Confirmatory Factor Analysis of Employee Trust Scale

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Type of Review: Peer Reviewed.  
DOI: [http://dx.doi.org/10.21013/jmss.v4.n3.p3](http://dx.doi.org/10.21013/jmss.v4.n3.p3)

How to cite this paper:  

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ABSTRACT
A The Employee Trust Scale is developed for a study that examines employees’ trust towards their supervisors. This 49-item measure is a newly created scale by the researchers based on the findings of their previous study “Exploring the Concept of Trust in Malaysia Society”. Through the result of exploratory factor analysis, Chua et al. (2015) was able to extract three factors, labeled ‘trustworthiness, ‘position status ‘and ‘relationship’ which accounted for 62.49% of the total variance and the scale provided reliable assessment. Considering the existing assumptions of three dimensions of employee trust toward their supervisor as established by Chua et al. (2015), in this paper, a confirmatory factor analysis was conducted to test the dimensionality of the Employee Trust Scale. This analysis was conducted with Structural Equation Modelling which was used to assess the fit of the model. In addition, reliability and validity of the model was measured. A total of 514 (274 males and 228 females) employees who were selected randomly from public and private organization sectors in Kota Kinabalu, Sabah, Malaysia were involved in this study. Their ages ranged from 21 to 59 years old with an average of 34.34 years old and their average tenure with their current organization was 8.46 years (with s.d. = 8.11 years). Finding of the present research can help in enhancing productivity within an organization by improving trust and relationship building between employees and employer.

Keywords: Employees trust scale, position status, relationship, trustworthiness, confirmatory factor analysis.

Introduction

Trust is an important aspect of all human relationships as it helps in mutual exchange of feelings and emotions, facilitate effective communication and resolve conflicts. Trust is an important component of interpersonal relationships and is needed in different elements of life. Apart from the family and interpersonal relationship, another place where trust plays an important role is within an organization. Mayer et al. [1], while explaining an integrated model of organization trust, stated that “trust is the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party” (p. 712). Vulnerability in relation to trust refers to an individual’s willingness to take some sort of risk. Risk-taking depends on the situation that an individual is facing, however, the amount of trust towards the other person can affect the level of risk-taking [1].

A Looking at the current research trends focusing on trust in the field of industrial/organizational function and structure, we can see that most of the researchers basically focus on factors such as customers’ level of trust towards an organization based on their experience. However, we need to understand that trust of employees within an organization is also very important factor as it can enhance productivity of an employee as well as the organization at large. Trust between individual and groups ia a highly important ingredient in the long-term stability of the organization and the well-being of it members. An environment of trust within an organization assumes that both the employee and their supervisors feel secure and convey implicit message that they both have each other’s best interests as well as the interest of the whole organization in their mind. Employee’s sense of trust towards their supervisors can help them to understand their supervisors’ point of view, they can even accept anger and criticism from their boss they trust as the employees can understand that the boss truly intends to help them. Huang [2] while studying the relationship between job performance and empowerment, feedback-seeking behavior, and supervisor trust, found out that trust towards the supervisor was a significant mediator. He further suggested that employees were more likely to engage in feedback-seeking behavior when they trusted their supervisor, which in turn helps them to enhance their job performance. Brown, Gray,
McHardy, and Taylor [3] also confirmed that there was a significant relationship between employee’s trust of managers and workplace performance.

Earlier researchers have identified many individual, contextual and relationship factors that can influence trust between employees and their daily supervisors. Dirks and Skarlicki[4] suggested that trust is more likely to develop among employees and supervisors when employees find their daily supervisor trustworthy. According to Mayer et al. [1] there are three elements of trustworthiness (1) Ability (2) Benevolence and (3) Integrity. Another important factor that have been found to affect development of trust is the relationship between employees and their supervisors. Daily interactions and long duration of relationship increases mutual understanding, enhances familiarity and improves level of knowledge about each other which further helps in development of trust [5, 6, 7].

