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The paper investigates measurement invariance of customer value construct across different populations (managers and customers). The purpose in doing this analysis is that whether the constructs were being mapped from two distinct groups. Data for this study comes from two samples: hotel managers and hotel guests. All classified hotels across Indonesia were included. A total 231 managers and 385 customers responded to the survey. The results indicate the conceptualisation and operationalisation of customer value developed in this study, does not significantly generalise across managers and customers. The results further indicate that the construct has robust psychometric properties; however, the construct was perceived differently by managers and customers.

Keywords: *Measurement invariance, customer value, hotel industry*

Introduction

Customer value has become an increasing concern to consumers and marketers (Patterson and Spreng, 1997), and should be the focus of business activities (Walter et al., 2001). The concept of value has been applied in various fields of study, such as economics, social science, accounting, finance, strategy, product management, information system, and marketing (Huber et al., 2001; Ulaga and Chacour, 2001). It is considered an abstract concept (Weinstein and Johnson, 1999); hence, its interpretation varies according to the context (Sweeney and Soutar, 2001). According to Slater and Narver (2000) customer value is created 'when the benefit to customers associated with products/ services exceeds the cost of the offer to the customer' (p.120). Customer value can be perceived from two different viewpoints, that is, customer value perceived by organisation and by customers. Previous studies in this area mostly examined customer value from customers' perspective. There has been little empirical research that examines customer value from two different perspectives of organisation and customers. An empirical study is needed to investigate customer value perceived by managers (customer delivered value), and customer value experienced by customers (customer received value). This raises an issue of the importance of measurement invariance for the customer value construct.

The issue of measurement invariance has not been widely examined in marketing (Mavondo and Farrell 2000). The studies of

measurement invariance in marketing mainly are related to the market orientation construct (e.g. Mavondo 1999, Mavondo and Farrell 2000, Mavondo et al. 2003). There is a lack of studies that have been done in assessing scale equivalence of the customer value construct. This paper aims to establish measurement invariance of the customer value construct from two distinct groups of managers and customers. Measurement invariance is a pre-requisite for comparing scaled measured under different context/group and promote in the interpretation of the results. Therefore, the objective of this paper is to demonstrate that the framing maps are equivalent in the two distinct groups.

Table 1. Definitions of Customer Value

Author(s)	Year	Definitions of Customer Value
Zeithaml	1988	The consumer's overall assessment of the utility of a product based on a perception of what is received and what is given.
Monroe	1990	Buyer's perception of value represent a trade-off between the quality and benefit they perceive in the product relative to the sacrifice they perceive by paying the price.
Bolton & Drew	1991	Value is a function of quality, sacrifices, characteristics, performance, expectation, and disconfirmation.
Anderson et al.	1993	Perceived worth in monetary units of the set of economic, technical, service, and social benefits received by a customer firm in exchange for the price paid for a product offering, taking into consideration the available alternative suppliers' offerings and price.
Gale	1994	Market perceived quality adjusted for the relative price of your product.
Christopher	1996	Customer value is created when the perceptions of benefits received from a transaction exceed the costs of ownership.
Woodruff & Gardial	1996	Trade-off between desirable attributes compared with sacrifice attributes.
Flint et al.	1997	The customers' assessment of the value that has been created for them by a supplier given the trade-offs between all relevant benefits and sacrifices in a specific-use situation.
Woodruff	1997	Customer's perceived preference for and evaluation of those product attributes, attributes performances, and consequences arising from use that facilitates achieving the customer's goals and purposes in use situations.
Walter et al.	2001	The perceived trade-off between multiple benefits and sacrifices gained through a customer relationship by key decision makers in the supplier's organisation.
Eggert &Ulaga	2002	The trade-off between the multiple benefits and sacrifices of a supplier's offering, as perceived by key decision-makers in the customer's organisation, and taking into consideration the available alternative supplier's offerings in a specific use situation.

Customer Value: Concept and Measurement

Concept of Customer Value

Holbrook (1999) defines customer value as "an interactive relativistic preference experience" (p. 5). Zeithaml (1988, p. 13) identifies four diverse meanings of value: (1) "value is low price, (2) value is whatever one wants in a product, (3) value is the quality that the consumer receives for the price paid, and (4) value is what the consumer gets for what they give". Flint et al. (1997) suggest that value can be classified as: values, desired values, and value judgments. The notion of values is defined as implicit beliefs that guide behaviour (i.e. core beliefs, desired end-states, or higher order goals of the behaviour). Desired value is interpreted as what customer wants to have happen (benefit sought), while value judgment is the customer's assessment of what has happened (benefits and sacrifices). This implies that value is a process of interpretation of what the customer feels concerning the product or service consumed, relative to the sacrifices. The definitions of customer-perceived value are presented in Table 1.

The majority of past studies on perceived value have focused on the fourth definition of Zeithaml (1988), which is basically similar to the concept of value judgment proposed by Flint et al. (1997). The interpretation of the Zeithaml (1988) definition of value is used widely as a fundamental basis for defining the concept of value. There are two common themes discussed in most definitions of value i.e. the notions of "trade-off" and "benefit-sacrifices". The concept of value judgment will be adapted in this study as it is more related to the meaning of perceived value (Ulaga and Chacour, 2001). The primary theme in this definition is the notion of trade-off which can be interpreted as a difference between benefits and sacrifices. That is, customer value is created when the customer perceives that the benefit of consuming products/services exceeds the sacrifices (Slater and Narver, 2000). The second common theme is the term "benefits and sacrifices". In the narrow perspective, benefit is identified as quality, while sacrifices is represented as a price. This narrow perspective is criticised as too simplistic (Sweeney and Soutar, 2001), and only reflects one dimension of the perceived benefits and sacrifices bundle (Christopher, 1996). Hence, the concept of value needs to include the total bundle of benefits and sacrifices which consists of both monetary and non-monetary aspects. This study adopts the common definition of customer value with a broader interpretation. For the purpose of the study, customer value is defined as a trade-off between total perceived benefits and total perceived sacrifices.

