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COMPANY'S PERFORMANCE SELF-ASSESSMENT (COPSA) AMONG FACILITIES OUTSOURCING FIRMS IN MALAYSIA: A FOCUS ON SERVICE DELIVERY

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ABSTRACT. Company performance self-assessment (CoPSA), whose fundamental purpose is to provide a check-and-balance mechanism for practice performance through progress-and-performance self-assessment (PaPSA) is yet to be in place in the facilities management industry. Specially needed by facilities service outsourcing firms (FSOFs), CoPSA benefits the top management from organizational introspection of company's own performance. This paper proposes and tests a CoPSA model using a parametric approach. Managers' perceptions about service delivery performance of their firm are measured using the Likert scale and then deduced into a three-equation two-step recursive model. From a total of 207 randomly chosen Malaysian outsourcing firms, sixty responses were obtained. The results indicate that more than half of the sampled managers have envisioned high performance delivery, with 80% achievement as their goal. However, this has not been adequately supported by a coherent firm's internal structure. In view of the finding, the study concludes that the service delivery strategy of small FSOFs in Malaysia is perceived to be rather passive.

KEYWORDS: Facilities management; Service delivery; Outsourcing; Performance; Recursive model

1. INTRODUCTION

The general challenge for facilities management organizations, among other things, is developing systems and developing people (Alexander 2003). Top in the rank are managers. Recruited to commit to company's vision, mission, and objectives, their opinion and perception can be used to gauge company's facilities service delivery performance. CoPSA is devised to deliver a verdict on how well an organization is doing through an internal monitoring, assessment, and control using internal stakeholders' inputs (conceptualized from NPR 1997; USDC 2011; Lichiello 2000). It is especially important in cases where facilities service outsourcing companies do not engage an external assessment team to do a periodic assessment of their performance.

The fundamental purpose of CoPSA is to provide a check-and-balance mechanism for practice performance through an internal process of diagnosis and improvement of company's management system (adapted from Edly *et al.* 2007). CoPSA's other purposes include promoting a shared understanding of collective mission and role in the overall governance and control structure of a company; civility and collegiality among managers for company improvement; constructive and dependable opinions from internal rather than external people; managers' sense of belonging, self-assessment based self-responsibility and self-improvement, and; a cheaper and more convenient assessment process compared to an external assessment exercise.

CoPSA functions to provide a concrete method for effective and reliable measurement of managers' perceptions which can mirror clients' expectations about a company. This is because the business policy and operations of most service outsourcing companies are normally client-oriented (Chakrabarty *et al.* 2008). Furthermore, CoPSA allows for an industry-wide perspective of companies' introspection as far as client-oriented service-related satisfaction, effectiveness, and efficiency (SEE) are concerned.

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Given the above perspective, two interrelated questions arise. How do managers self-assess their company's service delivery performance? How does a company provide a general scheme of progress and performance self-assessment? These questions are important at least for two reasons. First, corporate image is a function of organizational signals which determine the perceptions of various stakeholders regarding the actions of an organization (Riordan *et al.* 1997). Second, organizations that can translate strategies into a measurement system have a better potential to meet the changing customers' tastes and better business results (Kaplan, Norton 1996; Amaratunga, Baldry 2003). CoPSA is one of such strategies.

Facilities services are an important part of the business service sector. In Malaysia, there are about 270 facilities service related outsourcing firms[1] which operate fragmentally on various aspects of facilities management. None of the companies offers a complete range of facilities services. This poses some difficulty in making a general assessment of company's facilities service performance. Notwithstanding this, there is a need to devise a simple method that can objectively integrate performance elements, make measurements on them, and obtain a general conclusion about service delivery performance of each company through an internal assessment process. The recursive-model-based CoPSA proposed in this study addresses this point. In particular, this paper proposes and tests a psychometric-based recursive model in measuring outsourcing firms' facilities service delivery performance based on their managers' perception about some defined performance metric elements.

2. LITERATURE REVIEW

2.1. Service delivery performance assessment

There is contention against the lack of objective metrics for evaluating outsourcing results (Jiang, Qureshi 2006) which needs further attention. To improve this situation, performance assessment is used as a starting point for internal organizational improvement initiatives, including accountability for the efficient and effective deployment of resources (Glynn, Murphy 1996); to reflect on an organization's position with respect to its social responsibility (Kok *et al.* 2001); to identify gaps between current and desired performance of individual organizations (Radnor, Noke 2002); and to make organizational control (Smith 1993). It requires an adequate understanding on the part of the assessment or about factors that influence company's performance, their measurements, and approach to assessment.

There is a divergence of methodology, utilizing financial and/or non-financial measures, in company's performance assessment process (Schaefer 2002; Suwignjo *et al.* 2000; Takim *et al.* 2003; Moges 2007; Campbell *et al.* 2008; Zuriekat *et al.* 2011). The assessment process uses performance measures which form the intrinsic and/or express benchmarking elements. It can range from as simple as calculating deviations from a stipulated service level (AGSA 2009) to deriving quantitative measures using more complex steps (Campbell *et al.* 2008). This study adopts the second approach due to the complexity of factors that determine company's performance.

CoPSA specifies four main critical elements, namely the target (e.g. input, output, product, process, employee, organization), criteria and indicators (e.g. time, cost, income, profit, return, input-output value, efficiency, effectiveness), variables and measurements (e.g. physical quantity and quality, psychometric factors, engineering and technology factors, socio-cultural factors), and methodological approach (e.g. qualitative, quantitative, mixed approach) (adapted from Kurien, Qureshi 2011). All these must be designed based on a particular conceptual approach.

