The Impact of Performance Variables on Industry in K-Economy

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Abstract

In the knowledge economy, companies are thought to be the experts who develop innovative product or service as per demand and then market it to generate the revenue. The role of industry in a knowledge economy is to search and to promote inter-organizational collaborations for learning and to search linkages to arrange for complementary resources. These interactions improve the performance of industry in the knowledge economy. This research has been conducted to find out the impact of industry associated variables that significantly influence the performance of knowledge economy. Important attributes have therefore, been identified from the studies conducted in the field of knowledge economy. Influence of identified attributes on industry has been measured using structural equation modeling (SEM) technique. Data has been collected using survey questionnaire. Findings of the study confirm that there exist a strong relationship among the industry and it's identified variables that collectively influence the performance of industry in the knowledge economy.

Keywords: Knowledge economy; innovation; performance; collaborations

■1.0 INTRODUCTION

World Bank suggested that "the knowledge economy is primarily depends on the use of idea, than the physical skills, and on the technology and its applicability, in place of converting the raw material or getting the advantage of low wage low skilled worker" (2003, p. xvii). Prosperity through active use of human skills and knowledge is gradually overcoming the creation of wealth obtained through natural resources. The significant value creation has made Knowledge more important. In the 21st century, knowledge was thought to be an important commodity for the individuals, countries and businesses. [12] discussed that two forces are important in the advent of knowledge economy; the high involvement of knowledge in economic developmental activities and the increasing trends of globalization in economic affairs.

In order to analyze the organizations economic development capability in the event when creativeness and knowledge usage is become a decisive factor, the knowledge based economic system adopted by the organizations is the only effective tool used for this purpose[5]. The company's competitive advantage, irrespective of its size, is basically depends on its ability to capitalize the knowledge and skills together and use these knowledge and skills collectively to find out the solutions of their differentiated and complex requirements[12]. An in-depth review of the literature reveals that several studies have been conducted to find out the role of industry in knowledge economy. However, few efforts have been made to find out the impact of performance variables on industry in the knowledge economy. This research has, therefore, been conducted to find out the impact of industry variables that significantly influence the performance of knowledge economy.

■2.0 LITERATURE REVIEW

Development of human asset and getting maximum out of it is decisive in analyzing the economic structure of the organization in the knowledge based economic system. This not only encourages the apprenticeship but also helped in developing knowledge sharing attitudes that are thought to be the important levers in growth and development.

A knowledge based economy is thought to be a concept where technologies and innovative thoughts are the components, intellectual property is the commodity, high level of convenience in the products is the expectation and innovations are driven by the technology leaders. The concept of "knowledge-based economy" was devised by the Organization for Economic Co-operation and Development[17]. OECD defined knowledge based economy as "an economy directly based on the production, distribution and use of knowledge and information"[2]. The prospects of the knowledge based economic system can be realized only if such an institutional, economic and regulatory environment has been provided that support the knowledge acquisition, knowledge use and development, a system of education that support creativity, a vibrant information infrastructure, innovation support networks and systems. Economic growth, sustainability and investments in

innovative research are strongly linked with each other. Knowledge capital accumulation will help the advancement in the knowledge-based economic system. Knowledge is thought to be the extremely powerful tool of product development.

The unusual growth in information and communications technology, together with the high speed technological and scientific advancement, worldwide competition and the variations in the demand are the reasons that made knowledge a highly important object. To become a component of knowledge based economic system is important because knowledge and information are observed to be an asset that generates prosperity. The world is moving towards the internationalization and liberalization that allows free movement of capital, workforces and information. Workforce is the major source; therefore, it must be given the priority for skill development, knowledge up gradation, competencies and motivations. In the larger perspective, the overall economy should be based on the knowledge to increase the productivity. In other words productivity should be improved through knowledge application rather inputting labor or capital[8].

2.1 Context of Malaysia

[14]discussed Malaysia's concept on the knowledge-based economy. According to the Malaysian concept, creation and application of knowledge contribute significantly in the economic growth and wealth creation for the country. Currently, Malaysia is in the phase of intense competition from the economies that are rich in resources and have a low wage market as China, India, Indonesia and Thailand. In addition, Malaysia is still far behind the expertise and proficiency of the advanced economies as Japan, South Korea and Taiwan. To get the competitive advantage, Malaysia needs to move aggressively to improve the productivity in traditional industry and simultaneously, work for the improvement of its technical capabilities[14].