Measurement of Customer Value

Sweeney and Soutar (2001) developed and empirically tested a measurement of perceived value, namely PERVAL (perceived value scale). Sweeney and Soutar (2001) argue that the functional value of the Sheth et al. (1991) scale has not been appropriately measured, since it combined the attributes that positively (quality) and negatively (price) impact on perceived value. Sweeney and Soutar (2001) suggest perceived value scale (PERVAL), which consists of four items of quality, price, emotional value and social value. Responding to the limitation of the functional value of the Sheth et al. (1991), in their PERVAL model, the attributes of quality and price are measured separately. Sweeney and Soutar (2001) identify quality as how well the product was made, and they relate emotional response to how the customer feels about the product that they buy. Price means whether or not the money paid for the product is reasonable, while social value refers to the impression that the purchase of the product had on others. While the Sweeney and Soutar

Table 2. Measurement of Customer Value in Previous Studies

Author(s)	Year	Measurement Items
Eggert & Ulaga	2002	• Price: Compared to the price we pay, we get reasonable quality • Quality: Compared to the quality we get, we pay a reasonable price • Net-value: The purchasing relationship delivers us superior net-value
Sweeney & Soutar	2001	• Quality: Has consistent quality; Is well made; Has an acceptable standard quality; Has poor workmanship (*); Would not last a long time (*); Would perform consistently (*) Reverse scored • Price: Is reasonable priced; Offers value for money; Is a good product for the price; Would be economical • Emotional: Is one that I would enjoy; Would make me want to use it; Is want that I would feel relaxed about using; Would make me feel good; Would give me pleasure • Social: Would help me to feel acceptable; Would improve the way I am perceived; Would make a good impression on other people; Would give its owner social approval.
Petrick	2002	• Quality: Is outstanding quality; Is very reliable; Is very dependable; Is very consistent • Emotional response: Makes me feel good; Gives me pleasure; Gives me a sense of joy; Makes me feel delighted; Gives me happiness • Monetary price: Is a good buy; Is worth the money; Is fairly priced; Is reasonably priced; Is economical; Appear to be a good bargain • Behavioural price: Is easy to buy; Required little energy to purchase; Is easy to shop for; Required little effort to buy; Is easily bought • Reputation: Has good reputation; Is well respected; Is well thought of; Has status; Is reputable.

(2001) scales have been applied to measure of tangible product, Petrick (2002) suggests that there is a need for a different scale to be developed for measuring the perceived value of a service. It is further argued that scales developed for measuring a tangible product's perceived value are relatively difficult to employ in measuring perceived value of a service (Petrick, 2002).

Petrick (2002) developed a multi-item scale for measuring the perceive value of a service. The measurement consists of behavioural price, monetary price, emotional response, quality, and reputation. Behavioural price is defined as the price (non-monetary) of attaining a service. This includes the time and effort spent to search for the service (Zeithaml, 1988; Petrick, 2002). Monetary price refers to the price of a service (Petrick, 2002). Emotional response is defined as a descriptive judgment concerning the pleasure that a service gives the customer (Sweeney and Soutar 2001; Petrick, 2002). Quality is defined as a consumer's judgment regarding the service's overall excellence (Petrick, 2002; Zeithaml,1988). Finally, reputation is defined as the prestige or status of service, based on the image of the supplier (Petrick 2002). The measurement of customer value used in previous studies can be seen in Table 2.

In terms of measurement, this study applies the perceived value scale developed by Petrick (2002) to measure the perceived value of service. Although, this study has principally adopted mainly the items of Petrick's (2002) scale, the component of social value from the Sweeney and Soutar (2001) has also been included. The argument in justifying this construct of perceived customer value is that these components can be considered as a general value that can be applied in any situations (Sweeney and Soutar, 2001). The functional value (i.e. quality product or service) is considered a major aspect that will be evaluated by customers in relation to the perceived value process. Apart from behavioural price and monetary price as the functional value, the emotional value can be considered an essential dimension, since the perceived value involves both affective and cognitive aspects. Therefore, emotional value is regarded as a reflection of the affective perspective in perceived value. Additionally, social value is considered as one of the perceived value constructs, since every individual customer basically has a hierarchy of needs that is assumed to have direct or indirect influence on the perceived value. Three components of customer value in this study are reputation for quality (six items), value for money (three items), and prestige (three items). Reputation for quality captures the notion of quality and reputation and to some extent emotional value. Value for money can be viewed as comparing the benefits and sacrifices and represents monetary valuation. Prestige captures the social value of associating oneself with a product or a service (hotel) and represents what the "important others" think about the respondent for patronising a given hotel.

The hypothesis to be examined in this paper is postulated as follows:

Hypothesis: Customer value is being mapped similarly by managers and customers.

Measurement Invariance

Measurement can be defined as the systematic assignment of number of variables to represent certain characteristics of persons, objects, situations, or events (Vanderberg and Lance, 2000). Measurement invariance is a necessary condition for comparisons across groups (Cheung and Rensvold, 1999). Mavondo and Farrell (2000), and Mavondo et al. (2003) suggest that the test for measurement invariance is required to compare distinct

groups on their level of a trait or to investigate whether trait-level scores have differential correlates across groups. Vanderberg and Lance (2000) argue that test of measurement invariance is an important logical prerequisite to conducting cross group comparison. In doing measurement comparison across distinct groups, it should be assumed that the numerical values under consideration are on the same measurement scale. If the trait score across groups are not on the same measurement scale, the differences between groups in mean levels may be misleading.