Various approaches to performance assessment are purely qualitative in nature. Examples include strategic measurement analysis and reporting technique (Cross, Lynch 1988–1989); performance measurement questionnaire (Dixon *et al.* 1990); performance measurement for world class manufacturer (Maskel 1991, 1994); performance measurement design process (Neely *et al.* 1995, 1996, 2000, 2005; Neely 1999); balanced scorecard (Kaplan, Norton 1996; De Toni *et al.* 2007); and integrated performance measurement systems reference model (Bititci *et al.* 1998a, 1998b, 2000). Some studies adopt quantitative model-based approach for objectivity and better measurability such as back propagation neural network and linear discriminant methods (Bertels *et al.* 1999), regression-based balance scorecard factors (Campbell *et al.* 2008), analytical hierarchical network (AHN) (Isik *et al.* 2007), and matrix-based mathematical solution (Berrah, Clivillé 2008).

[1] There is no exact published figure for Malaysia. The figure suggested here was based on discussions with some of the respondents during interview sessions.

These studies are used only to set the basic principles that are indirectly related to the subject matter, i.e. quantitative recursive approach to measuring perception. Although some of them are old, the principles with respect to elements of performance measurement remain. Furthermore, there is no eminent literature related to the subject matter of our study as far as the self-assessment methodology is concerned. Further, our study adopts the conceptual approach to performance assessment proposed by Amaratunga *et al.* (2002), Gilleard and Granath (2007), Tucker and Smith (2007). They use *satisfaction*, *effectiveness*, and *efficiency* as performance metrics with elaboration on a number of their constituting sub-factors. Specifically, from thirty-eight past studies on performance measurements, Douglas (2009) ranked these sub-factors as follows: facilities performance (38/38); value by the facilities (29/38); integration (25/38); activities operation (25/38); flexibility (19/38); sustainability (19/38); commitment by the facilities resources (16/38); participation (9/38); and pattern of strategy (7/38). The issue here is how to interconnect these factors to form a meaningful and practical system of assessment elements. To the best of our knowledge, there have been no prior studies that functionally specify these factors into a recursive system of psychometric models. Although the subjective assessment of performance has to be made based on some qualitative grounds, we attempt to alleviate subjectivity by directing respondents to a somewhat cardinal assessment using the Likert scale and then modifying the scaled responses into somewhat quantitative form using a regression approach.

Synthesizing from Douglas (2009), we suggest a framework of self-assessment as represented in Figure 1. This framework reflects the most critical factors influencing satisfaction, effectiveness, and efficiency with regard to facilities service delivery performance. We propose that perceived satisfaction at workplace is a function of flexibility (*Flex*), integration (*Integ*), and sustainability (*Sustn*); effectiveness of a strategy is a function of pattern of strategy, participation, and facilities' performance (*Perfom*); while efficiency of a strategy is a function of activities operation (*Activ*), commitment by the facilities resources (*Comit*), value by the facilities (*Value*). The operational definition of each of these factors is summarised in Table 1. Also summarised, albeit generally, in Table 1 are the perception measurement items that represent each of these factors[2].

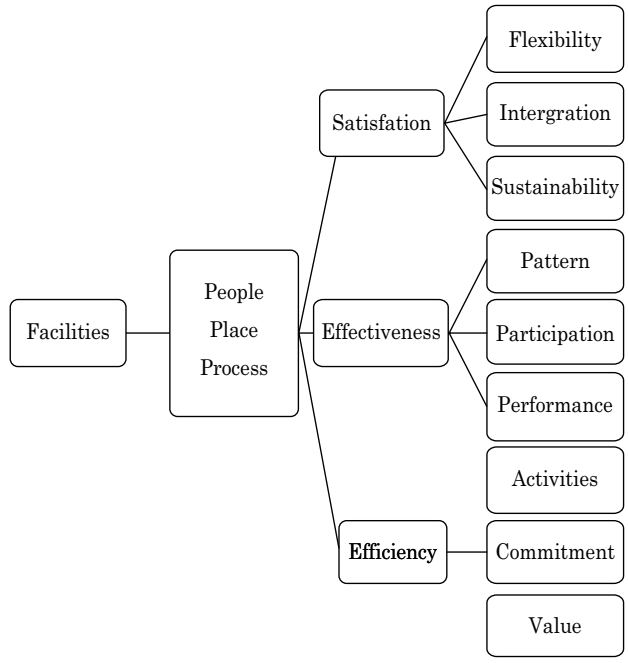

Fig. 1. Performance assessment factors

2.2. Modelling managers' perception

Apart from those mentioned under section 2.0, perception or opinion of managers can be modelled in various ways to include non-parametric analysis (Geladel, Young 2005; Shrivastava, Purang 2009) or parametric analysis such as ordinary least squares, logit and probit regressions (Vithessonthi 2005); factor analysis (Lewis *et al.* 2007); hierarchical linear model (Maxham *et al.* 2008), or neural network (Wong *et al.* 2011). The choice of model is primarily determined on the basis of theoretical justifications of the issue under study.

In our case, the conceptual model shown in Figure 1 intuitively indicates a rather sequential relationship between the three key factors of performance measurements and their corresponding componential factors, with place, people, and process as facilities management core value elements[3]. This means, performance measurement needs to incorporate assessment of factors related to mental world (people), physical world (place), virtual world (process). We hypothesize that the three elemental factors are endogenous variables while their componential factors are exogenous variables. This postulated relationship is important for two reasons. Firstly, perceived satisfaction, effectiveness, and efficiency are the main

[2] The detailed itemized elements are designed in the questionnaire but are not reported here. They can be obtained on request to the authors.

[3] The facilities management core value elements – people, place, and process – was first coined by Professor David Amstrong, a founding member of Facility Management Institute in 1982 (see Thomson 1990; Wiggins 2010).