As trust is a multidimensional construct and various factors affects development of trust, there is still no agreed definition on this construct and it is still debated on. Across different cultures and contexts, the term trust had a big difference in meanings whether from its’ concept or its’category or even its relationship with other related concepts [8]. Thus, there is no consensus on the exact components of trust and the scales designed to measure employee’s trust may also vary from one culture to another. Therefore the main objective of the present study was to determine the best fitting model and the constructs measured by the Employee Trust Scale, which is a newly created scale by Chua et al.[9] based on Malaysian organization culture. The Employee Trust Scale was developed for the purpose of examining employees’ trust toward their supervisors. In the present study, Confirmatory Factor Analysis (CFA) was conducted to determine the dimensionality of the Employee Trust Scale and to further evaluate whether the factor structure fits the results of dimensions extracted from Exploratory Factor Analysis (EFA) conducted in earlier study. Confirmatory Factor Analysis (CFA) was chosen for the present study as it can help researchers to test a model that can suggest in advance the relationship between latent factors and observed variables along with the relationship among the factors as well. This type of model is sensitive to the parameters such as being fixed to a certain value within a model, remaining equal to other parameters, and being independent while taking in any unknown value [10].

Method

Respondents
A total of 514 employees were randomly selected from administration, services, and uniform bodies sectors in Kota Kinabalu, Sabah, Malaysia. A heterogeneous sample was obtained to enable more general conclusions. In this study, the respondent gender ratio was quite fair even with 274 or 53.3% of male respondents and 228 or 44.4% of female respondents. The respondents age ranged from 21 to 59 years old with an average of 34.34 years old and their average tenure with their current organization was 8.46 years (with s.d. = 8.11 years).

Measures
The Employee Trust Scale is a scale developed by Chua, et al.[11] that based on the findings of their study on “Exploring the Concept of Trust in Malaysia Society”. The initial scale consisted of 82-items. After an exploratory factor analyses was conducted, a five-factor solution scale was identified and 47 items were retained. The five factors were then labeled after the content of the sub-items and related literature. The first factor was labeled as Competency (11 items) which referred to the extent to which the supervisor is judged to have knowledge, skills, and abilities in administering the organization and managing the tasks. The second factor was named as Benevolence (8 items) which measure the extent to which the supervisor is believed to have a desire to do something positive for organization and their subordinates. The third factor, Integrity (13 items) measure the supervisor’s adherence to a set of values that their subordinates’ find acceptable. The fourth factor was labeled as Position Status (9 items), which refers to employees’
trust in supervisor due to the nature of the status privileges itself, the obligation for employees to trust a leader because a leader is obliged to carry out the tasks entrusted and a leader is a decision-maker in the organization. The last factor, relationship (6 items) measure the employees’ trust toward their supervisor which is due to the collaboration and good relationship between employees and their supervisor and understanding between the two parties (Chua et al., 2015). Responses for the items were given on five-point Likert scales (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree) to indicate respondents’ degree of agreement or disagreement with each statement of the items.

Data Analysis
Data was analyzed by using IBM SPSS AMOS 23 Program. Considering the already existing assumptions of the five-factor of Employee Trust Scale as established by Chua et al. [9], the Confirmatory Factor Analysis was conducted to test the model fit of the Employee Trust Scale and to verify the fit of the model, multiple goodness of fit indices, such Comparative Fit Index (CFI), The Goodness of Fit Index (GFI), the Tucker-Lewis Index and Root Mean Square Error of Approximation (RMSEA), and the Chi-Square Statistic have been used to examine the predictive validity of the proposed five-factor (47 item-structure) of the Employee Trust Scale. In this study, composite reliability, convergent validity and discriminant validity of the scale was also investigated.