Since measurement invariance is a prerequisite for meaningful cross-cultural comparisons, the various versions of an instrument are identical including format, instructions, and response questions (Cheung and Rensvold, 1999). Measurement invariance is demonstrated when the observed test items or indicators are identical or invariant. In other words, measurement invariance requires that the links of latent variables with their indicators must identical across distinct groups (Mavondo and Farell, 2000). Vanderberg and Lance (2000) observed that there are eight primary tests of measurement invariance. According to Vanderberg (2002) all the eight tests were rarely conducted in the same study; rather, researchers chose tests might be based on their particular research needs. However, the most frequently conducted tests were those for configural and metric invariance (Vanderberg, 2002). The test of measurement invariance conducted in this study consists of six tests. The first test is the test of invariant-covariance matrices recommended by Vanderberg and Lance (2000). The next five tests recommended by Mavondo and Farrell (2000), and Mavondo et al. (2003) consist of testing for weak factorial invariance, testing for strong factorial invariance, testing for strict factorial invariance, and testing for elegant factorial invariance.

The Linear Confirmatory Factor Analytical (CFA) Model

Factor analytic models have been the most commonly used when doing the process of measurement invariance (Mavondo and Farrell, 2000). The factor analytic models allow identifying various forms of factorial invariance such as configural, weak, strong, and strict factorial invariance. That is, when representing measurement invariance within a factor model, it relates to factorial invariance. The CFA model can be represented by the following equation (Mavondo and Farrell 2000, Mavondo et al. 2003):

$$M \cong \tau + \Lambda(\alpha + \Psi)\Lambda' + \Theta\varepsilon = M \quad (1)$$

where M is a *(p x p)* moment matrix; $\hat{\tau}$ is an *(p x 1)* vector of intercepts for the *p* measured variables; $\hat{\tau}'$ is the transpose; $\hat{\alpha}$ is an *(m x 1)* vector of means on the m factors; $\hat{\alpha}'$ is the transpose and $\hat{\Phi}$ is an *(m x m)* matrix of covariances among common factors; $\hat{\Lambda}$ is *(p x m)* matrix of loadings of the *p* measured variables on the *m* latent variables, $\hat{\Lambda}'$ is the transpose; $\hat{\Theta}_e$ is a *(p x p)* matrix of covariances among measurement residuals and $\hat{M}$ is the estimated population moment matrix assuming the model is correctly specified.

The general model in the above equation can be extended to a multiple-group context as follows:

$$M_i \cong \tau_i \tau_{i+} \Lambda_i(\alpha_i \alpha_{i+} \Psi_i)\Lambda_{i+} \Theta\varepsilon_{g=M_i} \quad (2)$$

Where all matrices are as defined earlier, except for the addition of the g that the matrices were derived from the g th sample (Mavondo and Farrell, 2000, p.228).

Mavondo and Farrell (2000) suggest several points should be made in relation to the inclusion of intercepts terms for measured

variables and means for the latent variables in Equation 1: First, the inclusion of the τ (intercepts) matrices in Equation 1 allows for hypotheses involving strong and strict equivalences to be tested. Second, the inclusion of the α (means) matrices in Equation 1 enables testing of mean differences of latent variable across groups. Third, the inclusion of both the τ (intercepts) and the α (means) matrices into Equation 1 requires the fitting of structural models to moment matrices.

Factorial Invariance

This study conducted six test of measurement invariance containing testing for: invariance covariance, configural invariance, metric factorial invariance (i.e.: weak, strong, and strict factorial invariance), and elegant factorial invariance. A brief discussion on the various forms of invariance is presented in the following sections.

Invariance Covariance Matrices

Test of invariance covariance matrices is typically resulted in a multisample application of CFA by testing for equality of samples' covariance matrices (Vanderberg and Lance 2000). The acceptance/rejection of the null hypothesis is evaluated through the chi-square statistic and other overall goodness-of-fit-indices. In this instance, failure to reject the null hypothesis that $\Sigma_g = \Sigma_{g'}$ is commonly viewed as an indication of overall measurement invariance across groups. On the other hand, rejection of the null hypothesis that $\Sigma_g = \Sigma_{g'}$ is a preliminary indication that measurement invariance exists between groups (Vanderberg and Lance 2000).

Configural Invariance

Test of configural invariance is a test of the null hypothesis that a priori pattern of free and fixed factor loadings imposed on the items is equivalent across groups (Vanderberg and Lance 2000). Configural invariance can be identified by having the same pattern of fixed and free elements in the factor loadings matrices of each group (Mavondo and Farrell 2000). According to Vanderberg and Lance (2000) if the null hypothesis is accepted (i.e., finding support for measurement invariant) has two implications. First, it means that the respondent groups were employing the same conceptual frame of reference. Second, it means that further tests of additional aspects of measurement invariance may proceed as they are nested within the test of configural invariance. Similarly, Mavondo and Farrell (2000) suggest that failure to support a configural invariance indicates that the constructs are being mapped differently across the multiple groups, and consequently, that further group comparisons are not required. However, if the configural invariance is supported, then the more restricted model can be tested (Mavondo and Farrell 2000).

Metric Factorial Invariance

Factorial invariance was distinguished by Meredith (1993) into several forms are: weak, strong, and strict factorial invariances. All of these forms of metric invariance refer to the constraining of all elements in certain matrices to invariance, or equality, across groups. The three forms of metric factorial invariance, which are: weak, strong, and strict invariance, are hierarchically nested (Mavondo and Farrell 2000). Specifically, having additional constraints to the weak invariance yields the strong invariance, and with additional constraints for strict invariance required on the strong invariance model.

