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AN EMPIRICAL STUDY ON INNOVATION AND ROLE OF DEMOGRAPHIC VARIABLES

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Purpose: *The paper aims at looking at the influence of selected demographic variables on organisational innovation process.*

Design/Methodology/Approach: *As organisations face more globalised and fast paced competitive environment today than ever before, the need of the hour has become a concentrated effort by organisations to be innovative. Innovation has emerged as a mainstay of organisational sustenance and thus an empirical study was attempted at, to understand the relationships between innovation and demographic variables, if any. Literature review was done to generate a representative pool of factors influencing innovation. An accepted scale of innovation measurement seems to be missing especially in the Indian context. The study also aimed at understanding the efficacy of including demographic variables as an innovativeness measurement parameter in developing such a scale.*

Based on the literature review a questionnaire was designed that was used to collect the data. A 7-point Likert scale was used to capture the data on the statements pertaining to innovation. The type of data obtained through the questionnaire was quantitative. Random and judgemental sampling techniques were used to identify the respondent pool for study. The study tried to gauge interrelationship between innovation and employee age, gender and length of service. Based on the findings, the study concludes that age and length of service seem to have strong influences on the innovation potential while gender did not seem to have a very significant impact on innovation process and thus age and length of service can be included as influencing measurement parameter for innovativeness in any innovation scale development.

Keywords: *Innovation, Demographic Influencers*

INTRODUCTION

Growing competition, globalisation and changing circumstances make innovation a prerequisite for the growth, success and survival of any organisation. Maxims such as 'innovate or die' are clear expressions of the necessity for innovation as a concept with practical applications and utility (Isaksen & Tidd, 2006). While innovation in technology, production, marketing and finance all remain essential, it is innovation in management that is in short supply. Two major challenges that face us now more than ever are how to adapt successfully to change and how to bring about change in environments that are not conducive to our well-being and effectiveness. With the study of innovation and creativity at work, strategies can be evolved for meeting the challenge of how to bring about change in work environments. Innovation is a term that is used widely in management and organisational development literature. In business circles it is common to hear people talk about the importance of innovation. Management 'gurus' stresses the need for organisations to be innovative in order to survive. Innovation consists of a set of processes carried out at the micro-level, by individuals and groups of individuals, and these micro-processes are in turn stimulated, facilitated and enhanced by a set of macro-structural conditions.

However, rarely do the people who talk about the need for innovation say exactly what they mean by it; and, more importantly, they do not explain in detail what an organisation must do in order to be innovative. They do not tell their audience what processes are involved in innovation; nor do they outline the factors that need to be taken into consideration.

A literature study could not reveal the existence of any scale that measures the factors and processes relevant to organisational innovation. It is important for management to create the most favourable conditions for innovation to take place - and to steer the whole process. Thus, there is a need to develop a scale for managerial innovation. Since innovation is mainly the responsibility of management, a scale of innovation could be a valuable tool for organisations to establish whether their management team is up to the task. The scale intends to cover several factors and processes involved in innovation; it could help management to establish whether or not management has covered all of the processes, and where it is lacking or weak. Once management has identified weaknesses or factors

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that are missing, corrective steps can be taken to remedy the situation. At a more general level, this study adds to the body of existing work on innovation.

In what promises to be an even more volatile and demanding 21st century, the competitive ante will be raised even higher. Factors that were once genuine competitive advantages are now simply minimum admission requirements for staying in the game. The premium has shifted to the ability to manage major, strategic change effectively and almost continually - in short, to innovate consistently. Companies must innovate and innovate continuously to have any hope of survival, let alone dominance. While innovation in technology, production, marketing and finance all remain essential, it is innovation in management and strategy that is most desperately in short supply (Kiernan, 1996).

INNOVATION CONCEPT DEVELOPMENT

The term innovation is used in different ways that appear to vary systematically with the level of analysis employed. The term innovation can be confined to original inventions, defined as implying something new for the organisation but perhaps not original, or synonymous with any kind of change. There are literally hundreds of different definitions of innovation. From a few such definitions we shall relate to our understanding of innovation.

The concept of innovation did not emerge however overnight but the body of knowledge on innovation emerged and evolved with passing time and growing body of research. The era of 1960's was dominated by definitions of innovation which looked at innovation in terms of technological, commercial and product changes like the Zuckerman committee (1968) or definition given by (Marquis, 1969).

