A Comparison between Fresh and Old Employees' Adoption and Agility in Technological Changes

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Abstract

The aim of this study is to compare fresh and old employees' adoption and agility in technological changes according to their vintage-specific human capital. It is inquired that who are more adopted and agile in technological changes since fresh employees have updated skills and education related to new vintage and old employees have obsolescent skills related to old vintage. Therefore, this study assumes that whether fresh employees with updated skills are more adopted and agile in technological changes or old employees with obsolescent experience. Two questionnaires about adoption and agility are distributed among 324 top level managers in IT companies in Pune-India. In this perception study, the respondents are asked for filling the questionnaires according to their opinion about their fresh and old employees' adoption and agility in technological changes. The data analyzed through Wilcoxon Signed Ranks Test show there is a significant difference between fresh and old employees' adoption and agility in technological changes. It can be inferred that fresh and old employees' adoption and agility are needed for a satisfactory technological change. Since both of their vintage-specific human capital is complementary to each other to have an optimal technological change.

Keywords: *Adoption, Agility, Vintage-specific Human Capital, Technological Change*

INTRODUCTION

In recent technological changes, arising in organizational life time after time; employees need to adopt new technologies timely. In other words,

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insomuch continuous updation and upgradation of technologies are occurring in organizations, employees' adoption and agility in facing with these changes are needed. A satisfactory change needs an agile adoption toward environmental changes (Song, 2009). On the other hand, there are influential factors recognized as the main enhancers of employees' adoption and agility in technological changes. Then, this study presumes that adoption and agility would be determined and increased through different modes of human capital (Bass, 1969; Comin and Hobijn, 2009; Yaghoubi and Rahat Dahmardeh, 2011; Comin and Mestieri, 2014). Employees' skills and knowledge are the main factors in diffusing and adopting new technologies (Rosenberg, 1972). Besides, a model is developed in which it is highlighted that increase in learning and knowledge related to new technology would increase the speed of adoption in organizations (Attewell, 1992). So indirectly it is claimed that adoption and agility in technological changes can be increased through human capital. Fresh employees are recognized as those employees who achieve their skills through education or training meanwhile old employees are those who achieve their experience via working with a technology (Helpman and Rangel, 1998). Besides, organizations need to recruit and retain fresh and old employees, respectively. Because the former ones are skillful, knowledgeable and updated in new technology whereas the latter ones are experienced in old technology. Then each category might have its own advantages to have satisfactory technological changes in organizations (Kredler, 2008). A new production technology is called as a new vintage while an obsolescent technology would be called as an old vintage. So a technology-specific skill is recognized as a vintage-specific human capital. So it is presumed that fresh employees hold updated skills and knowledge related to new vintage and old employees who are experienced in old technology hold obsolescent human capital related to old vintage (Kredler, 2014). It is worthwhile to mention that on the one hand, adoption is considered as a cognitive-behavioral ability (Davis, 1986) and similarly agility as a cognitive-behavioral one (Zain et al., 2005). On the other hand, agility is determined as behavioral feature in some cases (Bullinger, 1999) while adoption as cognitive one (Rosenberg, 1956). Through reviewing the previous studies of change model, it can be said that adoption is a faculty occurring in the middle of change process (Conner, 1992). Meanwhile, agility is a faculty needed during change process displaying the speed of time assessed for implementation of technological changes (Mathiassen and Pries-Heje, 2006). Besides, agility shows the time taken

during the emergence of technology till its implementation (Haeckel, 1999). Meanwhile this agility during periods of time can be measured through a mathematical foundation (Giachetti, 2003). Besides, agility as a conceptual criterion of time stands in line with adoption to show a diffusion of technology (Mathiassen and Pries-Heje, 2006; Pawar and Meymandpour, 2017). Therefore, a change model based on Conner's model (1992) can be suggested. In this model the rate of adoption and agility would be the demonstrators of the level of a satisfactory change with special reference to fresh and old employees' human capital. It means that employees' human capital can be an influential construct in increasing the rate of adoption and agility controlling the level of success of a technological change. Fig. 1 pictures this notion.

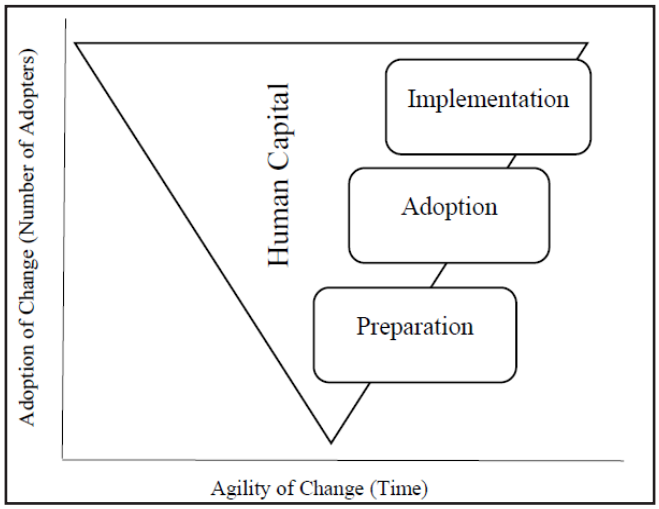

Fig. 1: The Proposed Model for Change Process Based on Conner's Model (1992)

Although this study suggests Fig. 1, the scope of this study is limited to a comparison between fresh and old employees' adoption and agility with reference to their human capital. Then the rate of adoption and agility in the passage of time would not be measured here. This model is pictured to show the position of the studied adoption and agility in a technological change.