Weak Factorial Invariance

The most basic form of metric invariance is weak factorial invariance, which referred as factor loading invariance or full metric invariance (Mavondo and Farrell 2000). Weak factorial invariance requires invariance

constraints on the link between indicators and the latent variables. As can be seen in Figure1., weak factorial invariance is achieved by constraining the factor loadings (λ k) to be equal across different groups.

Strong Factorial Invariance

Strong factorial invariance includes one set of additional constraint on the weak invariance model. Specifically, these additional constraints involve the intercepts of the measured variables (Mavondo and Farrell 2000). Strong factorial invariance is required to identify the mean differences on the latent variables across groups. As shown in Figure 1, strong factorial invariance is achieved by constraining the factor loading (λ_k) and the error variance ($\theta\delta_{kk}$) across different groups.

Strict Factorial Invariance

Strict factorial invariance is achieved by placing additional constraint on the strong factorial invariance. That is, measurement residuals or the unique factor invariance are included in addition to the strong factorial invariance. The addition of the invariance constraints on residuals produces a final model. According to Mavondo and Farrell (2000) if group differences in the intercepts, factor loadings and residuals are insignificant. Group differences in means and variances on the common factors influences group differences in means and variances on the measured variables. Subsequently, all group differences on the measured variables are identified by group differences on the common factors. As illustrated in Figure 1, strict factorial invariance is achieved by constraining the factor loading (λk), the error variance ($\theta\delta_k$), and measurement residual across different groups.

Metric Invariance of Covariances and Means of Latent Variables

Invariance of Covariances among Latent Variables

Mavondo and Farrell (2000) suggest three conditions should be made when considering invariance constraints on the covariance among the latent variables. First, invariance constraints on the covariances are interpretable when across-group metric invariance constraints have been placed on the factor loadings. Second, a complex constraint on factor variances and factor intercorrelations are represented by constraining invariance constraints on all covariances simultaneously. Third, metric invariance of the covariances should not be expected (Meredith 1993). This is because selection of a sample may be related to variables in the factor analysis under random sampling of individuals in a population. If the testing of invariance of covariance among latent variables producing the final model which invariances across groups, then it is called elegant (Mavondo and Farrell 2000).

Invariance of Means of Latent Variables

The means matrices are the final matrices in which metric invariance constraint may be placed. The means matrices contain the means of the latent variables (Mavondo and Farrell 2000). If metric invariance constraints have been imposed on the factor loadings and intercepts, then metric invariance constraints on elements of the means matrices can be identified.

Research Methodology

Sample

Two samples were collected: one for hotel managers and the other for hotel guests. To capture the information from hotel managers, all classified hotels across Indonesia were included in the sampling frame. Potential participating hotels were randomly selected, from a sample of 883 classified hotels from 29 provinces in Indonesia. The effective response rate was 247 out of 801 giving a useable sample of 231 and a response rate of 29% after adjusting for wrong addresses

and hotels whose policy is not to participate in research. The samples of hotel guests was collected from selected hotels in Java chosen on the basis that they were representative of the classes of hotels of participating managers. The number of respondents who participated in the customer survey was 385.

Questionnaire Development

This research employed self-administered questionnaire for both hotel managers and hotel guests. The questionnaires were developed in English and were translated to Indonesian and back translated to English several times until there was adequate correspondence between the versions. Two different types of questionnaires were used, one for hotel managers, and the other for hotel guests. The construct of customer value was identical in both questionnaires (see Table 3). Questionnaires were distributed by mail for managers and delivered to the hotels for hotel guests. The Total Design Method of Dillman (1991) was adopted in this study to obtain an optimal response rate. Questionnaires for managers were mailed to 801 hotels through out Indonesia. Approximately 50 questionnaires for hotel guests were distributed to the participating hotels, and then with the assistance of the hotel managers, the questionnaires were distributed directly to the hotel guests. The completed questionnaires were picked up by the researcher.

Non-response

Non-response is one of the potential sources of error that may make the survey results problematic. The mail survey covered all provinces across Indonesia. The response rate for this study is relatively high (29%) and the responses represented all provinces and classified hotels. Analysis of non-response bias indicate that no significant differences between early and late respondents on the constructs (Armstrong and Overton 1977). Therefore, non-response bias is unlikely to be present in the data.

Respondent Profile

The majority of participating hotels were from three star hotels (33.3%) followed by four-star hotels (24.2%), and the hotels employed more than 130 employees (43%). The number of respondents who participated in the customer survey comprised approximately 17% guests who stayed in five-star hotels, 50.38% who stayed in four-star hotels, 21% who stayed in three-star hotels, and less than 10% who stayed in one or two star hotels. The majority of hotel guests were male (65.5%) aged 31-40 years old (44.2%). Most respondents (49.4%) had stayed in the hotel 3 times a year, and most of them came from another city (72.2%). Overall, approximately 68% of respondents indicated that they definitely would stay in the hotel again indicating a high repurchase rate.

Measures and Psychometric Properties

This study combines the Petrick's (2002) and the Sweeney and Soutar (2001) scales. Three components of customer value are reputation for quality (six items), value for money (three items), and prestige (three items). The three dimensions of customer value had identical items for both managers and guests permitting it to be used a dependent variable for the corresponding models (see Table 3).

The measurement properties were assessed using confirmatory factor analysis (CFA). The measurement models fit well as indicated by CFA presented in Table 1. Reliability analysis for the measures produced Cronbach's alpha values are well above 0.9, suggesting good reliability for both constructs. Therefore, both measures were shown to have acceptable psychometric properties.

