartlett’s test of sphericity and KMO measure of sampling adequacy indicate that the data are suitable for factor analysis. All variables achieved a significant p-value, less than 0.001 in the Bartlett’s test of sphericity and the KMO measure of sampling adequacy values are .6 or above. Convergent validity exists when statistically-significant loadings for all items hypothesised to measure a latent variable are found (Anderson & Gerbing, 1988; Dunn, Seaker, & Waller, 1994; Hair, Anderson, Tatham, & Black, 1998). The critical ratios (c.r.) of all the items were found significant at the 0.05 level (c.r. > 1.96 = p < 0.05), which demonstrates strong convergent validity of the measurement model. Two methods were used to test discriminant validity. The first method to study discriminant validity was to measure the average variance extracted (AVE) in exploratory factor analysis in pairs of all the variables. Discriminant validity exists when the squared correlation between pairs of factors is less than AVE (Fornell & Larcker, 1981). The upper and lower diagonals of Table 3 show the results of AVEs and the squared correlations respectively. All paired squared correlations showed lower values than AVEs. Thus, the results suggested that discriminant validity was supported.

<table>
<thead>
<tr>
<th>Variables</th>
<th>ISQ</th>
<th>LMX</th>
<th>ET</th>
<th>CI</th>
<th>WA</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISQ</td>
<td>---</td>
<td>.80</td>
<td>.80</td>
<td>.80</td>
<td>.81</td>
</tr>
<tr>
<td>LMX</td>
<td>.48</td>
<td>---</td>
<td>.84</td>
<td>.85</td>
<td>.85</td>
</tr>
<tr>
<td>ET</td>
<td>.44</td>
<td>.46</td>
<td>---</td>
<td>.85</td>
<td>.86</td>
</tr>
<tr>
<td>CI</td>
<td>.32</td>
<td>.32</td>
<td>.31</td>
<td>.63</td>
<td>---</td>
</tr>
<tr>
<td>WA</td>
<td>.60</td>
<td>.38</td>
<td>.31</td>
<td>.63</td>
<td>---</td>
</tr>
</tbody>
</table>

The second method used to test discriminant validity is the examination of all pairwise variables to study the number of components extracted. Discriminant validity is achieved if two components (per two variables) are extracted, in contrast to the case of no discriminant validity that is associated with just one component being extracted (Anderson & Gerbing, 1988). Exploratory factor analysis using principal components with varimax rotation was performed. For all of the ten pairs of variables, there were always two components extracted for each pair of variables, indicating discriminant validity. All findings from exploratory factor analysis were further supported by acceptable Confirmatory Factor Analysis results, which are to be discussed in the following section.

■ Model Estimation
Partial disaggregation technique was used for both measurement and structural analyses to retain control over the complexity of the model in this study. Partial disaggregation combines items into composites to reduce higher levels of random error, but it still holds the advantages of modelling and is able to deal with potential data problems (Bagozzi & Heatherton, 1994; Bandalos & Finney, 2001; Dabholkar, Thorpe, & Rentz, 1996; Little, Cunningham, Shahar, & Widaman, 2002). Consequently, it leads to more interpretable and meaningful results.

■ Evaluation of the Measurement Model
Analysis of the measurement model that consists of all five variables was performed by AMOS17. At this stage, all five variables were hypothesised inter-correlated; that is no directions of paths were stated. All five of the major absolute fit indices for this measurement model attained satisfactory results. The p-value for chi-square was .04, and the AGFI was greater than .90. All fit measures demonstrated good results. Table 4 depicts the results of the major fit indices. In summary, the confirmatory factor validated the scales for the measurement of the five variables.

