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Human Resources Factors and New Product Development

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ABSTRACT

The customer expectations from an automobile industry has created competitive pressure and enriched the industry with attitude, knowledge, flexibility and speed for new challenges and changes. Processes are being streamlined and teams are reorganized and redeployed for higher productivity, enhanced quality, timely delivery and low cost. Together with these changes, companies are looking for ways to plan better and control their operations by shifting away from rigid and pre planned activities to quick response to changes. New Product development management has become a major component of competitive strategy to enhance organizational productivity and profitability. There is a human resource impact for a competitive advantage of new product development management - for speed, for creating an enhanced environment for an interactive role and for breaking the barriers on increasing reliability and dependability of new product and development. There is a demand for talent. There is significant role of the human resources in developing a successful new product. It should ensure right talent at the right time and make it a part of drivers for new product development. The factors that are critical for selecting the right human resource for new product development in automobile industry have been listed and established as important and can be considered during selecting human resource for new product development in automobile industry. A framework has been developed with the factors and links has been established between factors and successful new product development in selected automobile industry. The study is being carried out to identify factors and its relationship which can be used to position the right person, at the right place, at the right time for an automobile industry that undertakes new product development.

1. INTRODUCTION

New product development management has been a major component of competitive strategy to enhance organizational productivity and profitability. The strategies and technologies for effectively managing a new product development is quite a vast area to be worked. In recent years, organizational performance measurement and metrics have received much attention. Performance measurement and metrics pertaining to new product development management, specifically covering new product development have not received adequate attention. New product development management has been a major component of competitive strategy to enhance organizational productivity and profitability. The strategies and technologies for effectively managing a new product development is quite a vast area to be worked. In recent years, organizational performance measurement and metrics have received much attention. Performance measurement and metrics pertaining to new product development management, specifically

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covering new product development have not received adequate attention. Life time employment with a single employer as a career pattern is declining because today's contemporary careers are increasingly pursued in economic and organizational settings that are significantly different from those in the last two decades. Challenging realities of the new economy, increased global competition and uncertainty, rapid technological advances and shortened product cycles creating pressure for lower costs, higher productivity and high energy team have forced many firms to change their structures, processes and human resource practices in significant ways. To enhance the performance in new product development one of the ways may be a refinement in the induction of people for new product development. An appropriate identification and understanding of the factors in selection development resource for successful new product development will enhance quality, cost and delivery of the new product.

2. PURPOSE OF THE STUDY

The study attempts to contribute to the knowledge pool for the new product development. It seeks to understand the factors for the development professionals getting selected for new product development team for achieving superior successful products in automobile industry. The data collected were examined to discover the acceptance by experts and practitioners on the factors important for the engineers getting inducted for new product development team. The result is expected to enlighten the factors importance and its relationship. It is also expected to craft an improved quality level in the induction of the new product development engineers enabling enhancement in speed, technologies, customer understanding and team working with a resultant improvement in quality, cost and delivery and thereby successful new product.

3. SCOPE OF THE STUDY

The scope of this study is also constrained with ten factors which are imperative to be in new product development professionals. The study has been conducted in India with automobile organizations listed in Automotive Components Manufacturers Association of India 2010 (ACMA). This study focuses and limits to automobile new product development professionals involved from new product conceptual design till the handing over the new product developed for mass production. The automobile industry in India works with the base from its experience and has got enhanced from systems from west. The APQP (Advanced Product Quality Planning) has been framed by Ford, Chrysler and General Motors.

APQP is a process for product development system developed in the late 1980s for General Motors, Ford, Chrysler and their suppliers. It is a framework of techniques and procedures used to develop products in automobile industry. According to the Automotive Industry Action Group, generally known as AIAG (a not-for profit association created to develop recommendation and framework for the improvement of quality in the North American Automotive Industry) the purpose of using APQP is to produce a product quality plan that will support development of a product which will satisfy the customer. APQP focuses on up-front quality planning, customer satisfaction evaluation and support continual improvement.