Table 3. Summary Statistics of the Measurement Models Analysis

Construct Customer Value (Managers)	**Model Fit Indexes and Alpha** α =.947 χ 2= 82.873, df= 40, χ 2 / df = 2.072, GFI=.943, AGFI=.890, NFI=.955, TLI= .960, CFI=.976, RMSEA=.068	**SFL***	**t-value**
Reputation for quality	1. Our hotel delivers services of the highest quality	.743	13.570***
	2. The quality of our service is consistently high	.747	13.605***
	3. Our customers consider our services very reliable	.791	14.968***
	4. Our hotel is considered a "top quality hotel"	.909	16.759***
	5. Our customers genuinely enjoy staying at this hotel	.760	13.671***
	6. Our staff treat customers with great respect	.647	10.097***
Value for money	7. Our hotel rates are considered reasonable	.506	7.035***
	8. Our hotel offers value for money	797	11.616***
	9. Our reservation system is considered convenient	.815	12.967***
Prestige	10. Staying in our hotel is considered prestigious	.960	10.042***
	11. Staying in our hotel is considered a status symbol	.888	10.480***
	12. Staying in our hotel fits customers' social status	.681	9.758***
Construct Customer Value (Customers)	**Model Fit Indexes and Alpha** α =.922 χ 2= 115.239, df= 40, χ 2 / df = 2.881, GFI=.954, AGFI=.910, NFI=.964, TLI= .960, CFI=.976, RMSEA=.070	**SFL***	**t-value**
Reputation for quality	1. The hotel delivers services of the highest quality	.760	16.565***
	2. The quality of hotel service is consistently high	.817	18.154***
	3. The hotel service is considered very reliable	.797	17.642***
	4. This hotel is considered a "top quality hotel"	.839	18.427***
	5. I genuinely enjoy staying at this hotel	.720	14.303***
	6. The hotel staff treat us with great respect	.699	13.013***
Value for money	7. I consider the hotel rates to be reasonable	.757	14.729***
	8. This hotel offers value for money	.718	13.823***
	9. The hotel reservation system is convenient for me	.820	15.784***
Prestige	10. Staying in this hotel is considered prestigious	.909	17.668***
	11. I consider staying in this hotel a status symbol	.797	15.080***
	12. I consider staying in this hotel fits my social status	.866	16.645***

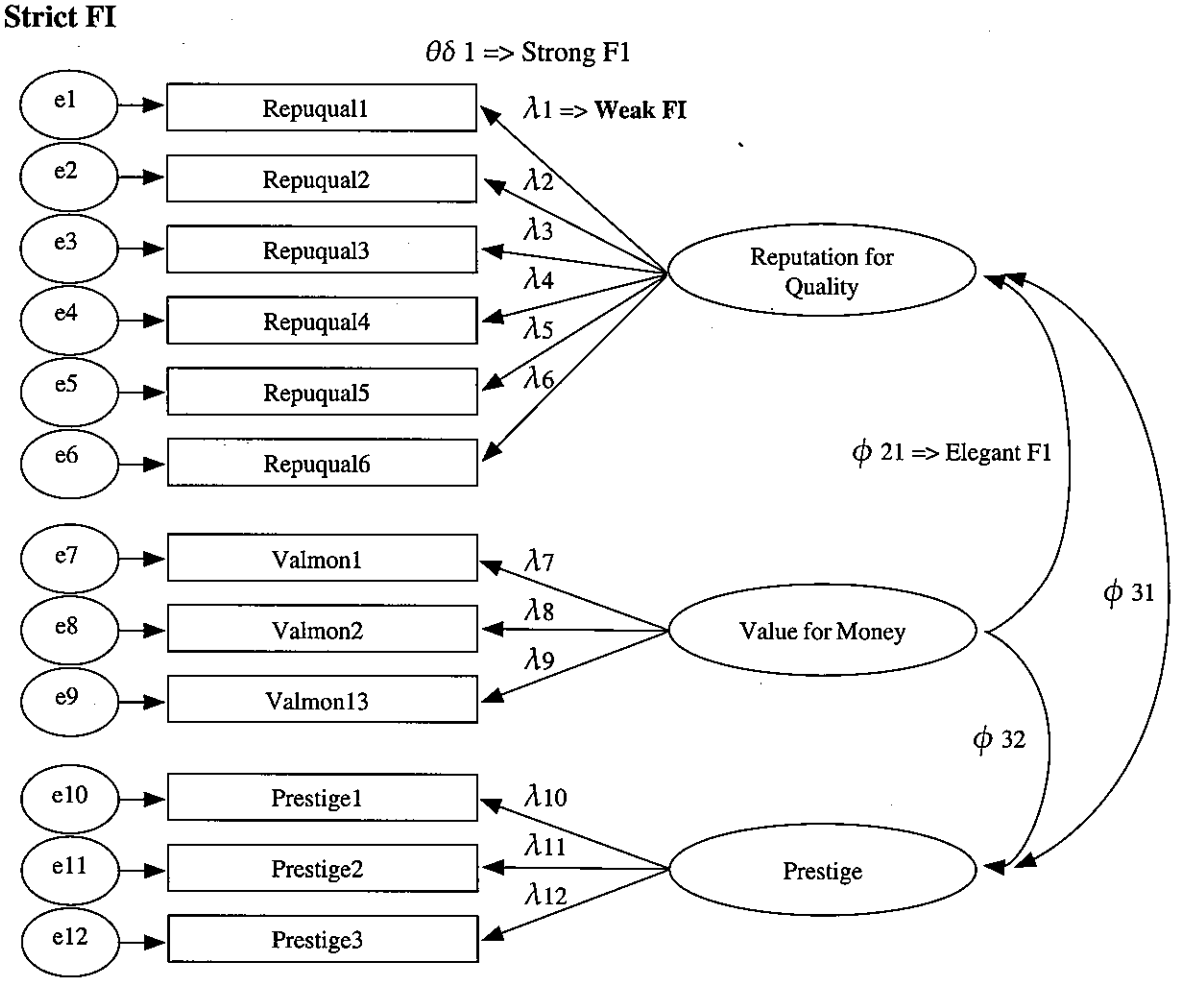
*SFL = standardized factor loading. *** = p < .001

Tests of Hypothesis Relating to Measurement Invariance

This section addresses the construct of customer value being mapped similarly, or differently, by two distinct groups. The extended equation for multiple-groups of managers and customer was applied in this study. The confirmatory factor analytical model for the measurement of customer value is illustrated in Figure 1. As presented in Figure 1, elegant factorial invariance is achieved by placing additional constraint of covariance among the latent variables on strict factorial invariance. Specifically, strict factorial invariance is performed by constraining the factor loading (λk), the error variance ($\theta\delta_k$), measurement residuals, and covariance among latent variables, across different groups.