Table 1. The variables used in the evaluation of sampled firms

Functional relationship	Definition	Perceptional measurement items
Endogenous variables		
Satisfaction at workplace (*Satis*)	The extent of employee's contentment about the flexibility, integration, and sustainability of a particular strategy at the workplace.	How contented are employees about the three elements with respect to a service delivery strategy.
Effectiveness of the strategy (*Effec*)	Levels of employees' confidence in the achievement of specific practices to ensure delivery of the desired services.	Perceived quality of company's goal being realized.
Efficiency of the strategy (*Efficn*)	Deployment of scheduled and accountable activity process	Perceived return on investment of facilities.
Exogenous variables		
Flexibility (*Flex*)	Coherence and responsiveness in the deployment of facilities. Whether the facilities deployment is passive or proactive to issues.	How flexible is the current company's strategy to place, people, and process?
Integration (*Integ*)	Strategy alignment of goals, which measures company's approach in harmonizing its goals and objectives.	How clear are the specific and major goals to employees?
Sustainability (*Sustn*)	Strategy that meets short-term expectations without compromising those of the future.	How far is the strategy already in place to meet facilities development and training?
Pattern of strategy (*Patrn*)	Strategy approach adopted to realize business results.	Has the strategy been impactful vis-a-vis the goal?
Participation (*Parti*)	Mode and form of firm's conduct on service delivery.	Has facilities' or unit's conduct on a specific delivery been satisfactory?
Performance of facilities strategy (*Perfom*)	How good does the strategy that is already in place ensure achievement of facilities' goal and vision?	Has the strategy of quality facilities service delivery been up to the expectation?
Activities operation (*Activ*)	Requirements of a particular strategy to ensure a specific project success.	How result-oriented is a unit with respects to its goal?
Commitment by facilities resources (*Comit*)	Strategy that is already in place to ensure passion and devotion to deployment of facilities service.	How active or proactive is the facilities service deployment strategy?
Value by the facilities (*Value*)	Strategy that is already in place to focus teams on delivering more results.	Has the level of service delivery and company's goal been balanced?

Source: Constructed from the above-cited literature.

intended outcomes of any facilities outsourcing firms. Secondly, all the nine determining factors of facilities service delivery performance are controllable factors that should be strategically planned within a particular company.

According to the model, perceived satisfaction at the workplace is theoretically influenced by manager's perception on flexibility, integration, and sustainability of a company's working environment. Perceived effectiveness in achieving company mission is theoretically influenced by manager's perception about the pattern of company strategy, workers' participation, and facilities performance. Lastly, perceived company efficiency is influenced by manager's perception about activities operation, commitment by the facilities resources, and value by the facilities. Using the Likert scale, managers' assessment of each factor can be arbitrarily scaled to reflect the intensity of their perception on each of the performance factors. The detailed measurement schema of managers' perceptional responses on company's performance is shown in Table 2.

Based on the conceptual structure of the variable relationship, a recursive model is proposed as a technique to modulate facilities performance measurement in this study. It is a causal model whereby each equation exhibits unilateral causal dependence (Gujarati 1995). In fact, the recursive models have been used in a number of facilities-service related studies. It is a useful approach to improving specific project's goal (Vogelvang 2005). It was used in outpatient health care study (Kropp, Carlson 1977). Doll *et al.* (1983) applied a recursive approach to evaluate farm values using five-equation models. Collier (1991) employed basic statistical analyses and a recursive path analysis

Table 2. The Likert scale perceptional measurements used in the study

	1	2	3	4	5
Exogenous variables					
Flexibility	Not flexible	Quite flexible	Moderately flexible	Sufficiently flexible	Very flexible
Integration	Very unclear	Quite unclear	Moderately clear	Sufficiently clear	Very clear
Sustainability	Very much not in place	Quite not in place	Moderately in place	Sufficiently in place	Very much in place
Pattern of strategy	Not impactful at all	Not quite impactful	Moderately impactful	Sufficiently impactful	Very impactful
Participation	Unsatisfactory at all	Quite unsatisfactory	Moderately satisfactory	Satisfactory	Very satisfactory
Performance of facilities strategy	Not up to expectation at all	Not quite up to expectation	Moderately up to expectation	Sufficiently up to expectation	Absolutely up to expectation
Activities operation	Not result-oriented at all	Not quite result-oriented	Moderately result-oriented	Sufficiently result-oriented	Absolutely result-oriented
Commitment by facilities resources	Totally inactive	Quite inactive	Moderately active or proactive	Sufficiently active or proactive	Absolutely active or proactive
Value by the facilities	Totally imbalanced	Quite imbalanced	Moderately balanced	Sufficiently balanced	Absolutely balanced
Endogenous variables					
Satisfaction at workplace	Very unsatisfied	Quite unsatisfied	Moderately satisfied	Satisfied	Very satisfied
Effectiveness of the strategy	Very ineffective	Quite ineffective	Moderately effective	Effective	Very effective
Efficiency of the strategy	Very inefficient	Quite inefficient	Moderately efficient	Efficient	Very efficient

model relating customers' assessment (perception) of service quality and performance criteria for a credit card processing centre. Due to the recursive nature of the conceptual structure of variables relationship, Oliver (1994), used the two-stage least square method in estimating consumer satisfaction versus affect, arousal, quality, disconfirmation, and service performance. Li and Collier (2000) applied a simple recursive model to test the effects of clinical technology, information technology, clinical quality, and process quality on hospital financial performance. Hamid (2001) applied a two-step recursive model in assessing the values of New Zealand's farm properties. Hansen and Sargent (2005) also applied a recursive approach using a three-equation model for recursive risk analysis, whereby the model recursively defined the sequence of expectations as a social planning tool. One study applied Markov chains approach to linear "recursive projects" where some activities are revisited after a period of time (Minh, Bhaskar 2006; Haoming, Zhang 2007). They used recursive model as an absorbing chain that enabled the calculation of expected value and effects in the respective "influence factors". This can be used to improve project prediction and control which gives facilities manager a better insight into management and the successful deliverance of a project's goal. Campbell *et al.* (2008) applied a three-equation recursive-like regression model for evaluating the performance of convenience store chain whereby they identified how multiple measures in a balanced scorecard might systematically be used to test how well different drivers of performance have been working to achieve strategic objectives and superior financial performance.

