

## A STUDY OF INNOVATIVE AND RESEARCH & DEVELOPMENT INITIATIVES IN THE SELECTED INDUSTRIAL ORGANIZATIONS IN PUNE REGION: A PILOT STUDY

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### ABSTRACT

*A study of Innovative and Research & Development initiatives in selected industrial organizations in Pune was carried. The inclusion criteria was a minimum turnover of Rs.100 crore of the company. Main aim of the study was the examination of role of HR initiatives in creating an innovative and Research and Development culture in corporate organizations. Additionally the study also explored the role of factors that mediate this relationship. Before the full-fledged study was carried, a pilot study was carried based on a sample size of 40 respondents which represented 10% of the sample size of the full study. Result showed that the culture of the select industrial organizations does not reflect innovation and R&D. There is a strong correlation between the lack of HR initiatives with the missing innovative and R&D culture. Additionally, there are significant factors that mediate in influencing HR initiatives in creating an innovative and R&D culture. This paper presents the pilot study.*

**Keywords:** HR Initiatives, Innovative culture, R and D culture, Corporate from Pune.

### Introduction

This work deals with the examination of role of HR initiatives in creating an innovative and Research and Development culture in corporate organizations. 100's of international companies are working towards innovation. The most innovative companies drive innovation at the individual, team and organizational levels. They enjoy two advantages. 1st, they are more efficacious at generating and executing new ideas. 2nd, their employees are more involved. This means that they are more fruitful and dedicated to the organization.

The study was carried with the following objectives:

- To study the role of HR in building an innovation culture in the organization,
- To study different HR initiatives that can set-up an innovation culture in the organization,
- To assess the culture of select industrial organizations to find out if it reflects innovation and R&D,
- To find out if there is a correlation between the HR initiatives (or lack of it) with the innovative and R&D culture,
- To ascertain the factors that mediate in influencing HR initiatives in creating an innovative and R&D culture, and

- To study the expected contribution from HR in achieving the innovation mandate of the organization.

400 employees from Corporate organizations in Pune were surveyed for the study. Before the main study was undertaken a pilot study was carried with a sample size of 40. The objectives of the pilot study were as under:

- a. To get a feel of issues to be encountered in data collection
- b. To test the usage of the questionnaire
- c. To test the hypotheses as per research methodology
- d. To test validity and reliability of questionnaire prepared for primary data collection

### Literature Review

No culture can be innovative without great individuals, and the demands on visionaries have never been bigger. It used to be the case that R&D organizations could hire a top expert to work on a particular project. In current fierce competition for those with the most varied skill sets, this restricted method doesn't work (Ishak, 2017). Culture, in its several arrangements, has always been a severe driver of revolution. The study emphasizes on creating few understandings into the role of "culture for open revolution dynamics" (Yun et al. 2020).

The aim of the study is to explore the associations between green organizational culture, green innovation and competitive advantage. The outcomes specify that green organizational culture has a positive impact on green innovation and competitive advantage (Gürlek & Tuna 2018). The study was led in Iran and focused to assess the associations among technology gaining & exploitation, organizational modernization, and organizational performance (Fartash et al. 2018). Rapid development in technological innovation needs organizations to enhance a culture that nurtures innovation practices for sustainable growth within global competition (Shahzad et al. 2017). The study focuses to understand the impacts of knowledge gaining on innovation practices and the regulating impacts of HRM, in terms of employee retention and HRM techniques, on this association. The outcomes specify that knowledge gaining positively impacts innovation performance and that HRM regulates the association between knowledge gaining and innovation performance (Papa et al. 2018). While governments have implemented employee empowerment practices all over the globe, they are also worried with and desire to decrease hurdles to innovation in the public sector (Demircioglu 2018). The aim of the study is to discover innovation hurdles in academic libraries. Through study of hurdles to innovation, the experts can further clarify the behaviour of innovation in academic library contexts, which can aid to eradicate determinants that hinder innovation (Chuang et al. 2019). Knowledge is measured as a planned asset for the organizations, particularly for knowledge-intensive organizations. Research and development (R&D) is a vital unit in organizations, as it is dedicated to knowledge generation and transfer (Jha & Varkkey 2018). An information has arisen from study on Western new product development (NPD). Though, the effect of nation and culture - specific impacts on these procedures has not been evaluated in detail yet. Therefore, the study recognizes the variances in NPD tactics among the Indian and German research and development (R&D) companies of

multinational companies (MNCs) (Brem and Freitag 2019).