While comparing the experiences of developing nations, [23]argued that the Malaysian economy has shown significant growth in economic and technological spheres. However, the main driver behind this growth was the experience and technology of the developed countries. Now it has been felt that for the sustainability, Malaysia has to focus on the new approach of innovation and transfer of technology. Although, this desire is not new in Malaysia; but unlike the developed countries, Malaysia is facing the constraints arising from the power centralization and the disintegration of institutional spheres. Therefore, the country's major technology reliance, as identified by Saad *et al*. still remains mostly on the transfer of technology from developed countries. Although, this technology transfer has provided a little help in technological learning that helped to increase the capacity of enterprises in Malaysia but the overall performance of Malaysian economy, during the last three decades, is said to be the result of foreign technology and Malaysia's has not yet been able to develop its own innovation system[23].

2.2 Industry and Knowledge Economy

In the knowledge economy firms are considered to be the 'hothouses' where inventions have been nurtured according to the need. Therefore, in the knowledge economy, companies are considered as the experts who develop the product or service as per demand and then market innovative products or services to generate the revenue[16].

Small companies on the other hand could not get the advantage of economy of scale due to which they could not develop the low cost products. Due to the limitations in the financial resources, development of research and innovation based products is the basic problem for the small industries. Moreover due to the small size, firms also not get proper opportunities to maintain alliances and networking with other business firms[24]. Therefore, globalization has posed real challenges for small and medium enterprises. Smaller firms could not respond quickly to the challenges of the global market. Therefore, to take the advantage of globalization, [24]suggested that these firms must develop networking with the government and the universities to overcome the problem of research and development.

The role of industry in a knowledge economy is to search and to promote inter-organizational collaborations for learning and to search linkages to arrange for complementary resources. These interactions help industry to spread the costs and risks attached with innovation, access to creative products and services, get benefit from the high tech components, and sharing of resources. With the development of new products and procedures, industry determines which activity could be completed independently, which activity requires collaborations with other organizations and which requires the support of government[10].

The aforementioned discussion, therefore, highlighted the role of industry as a driver of knowledge economy. The literature has helped to identify the variables that influence the performance of knowledge economy. Overall thirty (30) variables have been identified as a performance determinant of knowledge economy. Out of thirty (30) identified variables, experts in the field of knowledge economy have identified 09 variables as a determinant of industry performance in knowledge economy which have been taken as the construct of this study. Given below are variables that play an important role in the success of knowledge economy.

2.2.1 Value Added Manufacturing

It is the difference in value of inputs and the value of finally produced goods or services. In the manufacturing sector, high-value-added are capital-intensive and creating high tech and complex goods and services. The workers at high valued manufacturing are highly productive and knowledgeable and generate more value for working hour[11,5,3,19]

2.2.2 Inventor Patents

Inventors are the established icon. Today, many owners of individual patents—not assigned to any organization—are not mere tinkerers. More often, they are trained scientists, engineers, or students, pursuing independent research. Because the New Economy places a premium on innovation, this wellspring of innovative activity has become an important foundation for many entrepreneurial ventures [11,5,3,13,19]

2.2.3 Job Churning

Stable growth in employment masks the constant churning of job creation and destruction, as less innovative and un-efficient companies downsize or go out of business, and more-innovative and competent companies develop and replace incompetent firms. New firms account for only 3 percent of total employments, all of these jobs are new jobs, and therefore help grow the economy[3,25]

2.2.4 Initial Public Offerings (IPOs)

The number of IPOs is used as a knowledge economy indicator in the knowledge economy. They show the financial strength and stability of the economy[3,5,19]

2.2.5 Professional and Managerial Jobs

The role of professionals, managers, and technicians in the knowledge based economy is very important. Their importance is increased due to high level of automation in the knowledge based systems which eliminate the routine jobs [3,5,19]

2.2.6 Workforce Education/training

In knowledge economy, well trained and highly educated human capital is vital for innovative and production activities[11,5,3,13,19]

2.2.7 High-Tech Employment

The high-technology industry plays a major role as a driver of innovation and a basis for high-paid jobs. High-technology jobs are considered as the hot cakes for knowledgeable and skilled workers[5,3,19]

2.2.8 Entrepreneurial Activity

In the knowledge economy, success depends mainly on the development of innovative activities and development of new models for businesses. In the economic development, the importance of entrepreneurial ventures is undeniable. Although the rate of success is not very high, however, the new firms create jobs and develop innovation based products, processes and services[11,5,3,13,19]

2.2.9 Fastest-Growing Firms

The fastest-growing firms had shown expansion in the revenue around 200% during the period of four-year in US economy. It has been observed that the high growing firms usually, have less than 100 employees; they are the indicators of the successful entrepreneurial struggles in the economy and are the determinants of growth. High performing economies are famous for their entrepreneurial sectors[3,5].