<table>
<thead>
<tr>
<th>Fit indices</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-square</td>
<td>38.479 (25 df, p=.042)</td>
</tr>
<tr>
<td>Adjusted goodness of fit index (AGFI)</td>
<td>.937</td>
</tr>
<tr>
<td>Root mean square error of approximation (RMSEA)</td>
<td>.047</td>
</tr>
<tr>
<td>Incremental fit index (IFI)</td>
<td>.993</td>
</tr>
<tr>
<td>Normed fit index (NFI)</td>
<td>.981</td>
</tr>
</tbody>
</table>

■ Evaluation of the Full Structural Model
Based on the procedure suggested by Cheng (2001) and Anderson and Gerbing (1988), evaluation of the full model starts with assessment of the model fit, including the indices of AGFI, RMSEA, IFI, NFI. The results of all these indices are satisfactory, indicating an acceptance of the full structure model. The significant chi-square test result (chi-square = 44.602, df = 28, p = <0.024) is not desirable, but it
can be the result of large samples (Anderson & Gerbing, 1988; Bacon, 1997; Cheng, 2001; Hair et al., 1998, p.655; Hoyle, 1995; Purdie & Hattie, 2002). To further investigate the limitation of the chi-square index, three other alternative measures; Hoelter’s critical N, Normed chi-square (chi-square / df) and the standardised root mean square residual (SRMR) with cut-offs of greater than 200 (Hoelter, 1983; Hu & Bentler, 1995), 3 or less (Carmine & Melver, 1981; Kline, 1998) and 0.08 or less (Asmundson, Stein, & McCreary, 2002; Hu & Bentler, 1999; Kline, 2005; Lindwall, 2004) respectively, were used to test the impact of large sample size on the Chi-square statistic. The results of all these three measures are satisfactory, indicating that the p-value of chi-square statistics being less than 0.05 may be due to the effect of bigger sample size. The satisfactory results of all fit indices, which are shown in Table 5, suggest that the structure model is acceptable. Figure 2 shows the fitted model with correlations, the regression coefficients, and the R-squared values.

**Table 5: Fit Measures for the Full Structural Model**

<table>
<thead>
<tr>
<th>Fit Indices</th>
<th>Statistics</th>
<th>Bench mark</th>
<th>Acceptable or not</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-square</td>
<td>44.602 (28 df, p=0.024)</td>
<td>p&gt;0.05</td>
<td>N/A</td>
</tr>
<tr>
<td>AGFI</td>
<td>.931</td>
<td>&gt;0.90</td>
<td>Yes</td>
</tr>
<tr>
<td>RMSEA</td>
<td>.050</td>
<td>&lt;0.08</td>
<td>Yes</td>
</tr>
<tr>
<td>TLI</td>
<td>.992</td>
<td>&gt;0.90</td>
<td>Yes</td>
</tr>
<tr>
<td>NFI</td>
<td>.978</td>
<td>&gt;0.90</td>
<td>Yes</td>
</tr>
<tr>
<td>Hoelter’s critical N</td>
<td>223 at 0.05 level / 260 at 0.01 level</td>
<td>&gt;200</td>
<td>Yes</td>
</tr>
<tr>
<td>Normed chi-square</td>
<td>1.593</td>
<td>&lt;3</td>
<td>Yes</td>
</tr>
<tr>
<td>Standardised root mean square residual (SRMR)</td>
<td>0.03</td>
<td>&lt;0.08</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Figure 2: The Fitted Structure Model**

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Path Hypothesis Testing

After confirmation of the model fitting the data based on various fit indices, it is necessary to look at hypothesis testing of all paths in the conceptual model to determine whether the hypothesised relationships are statistically significant. In the conceptual model, there is one exogenous variable, namely LMX. The remaining four variables are endogenous variables, which have hypothesised causal links to them. All seven hypotheses achieved statistical significant results with p-values associated with the parameter coefficients less than 0.01. The standardised coefficients of the seven paths range from .223 to .629. The results of hypothesis testing in terms of the standardised coefficients, t-statistics and significant level (p-value) for the relationships between the five variables are summarised in Table 6.