RESULTS

Confirmatory Factor Analysis
Following Exploratory Factor Analysis (EFA), the Confirmatory Factor Analysis (CFA) was conducted to test the fitness of the proposed five-factor model (47-item-structure) of the Employee Trust Scale by using IBM SPSS Amos to perform structural equation modeling (SEM) of the data obtained from the 514 employees. In order to conduct a multivariate statistical techniques, as suggested by Tabachnick and Fidell[12], the sample size should be a minimum of 200. However, in order to conduct a confirmatory factor analysis, Kline [13] suggested the ratio of cases to free parameters should be 10 : 1. Therefore, the size of sample in this study is sufficient and should not be an issue while analyzing the data. The model fit was analyzed by comparing the results to the recommended Comparative Fit Index, in which the value obtain should be larger than 0.90 (CFI > .90), the Goodness-of-Fit Index should be larger than 0.90 (GFI > .90), the Tucker-Lewis Index should also be larger than 0.90 (TLI > .90), the Root Mean Square Error of Approximation value between 0.05 to 0.08 (RMSEA .05 - .08), and the Chi-Square Statistic value less than 5.0 (CMIN/DF < 5.0), which are considered as acceptable indices of fit and were used to determine the adequacy of the model of measure [14].

Refer to Table 1, the CFA results showed that the proposed model of five-factor of the Employee Trust Scale revealed that the majority of comparative fit indexes failed to reach the recommended standards for model fit [14, 15]. Standardized estimates for the measurement model for Employee Trust Scale showed a CFI of .723, a TLI of .867, a GFI of .874, and a RMSEA estimate of .074, and CMIN/DF of 3.804 (refer Table 1). The results suggested that the five-factor model of Employee Trust Scale did not fit the data well. The model exhibited covariance problem among the item (between item B50 and B65, B50 and B48, B60 and B59, B63 and B65) in Competency factor, covariance between (item B81 and B82, item B47 and B51) in Benevolence factor, covariance between (item B69 and B71, B78 and B79, B54 and B58, B70 and B71) in Integrity factor, covariance between (item B4 and B6, B7 and B8) in Position Status factor, and covariance between items (B36 and B38, B32 and B26) in Relationship factor. Some items loaded insufficiently on the corresponding latent factors with standardized regression weights less than .700. Therefore, a reasonable adjustment of data is required. Figure 1 showed a Measurement Model of the Employee Trust Scale.
Subsequent covariance analysis had been conducted in order to improve the model’s fit. As a result, items that loaded insufficiently on the corresponding latent factors and items with high covariance problem were then removed (e.g., Item B50, B65, B48, B75, B60, B47, and B59 in Competency factor, item B78, B55, B79, B71, and B58 in Integrity factor, Item B81 in Benevolence factor, Item B26 and B38 in Relationship factor, and item B6, B7, and B36 in Position Status factor). The adjusted model retained 28 items with recommended quality standards and the model confirmed a better goodness of fit with data (6 items retained in Competency factor; 5 items in Benevolence factor; 8 items in Integrity factor; 5 items in Position Status factor and 4 items measured Relationship factor). The estimates for the modified measurement models showed a better fit for the data with a CFI of .929, a TLI of .920, a tolerable GFI of .844, and a RMSEA estimate of .071, and CMIN/DF of 3.572(refer Table 1 for modified measurement model). Table 2 listed the retained items of The Employee Trust Scale. Figure 2 showed the Modified Mesurement Model of The Employee Trust Scale.

Composite Reliability
A composite reliability index (CR) and average variance extracted (AVE) were used to determine the reliability of the modified measurement model of the Employee Trust Scale. Refer to Table 3, the results showed the composite reliability index for all factors of the Employee Trust Scale were greater than the recommended level of 0.60 [16]. Composite reliability value for all the five factor range between 0.85 and 0.91. The results also showed Average Variance Extracted (AVE) values for all the five factors (range from .53 to .65) exceeded the minimum, the recommended level of 0.50 [17].