The 1970's saw the work of scholars like Gabor (source: Technology for creativity and innovation, Tools, techniques and application. IGI Global 2011, Business and Economics) who took the definition of innovation further to now talk about social innovations and the role and importance of social change to facilitate any technological change. During the 1980s, lot of work was done on the subject of innovation by authors like Galbraith (1982), Kanter (1990), Delbec and Mills 1985, Drucker (1985), Van de Van (1986), Kuhn (1986), Urabe (1988) , to name a few. According to Kanter (1983) innovation refers to a process of bringing any new, problem solving idea into use. Drucker (1985) has defined systematic innovation as a purposeful and organized search for changes, and in the systematic analysis of the opportunities such changes might offer for economic or social innovation as well as for competitive advantage. Plessis (2007) put emphasis on the knowledge component. He looked at innovation as the creation of new knowledge and ideas to facilitate new business outcomes aimed at improving internal business processes and structures to create market driven products & services.

During the process of research there seemed to be lack of agreement or unanimity in what constitutes a good measurement mechanism of organisational innovativeness. Innovation measurement is still at a very nascent state. Literature on the same was not available and hardly any accepted measurement system was found on the same. So while literature on what constitutes innovation galore the same cannot be said about the innovation measurement system.

The first generation of indicators focused on the input factors like R&D expenditure, Science & Technology personnel etc. The second generation of indicators concentrated on the outputs like patents, publications which were supposed to indicate innovation efficacy. The third generation of measurements looked at comparative tools like innovation surveys to gauge innovation efficacy. The fourth generation is still at a evolving state where due to the amorphous nature of the market and dynamic interweaving of external and internal organisational environment measurement has started talking of networks because now a holistic evaluation framework is the call of the hour as organisations become global, having alternative work schedules and strategic partnerships are forged the measurement system has to take care of all the above. Today in business strategic changes have reduced shelf life so the measurement systems have to take care of this transitiveness.

For the purpose of our study, we formulated the following study objectives:

- To develop the questionnaire for managerial innovation, and
- Determine the relationship between innovation and selected demographic data.

HYPOTHESIS FORMULATION (NULL HYPOTHESIS)

Based on the objectives, the following hypothesis was formulated:

(1) Organisation innovation does not improve with employee's age.

(2) Organisation innovation is not impacted by employee's gender.

(3) Organisation innovation has no relationship with length of service in the organisation.

STUDY SITE, TOOLS AND TECHNIQUES

A positivist approach is used in this study. Essentially, positivism is the view that the social sciences should use

the same methods as the physical sciences. This means that social phenomena are considered to be objectively occurring phenomena. The research should be more concerned with generalizing than with particularizing. a questionnaire has been designed that was used to collect the data. The questionnaire contained two sections- one on demographics and the other on factors that influence innovation. A 7-point Likert scale was used to capture the data on the statements pertaining to innovation. The questionnaire is attached as annexure.

The type of data obtained through the questionnaire was quantitative. The logic of the scale development and evaluation was guided by positivism. The analysis was done using SPSS statistical tools

- Frequency analysis on demographic data
- Cross tabulation
- Analysis of Variance

SAMPLING TECHNIQUE

The research subjects were chosen initially by means of random selection (probability sampling) and then by means of judgemental sampling (non-probability sampling). The sample size for the study was 40.

Probability sampling and non-probability sampling was used to collect the data. In probability sampling the probability of selection of each respondent is known. The specific sampling method used within probability sampling was random sampling. In random sampling, each person in the population has an equal probability of being chosen for the sample, and every collection of persons of the same size has an equal probability of becoming the actual sample. This is true irrespective of the similarities or differences among them, as long as they are members of the same population.

The specific type of non-probability data gathering method used was judgemental sampling.

ANALYSIS AND DISCUSSION

The following demographic data were obtained: age, gender and length of service in the organisation concerned.

Very few respondents, 7.5% were less than 25 years of age, 30% of the respondents were between age group of 25-30 years. Approx 62.5% of respondents were between 30-40 age group.

The distribution of males and females in the study was almost even with 52.5% males and 47.5% female respondents.

65% of respondents belonged to middle management level while 25% to senior management level and 10% of the respondents belonged to non-managerial levels in the organisation.

The majority of respondents (57.5%) had 6 – 15 years of service in the organisation.20% of respondents had 5 or less than 5 years experience, 22.5% of the respondents had 16-20 years of service with the organisation. Since no information was obtained about previous work experience, it would be pure speculation to try to correlate length of service with seniority in organisations. However since the majority of respondents showed continuity of service tenure with the organisation, it also indicated organisational durability with quite high level of employee retention.