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4. SIGNIFICANCE OF THE STUDY

In today's environment, there exists a situation where the "change" is anticipated and has to be accepted in any field. The automobile industry has been gearing up for a rapid growth for which they have been relying upon human resource – the right human resource at the right time. Employing the professionals who are required for the development of the new product development has been a challenge for the organisations involved in new product development. The development of new product needs multi-faceted professionals who will be able to take up the challenge of making a new automobile.

The significance of the study is to identify the key factors, its importance and its relationship that helps in achieving success in new product development. These factors need to be identified in an engineering professional, during the induction into new product development team. This enables an organisation to get identified separately from competition through successful new product with respect to the target quality, cost and delivery.

5. STATEMENT OF PROBLEM

The factors that are to be in human resource for successful new product development in automobile industry has to be listed. The listed factors has to be grouped and related with a framework that enhance contribution to new product development success. The current scenario in selection of professionals for new product development in automobile industry has tolerance in their selection process and tries to manage without considering set of factors that are critical for professionals getting inducted. The general practice in the organisation is to fill the requirements with the available internal talent pool, if not available, and then recruit similar experience from outside. This practice may not always lead organisations to get the deliverable for new product development such as cost, quality and delivery. Also the set of factor's collective strength is yet to be tamed and harvested by automobile organisations to understand its strength in new product development success. There is a need for identifying set of factors in human resource getting inducted to handle the complex activities of new product development. The set of factors in a frame work and its united energy has to be revealed.

6. OBJECTIVES OF THE STUDY

- To study overall human resource factors and new product development
- To explore the impact of factors that lead to success in automobile new product development.
- To construct a framework illustrating the relationship among the factors that enhances successful new product development in automobile industry.

STUDY AREA

The study area has been restricted to development professionals working for automobile industry in India. This covers original equipment manufacturers and automobile ancillaries in India.

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7. RESEARCH DESIGN

The research design selected is cross sectional design. The study is to identify the factor, develop frame work that enhances success in new product development.

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STANDARDIZED REGRESSION COEFFICIENT

PATH OF THE FACTORS			STANDARDIZED REGRESSION CO-EFFICIENT	T VALUE	P VALUE
CFW	<-	CL	0.095	2.312	0.021*
CFW	<-	CRE	0.154	3.806	<0.001**
CFW	<-	IPS	0.194	4.607	<0.001**
CFW	<-	LPT	0.223	4.886	<0.001**
CFW	<-	TCS	0.201	4.628	<0.001**

TABLE NO 1

IPS – Interpersonal skill; TCS – Techno-commercial skill; CRE – Creativity; LPT – Later proactive thinking; CL – Continuous learning; CFW – Cross functional working;

Note:

- ** denotes significance at 1% level
- * denotes significance at 5% level
- P value 0 to 0.01 rejects NH at 1% level
- P value 0.011 to 0.05 rejects NH at 5% level
- P value > 0.05 accept NH at 5% level

The value of R square for cross functional working is 0.452 which means that 45.20% of the variation in cross functional working (y) is explained by continuous learning (x_1), creativity (x_2), interpersonal skill (x_3), lateral proactive thinking (x_4) and techno - commercial skill (x_5) the predictor variables and error variance accounted for 54.80% which is the variation within cross functional working itself. This is significant at 1% probability level. The equation (4.1) shows the relation between cross functional working and interpersonal skill, continuous learning, techno-commercial skill, creativity and lateral proactive thinking.

The standardized regression coefficient for all the factors indicates statistical significance at 1% level except continuous learning which is significant at 5% level. The estimated positive sign implies that such effect is positive that Cross functional working would increase by 0.095 for every unit increase in continuous learning. The cross functional working would increase by creativity (0.154), interpersonal skill (0.194), lateral proactive thinking (0.223) and techno-commercial skill (0.201) for every unit change in them. As a summary the highest impact on cross functional working is from lateral proactive thinking followed by techno-commercial skill, interpersonal skill, creativity and continuous learning.

