The role of physical and financial, social, human and natural capitals in explaining work performance of employees in Malaysian public sector

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In this paper, we investigated the influence of four basic types of capital: physical and financial, social, human, and natural on work performance of the employees in public sector at federal ministry level in Malaysia. A structured research instrument was utilized to survey a sample of 1253 employees from 19 federal ministries in Malaysia. Pearson correlation was employed to analyze the relationships between the independent variables and dependent variable. Enter method regression was employed to determine to what extent these capital factors explain the variation of work performance among employees. Analysis shows that there are positive linear relationships between the four capitals and work performance. Only three of the four capitals considered in the regression model namely human, social, and physical and financial capitals were significant in explaining the variation of work performance. Natural capital did not show significant contribution. Human capital made the highest contribution in explaining variation of work performance, followed by the three nonhuman capitals: social, and physical and financial capitals. Natural capital made an insignificant contribution.

Key words: Physical and financial capital, social capital, human capital, natural capital, work performance.

INTRODUCTION

Employees’ work performance is the most relevant and appropriate tool in determining the quality and quantity of outputs in public sector organizations. The productivity of an organization highly depends on the performance of its employees. It has been frequently emphasized that the success of an employee depends on three types of capital: physical capital, human capital, and social capital. However, all of them can facilitate production activities and their final success. A number of studies have demonstrated the importance of the three types of capitals (social, human, physical and financial) on performance (Zhang and Fung, 2006; Putnam, 1993; Portes,1998; Portes and Landolt, 1996). According to Sheu and Lo (2005), substantial number of studies has documented the positive relationships between social, human, physical and financial capitals with performance; however, natural capital is considered a marginal input and has been ignored. Furthermore, only a few studies have appeared to examine the influence of the capitals on employee’s work performance using quantitative research. Moreover, much of the literature focuses only on the relationships. To deliver efficient services to the people, an organization success is determined to a large degree on four basic capitals. Therefore, special investigation should be carried out to determine the influence of these factors on employees’ work performance in the public sector in Malaysia. To fill this gap this particular study addresses the influence of the aforementioned four capitals on work performance as well as the relationships between variables.

Performance

Performance is a function of ability and motivation. Both ability and motivation are affected by individual
characteristics, and environment factors (Reitz, 1977) as shown in Figure 1. In fact, differences among individual performances of certain types maybe dominated by differences in the individuals' abilities. Ability is a broad term encompassing, skills, knowledge, aptitude, personality and experience. Each of these factors can play major role in performance. Environmental factors in which the individual perform can affect performance. Physical and social environment can influence performance in several ways. The role of physical and social environment of work cannot be overlooked. The physical environment including technology and working conditions such as noise, light, air quality and so on can affect both motivation and ability of people to perform their job. The social environment of work including peers, supervisors, and subordinates plays a major role in individual performance (Reitz, 1977).

**Capitals and performance**

Human capital refers to the investment undertaken by individuals in the form of education and training in skills. As with any investment, the objective is to increase productivity (Becker, 1964). The theory of human capital states that the differences in the performance of individuals are due to some of the characteristics of the individuals themselves such as skill, knowledge and talent. Currently, the linkage between human capital and performance is well established. Results of study conducted by Seleim et al. (2007) revealed that human capital indicators had a positive association on organizational performances. There is large evidence that demonstrates a positive relationship between human capital and performance (Switzer and Huang, 2007; Hitt et al., 2001). It is vivid that as employees acquire more education and training, human capital drives the production of goods and services. Similarly Dooley (2000) found a significant and positive correlation between the quality of developers and product. Henderson and Cockburn (1994) reported that the acquisition of skilled scientists leads to higher productivity. Hussi and Ahonen (2002) stated that employees with efficient knowledge were considered among the most productive in Finland.