The factorial invariance across managers and customers was explored in this study. Specifically, several types of factorial invariance (i.e.: configural, weak, strong, strict, and elegant factorial invariance) were tested. The results of hypothesis testing relating to measurement invariance are presented in Table 4.

Figure 1. Hypothesised Model of Customer Value for Managers and Customers



λk = factor loading; ϕij = covariance of factors; $\theta\delta_k$ = error variance.

Test of Invariant Covariance Matrices (Model 0)

Test of invariance covariance matrices can be used to develop the baseline model, termed Model 0. The baseline model was established to investigate whether the model fits the date adequately. The results as shown in Table 1, Model 0 had a $\chi^2(92) = 287.524$; $p<0.001$; χ^2/df ratio = 3.125; a RMSEA = 0.059, the NFI = 0.943; CFI = 0.942 and TLI = 0.960. Model 0 indicated good model fit.

Test of Configural Invariance (Model 1)

In Model 1, all values in all model matrices are freely estimated for two different groups of managers and customers. Model 1 was specified as follows: (a) one indicator variable for each latent factor was fixed at 1.0 in both samples of managers and customers; (b) the factor means were fixed to zero across the two samples. Model 1 then was used as a benchmark against which the fit of more restricted model is compared (Vanderberg and Lance, 2000). The results for Model 1 had a $\chi^2(96) = 290.679$; $p=0.000$; χ^2/df ratio = 3.028; a RMSEA = 0.057, the NFI = 0.942; CFI = 0.960 and TLI = 0.945. Model 1 was demonstrated to fit the data adequately. Model 1 is statistically non-significant ($\Delta\chi^2 = 3.155$, Δdf = 4, $p<0.75$) indicates that there is evidence the customer value construct was being mapped the same way across the two groups of managers and customers.

Testing for Metric Factorial Invariance

Testing for Weak Factorial Invariance (Model 2)

The weak factorial invariance was tested by modifying Model 1 through invoking the additional constraint that the factor loading matrices are invariant across the managers and customers sample. The resultant χ^2 from this restricted model is compared with that from Model 1. This model identified as Model 2 which is nested in Model 1 so the chi-square difference is the appropriate test (Vanderberg and Lance 2000). The results of testing for weak factorial invariance indicate that $\Delta\chi^2(\Delta df) = 191.935$ (3), $p<0.001$ (significant) and the practical fit index are above 0.890. This suggests there is a worsening in adding the constraint. This implies that the regression weights are not invariance across the comparison samples. Therefore, there is evidence that the customer value construct are being perceived differently by the two distinct groups. Since Model 1 is better than Model 2, hence, under such conditions the less restricted Model 1 is to be preferred for the conceptualisation. Based on the results, under normal circumstances, further tests of measurement invariance are not necessary and need not to be undertaken. However, further tests were undertaken in this study for illustrative purposes only (as per Vanderberg and Lance 2000).

Testing for Strong Factorial Invariance (Model 3)

Model 3 represents additional constraints on Model 2. The elements of the τ matrices are constrained to be invariant across groups. This lead to a statistically significant worsening in Model 3 as indicated by $\Delta\chi^2(\Delta df) = 203.155$ (5), $p<0.001$. The results demonstrate that the models have different regression weights. Failure to support strong factorial invariance means that both the means of the latent variables as well as covariances among the latent variables are not invariant. This indicates that the interpretation of the differences across managers and customers with regard to mean, variance-covariances or both is problematic (Mavondo et al. 2003).

Testing for Strict Factorial Invariance (Model 4)

The strict factorial invariance requires

Table 4. Measurement Invariance between Managers and Customers
Note: * the models are based on Model 1 (configural invariance) since this was the best fitting model.

Model Comparison	χ 2	df	χ 2/ df	$\Delta\chi$2	Δdf	P	$\Delta\chi$ 2/Δdf
Model 0 (Baseline)	287.524	92	3.125	-	-		-
Model 1* (CI)	290.679	96	3.028	3.155	4	p<.75	.7887
Model 2 (Weak FI)	482.614	99	4.875				
Model 2 vs. Model 1 (weak FI test)				191.935	3	p<.001	63.978
Model 3 (Strong FI)	493.834	101	4.889				
Model 3 vs. Model 1 (strong FI test)				203.155	5	p<.001	40.631
Model 4 (Strict FI)	499.458	104	4.802				
Model 4 vs. Model 1 (strict FI test)				208.779	8	p<.001	26.097
Model 5 (Elegant FI)	500.653	107	4.679				
Model 5 vs. Model 1 (elegant FI test)				209.974	11	p<.001	19.088

across-group invariance constraints on the Θ_e matrices in addition to those in Model 3. The results in Model 4 is compared to Model 1 providing the results of $\Delta\chi$ 2(Δdf) = 208.779 (8), p<0.001. This clearly demonstrates that the models are different leading to worsening the model significantly.