This study employs a three-equation recursive model comprising three elemental performance metrics as the dependent variables and nine perceived influencing factors as the predictor variables. This model is specified in order to harmonise the performance metrics with their perceived influencing factors as an equation system. Furthermore, the multi-dimensional characteristic of a recursive relationship enables forward and backward traceability of the constituting factors (see Guclu, Bilgen 2010). For comparison of results, the traditional regression model is also specified.

Measured based on the Likert scale of 1–5, the variables used are defined as follows:

Satis	= Y_0 = Expressed satisfaction workplace (absolute level)
Effec	= Y_1 = Perceived effectiveness of strategy (absolute level)
Efficn	= Y_2 = Perceived efficiency of strategy (absolute level)
$\hat{Y}_0$	= Expressed satisfaction at workplace (predicted level)
$\hat{Y}_1$	= Perceived effectiveness of strategy (predicted level)
$\hat{Y}_2$	= Perceived efficiency of strategy (predicted level)
P_0	= Practice performance (reduced model)
P_1	= Practice performance (transformed model)
P_2	= Practice performance (base model)
Flex	= Flexibility
Integ	= Integration
Sustn	= Sustainability
Patrn	= Pattern of strategy
Parti	= Participation
Perfom	= Facilities performance
Activ	= Activities operation
Comit	= Commitment by the facilities resources
Value	= Value by the facilities

a, b, c, *b, p, t,* and *g* are regression parameters,

e, u, and ε are error terms.

Model 1. Let's specify the model as follows:

$$Y_0 = a_0 + a_1 Flex + a_2 Integ + a_3 Sustn + u_1, \quad (1–1)$$

$$Y_1 = b_0 + b_1 Patrn + b_2 Parti + b_3 Perfom + u_2, \quad (1–2)$$

$$Y_2 = c_0 + c_1 Activ + c_2 Comit + c_3 Value + u_3, \quad (1–3)$$

where: Y_0, Y_1, and Y_2 (expressed satisfaction at workplace, perceived effectiveness of strategy, and perceived efficiency of strategy, respectively) are endogenous variables which are related to performance determinants in some functional form and can be estimated by the ordinary least squares method. Using sample data on these determinants, separate regressions are run on Y_0, Y_1, and Y_2 to derive their estimated values $\hat{Y}_0$, $\hat{Y}_1$, and $\hat{Y}_2$, respectively. These values are then regressed again using the sample data to derive the composite value of another endogenous variable, practice performance, P_0 based on the following reduced model:

$$P_0 = \tau_0 + \tau_1 \hat{Y}_0 + \tau_2 \hat{Y}_1 + \tau_3 \hat{Y}_2 + \varepsilon. \quad (1–4)$$

Model 2. Let's specify the basic models as follows:

$$Y_0 = a_0 + a_1 Flex + a_2 Integ + a_3 Sustn + e_1, \quad (2–1)$$

$$Y_1 = b_0 + \beta_0 \hat{Y}_0 + b_1 Patrn + b_2 Parti + b_3 Perfom + e_2, \quad (2–2)$$

$$Y_2 = c_0 + \beta_0 \hat{Y}_0 + \beta_1 \hat{Y}_1 + c_1 Activ + c_2 Comit + c_3 Value + e_3, \quad (2–3)$$

Expanding (2–2) and ignoring the error term in equation (2–1) will give the following model:

$$Y_1 = b_0 + \beta_0\{a_0 + a_1 Flex + a_2 Integ + a_3 Sustn\} + b_1 Patrn + b_2 Parti + b_3 Perfom + e_2, \quad (2–4)$$

Expanding equation (2–3), by ignoring the error terms in equations (2–1) and (2–2), and re-arranging it will give the following model:

$$Y_2 = c_0 + \beta_0 a_0(1+ \beta_1) + \beta_1 b_0 + (1 + \beta_1)\{\beta_0 a_1 Flex + \beta_0 a_2 Integ + \beta_0 a_3 Sustn\} + \beta_1(b_1 Patrn + b_2 Parti + b_3 Perfom) + c_1 Activ + c_2 Comit + c_3 Value + e_3. \quad (2–5)$$

Since equations (2–4) and (2–5) are under-identified and, thus, have no possible simultaneous solutions, there is no way of finding the optimal solutions for the parameter estimates except by some recursive steps (Curran, Meuter 2005). Therefore, to derive the performance assessment regression model, equation (2–5) need to be estimated indirectly. To do this, the coefficients a_0, a_1, a_2, a_3, b_0, b_1, b_2, b_3, c_0, c_1, c_2, and c_3 are estimated from equations (1–1), (1–2), and (2–3). The coefficients β_0 and β_1 are then estimated from regressing equations (2–1), (2–2), and (2–3). In equations (2–2) and (2–3), instead of the actual values Y_0 and Y_1, their estimates $\hat{Y}_0$ and $\hat{Y}_1$ are used in the regression. Specifically, to obtain the estimates of β_0 and β_1, equations (2–1), (2–2), and (2–3) are estimated recursively, using $\hat{Y}_0$ and $\hat{Y}_1$ as instrumental variables. First, equation (2–1) is regressed and its estimated values $\hat{Y}_0$ are inputted to equation (2–2). Second, equation (2–2) is regressed and its estimated values $\hat{Y}_1$ are inputted to equation (2–3). Third, regression is executed on equation (2–3). Finally, the second composite value P_1 (practice performance) is calculated as follows:

$$P_1 = \pi_0 + \pi_1 Flex + \pi_2 Integ + \pi_3 Sustn + \pi_4 Patrn + \pi_5 Parti + \pi_6 Perfom + \pi_7 Activ + \pi_8 Comit + \pi_9 Value + e_3, \quad (2–6)$$

where: $\pi_0 = c_0 + \beta_0 a_0(1+ \beta_1) + \beta_1 b_0$; $\pi_1 = \beta_0 a_1(1 + \beta_1)$;$\pi_2 = \beta_0 a_2(1 + \beta_1)$; $\pi_3 = \beta_0 a_3(1 + \beta_1)$; $\pi_4 = \beta_1 b_1$; $\pi_5 = \beta_1 b_2$; $\pi_6 = \beta_1 b_3$; $\pi_7 = c_1$; $\pi_8 = c_2$;$\pi_9 = c_3$.

The main purpose of these recursive steps is to enable componential assessment of performance metrics as theoretically postulated earlier while at the same time be able to predict the overall practice performance using all the performance determinants in a single predictive equation.

Model 3. Let specify the model as a traditional regression model as follows:

$$P_2 = \gamma_0 + \gamma_1 Flex + \gamma_2 Integ + \gamma_3 Sustn + \gamma_4 Patrn + \gamma_5 Parti + \gamma_6 Perfom + \gamma_7 Activ + \gamma_8 Comit + \gamma_9 Value + e_3. \quad (3)$$

In this model, the overall practice performance, P_2 is directly regressed against its determinants using the ordinary least squares technique to estimate the regression parameters γ's. Equation (3) is used as a check method to equation (2–6) in predicting the final value of practice performance. Theoretically, both models should have similar predictive capability. However, equation (2–6) is superior to equation (3) for its ability to explain practice performance based on the critical components (metrics) of facilities outsourcing practice. This explanatory capability is not possessed by equation (3).

3. METHODOLOGY

Based on Figure 1 and Table 1, firm's performance measures are devised using the Likert scaling method with managers' perception responses scaled from 1-5. In view of the divergent outsourcing service deliveries, the questionnaire has over forty assessment questions that define the nine factors previously discussed[4]. As many as 207 questionnaire sets were sent randomly to small FSOFs[5] out of 270 facilities service related outsourcing firms in Malaysia but only sixty-six questionnaire sets were returned. Out of this figure, fifty-four sets were used for regression with six sets used for testing purposes[6]. The questionnaire-returning respondents represent about 32% of the sampled firms.

The respondents hold a position from the top management (CEO and senior manager) to the middle-level management (assistant manager and senior executive). The top management made up 30% while the middle-level management made up 70% of the sample. About 85% of the respondents were males. The mean age of the respondents was 32 years old. About 23% of the companies have a workforce of between 12–20 people, 14% having 8–12 employees, while 63% having less than 8 employees. About 68% of the respondents have been in the industry for less than 10 years, 20% have 10–15 years of experience while the rest have more than 15 years of experience. About 70% of the companies have been in the facilities-related business for over 15 years, 15% between 5–10 years while the rest less than 5 years. The companies have a business related to maintenance – 25%, property management – 35%; construction – 15%, facilities equipment – 15%; and miscellaneous – 10%.

The data obtained were analyzed and summarised in Table 5. The analysis was presented in two stages. First, regressions were run to obtain first-level endogenous estimating equations Y_0, Y_1, Y_3, Y_0', Y_1', and Y_3'. Second, regressions were also run to derive second-level endogenous variables T_0, T_1, and T_2.

4. RESULTS AND DISCUSSION

4.1. Basic statistics

The basic summary statistics of all performance factors are shown in Table 3.

Table 3. Basic summary statistics of all performance factors

Variables	Summary statistics				
	Valid N	Mean	Std. Deviation	Minimum	Maximum
Flex	54	3.7546	0.4671	2.75	5.00
Integ	54	3.7037	0.5910	2.25	5.00
Sustn	54	3.7803	0.6619	1.25	5.00
Patrn	54	3.7546	0.5309	2.75	5.00
Parti	54	3.7593	0.5827	2.00	4.75
Perfom	54	3.8333	0.5537	2.00	5.00
Activ	54	3.4676	0.6624	2.00	4.50
Comit	54	3.1528	0.6841	1.00	4.50
Value	54	3.6274	0.5279	2.33	4.67
Satis	54	3.0139	0.7746	0.75	4.25
Effec	54	2.3122	1.0098	0.00	3.75
Efficn	54	2.9306	0.6540	0.75	3.50
Y_0	54	3.0120	0.2666	2.31	3.56
Y_1	54	2.3116	0.2536	1.62	2.86
Y_2	54	2.9297	0.3724	1.83	3.57
P_0	54	2.7586	0.2117	2.25	3.22
P_1	54	2.7593	0.6424	1.00	3.56
P_2	54	2.9074	0.2926	2.00	3.00

The mean value of evaluative elements (column 3) shows that *Perfom* has the highest value as 3.8333 with arrange of 2 to 5 and the smallest value is *Com* at a value of 3.1528 with a range of 1 to 4.5. Looking at three main componential performance metrics, *Satis* has the largest mean value of 3.0139 with a range of 0.75 to 4.25 while *Effec* has the least mean value of 2.3122 with a range of 0 to 3.75. With a mean value score of 2.9306 and a range of values of 0.645 to 0.75, *Efficn* was quite close to *Satis*. Overall, managers have rated their respective companies just at an "ordinary" level of practice performance.