Convergent and Discriminant Validity
Validity is most fundamental in developing and evaluating the assessment scale and reliability is a prerequisite to validity. When conducting a Confirmatory Factor Analysis, it is absolutely necessary to establish reliability, as well as convergent and discriminant validity. The evidence of convergent validity was examined by comparing the results of the analysis to the recommended thresholds values for convergent validity (CR > 0.70; CR > AVE and AVE > 0.50). However, the evidence of discriminant validity was analyzed by comparing the AVE values of each factor and the variance shared by the factor and all other variables. Refer to Table 3, the results showed all factors of the Employee Trust Scale were greater than the recommended level of CR > 0.70 CR > AVE and AVE > 0.50. The results also showed all the factors correlated well with each other within their correspondence latent factor. This suggested that the latent factors was well explained by its observed variables and good composite reliability of the scale.

The results of discriminant validity analysis showed in all comparisons, the AVE value of all the dimensions were lower than all of the combinations of the shared variance (refer Table 4). This suggested that the data have some discriminant validity issues. According to Hair et al. [17] this may due to some variables correlating higher with variables outside their parent factor than with the variables within their parent factor. As referring to Figure 2, the latent factor of Competency is better explained by the factor of Integrity (loading value = .960), Benevolence and Relationship (loading value = .846), than by its own observed variables (loading value range between .740 and .840). The same problem also found on the latent factor of Integrity, Benevolence, Relationship and Position Status.

Discussion
This investigation was conducted to determine the best fitting model and the constructs measured by the Employee Trust Scale in a sample of public and private employees in Malaysia. The Western model [1] proposed three elements of trustworthiness (i) ability (ii) benevolence and (iii) integrity. The theoretical background of this research work by Chua et al. [9] provides a model about trust of an employee toward his/her immediate supervisor with the addition of another two factors (position status and relationship)
since the development of the questionnaire was designed with local context. It was assumed that position status and relationships were important components of trust building among Malaysian employees and their supervisors.

The initial CFA results showed that the proposed model of the five-factor of the Employee Trust Scale did not met the requirements standards for model fit as suggested by Hu and Bentler[14]. The model exhibited covariance among the items in all five factors and some of the items showed insufficient value of regression weight. However, the modified measurement model retained 28 items out of 47 items with recommended quality standards and the model confirmed a better goodness of fit with data (CF=.929, a TLI=.920, GFI =. 844, RMSEA=.071, and CMIN/DF = 3.572). Each factor of the five-factor model has at least four items. It may be concluded that the modified measurement model reflected the local trust culture better and might be related to the Asian culture. It is also worth noted that the samples were drawn from various job sectors (navy, soldiers, bankers, white collar and blue collar workers). The context of trust might be different in each sector. The role of supervisors in each organization is different from other. For example in uniform bodies such as navy and military, the dimensions as well as determinants of trust towards supervisors are different from the one in banks, schools, hospitals and others. As it is suggested by Quinn, Reed, Browne, and Hiers[18] that “When one moves into the managerial structure of the large corporation or firm, one is not just moving into a ‘job’ but into a bureaucratic setting that contains its own social and cultural environment and rules of behavior. Therefore we can assume that sample heterogeneity in the present research might have effect on the results of Confirmatory factor Analysis. As some items in the scale developed by Chua et al. [9] may be relevant to a particular work sector only. Therefore, a larger and adequate proportion of each sector needs to be considered to gain better understanding and reevaluate the fit of the model.

The reliability of the modified measurement model of the Employee Trust Scale is considered good for each factor. However, it should be taken into account that the data was taken from various samples of private and public sector workers (bankers, navy, teachers, policemen,nurses, administrative, professionals, commercial etc.). Therefore, it is suggested that cross-validation with larger samples for each job sector should be considered to extend outcomes beyond the population. It is recommended to future researchers to increase and balance out the number of respondents in both sectors to achieve more reliable results and come out with a solid conclusion. Cross-validation could be considered to confirm and extend the outcomes beyond the sample involved.