Testing for Elegant Factorial Invariance (Model 5)

All elements in the covariance matrices to invariance across groups were constrained in order to test the invariance of factor variance-covariance matrices across the managers and customers. If across-group invariance constraints were placed on the three elements this produces Model 5 (Mavondo and Farrell, 2000). Comparison between Model 5 and Model 1 leads to a significant change in fit, $\Delta\chi$ 2(Δdf) = 209.974 (11), p<0.001. The result leads to failure to support invariance of factor variance-covariance matrices. This suggests that the constructs are being mapped differently across the two groups. Thus elegant factorial invariance was not supported. In addition, the RMSEA = 0.077 and both NFI and TLI = 0.900, and CFI are above 0.900. These results indicate that Model 5 is preferable to Model 4; however, it was not considered as elegant.

The results of hypothesis testing indicate that the customer value construct are being perceived differently by the two distinct groups of managers and customers. The results of five tests of comparison across group for this study demonstrates that test of configural invariance, Model 1, produces the best results. That is, only in this test that provides evidence that the construct of customer value was being mapped similarly by managers and customers. In other words, managers and customers perceived the concept of customer value very differently. Model 1 is superior to Model 2; therefore, under certain conditions the less restricted Model 1 is to be preferred. Based on the results, under normal circumstances, further tests of measurement invariance are not necessary and need not to be undertaken. However, further tests were undertaken in this study for

Table 5. Parameter Estimates

Variable	Factor Loadings												Intercepts			
	Manager						Customer						Manager		Customer	
	Reputation for Quality		Value for Money		Prestige		Reputation for Quality		Value for Money		Prestige					
	PE	SE	PE	SE	PE	SE	PE	SE	PE	SE	PE	SE	PE	SE	PE	SE
Repuqua l1	.944	.048					.944	.048					5.805	.074	4.834	.057
Repuqua l2	.968	.043					.968	.043					5.576	.071	4.862	.053
Repuqua l3	1.000						1.000						5.567	.069	4.816	.054
Repuqua l4	1.273	.074					1.048	.056					5.416	.078	4.774	.058
Repuqua l5	.821	.061					.883	.054					5.974	.059	5.278	.055
Repuqua l6	.687	.060					.884	.055					6.307	.054	5.213	.054
Valmon1			.643	.083					.994	.056			5.944	.066	4.909	.056
Valmon 2			.914	.049					.935	.059			5.909	.063	4.725	.055
Valmon 3			1.000						1.000				5.814	.062	4.979	.051
Prestige 1					1.515	.150					.994	.056	5.247	.089	4.717	.060
Prestige 2					1.444	.133					.935	.059	5.026	.096	4.499	.063
Prestige 3					1.000						1.000		5.519	.082	4.564	.063

Note: PE: parameter estimates; SE: standard errors; Repuqual: reputation for quality; Valmon: value for money.

illustrative purposes only (as per Vanderberg and Lance, 2000). Model 3 represents additional constraints on Model 2 (test for strong factorial invariance). This lead to a statistically significant worsening in Model 3 as indicated by $\Delta\chi 2(\Delta df) = 203.155$ (5), $p<0.001$. Failure to support strong factorial invariance means that both the means of the latent variables as well as covariances among the latent variables cannot be evaluated. Thus, further analysis of invariance was not continued.

Parameter Estimates across Manager and Customer

As noted previously, Model 1 was chosen as the best fitting model for both data of managers and customers. Table 5 summaries the parameter estimates across the two distinct samples of managers and customers. Specifically, Table 5 reports factor loadings for sub-construct of customer value which is indicated by the first through sixth column in the table. It also provides the elements in the intercept matrices as listed in the seventh and eighth column in the table.

All factor loadings ranged from 0.643 to 1.273 for managers; and 0.883 to 1.048 for customers. These estimates had small standard errors, ranging from 0.043 to 0.150 for manager; and 0.043 to 0.059. These statistics suggest that all of the factor loadings were fairly large. Furthermore, the elements in the intercepts matrices ranged from 5.026 to 6.307 for managers; and 4.499 to 5.278 for customers. This indicates that the intercepts are significantly different with those for the customers being significantly smaller than those for the managers' samples. The implication is that the managers' perceived value appear to be higher than the customers' received value since given a zero indicator value (regression weight) the latent variables for reputation for quality, value for money, and prestige the estimates are significantly higher for the managers sample.

Conclusion and Implications

This sought to investigate the measurement invariance of the customer value construct. The purpose in doing this analysis is that the constructs were being mapped from two distinct groups. There were six tests conducted for investigation measurement invariance of customer value. The results indicate that the construct of customer value was perceived similarly by the two samples at the configural invariance level only. The results demonstrate that the conceptualisation and operationalisation of customer value developed in this study, does not significantly generalise across managers and customers. The respondents used the same frame of reference in responding the questionnaire. However, the scales were adjusted differently across two distinct samples. Thus, the concept is understood the same way but the actual matrices are different.

Furthermore, the intercepts were significantly different across two distinct samples. This indicates that managers' perceived value appears to be higher compared to customers' perceived value. The results indicate that the construct of customer value was perceived similarly by the two samples at the configural invariance level. Beyond the superficial (configural invariance) managers and customers perceive customer value differently. Thus, despite the impressive psychometric properties of customer value for both samples, the concept is still conceptualised and operationalised differently across the manager and customer samples. The lack of measure equivalence indicates a significant gap in understanding of the concepts of customer value between managers and customers. Lack of measure equivalence could be difficult in interpreting findings across qualitatively distinct samples

of managers and customers.

Based on the findings of this study managers are encouraged to understand their customers as a prerequisite to investing in those capabilities that can deliver superior value to customers. This study suggests that investment in research to understand customer is a good investment. This study further encourages managers to adopt the customers' perspective as a useful guide to resource deployment and potential source of sustainable competitive advantage.