### Research Gap

Studies on innovative and R & D culture in organizations are widely seen (Ishak 2017; Yun et al. 2020; Dodge et al. 2017). Same is the case with literature on benefits of innovative and R & D culture in organizations (Gürlek & Tuna 2018; Fartash et al. 2018; Frishammar et al. 2019). However when it comes to studying role of HR in building Innovative and R & D culture in organizations the gap is quite distinctly seen both in conceptual and contextual terms. For example the study by Tajeddini et al. (2020) merely states that significant benefits can be exploited if HR plays a role in improving innovative culture. But how HR can exactly do this is not discussed. Only one study (Krishnan & Prashantham, 2019) dealing with Indian organizations is found on role of HR in building innovative and R & D culture. Given the fact that an innovative and R & D culture can significantly advantage organizations and also the lack of comprehensive research in this area, both, in conceptual & contextual terms, this study was undertaken to address the following questions:

RQ1: Does HR have a significant role in building innovative culture in an organization?

RQ2: What are the various Innovative Practices and Research and Development initiatives in the organization?

RQ3: Does the select industrial organizations culture reflect innovative and R&D?

RQ4: Is there a correlation between the HR initiatives (or lack of it) with the innovation and R&D culture?

RQ5: What factors mediate in influencing HR initiatives in creating an innovative and R&D culture?

RQ6: What measures can be taken by HR in achieving the innovation mandate of the organization?

### Methodology

**Sample**– The sample size for the main study was rounded off to 400 employees. For the pilot study, 10% of 400 employees or 40 employees were selected as sample.

**Instrument for survey** – A Questionnaire was designed for this purpose. It was modified as per suggestions given by the guide. The questionnaire was divided in 4 main sections and 10 questions were framed under each of the sections. These sections were - Innovative Practices and Research and Development initiatives; R&D Culture; HR Initiatives and Mediating Factors. The responses to the questions were taken on a 5-point Likert scale. The questionnaire was tested for validity and reliability as under –

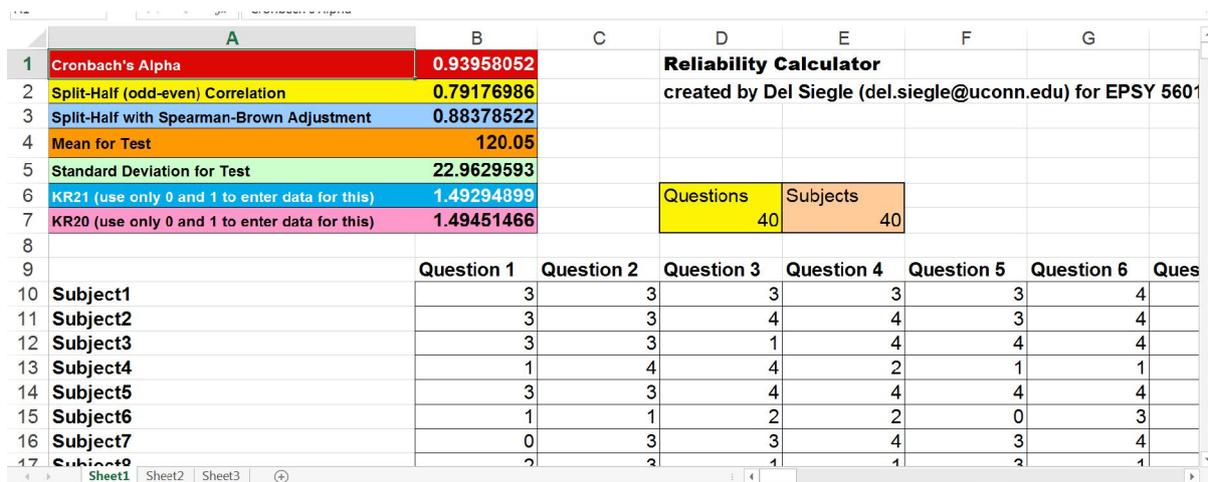
**Test of validity** –The hypotheses, hypotheses testing method, questionnaire etc. were validated by the Guide and other experts in the field so as to ensure that the measurement was adequate and accurate in terms of the desired direction.