The study revealed that some latent factors correlated highly with the observed variable which means the “constructs have an influence on the variation of more than the observed variables to which they are theoretically related” [19]. However, further investigation needs to be done to investigate whether it is an issue of statistical discrepancies or confirming hypothesized structural paths. Hence, further refinement at the item level for the latent factors (competency, integrity, benevolence, relationship and position status) needs to be done. To deal with the discriminant validity, it is suggested to remove or revise the items that overlap with other factors than by its own observed variables [20]. By doing that, stronger inferences can be made regarding the nature of the relation between trust and the five factors. The items might be conceptually different from items that assess in different work sectors. For example integrity and competency of a supervisor may conceptually mean the same in the uniform bodies sector as compared to other work sectors.

The components of employees trust towards their supervisors discussed in the present study can be useful for organizations to help their employees to build high quality trust relationships. Apart from that the overview of these components can help supervisors create productive environment by analysing, prioritizing and capitalizing on trust components that employees under their supervision find important for building a trusting relationship.
Conclusion

The study offers important theoretical implications for organizations. Trust has been identified as an important factor in organization particularly between the employees and supervisor. These include competency, benevolence, integrity, position status and relationship. The research model supports the role of position status and relationship as a new addition to the Western Trust Model proposed by Mayer et al. [1]. We suspect culture (collectivism and power distance) plays an important role in the expanded model. However, further investigation and more empirical research need to be done to confirm the finding and further validate the model. Exploring a clearer concept of trust also should be done to eliminate issues of discriminant validity to improve the model. Since the findings suggest an addition of two unique factors in trust between subordinate and immediate supervisor in Malaysian context, it is recommended to conduct a study on a more comprehensive scale development and validation. As a conclusion, The Employee Trust Scale has provided potential development of the Malaysian model and scale measured by reliable and validated self-developed scales. However, more research needs to be done to conceptually and statistically establish a better foundation in different job sectors.

Acknowledgment

The research for this paper was financially supported by the Universiti Malaysia Sabah, under Priority Area Research Grant Scheme: Developing and Validating Malaysian Employee’s Trust Scale, grant no. SBK0099-SS-2013.

References


Table 1

Model Fit Statistics from Confirmatory Factor Analysis for the Employee Trust Scale

<table>
<thead>
<tr>
<th>Fit Indices</th>
<th>Recommended Fit</th>
<th>Measurement Model</th>
<th>Modified Measurement Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMIN/DF</td>
<td>CMIN/DF &lt; 5.0</td>
<td>3.804</td>
<td>3.572</td>
</tr>
<tr>
<td>CFI</td>
<td>&gt; .90</td>
<td>.723</td>
<td>.929</td>
</tr>
<tr>
<td>GFI</td>
<td>&gt; .90</td>
<td>.874</td>
<td>.844</td>
</tr>
<tr>
<td>TLI</td>
<td>&gt; .90</td>
<td>.867</td>
<td>.920</td>
</tr>
<tr>
<td>RMSEA</td>
<td>.05 -.08</td>
<td>.074</td>
<td>.071</td>
</tr>
</tbody>
</table>

Figure 1. Measurement Model of The Employee Trust Scale
Table 2
The Retained Items of the Employee Trust Scale Result of Confirmatory Factor Analysis

<table>
<thead>
<tr>
<th>Factor</th>
<th>Item</th>
<th>Number of Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competency</td>
<td>43, 46, 50, 56, 63, 68</td>
<td>6</td>
</tr>
<tr>
<td>Benevolence</td>
<td>51, 57, 72, 74, 82</td>
<td>5</td>
</tr>
<tr>
<td>Integrity</td>
<td>54, 61, 62, 64, 66, 69, 70, 77</td>
<td>8</td>
</tr>
<tr>
<td>Position Status</td>
<td>4, 5, 10, 17, 22</td>
<td>5</td>
</tr>
<tr>
<td>Relationship</td>
<td>26, 32, 36, 49</td>
<td>4</td>
</tr>
</tbody>
</table>