Limitations and Further Research

The use of two languages in the study may have created some problems. The questionnaire was rigorously tested in both languages and through translation and back translation. There still remains the possibility that the interpretation of the questionnaire could be different. The problem is also associated with different levels of familiarity with questionnaires between the relatively well-educated managers and the relatively heterogeneous sample of customers. In addition, given the very significant differences in customer value adopted by managers and customers, there is a need for in-depth qualitative study to establish how the items were interpreted by the different groups. Further research should be conducted to validate the customer value construct in different setting; this may allow developing robustness of the construct.

References

Anderson, J. C., Jain, D. C., and Chintagunta, P. K. (1993), Customer Value Assessment in Business Markets: A State-of-Practice Study, *Journal of Business-to-Business Marketing, 1(1)*: 3-19.

Armstrong, J. S., and Overton, T. S. (1977), Estimating Non-response Bias in Mail Surveys, *Journal of Marketing Research, XIV* (August): 396-402.

Bolton, R. N., and Drew, J. H. (1991), A Multistage Model of Customers' Assessments of Service Quality and Value, *Journal of Consumer Research, 17*: 375-384.

Cheung, G. W., and Rensvold, R. B. (1999), Testing Factorial Invariance across Groups: A Reconceptualization and Proposed New Method, *Journal of Management, 25*(1): 1-27.

Christopher, M. (1996), From Brand Value to Customer Value, *Journal of Marketing Practice: Applied Marketing Science, 2(1)*: 55-66.

Dillman, D. A. (1991), The Design and Administration of Mail Surveys. *Annual Review of Sociology, 17*: 225-249.

Eggert, A., and Ulaga, W. (2002), Customer Perceived Value: A Substitute for Satisfaction in Business Markets, *Journal of Business and Industrial Marketing,* 17(2/3): 107-118.

Flint, D. J., Woodruff, R. B., and Gardial, S. F. (1997), Customer Value Change in Industrial Marketing Relationships, *Industrial Marketing Management, 26*, 163-175.

Gale, B. T. (1994), *Managing Customer Value: Creating Quality and Service That Customers Can See*, New York: The Free Press.

Holbrook, M. B. (1999), *A Framework for Analysis and Research*, London and New York: Morris B. Holbrook.

Huber, F., Herrmann, A., and Morgan, R. E. (2001), Gaining Competitive Advantage through Customer Value Oriented Management. *Journal of Consumer Marketing, 18*(1): 41-53.

Mavondo, F. (1999), Market Orientation: Scale Invariance and Relationship to Generic Strategies across Two Countries, *Journal of Market Focused Management, 4*: 125-142.

Mavondo, F., & Farrell, M. A. (2000), Measuring Market Orientation: Are There Differences Between Business Marketers and Consumer Marketers? *Australian Journal of Management, 25*(2): 223-245.

Mavondo, F., Gabbott, M., & Tsarenko, Y. (2003), Measurement Invariance of Marketing Instruments: An implication across Countries, *Journal of Marketing Management, 19*:523-540.

Meredith, W. (1993), Measurement Invariance, Factor Analysis and Factorial Invariance, *Psychometrika, 58:* 525-543.

Monroe, K. B. (1990), *Pricing: Making Profitable Decision*, New York: McGraw-Hill.

Narver, J. C., & Slater, S. F. (1990), The Effect of a Market Orientation on Business Profitability, *Journal of Marketing, 54*(4): 20-35.

Narver, J. C., Slater, S. F., and MacLachlan, D. L. (2004), Responsive and Proactive Market Orientation and New-Product Success, *Journal of Product Innovation Management, 21*: 334-347.

Patterson, P. G., and Spreng, R. A. (1997), Modelling the Relationship between Perceived Value, Satisfaction and Repurchase Intentions in a Business-to-Business, Services Context: An Empirical Examination, *International Journal of Service Industry Management, 8*(5): 414-434.

Sheth, J. N., Newman, B. I., and Gross, B. L. (1991), *Consumption Values and Market Choice*, Cincinnati: Ohio: South Western Publishing.

Slater, S. F., and Narver, J. C. (2000), Intelligence Generation and Superior Customer Value, *Journal of Academy of Marketing Science, 28*(1): 120-127.

Sweeney, J. C., and Soutar, G. N. (2001), Consumer Perceived Value: The Development of A Multiple Item Scale, *Journal of Retailing, 77*: 203-220.

Ulaga, W., and Chacour, S. (2001), Measuring Customer-Perceived Value in Business Markets, *Industrial Marketing Management, 30*: 525-540.

Vanderberg, R. J. (2002), Toward a Further Understanding of and Improvement in Measurement Invariance Methods and Procedures, *Organizational Research Methods, 5*(2):139-158.

Vanderberg, R. J., and Lance, C. E. (2000), A Review and Synthesis of the Measurement Invariance Literature: Suggestions, Practices, and Recommendations for Organizational Research, *Organizational Research Methods, 3*(1): 4-70.

Walter, A., Ritter, T., and Gumenden, H. G. (2001), Value Creation in Buyer-Seller Relationships. *Industrial Marketing Management, 30*:365-377.

Weinstein, A., and Johnson, W. C. (1999), *Designing and Delivering Superior Customer Value*, Boca Raton: St Lucie Press.

Woodruff, R. (1997), Customer Value: The Next Sources for Competitive Advantage, *Journal of the Academy of Marketing Science, 25(2)*: 17-23.

Woodruff, R. B., and Gardial, S. F. (1996), *Know Your Customer: New Approaches to Understanding Customer Value and Satisfaction*, Cambridge: The USA: Blackwell Publishers.

Zeithaml, V. A. (1988), Consumer Perceptions of Price, Quality, and Value: A Means-End Model and Synthesis of Evidence, *Journal of Marketing, 52*: 2-22.

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