[4] The detailed questionnaire is held for purpose of brevity. It can be obtained from the authors on request.

[5] We selected small companies because they have a larger size of population compared to that of multi-national companies.

[6] Six pilot-test questionnaire sets were excluded from the regression analysis because they lacked some of the detailed information required.

Table 4. Spearman's partial correlation among perceived performance factors

	T0	Y0	Y1	Y2	Ŷ0	Ŷ1	Ŷ2	*Flex*	*Integ*	*Sustn*	*Patrn*	*Parti*	*Perfom*	*Activ*	*Comit*
Y0	**0.76**														
Y1	**0.77**	**0.78**													
Y2	0.55	0.35	0.21												
Ŷ0	0.31	0.31	0.30	0.26											
Ŷ1	0.30	0.26	0.24	0.41	**0.74**										
Ŷ2	0.52	0.35	0.35	0.57	0.51	**0.67**									
Flex	0.19	0.19	0.18	0.21	0.36	**0.68**	0.50								
Integ	0.28	0.31	0.30	0.16	**0.90**	0.55	0.39	0.43							
Sustn	0.24	0.27	0.17	0.32	0.21	0.53	0.38	**0.66**	0.17						
Patrn	0.28	0.23	0.22	0.35	**0.72**	**0.94**	**0.66**	**0.70**	0.49	0.55					
Parti	0.26	0.24	0.21	0.42	0.63	**0.88**	0.56	0.50	0.52	0.38	**0.68**				
Perfom	0.18	0.21	0.11	0.18	0.36	0.46	0.13	0.39	0.35	0.40	0.40	0.42			
Activ	0.08	0.07	0.02	0.06	0.25	0.41	0.10	0.30	0.20	0.21	0.36	0.39	0.29		
Comit	0.54	0.33	0.35	0.57	0.47	0.64	**0.99**	0.49	0.36	0.38	0.63	0.54	0.11	0.18	
Value	0.02	0.13	0.08	0.14	0.55	0.61	0.24	0.38	0.44	0.23	0.58	0.52	0.39	0.23	0.13

Partial correlations among endogenous and exogenous performance factors are shown in Table 4. A few performance factors quite strongly co-existed (correlation > 0.65) in facilities service outsourcing companies, particularly *Parti* and *Patrn*, *Flex* and *Sustn* and *Flex* and *Patrn*. *Integ* and predicted *Satis* ($\hat{Y}_0$),*Patrn*, *Parti* and predicted *Effec* ($\hat{Y}_1$), and *Comit* and predicted *Efficn* ($\hat{Y}_2$) were highly correlated. Thus, based on *a priori* theory, *Integ*, *Parti*, *Patrn*, and *Comit* can be considered important factors influencing service delivery performance of facilities outsourcing firms.

Among the endogenous variables, strong positive correlations occurred among the predicted expressed satisfaction at workplace ($\hat{Y}_0$) and predicted perceived effectiveness of strategy ($\hat{Y}_1$); predicted perceived effectiveness of strategy ($\hat{Y}_1$) and predicted perceived efficiency of strategy ($\hat{Y}_2$). Predicted expressed satisfaction at workplace ($\hat{Y}_1$) and predicted perceived efficiency of strategy ($\hat{Y}_2$) were moderately correlated. These outcomes indicate that the three endogenous factors of service delivery excellence can be predicted to have co-existed as positive expectations among managers of facilities outsourcing firms.

Commitment by facilities resources was highly correlated with perceived efficiency of strategy. Based on *a piori* theoretical ground, the degree of activeness or proactiveness of strategy in deploying facilities has an expected positive influence on the perceived efficiency of the strategy itself. Said another way, the strategy for facilities deployment would have been expected to be efficient if the deployment strategy is itself active or proactive in nature.

Managers' assessment on the pattern of service delivery strategy was also highly correlated with perceived effectiveness of strategy (Y_1). Again, based on *a piori* theoretical ground, managers' assessment on strategy approach adopted to realize business results would have been perceived to be impactful on firm's goal. This means, if firm's goal is to be perceivably satisfactorily achieved, firm's strategy approach must have favourable manager's assessment too.

4.2. Regression results

Since the models pick up the perceived influence of each performance factor on the performance of practice in facilities service delivery, each regression parameter is interpreted as the hedonic expectation of an evaluated performance factor on the predicted level of service delivery performance. It measures how a manager's assessment of a performance factor of his firm is going to yield expected service delivery performance and, thus, can be used to evaluate the level of firm service delivery performance. The higher the performance score (T_0, T_1, or T_2) the better will be the firm's expected service delivery performance.

Based on the reduced-form model, expressed satisfaction at workplace and perceived efficiency of strategy were significantly evaluated to have yielded positive expected service delivery performance, T_0. Satisfaction at workplace is a manifestation of the healthiness of a firm while considering strategy alignment of goals (integration) and strategy sustainability. This means, managers believed and expected that harmonization of firm's goals and objectives will bring positive influence on facilities service delivery performance (see Tables 5 and 6).