According to social capital theory, better connected individuals can achieve better performances. Many studies have demonstrated the positive impacts of social capital on performance (Ahuja, 2000; Powell, 1998; Powell et al., 1999). However, fewer studies relate social capital to individual level of productivity. A study was conducted by Greve et al. (2006) in order to find out how capitals contribute to individual productivity in organizations. Findings of their study revealed that social capital is the most important factor for determining productivity. Zhang and Fung (2006) postulated that three types of capital (natural, physical and human capital) together, constitute the basis for performance. In relation to physical and financial capital, Graca et al. (1995) and Caballe and Santos (1993) demonstrated that an increase in physical capital should have a positive effect on human capital; on the other hand, increased physical capital means human capital will be more productive in the future. Similarly Sheu and Lo (2005) postulated that an economy requires four types of capital, namely human capital, financial capital, manufactured or physical capital and natural capital, to function efficiently. Human capital is usually expressed in the form of labor and intelligence, and culture and organization. Financial capital consists of cash, investments and monetary instruments. Manufactured or physical capital includes infrastructure, machines, tools and factories. In addition, natural capital is made up of our resources, living systems and ecosystem services. Fisk and Rosenfeld (1997) proposed that improved air quality (natural capital) could result in significant reductions in illness and absenteeism and thus help to increase productivity. Watkins and Wedman (2003) reported that results (performance) can only be
accomplished through the use of resources (human, physical and financial, etc.) within organizational process. Nowadays, the performance theories are seriously depending on social, economical, psychological and political influences embarking towards individual and organizational work performance. In view of the fact that human, social, financial and physical and natural capitals are similar to the element of performance model of Reitz (1977). For example human capitals can be considered as individual characteristics and social, financial and physical and natural capitals representative of the environmental factors.

Furthermore, the expanded ecological economic model by Ekins (1992) and Costanza et al. (1997) implies that the four forms of capital namely natural, social, human and manufactured capital combine in the economic process to produce goods and services, usually measured as gross national products (GNP). This model combines data on national level by defining the natural capital which includes ecological systems and other aspects of the natural world; human capital (formerly labor) which includes both the physical labor of humans and the know-how stored in their brains; manufactured capital which includes all the machines and other infrastructure of the human economy; and social capital which includes the web of interpersonal connections, institutional arrangements, rules, and norms that allows individual human interactions to occur (Figure 2).

Thus, this research emphasizes on human, social, financial and physical and natural capitals which are used to show the influences on work performance.

Objectives of the study

Objectives of the study are to:

1. Determine the relationships between physical and financial, natural, human, and social capitals and work performance.
2. Assess the proposed four-factor regression model to explain the variation of employees’ work performance.

This study hypothesizes that physical and financial, human, social, and natural capitals are positively correlated to work performance. A positive relationship suggests that work performance score is more apt to increase when the physical and financial, human, social, and natural capital increase.

MATERIALS AND METHODS

Sample and design

We based our work on expanded model of the ecological economic system. The core of this model is the set of four basic types of capital: human, social, natural and built. Hence the ecological economic model by Ekins (1992) and Costanza et al. (1997) adapted for this study is to investigate the influence of these four capitals on work performance. The study was carried out among the Malaysian public sector employees at federal ministries level. A descriptive correlation was designed to describe the relevant features of the data collected, as well as the relationship between the variables. This study examined the relationship between the four capitals and work performance. The research framework showed in Figure 3.

Research framework

Variables of study

The dependent variable for this study is work performance. The work performance scores consist of three dimensions: quality of work (4 items), quantity of work (7 items) and timeliness (6 items), which gives a total 17 items. The composite scores were computed by averaging the responses of 17 items used and then the mean of the composite scores were calculated to give the work performance scores needed for analysis. There are four independent variables in this study namely: physical and financial capitals, human capital, social capital, and natural capital. The physical and financial capital was measured by 21 items indicating the extent of adequacy and usability of resources in organization such as budget, tool and equipment, infrastructure, material and supplies, and ICT (computer, fax, telephone, and internet). While human capital was measured using 27 items representing the extent of employees’ knowledge and skills at work, discipline, implementation of policy and procedures, communication skill and ability to organize the work. The social capital consists of 27 items measuring the extent of employees’ relationship and cooperation with colleague, social community interaction, and work family balance. The natural capital comprises 10 items quantifying the extent of air quality, water quality, green reserve area, soil conservation, maintenance of sewage system, noise pollution, industrial waste pollution, household waste pollution, traffic congestion and connectivity, and epidemic diseases.