A check-list as prescribed by Collingridge et al. (2015) was applied for validation as under –

**Table 1: Application of Collingridge check-list for validation**

Step No.	Step	Action
1	Establish Face Validity	The questionnaire has been validated for face validity by guide and group of experts.
2	Clean Collected Data	Our mechanism of collecting data ensures that there is no invalid entry because there is no entry only. It is a selection for range of options.
3	Use Principal Components Analysis (PCA)	Too many variables not being under consideration PCA was not used.
4	Check Internal Consistency	This was done through Cronbach’s Alpha

**Test of reliability** – Cronbach’s Alpha and other tests were applied on the questionnaire using “Siegle Reliability Calculator” an excel program and the results are summarized as under:



**Figure 1: Cronbach’s Alpha score for entire questionnaire**

As the Cronbach’s alpha score was more than 0.70, the questionnaire was considered as reliable.

**Hypotheses formulation-**

The hypotheses formulation is presented below-

**Table 2: Hypotheses formulation**

Sr. No.	Area of study	Null hypothesis	Alternate hypothesis
1	Innovation and R&D Culture	The culture of the select industrial organizations reflects innovation and R&D	The culture of the select industrial organizations does not reflect innovation and R&D
2	HR Initiatives	There is no correlation between the HR initiatives (or lack of it) with the innovative and R&D culture	There is a correlation between the HR initiatives (or lack of it) with the innovative and R&D culture
3	Mediating Factors	There are no significant factors that mediate in influencing HR initiatives in creating an innovative and R&D culture	There are significant factors that mediate in influencing HR initiatives in creating an innovative and R&D culture

**Scheme formed for testing of hypotheses**

- A survey questionnaire was designed to collect primary data in order to test the hypothesis as stated earlier.
- In line with the hypothesis the questionnaire was divided into following parts / sections:
  1. Innovative Practices and R&D initiatives;
  2. R&D Culture;
  3. HR Initiatives; and,
  4. Mediating Factors
- Each section had ten questions
- Responses to these questions were taken on 5-point Likert scale
- The responses were 0 – Can’t Say, 1- Somewhat Agree, 2 – Strongly Agree, 3 – Somewhat Disagree and 4 – Strongly Disagree
- The responses under each of the sections were aggregated under two opposite groups of agree and disagree.
- For each of the extreme responses, a weight of 2 were applied so as to distinguish them from the non-extreme responses.
- Percentages to questions under one particular section of the questionnaire were averaged to get a single score for that section.
- The section-wise average score percentage were compared with a hypothesized mean of the population of 50% score connoting an event by chance and not due to statistical significance.
- Hypothesis H1 were tested using a t-test.
- Hypothesis H2 was tested using simple regression with R&D culture as dependent variable and HR Initiatives as independent variable.
- Hypothesis H3 was tested using a multiple regression with R&D culture as dependent variable and HR Initiatives and mediating variables as independent variables.
- P-values along with R<sup>2</sup> values were calculated and the null hypotheses were checked for rejection or non-rejection.

**Data analysis and interpretation**

Descriptive analysis is shown in Table 3.