Table 5. First-level regression results

	Endogenous variables		
	Satis	*Effec*	*Efficn*
Intercept	0.9224 (1.0294)	0.5675 (0.4284)	1.1246 (1.7709)*
Flexibility (*Flex*)	–0.2893 (–0.9125)	–	–
Integration (*Integ*)	0.4610 (2.2714)**	–	–
Sustainability (*Sustn*)	0.3907 (1.9081)*	–	–
Pattern of strategy (*Patrn*)	–	0.31907 (0.7998)	–
Participation (*Parti*)	–	0.204622 (0.5371)	–
Facilities performance (*Perfom*)	–	0.013565 (0.0436)	–
Activities operation (*Activ*)	–	–	–0.0635 (–0.5414)
Commitment by the facilities resources (*Comit*)	–	–	0.536176 (4.8054)**
Value by the facilities (*Value*)	–	–	0.0931 (0.6371)

Table 6. Second-level regression results

	Endogenous variables		
	Service delivery performance parameters		
	P_0 (Reduced model)	P_1 (Transformed model)	P_2 (Base model)
R^2 Adj. R^2 F-value Sample size	0.70 0.65 124.5 54	0.88 0.84 256.6 54	0.85 0.82 256.6 54
Intercept	–0.2134 (–0.2579)	0.754291 (1.0294)	1.0304 (1.3122)
Expressed satisfaction at workplace (Y_1)	0.5113 (1.7045)*	–	–
Perceived effectiveness of strategy (Y_2)	–0.6004 (–1.3848)	–	–
Perceived efficiency of strategy (Y_3)	1.0194 (3.7325)**	–	–
Flexibility (*Flex*)	–	– 0.0368 (–0.9125)	–0.3097 (–1.1440)
Integration (*Integ*)	–	– 0.0586 (–2.2714)**	0.2244 (1.2490)
Sustainability (*Sustn*)	–	– 0.0497 (–1.9081)*	0.1665 (0.9839)
Pattern of strategy (*Patrn*)	–	0.0047 (0.7998)	–0.1537 (–0.5164)
Participation (*Parti*)	–	0.0272 (0.5371)	–0.1259 (–0.5809)
Facilities performance (*Perfom*)	–	– 0.0047 (–0.0436)	0.1919 (1.1137)
Activities operation (*Activ*)	–	– 0.1172 (–0.5414)	0.0066 (0.0501)
Commitment by the facilities resources (*Comit*)	–	0.6874 (4.8054)**	0.5984 (3.4837)**
Value by the facilities (*Value*)	–	0.0914 (0.6371)	–0.0441 (–0.2079)

Note: Significant at 5% level (**) and 10% level (*).

The regression results in Table 6 indicate that 85–88% of performance practice (P_2 and P_3) was explained by the metrics "efficiency, effectiveness and satisfaction" and their sub-factors. The model shows status, degree and effect of the outsourcing strategy which provides a basis for performance evaluation of company's services delivery. The results of the recursive analysis carried out has shown that "efficiency metric" was significant at 95% confidence level, while "satisfaction metric" was significant at 90% confidence level. However, the analysis has shown that "effectiveness" metric was not significant. A search through the data has confirmed this situation which was related to the strategy ineffectiveness in the facilities service outsourcing firms.

From the analysis of the influencing factors of performance metric, "commitment" has shown significance at 99% confidence level, while "sustainability" was significant at 90% confidence level, whereas "integration and participation" were significant at 80% confidence level. In addition, "flexibility, pattern, performance, activities and value", were accepted by the null hypothesis. This means that the factors did not or did least influence the performance of the companies sampled. However, these factors are required for performance outsourcing deliveries. This also indicates companies' strategy gap identified in this study.

4.3. Testing the self-assessment tool

To do the performance assessment, we first transfer the regression coefficients from the first-level and second-level regressions in Tables 5 and 6 and organize them into Table 7. The values of $\hat{Y}_0$, $\hat{Y}_1$, and $\hat{Y}_2$ for the six out-sample companies in Table 7 were estimated using the first-level regressions in Table 5 while the values for X_{11}, X_{12}, X_{13},…,X_{33} in Table 7 were computed from a prior interview with

Table 7. Summary of company's performance score matrix and "performance verdict"

Performance factors	Endogenous variables			Out-sample companies					
	P_0	P_1	P_2	Firm	Firm	Firm	Firm	Firm	Firm
	(Reduced model)	(Transformed model)	(Base model)	A	B	C	D	E	F
Intercept	–0.2134	0.754291	1.0304						
Expressed satisfaction at workplace, Y_0	0.5113	–	–						
Perceived effectiveness of strategy, Y_2	–0.6004	–	–						
Perceived efficiency of strategy, Y_3	1.0194	–	–						
Predicted Y_0 ($\hat{Y}_0$)	–	–	–	2.5	2.9	2.4	2.3	2.7	2.4
Predicted Y_1 ($\hat{Y}_1$)	–	–	–	2.7	2.3	2.1	2.5	2.5	2.3
Predicted Y_2 ($\hat{Y}_2$)	–	–	–	2.9	2.6	3.2	2.9	3.2	2.8
Flexibility (*Flex*)	–	–0.0368	–0.3097	3.2	3.6	3.7	3.6	3.9	3.7
Integration (*Integ*)	–	–0.0586	0.2244	2.4	3.6	2.5	2.5	3.4	2.8
Sustainability (*Sustn*)	–	–0.0497	0.1665	3.5	3.6	3.5	3.3	3.5	3.3
Pattern of strategy (*Patrn*)	–	0.0047	–0.1537	4.1	2.6	2.9	3.3	4.2	2.9
Participation (*Parti*)	–	0.0272	–0.1259	3.7	4.2	2.8	4.2	2.7	3.8
Facilities performance (*Perfom*)	–	–0.0047	0.1919	4.1	2.9	2.8	2.5	3.5	3.2
Activities operation (*Activ*)	–	–0.1172	0.0066	2.5	2.5	3.6	2.4	2.8	2.9
Commitment of facilities resources (*Comit)*	–	0.6874	0.5984	3.1	2.4	3.9	3.1	3.6	2.9
Value by the facilities(*Value*)	–	0.0914	-0.0441	2.6	3.7	2.7	2.9	3.4	3.2
Assessment results:†									
Reduced model (P_0)				2.4	2.6	3.0	2.4	2.9	2.5
Transformed model (P_1)				2.5	2.0	2.9	2.5	2.8	2.3
Base model (P_2)				2.6	2.2	3.0	2.2	2.9	2.5
Test for mean's difference:ζ									
P_0 vs. P_1 = 1.26									
P_0 vs. P_2 = 0.79									
P_1 vs. P_2 = –0.88									
Overall assessment ('performance verdict')				Low	Low	Moderate	Low	Moderate	Low