- **Competency**
  - Item 43: My head of department has great experience in performing his/her/her task.
  - Item 46: My head of department has a convincing appearance.
  - Item 50: My head of department is capable in delegating tasks to his/her/her employees.
  - Item 56: My head of department able to make quick decision.
  - Item 63: My head of department brings development to the department.
  - Item 68: My head of department shows confidence in task performance and administration.

- **Benevolence**
  - Item 51: My head of department always encourages and supports his/her/her employees in their work.
  - Item 57: My head of department consider every decision taken accordingly.
  - Item 71: My head of department is a discipline person in task performance and administration.
  - Item 74: My head of department is very considerate in his/her management.
  - Item 82: My head of department is concerned about the welfare of his/her employees.

- **Integrity**
  - Item 54: My head of department is a person with high principles.
  - Item 61: My head of department respects his/her employees.
  - Item 62: My head of department generates significant output.
  - Item 64: I like the ethic values of my head of department.
  - Item 66: My head of department is a dedicated person.
  - Item 69: My head of department is very sincere in performing tasks and in making decisions for the department.
  - Item 70: The management of my head of department is honest and truthful.
  - Item 77: My head of department always strives to ensure that the organizational goals are achieved.

- **Position Status**
  - Item 4: My head of department is responsible for the advancement and development of the organization.
  - Item 5: We need to trust our head of department because he/she is our head of department.
  - Item 10: I obey the instructions of my head of department because he/she is the head of department of the organization.
  - Item 17: I have to obey and carry out the tasks entrusted by my head of department.
  - Item 22: My head of department is the determining factor in the administration of the organization.

- **Relationship**
  - Item 26: My head of department has a good knowledge about my background.
  - Item 32: My head of department understand me well.
  - Item 36: My head of department spends time with his/her/her employees.
  - Item 49: My head of department always discusses issues related to work with his/her employees.
Figure 2. The Modified Measurement Model of the Employee Trust Scale.
### Table 3
Composite Reliability and Average Variance Extracted of the Employee Trust Scale

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Composite Reliability (CR)</th>
<th>Average Variance Extracted (AVE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competency</td>
<td>.92</td>
<td>.64</td>
</tr>
<tr>
<td>Benevolence</td>
<td>.91</td>
<td>.66</td>
</tr>
<tr>
<td>Integrity</td>
<td>.94</td>
<td>.65</td>
</tr>
<tr>
<td>Position Status</td>
<td>.85</td>
<td>.53</td>
</tr>
<tr>
<td>Relationship</td>
<td>.85</td>
<td>.59</td>
</tr>
</tbody>
</table>

### Table 4
Convergent and Discriminant Validity of the Employee Trust Scale

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Composite Reliability (CR)</th>
<th>Average Variance Extracted (AVE)</th>
<th>Maximum Shared Variance (MSV)</th>
<th>Average Shared Variance (ASV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competency</td>
<td>0.92</td>
<td>0.64</td>
<td>0.97</td>
<td>0.88</td>
</tr>
<tr>
<td>Benevolence</td>
<td>0.91</td>
<td>0.66</td>
<td>0.99</td>
<td>0.88</td>
</tr>
<tr>
<td>Integrity</td>
<td>0.94</td>
<td>0.65</td>
<td>0.99</td>
<td>0.85</td>
</tr>
<tr>
<td>Position Status</td>
<td>0.85</td>
<td>0.53</td>
<td>0.73</td>
<td>0.70</td>
</tr>
<tr>
<td>Relationship</td>
<td>0.85</td>
<td>0.59</td>
<td>0.87</td>
<td>0.82</td>
</tr>
</tbody>
</table>