Age	<30 years	30-40 years	40-50 years	>50 years	Total	
Count	8	12	11	9	40	
Percentage	20%	30%	28%	23%	100%	
Role	Executive	Manager	Others	Total		
Count	11	15	14	40		
Percentage	28%	38%	35%	100%		
Industry type	Manufacturing	IT	Others	Total		
Count	13	12	15	40		
Percentage	33%	30%	38%	100%		
Work experience	<5 years	5-10 years	10-15 years	>15 years	Total	
Count	5	3	20	12	40	
Percentage	13%	8%	50%	30%	100%	
Education	Graduate	Post Graduate	Professional	Others	Total	
Count	0	18	22	40		
Percentage	0%	45%	55%	100%		
Department	Operations	Marketing	HR	Accounts	Others	Total
Count	11	10	4	9	6	40
Percentage	28%	25%	10%	23%	15%	100%
Total strength of employees	<100	100-500	>500	Total		
Count	16	9	15	40		

Percentage	40%	23%	38%	100%		
Average approximate annual turnover	Rs.100-500 crores	Rs.500-Rs.1000 crores	>Rs.1000 crores	Total		
Count	8	18	14	40		
Percentage	20%	45%	35%	100%		
Average % spend on R and D of turnover	<1%	1-5%	5-10%	>10%	Total	
Count	16	8	7	9	40	
Percentage	40%	20%	18%	23%	100%	

**Table 3: Descriptive Data**

A total of 40 employees were surveyed. Out of the 40, 8 were <30 years old, 12 were between 30-40 years, 11 were between 40-50 years and 9 were >50 years old. In terms of role, 11 were Executive, 15 were Managers and 14 were others. In terms of the industry type, 13 belonged to manufacturing, 12 belonged to IT, while 15 belonged to others. Out of the 40, 5 had work experience <5 years, 3 had between 5-10 years, 20 had between 10-15 years and 12 had >15 years of experience. In terms of education, 18 were Post Graduate and 22 were Professionals. Out of the 40, 11 were working in Operations, 10 in Marketing, 4 in HR, 9 in Accounts and 6 in others. In terms of strength

of employees at workplace, 16 belonged to <100 bucket, 9 belonged to 100-500 bucket and 15 belonged to >500 bucket. In terms of annual revenue, 8 belonged to 100-500 Cr. category, 18 belonged to 500-1,000 Cr. category and 14 belonged to >1,000 Cr. category. And lastly, in terms of R&D spend as % of sales, 16 belonged to <1% bracket, 8 belonged to 1-5% bracket, 7 belonged to 5-10% bracket and 9 belonged to >10% bracket. Summary of the responses to the first section of the questionnaire about visibility of the Innovative Practices and R and D initiatives in the organization are given in Table 4:

**Table 4: Summary of responses to Section I of the questionnaire**

Practice	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	Average
Lack of visibility	85%	84%	70%	65%	77%	78%	80%	77%	83%	75%	77%

**Inferential analysis (Testing of hypotheses)**

**1) Hypothesis 1:**

The average responses to section II of the questionnaire were as follows:

**Table 5: Responses to Section II**

Statement	1	2	3	4	5	6	7	8	9	10	Avg.
% Disagreement	81%	81%	86%	85%	75%	76%	80%	72%	82%	80%	80%

Taking this as the sample mean, hypothesis was tested using a t-test as tabulated below:

**Table 6: Testing of Hypothesis 1**

Parameter	Value
Average	80%
SD (Standard Deviation)	1.02712
H1 (Hypothesized mean of population)	50%
Ho (Sample mean)	0.80
n (Sample Size)	40
t-value	1.83
p-value	0.037548

Given that p-value is <0.05, we reject null hypothesis.

**2) Hypothesis 2:**

Hypothesis 2 was tested using simple regression using R&D Culture as dependent variable and HR initiatives as independent variable.