Note: † As a general guide, the assessment score can be low (0.0 – 2.5), moderate (2.6 – 3.1), good (3.2 – 3.7), very good (3.8 – 4.3), and excellent (4.4 – 5.0).ζ The critical t-value (at $\alpha = 0.05$) = 2.57.

the respondents from the "test" companies, i.e. six out-sample companies. By plugging-in the values of the endogenous variables ($\hat{Y}_0$, $\hat{Y}_1$, and $\hat{Y}_2$) and the exogenous (X_{11}, X_{12}, X_{13},...,X_{33},) into the second-level regression models P_0,P_1, and the P_2, the CoPSA results were then computed as shown at the lower part of Table 7. The results are straightforward. The predicted responses – expressed in the form of Likert scaling – are quite reasonable.

Table 7 shows that although the recursive models have produced slightly different estimates of CoPSA results, the differences were sufficiently small. The t-test for difference of paired sample means shows that the differences in the CoPSA results among the models were not statistically significant. Specifically, the t-values for pair-wise model comparison, namely P_0 vs. P_1, P_0 vs P_2, and P_1 vs. P_2 were 1.26, 0.79, and –0.88 respectively, against the critical t-value of 2.57. This means, these alternative models can be used for assessment purposes.

Notwithstanding this, for explanatory purposes, the models with the dependent variables P_1 and P_2 should be preferred to that with dependent variable P_0. This is because the first two models are full models with all explanatory variables included in the specification and, thus, are capable of more detailed explanation of company's service delivery performance.

Overall, the out-sample facilities service firms were found to have low to moderate performance in facilities service delivery as perceived by their own managers.

5. CONCLUSIONS AND IMPLICATIONS

This study has suggested that Malaysian small FSOFs are yet to be perceived as efficient organizations by their managers. The activity operations (workflow) by most firms have not been in such a state to guarantee achievement of sustainable quality services. The result, which was in contrast with the theory, has shown that expectations of optimal services delivery were rather unfulfilled. The results indicated that the strategy gap in Malaysian small FSOFs (based on the sample) has caused the incapacity to ensure performance of outsourcing service delivery. In view of the finding, this study concluded that service delivery strategy of small FSOFs in Malaysia was perceived to be rather passive. However, as facilities management in Malaysia is still growing, there is considerable room for further improvement in facilities service delivery.

This study makes contribution to knowledge in the context of facilities service outsourcing performance assessment method. The recursive model in translating qualitative elements of assessment (i.e. perceptions and opinions) into a quantitative prediction of company's performance is new to this field. To the best of our knowledge, no previous studies have applied this method for small FSOFs' performance assessment. In particular, no other studies in facilities service outsourcing have applied a recursive approach to PaPSA.

This study also makes contribution to facilities outsourcing practices. First, providing an objective method for measuring managers' perceptions and opinions is vital in order to partly mirror customers' expectations about a company. This is because, at one end, managers' perception can provide an organization with the opportunity to constructively evaluate what aspects of the business strategy work well, and what aspects do not work well, for ensuring a continuous improvement (Fleming 2004; Tucker, Smith 2007). The outcomes of the improvement are what being delivered to the clients at the other end. Thus, if CoPSA is properly implemented, one can expect that both groups of company's stakeholders will have a matching assessment of the company's performance.

Second, the method proposed in this study was based on the conceptual considerations of how assessment mechanism works, focusing on managers' perception about a company's service performance. Nevertheless, the method can also be extended to company's clients for the same purpose, creating a back-to-back assessment procedure for a continuous service improvement. Further, the methodology described in this study is useful in developing a model of perception based view of managers to better understand managers' perception of facilities service outsourcing environments in which practitioners seek to develop self-assessment performance measurement. Simple, inexpensive diagnostic tools tailored towards specific work settings can be developed using the approach described in this study. In particular, the recursive model can be specified to measure managers' perception of a broad range of work environment in small FSOFs and to predict company's performance. While the performance measurement factors used in this study may not be generalizable, the methodology proposed can be used to develop a unique PaPSA system and modelling approach for the self-assessment of any type of service-based company.

Third, CoPSA is a key process to organizational introspection with respect to client-oriented

service-related SEE which translate performance assessment factors into "performance verdict" for a particular company. It benefits the top management from organisational introspection of how good a company performs based on the perceptions and opinions of its own manager. It is a new approach to organizational improvement. It is an internal performance assessment mechanism that encourages positive culture of self-correction within an organization.

There could have been possible bias in the interview outcomes due to the nature of questionnaire design and sample selection. Nevertheless, we have adopted a controlled-interview approach whereby we selected the manager as the most qualified and rationale member of the organization who knows very well about the roles and functions of organization, carefully designed the questionnaire and interview technique to exactly draw manager's attention on the current organization where he/she worked, and preluded each interview session by an explanation of information elicitation procedure to the respondent. A previous study has shown that, with such an approach, congruence in the interviews outcomes can still be maintained using self-assessment techniques compared to assessment by other people (Baruch 1996).

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