Multicollinearity is a phenomenon in which two or more predictor variables in a model are highly correlated which may change erratically in response to small change in the model or the data. The check for multicollinearity has been done for understanding how well the predictors predict the outcome variables. This is confirmed from variance inflation factor (VIF) and its tolerance. A tolerance more than 0.2 or 0.1 and/or a VIF less than 5 or 10 indicates that there is no multicollinearity. In this relationship between cross functional working and its predictors

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Interpersonal skill, continuous learning, techno-commercial skill, creativity and lateral proactive thinking the tolerance have been found in the range of 0.525 and 0.661 with VIF between 1.513 to 1.905 that are well within the range and confirms that there is no multicollinearity.

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STANDARDIZED REGRESSION COEFFICIENT

PATH OF THE FACTORS			STANDARDIZED REGRESSION CO - EFFICIENT	T VALUE	P VALUE
SIS	<-	CL	0.053	1.277	0.202
SIS	<-	CRE	0.166	4.033	<0.001**
SIS	<-	CFW	0.157	3.509	<0.001**
SIS	<-	IPS	0.177	4.127	<0.001**
SIS	<-	LPT	0.186	3.979	<0.001**
SIS	<-	TCS	0.132	2.977	0.003**

TABLE NO 2

IPS – Interpersonal skill; TCS – Techno-commercial skill; CRE – Creativity; LPT – Later proactive thinking; CL – Continuous learning; SIS – Supplier integrating skill; CFW – Cross functional working;

Note:

- ** denotes significance at 1% level
- * denotes significance at 5% level
- P value 0 to 0.01 rejects NH at 1% level
- P value 0.011 to 0.05 rejects NH at 5% level
- P value > 0.05 accept NH at 5% level

The value of R square for supplier integrating skill is 0.451 which means that 45.10% of the variation in supplier integrating skill (y) is explained by continuous learning (x_1), creativity (x_2), cross functional working (x_3), interpersonal skill (x_4), lateral proactive thinking (x_5) and techno-commercial skill (x_6) the predictor variables and error variance accounted for 54.90% which is the variation within Supplier integrating skill itself. This is significant at 1% probability level. The equation (4.2) shows the relation between supplier integrating skill and interpersonal skill, continuous learning, techno-commercial skill, creativity, lateral proactive thinking and cross functional working.

The standardized regression coefficient for all the factors indicates statistical significance at 1% level except continuous learning which is not significant. The estimated positive sign implies that such effect is positive that supplier integrating skill would increase by 0.053 for every unit increase in continuous learning. Further supplier integrating skill would increase by creativity (0.166), cross functional working (0.157), creativity (0.177), lateral proactive thinking (0.186) and techno-commercial skill (0.132) for every unit change of the predictor variables. As a summary, the highest impact on supplier integrating skill is from lateral proactive thinking followed by interpersonal skill, creativity, cross functional working, techno-commercial skill, and continuous learning.

Multicollinearity in this relationship between supplier integrating skill and its predictors interpersonal skill, continuous learning, techno-commercial skill, creativity, lateral proactive

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thinking and cross functional working the tolerance have been found in the range of 0.501 and 0.643 with VIF between 1.556 to 1.996 and confirms that there is no multicollinearity.

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STANDARDIZED REGRESSION COEFFICIENT RESULTS FOR HYPOTHESIS TESTING H4

PATH OF THE FACTORS			STANDARDIZED REGRESSION CO-EFFICIENT	T VALUE	P VALUE
INN	<-	CL	0.033	0.795	0.427
INN	<-	CRE	0.259	6.028	<0.001**
INN	<-	CFW	0.145	3.170	0.002**
INN	<-	IPS	0.201	4.498	<0.001**
INN	<-	LPT	0.086	1.832	0.067
INN	<-	SIS	0.110	2.435	0.015*

TABLE NO 3

IPS – Interpersonal skill; INN – Innovation; CRE – Creativity; LPT – Later proactive thinking; CL – Continuous learning; SIS – Supplier integrating skill; CFW – Cross functional working;.