Measurement and instrumentation

We used structure questionnaire to collect primary data needed. Developing the instrument for measuring work performance (WP), physical and financial capital (P&FC), human capital (HC), social capital (SC) and natural capital (NC) was divided into two main phases. The first/main phase was to identify relevant dimensions for measuring WP, P and FC, HC, SC and NC. The second phase involved a series of focus group discussions (FGD). Since this research was not a replication of any previous studies, the research team had to develop the instruments from scratch. Accessible literatures on WP, P and FC, HC, SC and NC were gathered and reviewed. The research team was also aware that measures and measurement process can be highly reliable (or high internal consistency). To create a measure with construct validity, first, the domain of interest was defined by the research team, then construct measurement items are designed which adequately measure that domain. After that, modifying the measure was undertaken several times through a series of meetings among members of the research team to reduce contamination, deficiency, distortion, and increase accuracy. Therefore, modifications were carried out from time to time based on the feedback received from research team members during a series of workshop conducted. With clarity, contamination, deficiency, distortion, and accuracy in mind, some questions were reduced in the respective sections, rephrased, combined or deleted. The researchers were aware that a lengthy questionnaire might deter participation. Hence, this calls for reduction of questions or items and the appropriateness in line
with the objectives set in the research. The original questionnaire was developed in English and then translated to the Bahasa Melayu – to facilitate the data collection. This was done by a language expert from a government boarding school. The purpose of this step is to select the familiar words suitable to the circumstances of the questionnaires. The second phase of the instrument development involved two series of focus group discussions (FGDs). The first FGD focused on the construct validity of the instrument. During the FGD session, the invited discussion panels were briefed on the objective of the research, as well as their roles as knowledgeable informants in the FGD. For construct validity they were asked to respond to the appropriateness of QOL dimensions identified earlier. In the discussion, the panel and the research team members were reminded to review each dimensions in terms of contamination, deficiency, distortion, and accuracy according to their experiences in their respective organization settings. The panel comprised 10 knowledgeable informants from various agencies and public sector. The agencies involved were Public Services Department (PSD), Kementerian Dalam Negeri (KDN), Ministry of Human Resources, Malaysian Productivity Corporations (MPC), CUEPACS, National Institute of Public Administration (INTAN), Malaysian Modernization and Management Planning Unit (MAMPU), PERHILITAN and Economic Planning Unit (EPU).

The second FGD mainly focused on content validity of the instruments. In addition to research team members, 21 panel of knowledgeable informants from various agencies participated in the second FGD. This group was also briefed on the purpose of the research and the FGD. All members of the panel responded collectively to assess the relevancy as well as the sufficiency of the
dimensions and items of QOL instruments in the context of Malaysian Public Sector. Specifically, the panel members were requested to review the items and decide on the suitability of the items to the dimensions as well as government context. The panel members were also asked if any other items should be included, and to comment on the items related to specific dimensions of WP, P and FC, HC, SC and NC. In addition, the panels were asked to check each item for clarity, uniformity and content validity. This FGD provided the opportunities to improve the order of questions, general organization of the instrument, question construction, clarity and appropriateness of wordings, understanding and general outlook. Modifications on the instruments were carried out based on the feedback received from the two FGD’s. A pilot test was conducted after finalizing the instrument. Reliability analysis by using Cronbach’s alpha was carried out on the five variables included in the model of this research.

