

ABSTRACT

The search for competitive advantage has led to the recognition of innovation as a vital ingredient for survival and profitability in the 'Information Age'. It is becoming harder for organizations to retain a competitive advantage through innovation based only on physical or financial assets or even on a new technology. Organizations need to concentrate on developing distinctive competencies that are more difficult for competitors to imitate (Barney, 1991; Wernerfelt, 1984). Such development has become the focus of attention not only among academicians but also among business consultants, journalists, government officials and business leaders (Miyazaki, 1995). The present study used the organizational level of analysis and aimed at measuring organizational innovation potential, competencies relevant for different types of organizational innovation and providing suggestions for designing a competency-based management approach to innovation.

The objectives of the thesis were

- To develop an integrated measure to understand organizational innovation potential in Information Technology organizations.
- To identify the types of innovation and the competencies that differentiates between innovative and less innovative organizations in the Information Technology sector.
- To explore the definitions of innovation used by Information Technology organizations.
- To examine the influence of competencies on different types of innovation for innovative and less innovative organizations in Information Technology organizations.
- To develop a model on competency based management approach (CBM) to innovation for Information Technology organizations.

A review of literature on innovation found that unique competencies are an important source of enduring strategic advantage and innovation (Lippman & Rumelt, 1982; Dosi & Teece, 1993).

Approaches of innovation viewed innovation mainly from individual perspective (Scott & Bruce, 1994) and organizational perspective (Slappendel, 1996; Van de Ven & Rogers, 1988; Lunvall & Johnson, 1994). This study adopts organizational level perspective for promoting innovation in organizations. The organizational competencies that foster innovation in the organization emerged from literature review were product/services breadth competency (Harvey, et. al., 2000), product change competency (Wright, et. al., 1998), HR delivery competency (Wright, et. al., 1998), efficient production process competency (Wright, et. al., 1998), new business development competency (Wright, et. al., 1998), HR strategic competency (Harvey, et. al., 2000), HR effectiveness competency (Harvey, et. al., 2000), network for social knowledge competency (Harvey, et. al., 2000), collective visionary leadership competency (Harvey, et. al., 2000; Alldredge and Nilan, 2000), superior forecasting competency (Makadok and Walker; 2000), innovation awareness competency (Harvey et. al., 2000, Birla 3m), innovation adaptability competency (Harvey, et. al., 2000), technological diversity acquisition competency (Harvey, et. al., 2000) and organizational learning competency (Garvin David, 1993).

Literature highlights three types of organizational innovation measurement. These are – input- oriented measures (Rogers, 1998), output-oriented measures (Rogers, 1998) and newness- oriented measures (Zaltman et al., 1973). All these individual measurements can only act as partial indicators of innovation. To create a better measure of organizational innovation this study takes into account all individual measures reported in the previous literature.

A conceptual model was developed with the variables derived from literature review. The model described how competencies and innovation were related. A total of 14 competencies were considered for the study. Competencies were considered as independent variables. Input, output and newness-oriented measures were collectively taken as a measure of organizational innovation. A score calculated by aggregating newness and input-oriented

measures was named as organizational innovation potential score. This score was considered as a dependent variable. Output-oriented measures were used to verify the organizational innovation potential score.

Preliminary case studies were done on 8 organizations to validate the relevance of the conceptual model. The variables were operationally defined once the model was finalized. Two questionnaires were developed – (a) questionnaire 1 measures competencies useful for innovation using 7 point rating scale with 61 items (b) questionnaire 2 measures organizational innovation in organizations from Information Technology sector using both categorical (15 items) and 7 point rating scale (42 items). Data was collected from 408 IT professionals across 42 organizations using these two questionnaires. Top-level management personnel who understand the innovation process well in the organizations were asked to answer the organizational innovation questionnaire. Competency questionnaires were answered by a cross section of the employees from all levels. The reliability and validity of both the questionnaires were established. The cronbach alpha for competency questionnaire and organizational innovation questionnaire were 0.96 and 0.88 respectively. Input-oriented measures and newness-oriented measures of organizational innovation questionnaire were factor analyzed separately. The factors found from newness-orientated measures were radical and incremental innovation in management and administration (eigenvalue 5.73), radical and incremental innovation in product, market and supplies (eigenvalue 1.86), and radical and incremental innovation in services and methods of production (eigenvalue 1.18). One factor emerged from input-oriented measures of innovation, which was renamed as support function of innovation. These factors were considered to be the different types of innovation.