Note:

- ** denotes significance at 1% level
- * denotes significance at 5% level
- P value 0 to 0.01 rejects NH at 1% level
- P value 0.011 to 0.05 rejects NH at 5% level
- P value > 0.05 accept NH at 5% level

The value of R square for Innovation is 0.422 which means that 42.20% of the variation in Innovation (y) is explained by continuous learning (x_1), creativity (x_2), cross functional working (x_3), interpersonal skill (x_4), lateral proactive thinking (x_5) and supplier integrating skill (x_6) the predictor variables and error variance accounted for 57.80% which is the variation within Innovation itself. This is significant at 1% probability level. The equation (4.3) shows the relation between innovation and interpersonal skill, continuous learning, techno-commercial skill, creativity, lateral proactive thinking, cross functional working and supplier integrating skill.

The standardized regression coefficient for creativity, cross functional working and interpersonal skill factors indicates statistical significance at 1% level and supplier integrating skill significant at 5% level. The analysis shows both lateral proactive thinking and continuous learning not statistically significant. The estimated positive sign implies that such effect is positive that innovation would increase by 0.033 for every unit increase in continuous learning. Further innovation would increase by creativity (0.259), cross functional working (0.145), interpersonal skill (0.201), lateral proactive thinking (0.086) and supplier integrating skill (0.11) for every unit change of the predictor variables. As a summary the highest impact on innovation is from creativity followed by Interpersonal skill, cross functional working, supplier integrating skill, lateral proactive thinking and continuous learning.

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Multicollinearity in this relationship between innovation and its predictors interpersonal skill, continuous learning, creativity, lateral proactive thinking, cross functional working and supplier integrating skill the tolerance have been found in the range of 0.517 and 0.673 with VIF between 1.485 to 1.933 and confirms that there is no multicollinearity.

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8. LIMITATIONS OF THE STUDY

- Like any other study, the results of this study must be evaluated with certain key limitations which are listed below:
- The limitation of this study is primarily to automobile industries in India.
- The age and maturity of the organisation is not considered during analysis in this study, the output may be differing, if studied in specific.
- This study does not differentiate the size (small / medium / large) of the organisation; the focus on size of the organisation may change the outcome.
- In this study the aspects like age, gender and location of the organisation were not considered to impact the study results.

9. SUGGESTIONS

What emerges from the research is skill identification and inventory planning than a competency model. In other words, companies ultimately should build a compendium of development professional with knowledge and skill sets, instead of job or task specific profiles, describing the full array of characteristics prerequisite for successful performance of professionals and organisation in new product development – especially an individual's underlying personal traits, interests and motives on which the ability and desire to exercise professional expertise depend. The factors listed and related through a framework show the strength and direction of the relationship between factors. These strengths of the relationship can be utilized by the automobile industry by identifying them in the development professionals getting selected for automobile new product development. When these factors profiled in a professional, enable the automobile organisation plan the team for new product development. The listed factors may be varying between individuals, but the identification of its presence gives clear understanding of the professionals, their present capability and allows the organisation to plan training and exposure for their gaps or improvements.

10. CONCLUSION

The research concluded existence of positive statistical evidence for the listed factors which are acknowledged as essential to be recognized during the induction of the development professionals into a new product development team. However further research may be taken up focusing implementation portion of this factors identification. This study may enable in profiling human resource with a system framed in recruiting and positioning resources that will be able to manage the new product development in a way that provides the organisation a chance to serve the customer as they wish and also beyond. The validation of the framework can be taken up in the real world for further research which may increase the confidence of the factors and framework. It will help the organisations in implementation of the selection method using the factors and positioning of the resource at the right place benefits the organisation in successful new product development.

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