The cross tabulating of value of innovation with age of respondents indicate positive relationship between age of respondents and value of innovation. Incidentally we also observe that as the age increases the focus of innovation seems to shift more from innovation as a whole to laying stress on innovative problem solving. We see that in the <= 26 group where about 7.5 % of our respondents fall there is 100% emphasis put on innovation as a whole rather than piecemeal innovative measures. Any and every innovative idea thus gets welcomed in the organisation. In 27-30 age group comprising 30% of our respondent population, we see emphasis on holistic innovation and welcoming innovative suggestions in the organisation. In 31-34 age group comprising 25% of our population, there still remains 90% emphasis on welcoming innovation as a whole and only about 10% emphasis on innovation problem solving as a mainstay of propelling innovation in the organisation. In 35-38 age group comprising 15% of our respondent population, 16.7% put emphasis on innovation as a whole while 83.3% of people in this group feel that innovative problem solving go a long way as a sign of an innovative organisation. In 39+ age group where 22.5% of our population fall, 44.4% feel that new ideas are important in innovation process and 55.6% put emphasis on innovative problem solving.

The p values for age and value innovation is at .00 thus indicating that there is a relationship between employee age and organisation innovation as our p value for age and value of innovation is significant for this variable as p value is < 0.05. Since the p value is < 0.05 thus we reject the null hypothesis. H0 and accept relationship between employee age and organisational innovation orientation.

Cross tabulation of gender and value of innovation reveal that 57.1% of males put emphasis on welcoming innovation as a whole within the organisation, 14.3% put emphasis on welcoming new ideas while 28.6% of males put emphasis on innovative problem solving to promote and harness innovation in the organisation. 68.4% of females in the organisation put emphasis on welcoming innovation as a whole in the organisation, 5.3% emphasise new idea generation while 26.3% of females promote innovation by innovative problem solving. The gender of the employees does not seem to

make any specific difference in individual or organisational orientation towards innovation. The p values of .596 indicate insignificant relationship between gender and organisational innovation process. There thus exists no relation between gender and innovation. Since the P value is > than 0.05 thus we accept the null hypothesis that gender does not play a role in impacting innovativeness of the organisation.

Cross tabulation of length of service with value of innovation also reveals some interesting observations. We see a positive relationship between length of service of employees and innovation in the organisation. We see that employees with < 5 years of service tenure, which comprises 20% of our respondent population, put 100% emphasis on welcoming innovation in any and every form within the organisation. Employees with 6-10 years of service experience (42.5% of our respondents) emphasize 94.1% on welcoming innovation while 5.9% on innovative problem solving to propel innovation within the organisation. Employees with 11-15 years of experience, 15% of our respondents feel that innovation in the organisation gets impetus more from innovative problem solving (83.3%) and only 16.7% feel that innovation flowers more and is propelled more by welcoming innovation as a whole within the organisation. Employees with 16-20 years of experience (22.5% of our respondents) feel that innovation is propelled more by innovative problem solving (55.6%) while 44.4% of employees in this age group feel that for innovation within the organisation, welcoming new ideas play a significant role in the process of innovation. The p value of .00 indicates there is a significant relationship between employee's length of service with the organisation and organisation innovation. Since the p value is <.05 so we reject the null hypothesis and accept correlative association between employees length of service and value of innovation.

Summaries of ANOVA Results and Interpretations thereof for Variables Viewed in Isolation

There are two major assumptions that data need to satisfy for the analyst to be able to perform ANOVA. Firstly, the treatments (or groups of *variables* in this case) need to be independent. This is assumed to be the case by the research design of this study. Secondly, the underlying distribution of each treatment (i.e. *factor*) needs to be normal. To determine the validity of this assumption, a range of tests pertaining to the location, range and distribution of the factors were performed prior to ANOVA.

The main outcomes of these preliminary analyses were the following:

The ANOVA results indicate that age seems to play a significant role in organisation innovation. When we check the means for each age group we find that the means increase with age. The F value for value of innovation and age is significant with p value of .000 and F value of 27.078. Therefore we can say that with age innovation and organisational innovativeness significantly improves.

When we look at ANOVA for gender and value of innovation it indicates that although there is difference in means between the genders but at a significance level of 0.05 indicate that genders play no role in organisation innovation. The F value (.322) for gender and value of innovation is insignificant with P value of .573 which is > .05. Thus the findings reiterate insignificant relationship between gender and innovativeness.