The items under 14 competency variables were factor analyzed and 14 competency factors were found explaining 69.11 percent of the total variances.

The organizations were cluster analyzed on the basis of the organizational innovation potential score. The cluster analysis results categorized organizations into two distinct clusters, viz- innovative (n=12) and less innovative organizations (n=30), which are considered to be two levels of innovation. The result of F-test showed that there was a

significant difference between these two clusters of organizations. Multiple discriminant analysis (Wilks Lambda: 1.2, Chi Square: 36.26, p -value: 0.01) results indicated that innovation in management and administration, innovation in products, markets and supplies, innovation in services and methods of production, and support function of innovation were four factors (types) discriminated between the two clusters of organizations. It was also observed that 94% of the sample organizations were correctly classified by these factors (types). Hence, we can conclude that these innovation factors (types) can be used as valid predictors to differentiate between innovative and less innovative organizations.

A multiple discriminant analysis (Wilks Lambda: 0.18, Chi Square: 81.31, p -value: 0.01) was carried out between two clusters of organizations on competencies. It was found that three competencies (organizational learning competency, product breadth competency and innovation adaptability competency) discriminated between innovative and less innovative organizations. The results indicated that 86% of the total sample organizations could be correctly classified as innovative and less innovative organizations based on these competencies. The comparison of means using the t -test results showed that there were significant differences between innovative and less innovative organizations with respect to all fourteen competencies used in the study.

From the linear regression model it was observed that, innovation in innovative organizations was determined differently than that of less innovative organizations with respect to all factors (types) of innovation and organizational innovation potential score. Interestingly, the role of organizational learning competency was important for innovation in both innovative and less innovative organizations for all the factors (types) of innovation and their overall organizational innovation potential.

Results of chi-square tests on definitions of innovation showed that an understanding of innovation process required analysis of various definitions of innovation or a specific definition of innovation according to the context of use. Graphical representation along with chi square test results indicated that innovative organizations were more likely to adopt “inventing something new” as one of their definitions of innovation than less innovative organizations.

The exploration into the measurement, definitions and competencies for innovation has yielded substantial insights into the organizational innovation potential. In order to achieve competitive advantage through innovation, organizations need to build up and increase various competencies important for different innovation levels and types. Organizational learning competency has considerable roles as a critical determinant of innovation. This competency is useful for innovation in both innovative and less innovative organizations because it facilitates innovation through learning and interacting on the job.

In spite of some overlap in the two groups of organizations (innovative & less innovative), the regression results reveal that there exist differences in competencies that influence different types of innovation in these two groups. This supports the idea that *complementary competencies* are necessary in order to promote innovation in innovative and less innovative organizations. This thesis has also contributed to the development of theoretical concepts for competency-based management approach to innovation.

The organizational innovation potential score can be used as a diagnostic tool by organizations to measure innovation

Based on the conclusion suggestions are given to the organization

1. In order to achieve competitive advantage through innovation, organizations need to build up and increase various competencies important for different innovation types and levels.
2. It is desirable to focus on innovation in management and administration along with that in products, processes and services.
3. Innovation requires much more than technical skills. Successful innovation requires a careful identification of competencies, which foster innovation in an organization; at this stage it is very important to strike a balance between corporate strategy and HR practices.

4. Organizations may budget innovation, and better manage the financial risks involved in innovation.

The contributions of the research are

1. It is suggested that the questionnaire used in the present study to measure innovation potential can be used as a diagnostic tool. Based on the diagnosis, appropriate actions can be planned to promote organizational innovativeness.
2. Innovation in management and administration, innovation in products, markets and supplies, innovation in services and methods of production and support function of innovation can be used as discriminators between innovative and less innovative organizations (levels of organizations)
3. Organizational learning competency, product breadth competency and innovation adaptability competency are the competencies that can be used as discriminators between innovative and less innovative organizations (levels of organizations).
4. In attempting to build an enduring organization it is vitally important to understand the key role of the soft side (definitions, measurement) of organization in innovation.
5. There are different predictors for different types of innovation in innovative and less innovative organizations. Hence, organizations wish to introduce innovation in different types and levels should focus on different set of competencies.

The direction of the future research

1. A longitudinal and cross country study using the organizational innovation potential questionnaire and competency measurement questionnaire may be desirable to understand the innovation potential of organizations.

2. Further research should examine competencies not only for innovation itself but also for different stages of innovation, viz. adoption, diffusion, commercialization etc.
3. Future research might also consider how innovation is related to organizational performance and other internal and external factors.