The instrument response scale
The response scale was also decided during the first phase of the instrument development. To break monotony of 5-point-anchors, it was decided that the scale instrument used be the 10-point version as this multipoint scale yields more data variability. There are several reasons to the usage of this scale point. On a 10-point scale, the wider distribution of scores around the mean gives us more discriminating power. For instance, a respondent that routinely receives 90% top-two box scores on a five-point scale will likely only enjoy about 85% top-two box score on a seven-point scale. On a 10-point scale, the same respondent would expect a score of only about 75%. According to Allen and Rao (2000), the second reason a seven-point or 10-point scale is preferred involves covariance. In general, it is easier to establish covariance between two variables with greater dispersion (that is, variance) around their means. It is this covariance that is so critical to establishing strong multivariate dependence models. Thus, from a model development perspective, the 10-point scale is preferred. In summary, scales with more points are recommended in model development. This is because of the increased variance and better chances of demonstrating covariance among key variables (Allen and Rao, 2000). In simple terms, it is easier for respondents to give ratings in terms of percentages or marks, for example, 80% or 80 marks.

The Cronbach’s alpha values obtained for the pilot test ranged from 0.93 to 0.99 as shown in Table 1, thus meeting Nunnally and Bernstein’s (1994) recommendation of > 0.7 as the acceptable reliability level and good internal consistency among the items. The alpha values for the actual survey ranged from 0.87 to 0.95 also depicted in Table 1. Kline (1995) is of the view that alphas should never drop below 0.7, the minimum for a good test. This is because the standard error of measurement of a score increases as the reliability decreases. Thus, it can be seen from Table 1 that all the alpha values are highly satisfactory and rather impressive.

Sample size
Two stages of cluster random sampling were carried out to determine the sample size for this study. The target population for this study is Malaysian public sector employees at federal ministries level. Currently, there are 25 ministries at federal level in Malaysia. However, only 15 ministries executed three working systems (ISO, KPI and E-Government). At first stage from 15 ministries, 12 ministries were selected through a simple random sampling procedure. Then from the 12 selected ministries 1400 employees were selected from each cluster through simple random sampling. G-POWER method was used to calculate the sample size of the study by specifying the values of effect size, $f^2 = 0.15$ (Medium), $\alpha = 0.05$, power $= 0.95$ and number of predictors $= 13$. The minimum suggested sample of study is 429. Since the larger the size the lesser the sampling error, total sample size for the study was specified as 1253. This study utilized a questionnaire as the instrument to collect data from the respondents. A questionnaire was created by the researchers from literature. A drop-off and pick-up method was adopted to collect data from the respondents. Respondent were asked to rank their capitals on the 10 point scale.

RESULTS AND DISCUSSION

The relationship between career physical and financial, human, social, natural and work performance

The relationship between career physical and financial, human, social, natural and work performance was investigated using Pearson product-moment correlation coefficients. Preliminary analyses were performed to ensure no violation of the assumptions of normality and linearity. The normality assumption was checked by comparing the skewness values obtained (Table 2) with cutoff point of within $\pm 2.0$ as suggested by George and Mallery (2006); while the linearity was assessed using the matrix scatter plots obtained using graph procedure of SPSS program. Since there were five bivariate pairs, Bonferroni adjusted alpha of 0.0125 (0.05/4) was used to test null hypothesis of the bivariate pairs.

As depicted in Table 2, the strongest linear relationship was found between human capital and work performance ($r = 0.81$, $p = 0.0001$). Comparing the correlation coefficient value obtained to Cohen (1988; pp 79-81) criteria ($r = 0.10$ to 0.29 is small, $0.30$ to 0.49 is medium or moderate, and $r = 0.50$ to 1.0 is strong), a correlation coefficient value of 0.81 indicates positive and strong linear relationship between human capital and work performance suggesting that as the score for human capital increases so does the rating for work performance. The second highest was found between social capital and work performance ($r = 0.73$, $p = 0.0001$) and a Pearson’s correlation coefficient value of 0.73 indicates that there was strong positive linear relationship between social capital and work performance. The next highest was between physical and financial capital, and work performance ($r = 0.38$, $p = 0.0001$) and an $r$ value of 0.38 obtained indicates a moderate positive linear relationship. Finally, natural capital only showed a small positive correlation with work performance ($r = 0.24$, $p = 0.0001$). Although this study was not designed to determine, whether, an increase in one variable caused an increase in the value of a second variables. It would seem logical to say that the work performance is more apt (likely) to increase when physical and financial, human, social and natural capital increase.