2.3 Hypotheses Development

Following hypotheses have been developed

H1: *Value-Added Manufacturing influenced industry's performance significantly in the knowledge economy.*
H2: *Inventor patents have a significant effect on the performance of industry in knowledge economy.*
H3: *Job churning has significant influence on Industry's performance in knowledge economy.*
H4: *Initial Public Offerings (IPOs) have significant influence on Industry's performance in k-economy.*
H5: *Professional & Managerial Development have significant influence on Industry's performance in knowledge economy.*
H6: *Workforce Training/Education influence Industry's performance in knowledge economy significantly.*
H7: *High Tech Employment significantly influences the Industry's performance in knowledge economy.*
H8: *Entrepreneurial Activities significantly influence Industry's performance in knowledge economy.*

H9: *Fastest Growing Firms significantly influence Industry's performance in knowledge economy.*
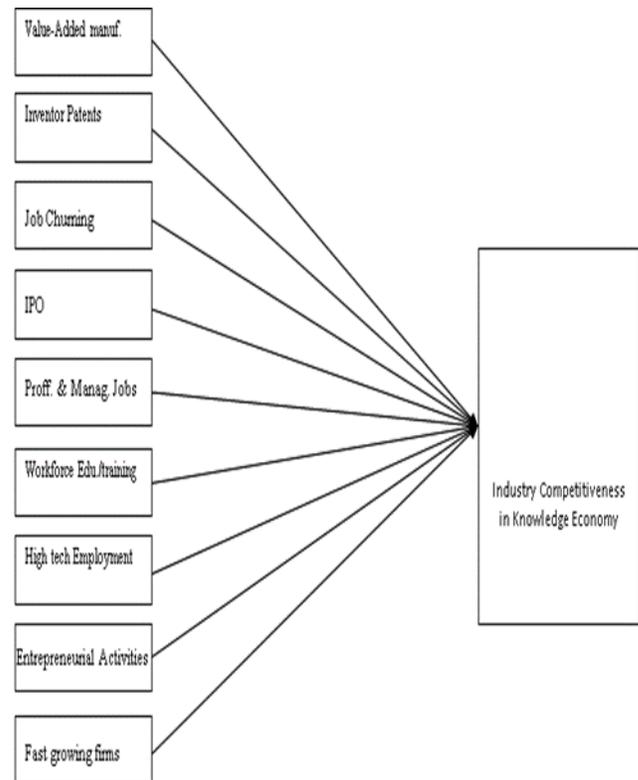

Figure 1   Model to determine the role of industry in knowledge economy

■3.0 RESEARCH METHODOLOGY

3.1 Data and Analysis

This research is being done to measure the influence of industry's performance attribute's on Industry performance in knowledge economy. The analysis has been done using primary data. The data has been collected from the R&D based industrial sector in Malaysia. Structural equation modeling (SEM) has been used to analyze the data and test the hypotheses as was performed by Kim *et al*. (2004).

3.2 Size of Sample

The rationale behind selecting R&D based industry as respondents was that the people working in these organizations are the important players whose sole focus is to develop innovation based product and services. According to[6] the size of the sample should depends on the number of items developed for some specific characteristic. It was suggested that each item should be represented using 5 samples. Since, this study intends to use 29 items; therefore, the sample size would be 145. Respondents were selected from R&D based industries in Malaysia and survey questionnaires were distributed personally.

3.3 Survey Instrument

To calculate and measure the dimensions of industry performance the instrument was adapted from[20]. It contained 29 items measured on 5 point Likert scale.

■4.0 RESULTS AND DISCUSSION

The goodness of fit index values are presented in Table 1. The values with 40.15 degree of freedom satisfy the requirements of standard values for index fit. The values of GFI, NFI, and CFI ranged from 0 to 1. For a good fit, the GFI and NFI values should be greater than 0.90 and for CFI, the value should be greater than 0.95. A value of 0 for RMSEA represents an exact fit; whereas the values less than 0.05 shows a close fit and values between 0.05 and 0.08 are a reasonably good fit, values between 0.08 and 0.10 represents an average fit, and values more than 0.10 represents a poor fit[4]

Table 1 Goodness of fit index

Index	Chi-square (df)	GFI	AGFI	P	CFI	NFI	RMSEA
Observed Value	40.15	0.847	0.881	0.004	0.953	0.922	0.049
Standard Values	-	>0.80	>0.80	<1.00	>0.90	>0.90	<0.05

Table 2 Test of collinearity

Variables	Tolerance	VIF
Value-Added Manufacturing	0.734	1.498
Inventor patents	0.567	1.732
Job churning	0.698	1.771
Initial Public Offerings (IPOs)	0.714	1.445
Professional & Managerial Dev.	0.722	1.787
Workforce Training/education	0.717	1.124
High Tech Employment	0.679	1.499
Entrepreneurial Activities	0.790	1.878
Fastest Growing Firms	0.898	1.677