**Table 6: Path Hypothesis Confirmation Using Total Population Data**

<table>
<thead>
<tr>
<th>Model Hypotheses</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H1</strong>: Co-worker interaction is a positive determinant of work atmosphere.</td>
<td>Coefficient / t-statistic .629 / 10.215 (p&lt;0.001)</td>
</tr>
<tr>
<td><strong>H2</strong>: Work atmosphere is a positive determinant of ISQ.</td>
<td>Coefficient / t-statistic .528 / 8.430 (p&lt;0.001)</td>
</tr>
<tr>
<td><strong>H3</strong>: ISQ is a negative determinant of employee turnover.</td>
<td>Coefficient / t-statistic -.324 / -4.532 (p&lt;0.001)</td>
</tr>
<tr>
<td><strong>H4</strong>: LMX is a negative determinant of employee turnover.</td>
<td>Coefficient / t-statistic -.327 / -4.489 (p&lt;0.001)</td>
</tr>
<tr>
<td><strong>H5</strong>: LMX is a positive determinant of co-worker interaction.</td>
<td>Coefficient / t-statistic .223 / 3.428 (p&lt;0.001)</td>
</tr>
<tr>
<td><strong>H6</strong>: LMX is a positive determinant of work atmosphere.</td>
<td>Coefficient / t-statistic .262 / 5.162 (p&lt;0.001)</td>
</tr>
<tr>
<td><strong>H7</strong>: LMX is a positive determinant of ISQ.</td>
<td>Coefficient / t-statistic .290 / 5.153 (p&lt;0.001)</td>
</tr>
</tbody>
</table>
DISCUSSION

This research investigates the antecedents and consequence of ISQ from the internal marketing perspective, with particular interest in the mediating effect of ISQ on employee turnover. First, by focusing on antecedents of ISQ, this study explored what creates a sense of fulfilment in employee needs and expectations. Second, the investigation of the relation between ISQ and employee turnover shed light on how ISQ affects employees’ intent to leave the organisation. This study suggests that LMX and work atmosphere have significant impacts on ISQ, which is similar to what Paraskevas (2001) and Edvardsson et al. (1997) found in their studies. Additionally, it was found that LMX can affect ISQ through mediators such as co-worker interaction and work atmosphere, which has not yet been found in the existing literature. The empirical results also suggested that co-worker interaction can significantly affect work atmosphere, which corresponds to what Dunegan et al. (1992) indicated in their research. In terms of the consequence of ISQ, it was confirmed that ISQ is a significant determinant of employee turnover, which contributes to the extant literature on the relationship between ISQ and employee turnover. Finally, LMX was found a significant determinant of employee turnover, which is consistent with the findings of Graen et al. (1982), Ferris (1985), and McClane et al. (1991).

CONCLUSION

Organisations often perceive employee turnover as a costly behaviour that must be kept to a minimum because of the costs associated with hiring and training replacement employees. Since nurses represent the majority of employees in a hospital (Lan et al., 2006), the costs associated with nurse turnover are more noteworthy than those of other employees. This study enables us to better understand what factors affect employee turnover by empirically examining the inter-relationships between LMX, ISQ, co-worker interaction, work atmosphere, and employee turnover from the Taiwanese nurse’s point of view. While LMX directly influences employee turnover, it was also found that co-worker interaction, work atmosphere and ISQ have mediating effects on employee turnover. The impacts of LMX and ISQ on employee turnover were found to be negative, while the other five hypothesised relationships were found positive. In order to reduce employee turnover, in addition to cultivating positive LMX issues, hospital management can focus on encouraging co-worker interaction, providing positive work atmosphere, and creating good ISQ. With respect to the limitations of this study, the cross-sectional design did not allow us to test the causal relationships among the antecedents and outcome in the straightest sense. Another limitation is that this study was conducted in eastern Taiwan, which limits the generalisability of the results to hospitals in other regions of Taiwan. Future research using longitudinal research design and taking samples from other countries would strengthen the generalizability and validity of the model.

REFERENCES