Results of correlation are consistent with past findings that suggested there are positive relationship between the four capital and work performance (Ahuja, 2000; Powell, 1998; Powell et al., 1999; Seleim et al., 2007;
A four-factor linear regression model was proposed to explain the variation of work performance among employees. The four-factor variable multiple linear regression model were physical and financial capitals ($X_1$), human capital ($X_3$), social capital ($X_2$), and natural capital ($X_4$). Therefore, the equation of the proposed multiple linear regression model is as follows:

$$\hat{Y} (\text{work performance}) = b_0 + b_1(X_1) + b_2(X_2) + b_3(X_3) + b_4(X_4) + e$$

where: \( \hat{Y} = \) Work performance, \( b_0 = \) Constant (Intercept), \( b_{1-4} = \) Estimates (Regression coefficients), \( X_1 = \) physical and financial capitals, \( X_3 = \) human capital, \( X_2 = \) social capital, \( X_4 = \) natural capital; and \( e = \) Error

To determine to what extent the research data fits the proposed multiple linear regression model, enter regression method was used. Based on the enter method, only three of the four predictor variables were significant in explaining work performance (\( \hat{Y} \)). The three predictor variables were: physical and financial capitals \( (t = -2.328, p = 0.020) \), human capital \( (t = 23.164, p = 0.0001) \), and social capital \( (t = 7.735, p = 0.0001) \). The factor natural capital \( (X_4) \) was not significant \( (t = -0.603, p = 0.546) \). This suggests that the four-predictor MLR model was only partially supported by the research data. As depicted in the coefficients table (Table 3), the estimates (\( B \) weights) of the model coefficients are as follows: \( b_0 = 0.68, b_1 = -0.04, b_2 = 0.74, b_3 = 0.22 \) and \( b_4 = -0.01 \). According to these \( B \) weights, the estimated regression equation is as follows:

$$\hat{Y} \hspace{2pt} \text{(work performance)} = 0.678 - 0.039(X_1) + 0.743(X_2) + 0.218(X_3) - 0.01(X_4) + e$$

The R-squared of 0.68 implies that the four variables explained about 68.0% of the variance or variation in employees’ work performance. This is quite an impressive result considering the fact that the natural capital was not contributing at all. The ANOVA table tests the null hypothesis that the multiple \( R \) in the population equals 0. The ANOVA table revealed that the F-statistics \( [F \ (4, \ 1248) = 658.539] \) was very large and the corresponding p-value was highly significance \( (p = 0.0001) \) or lower than the alpha value of 0.05 indicating that the null hypothesis was rejected and thus the multiple \( R \) is not equal to zero, and thus confirming that there is a linear relationship between the four-predictor variables and work performance.

As depicted in Table 3, the largest beta coefficient was 0.743 which is for human capitals \( (X_3) \). This means that this variable makes the strongest unique contribution to explaining the dependent variable (work performance), when the variance explained by all other predictor variables in the model is controlled for. It suggests that one standard deviation increase in human capital is followed by 0.743 standard deviation increase in work performance.

Graca et al., 1995; Caballe and Santos, 1993).
performance. The beta value for social capital was next highest 0.21, followed by physical and financial capital (-0.05), while the standardized coefficients for natural capital was the smallest (-0.01) indicating that it made the least contribution. It is important to note that the negative signs of beta for physical and financial capital (-0.05) was contrary to expectation. This can be possibly due to the fact that respondents might overrate the physical and financial capital.

Assessing assumptions of the work performance MLR model

Multicollinearity

Several methods can be used to check for the presence of multicollinearity of the MLR model. The first one is using the zero-order correlation matrix table (Table 4). Pallant (2007) suggested checking that the correlation between each of the independent variables is not high ($r = 0.9$ or above). Based on this cut-off value none of the IV's was highly correlated with each other.