Table 3 Test Results

Path	Estimate	S.E.	C.R	P	Hypo	Results
Value-Added Manufacturing	0.277	0.127	4.340	0.019	H1	Accept
Inventor patents	0.179	0.100	3.890	0.016	H2	Accept
Job churning	0.499	0.121	1.951	0.001	H3	Accept
Initial Public Offerings (IPOs)	0.471	0.091	4.998	0.021	H4	Accept
Professional & Managerial Dev.	0.378	0.089	3.345	0.011	H5	Accept
Workforce Training/education	0.342	0.099	3.389	0.018	H6	Accept
High Tech Employment	0.311	0.123	1.893	0.000	H7	Accept
Entrepreneurial Activities	0.365	0.121	3.629	0.000	H8	Accept
Fastest Growing Firms	0.298	0.113	2.223	0.003	H9	Accept

The value given in Table 1 shows that the model is a good fit as it fulfills all the standard values, therefore, the model is considered as a good model. Moreover, the value of P also indicates that the model is a good fit. According to Ali *et al.* (2010), the model is measured to be fit if its P value is less than 1 (P < 1). Since the P value in this model is 0.004, which again shows that the model is a good fit.

Given that the values of Goodness of fit for most of the variables are above acceptance level, it was therefore, decided to test the collinearity (Table 2). The results reflected that tolerance levels (< or equal to 0.01) and Variation Inflation Factor (VIF) values (below 10) were within acceptable range[17]. Durbin Watson values for all factors were between 1.5 and 2.5. The results did not indicate multi-collinearity between the variables.

Table 3 provides the results of hypotheses tests of the relationship between constructs of industry and their relationship and influence on industry in knowledge economy. "The significance test is the critical ratio (CR), which represents the parameter estimate divided by its standard error. The parameter estimate is significant at p < 0.05 if CR is > ± 1.96"[4].

For the acceptance of hypothesis the value of P of each variable should be less than 0.05. Table 3 shows that the variables of industry performance positively influence the industry performance in knowledge economy. The results also show that Value Added Manufacturing, Inventor Patents, IPOs, Professional and Managerial Development, Workforce training and Entrepreneurial activities have a strong impact on industry performance. This implies that the contribution level of these attributes in industry performance is high to attain the competitive advantage in knowledge economy.

■5.0 CONCLUSION

This paper examined the impact of industry performance variables on industry competitiveness in knowledge economy with reference to Malaysia. The variables have been identified with the help of experts in the field of knowledge economy. This is a thought-provoking study in the context that it has identified specific variables of industry performance. This paper will provide industry top management an insight about the focus areas in the industry development and also provide useful information for their future policy development. The study has found significant and strong relationship between Value Added Manufacturing and IPOs and industry performance. This establishes the fact that the VA manufacturing and IPOs are the strongest determinant of industry performance in knowledge economy. This result has therefore, confirmed the findings of[11,5,3,19].

Secondly, Workforce training/education and Inventor patents along with professional and managerial training and Entrepreneurial activities also found to have significant relationship with industry performance in knowledge economy. This confirms the finding of[23,21,6]. Provision of training and education are the considered to be the important activities of industries in knowledge economy[6]. The current era as the era of knowledge capitalism, entrepreneurial activities have, therefore, been considered important[15] especially in the form of spin out firms[7]. As per findings of[3], success in the knowledge economy largely depends on the expanded innovative and developmental activities of new business models. Hence, Entrepreneurial ventures are important for the country's economic development. Therefore, this study also confirms the findings of[3].

Thirdly, significant relationship was also observed among Fastest Growing Firms, Job Churning and High Tech Employment and industry performance. This also confirms that the fast growing firms help the economy in term of job creation and economic. Furthermore, high-tech employment and job churning are also important in knowledge economy. High tech

professionals help in developing a high tech knowledge society which in turn develop the required skills and abilities among the professionals, managers, and technicians which increase the firm's level of competitiveness based on creativity and innovation. This has confirmed the findings of[11,5,3,18].

The findings of this research paper would be helpful for the industrial sector in Malaysia to tailor their policies and strategies for maximizing the advantage and to gain the higher economic success.

■6.0 LIMITATIONS

Data collection is the most difficult and challenging activity in Malaysia as the respondents are reluctant to respond the questionnaires. Apart from above, money and "Time Factor" are also limitations for this study.

■7.0 FUTURE RESEARCH

This research identifies new dimension of industry role in knowledge economy. However, this study is limited to Malaysian industrial sector. Future research can be performed in other developing countries as well. Due to the important role of industry in knowledge economy, a comprehensive research can also be conducted in future using other dimensions of research collaborations.

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