**Table 7: Summary statistics H2**

Variable	Observations	Obs. with missing data	Obs. without missing data	Minimum	Maximum	Mean	Std. deviation
Avg. Culture	40	0	40	-1.900	1.900	-0.843	0.952
Avg. Initiatives	40	0	40	-1.800	1.800	-0.898	0.896

**Table 8: Correlation matrix H2**

	Avg. Initiatives	Avg. Culture
Avg. Initiatives	<b>1</b>	0.947
Avg. Culture	0.947	<b>1</b>

**Table 9: Analysis of variance (Avg. Culture) H2**

Source	DF	Sum of squares	Mean squares	F	Pr > F
Model	1	31.680	31.680	329.092	<b>&lt;0.0001</b>
Error	38	3.658	0.096		
Corrected Total	39	35.338			

Interpretation (Avg. Culture):

Given the R<sup>2</sup>, 90% of the variability of the dependent variable Avg. Culture is explained by the explanatory variable. Given the p-value of the F statistic computed in the ANOVA table, and given the significance level of 5%, the information brought by the explanatory variables is significantly better than what a basic mean would bring.

Given the p-value <0.05, the second null hypothesis was rejected.

**3) Hypothesis 3:**

Hypothesis 3 was tested using multiple regression using R&D Culture as dependent variable and HR initiatives and mediating factors as the independent variables.

**Table 10: Summary statistics H3**

Variable	Observations	Obs. with missing data	Obs. without missing data	Minimum	Maximum	Mean	Std. deviation
Avg. Culture	40	0	40	-1.900	1.900	-0.843	0.952
Avg. Initiatives	40	0	40	-1.800	1.800	-0.898	0.896
Avg. Med.Factors	40	0	40	-1.900	1.300	-0.968	0.925

**Table 11: Correlation matrix H3**

	Avg. Initiatives	Avg. Med.Factors	Avg. Culture
Avg. Initiatives	<b>1</b>	0.965	0.947
Avg. Med.Factors	0.965	<b>1</b>	0.966
Avg. Culture	0.947	0.966	<b>1</b>

**Table 12: Analysis of variance (Avg. Culture) H3**

Source	DF	Sum of squares	Mean squares	F	Pr > F
Model	2	33.056	16.528	267.950	<0.0001
Error	37	2.282	0.062		
Corrected Total	39	35.338			

Interpretation (Avg. Culture):  
 Given the R<sup>2</sup>, 94% of the variability of the dependent variable Avg. Culture is explained by the 2 explanatory variables. Given the p-value of the F statistic computed in the ANOVA table, and given the significance level of 5%, the information brought by the

explanatory variables is significantly better than what a basic mean would bring. Given that p-value is <0.05, we reject the null hypothesis.

**Summary of inferential analysis**

Summary of the testing of the three hypotheses along with their interpretation is given below -

**Table 13: Summary of inferential analysis**

Sr. No.	Null Hypotheses	R <sup>2</sup> / p-value	Decision	Interpretation
1	The culture of the select industrial organizations reflects innovation and R&D	p-value 0.037	Reject Null	The culture of the select industrial organizations does not reflect innovation and R&D
2	There is no correlation between the HR initiatives (or lack of it) with the innovative and R&D culture	90% / <0.0001	Reject Null	There is a correlation between the lack of HR initiatives with the missing innovative and R&D culture
3	There are no significant factors that mediate in influencing HR initiatives in creating an innovative and R&D culture	94% / <0.0001	Reject Null	There are significant factors that mediate in influencing HR initiatives in creating an innovative and R&D culture.

**Conclusion**

The culture of the select industrial organizations does not reflect innovation and R&D. There is a strong correlation between the lack of HR initiatives with the missing innovative and R&D culture. Additionally, there are significant factors that mediate in influencing HR initiatives in creating an innovative and R&D culture. While the independent variable HR initiatives returns R<sup>2</sup> of 90%, the multiple regression along with the mediating factors shows that the R<sup>2</sup> is 94%. Thus, the mediation effect is seen. Data collection is possible with reasonable comfort.

Processing of the data into variables required for inferential data analysis can be done. The hypotheses can be duly tested as per research methodology. The questionnaire prepared for primary data collection tests well for validity and reliability. However, respondents demanded confidentiality. Referring to an articles (PageUp 2017) statement – “HR is well-positioned to create a significant strategic impact, but has been criticized for lack of business acumen”, it was decided to add a question to this effect in the expert interview questionnaire.

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