The second method is to assess the condition index table as obtained in Table 4. Using this table, first we need to identify all condition indices above a threshold value of 30.0. Then, for all condition indices exceeding the threshold value of 30.0, identify variables with variance proportions above 0.50%. Finally, a collinearity problem is indicated when a condition index identified in step 1 accounts for a substantial proportion of variance (0.90 or above) for two or more coefficients. Based on the collinearity diagnostic Table 4 obtained, only the fifth model dimensions had condition index above the threshold value of 30.0 (42.11), and the variables found with a variance proportion above 0.50 were human capital and social capital with their variance proportion values of 0.92 and 0.82, respectively. This did not fulfill the last criteria (substantial proportion of variance (0.90 or above) for two or more coefficients) indicating an absence of multicollinearity among the four independents variables included in the MLR model.

The last method is to examine the tolerance variance inflation factor (VIF) statistics presented in Table 3. As noted in Table 3, none of independent variable has a tolerance value smaller than 0.10 (the minimum is 0.310)
and all the variance inflation factor (VIF) statistics are less than 10.0 (the maximum is 3.25). A tolerance value of less than 0.10 or a VIF value of above 10 suggests the presence of multicollinearity (Pallant, 2007; 156). Again this suggests that there was no serious multicollinearity problem among the predictor variables of the estimated model.

**Normality, homoscedasticity, linearity of residuals**

The normal P-P plot of the regression standardized residuals of Figure 4 revealed that the majority of the observed values fall approximately along the diagonal normality line from bottom left to top right indicating that the residuals were from a normally distributed population or suggesting no major deviations from normality, one of the assumptions that ought to be met for any multiple linear regression analysis.

Another assumption of a multiple linear regression analysis is that the model must be linear. The linearity assumption of the model is normally assessed by examining the scatter plot of the standardized predicted values against observed values. The scatter plot obtained (Figure 5) shows that the values cluster around a straight line from bottom left to top right indicate that the relationship between the four-predictor variables are linearly related to work performance (Y). This clearly suggests that the linearity assumption is not violated. The scatter plot obtained also showed that the residual variances were about equal in distance (constant) from bottom left to top right of the regression line signifying the regression model was very stable.

**Conclusion**

Although, this study was not designed to determine, whether, an increase in one variable caused an increase in the value of a second variables. It would seem logical that to imply that the work performance score is more apt to increase when the physical and financial, human, social, and natural capital increase. This study has contributed to the literature on physical and financial capitals, human capital, social capital and natural capital by examining the relationship between capitals and work performance. The results suggest that there are relationships between the four capitals and work performance. Hence, employee's work performance is expected to increase if employees have physical and financial capital, human capital, social capital and natural capital. However, the data does not fully support the proposed four-predictors multiple linear regression model. In other words, not all four capitals can influence work performance. The result supports the importance of human capital and social capital, and physical and financial capital for work performance. Hence, to improve the work performance of Malaysian public sector employees at federal ministries level, these capitals must be considered and upgraded. Further research needs to
be conducted on capitals and its impact on work performance. Furthermore, since the human capital is the biggest predictor of work performance, the challenge is to develop and enhance human capital of employees by providing education and effective training program for them.

Findings of the study would help policy makers to give greater focus on the development of skillful and knowledgeable employees as the whole organization is dependent on them to translate the policy and strategies into reality. More quantitative and qualitative research at the local government is required to fully explore how capitals influences work performance. An important implication of the findings of this study is that organizations should take good care of all its capitals, that is, natural, human, and social in addition to its physical and financial capital, in order to continually improve the work performance of all its employees. It is recommended that organization should wisely manage all its capitals using and improving the physical and financial, social, natural and human capitals in ways that allow these capitals to continue to support the organization in the future. In addition, a balance of these capitals is necessary to sustain the desired level of work performance among the employees.

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