The ANOVA results for length of service and value of innovation show increase in means as length of service increases, thus indicating significant relation between the two. The F value of 36.134 with p value of .000 indicates significant relationship between innovation and length of service. As length of service increases, innovative suggestion and constructive role of employees in the innovation process takes place. Thus length of service significantly improves organisational innovation. The results suggest that the means improve with length of service and at a significance level of 0.05.

From the cross tabulation test and ANOVA we can say that the following hypothesis is proved:

H1: Organisation innovation significantly improves with employee's age.

H3: Organisation innovation significantly improves with length of service in the organisation.

However, the following hypothesis is not proved:

H2: Organisation innovation significantly differs between genders.

Discussion

Innovation is a term that is widely used in organisational development and business management literature, emphasizing how important it is for companies to be innovative if they want to survive current turbulent economic conditions. Management can be seen as the most important role players in the process of innovation. They must create the right conditions for innovation to take place, and must manage the whole process of innovation adequately. The new role that is envisaged for Human Resource practitioners is that of active partners in the design and execution of strategy. Innovation is one of the strategies that are being used by organisations in these turbulent economic times in which we live. Human Resource Management can play a crucial role in making innovative behaviour a reality.

The procedure generally known as the Analysis of Variance (ANOVA) and Cross-Tab Test was used to perform comparative analysis on the demographic variables.

ANOVA and Cross tab test were used with age, gender, and length of service and the organisation innovation. There are very few studies that investigate the relationship between age and innovation, gender and innovation, and length of service and innovation as was done in this study. Thus not all of the results of this study can be compared with other data. Where it is possible the results of this study is related to existing data. The following research articles also investigated the relationship between age and innovation, gender and innovation, and length of service and innovation: Bantel and Jackson (1989), Harhoff (1999), Reuvers, Van Engen, Vinkenburg and Wilson-Evered (2008), and The Harvard Business Essentials (2003).

The results of the study were as follows:

Age and innovative behaviour

Age seems to play a significant role in organisation in organisational innovative process. The organisation seems to have a young and vibrant population base as 77.5% of respondents are below 38 years of age. Since the employee base comprises of young employees so the innovative quotient of the organisation will tend to be on an upward curve. We see a positive and significant relation between age and innovative behaviour.

Gender and innovative behaviour

Our study tried to incorporate a fair representation of both the genders in our study. However the results of this study indicate that there is no significant relationship between gender and innovation.

Length of service and innovative behaviour

According to Goffin and Mitchell (2005) and Holt (1992) of the outside sources of innovation opportunity, demographics are the most reliable. The demographics for the next 50 years show that many markets will evolve. Those who are aware of changing demographics can exploit the opportunities and reap great rewards and thus experience of employees may come to play an important role in the process of innovation. Experience has traditionally been considered as an added boon in job performance and so we included experience as a factor of our study drawing its inter-relationship with innovativeness in the organisation.

Employees show innovativeness differently with different experience brackets. We see that peaking of innovation with experience happens between people holding 6-10 experience. The results of this study indicate that there is a significant positive relationship between length of service and innovation.

RECOMMENDATIONS

Policy recommendations

At present there is a lot of transformation taking place in Indian organisations where the equity principle is followed and organisations are expected to adhere. Innovation is a necessity for organisations if they want to survive in a competitive global market. Innovation is a complex and dynamic process. If policies regarding equity employment do not take into consideration the complex and dynamic nature of innovation, it can be detrimental to the well-being of organisations and ultimately the country itself. Organisations will have to inform themselves on the processes important within innovation. It is particularly important when appointing or developing employees.

Recommendations for practice

Many organisations implement programmes to be more competitive in the marketplace. Such programmes should focus on the specific individual characteristics of individuals, while keeping in mind the demographic influences on innovation.

Recommendations for further research

Although the demographic variables were related to the different factors of innovation, more detailed information on some of the demographic variables is needed to be able to make more detailed and complete analyses of their relationship with innovation. In this regard specifically two variables come to mind: More detailed information is needed on the educational level, seniority and the industry sector. One will be able to make more meaningful interpretations of the data if it is known in what field a person's qualifications lie. It would then be possible to see whether there is a significant difference for instance between those who have a degree in an engineering field, the natural sciences, the social sciences and the economic and management sciences.

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