LITERATURE REVIEW

It is definite that technology adoption has been widely studied in technological changes by scholars since it is one of the three stages

(preparation, acceptance and commitment) of change process (Conner, 1992). Through reviewing the literature of technological changes it can be seen the first and the most basic theoretical and empirical work related to adoption of technological changes is referred to Technology Acceptance Model (TAM). TAM is developed by Fred Davis (1986) and determined as the base for most of the models related to acceptance technology. On the other hand, it should be considered that most attitude-behavior components in acceptance technology models are based on Rosenberg's theory of attitude (1956) and Triandis' model of behavior (1971). On the other hand, organizational agility was first defined by Nagel and Dove (1991) supposing that workforce agility is needed for facing continuous changes in organization. Kotter (1996) pointed out the first step in change process is preparation for change and one of its requirements is promptness. Besides, Lyytinen and Rose (2004) claimed that speed is determined as one of the main factor in a technological change. On the other hand, there are a huge number of factors for increasing workforce adoption and agility in organizational changes. Vintage-specific human capital can be considered as one of the main influential determinants in employees' technology adoption and agility. Some scholars claimed that individuals' experience as a human capital would increase the adoption of new technology (Fishbein and Ajzen, 1975; Thompson et al., 1994; Venkatesh and Davis, 1996). Chari and Hopenhayn (1987) believed that adoption of technological changes needs vintage-specific human capital that can be summarized in experience or expertise and skills or knowledge. Meanwhile there are other works related to increasing agility through human capital. Prahalad and Hamel (1990) believed that capitalizing human skills according to current changes occurring in an organization would be essential for developing workforce quickness and agility. Plonka (1997) highlighted the role of human factors in improving workforce agility especially in contributing to manipulate new system. Qin and Nembhard (2010) believed that improving human capacity can affect workforce agility to face stochastically changing conditions. But it is questioned which mode of human capital leads to more adoption and agility in technological changes. As fresh employees are educated and skillful and old employees are experienced (Helpman and Rangel, 1998), it is questioned who are more adopted and agile in technological changes. Therefore, a comparison between fresh and old employees' adoption and agility is needed with reference to their vintage-specific human capital. So, in this study it is aimed to compare these two categories from top level

managers' point of view to find out who are more adopted and agile on the base of their human capital.

The previous works concerned neither both fresh and old employees nor both their adoption and agility in technological changes but mostly their human capital (Chari and Hopenhayn, 1987; Attewell, 1992; Plonka, 1997; Kredler, 2008; Qin and Nembhard, 2010). So the current work tries to compare both fresh and old employees' adoption and agility together to find out who are more adopted and agile in technological changes with reference to their human capital. Therefore, this study conducts the following research structure.

RESEARCH METHODOLOGY

The objective of this study is to compare fresh and old employees' adoption and agility based on their human capital. Thus it can be inquired that:

- Is there any differences between fresh and old employees' adoption and agility?
- Is there any positive relationship between fresh employees' adoption and agility?
- Is there any positive relationship between old employees' adoption and agility?

To achieve the objectives of this study and make sense of the mentioned questions, the study is conducted through the following research design.

This comparative study of employees' adoption and agility tries to compare fresh and old employees' adoption and agility with special reference to their specific human capital in technological changes. Since, the statistical population of this study is top level managers of IT companies the accessed ones are in Pune-India, there are other branches of IT companies all over India and even other countries so the population is considered as infinite population in this study. The samples of this study who are 324 top level managers are selected through sampling judgment procedure from 324 IT companies out of 600 in Pune-India as each respondent is taken from a company. The sample size is calculated through sample size calculation formula for infinite population (Godden, 2004). The respondents are asked for filling the questionnaires according to their perception about their fresh and old employees' adoption and agility in technological changes occurring in their companies. In an informal discussion with the respondents it is found out around above 5000 fresh and old employees work at 324 companies including their

branches. As mentioned earlier, fresh employees are defined as those employees achieving their skills through education or training. Meanwhile old employees are defined as those employees achieving their experience through working with a technology (Helpman and Rangel, 1998). This is while 65% of employees (about half of them are temporary employees) recognized as fresh employees are between 22-30 years old with 1-5 years' experience. Meanwhile, 35% of employees recognized as old employees are between 31-55 years old with 6-20 years' experience.

The data is collected through secondary and primary data. As it is mentioned the primary data are collected via questionnaires, observation and informal discussion. The researcher-made questionnaires with 28 statements consist of two comparative fresh and old employees' adoption and agility questionnaires standardized through reliability and validity in SPSS. The 5-point Likert Scale (strongly agree, agree, neutral, disagree, strongly disagree) is applied for both questionnaires; adoption and agility. Each questionnaire consists of 14 questions that each divided into two parts (fresh and old employees) regarding top level managers' perception of their fresh and old employees' adoption and agility. The components of adoption questionnaire are extracted from Taylor and Todd's questionnaire (1995) with the reliability of $\alpha = 0.69 – 0.95$ in their study. Although the adoption questionnaire developed is based on Taylor and Todd's questionnaire, it does not represent their whole questionnaire. Questions 1, 4 and 7 measure attitude of perceived usefulness, questions 2 and 3 measure compatible ease of usage and questions 5 and 6 measure efficacious control. In agility questionnaires, questions 1, 2 and 5 measure prompt responsiveness, questions 3 and 4 measure competent flexibility and questions 6 and 7 measure proactive partnership. The components of agility questionnaire are extracted from Zhang's model of agility (2011) with cronbach's alpha of 0.70 in his study. It is worthwhile to mention the statements of each questionnaire are designed based on employees' human capital comparing employees' adoption and agility.

Reliability and Validity

To measure the consistency and stability of the research questionnaires in this study, the internal consistency reliability of each questionnaire is tested through cronbach's α in SPSS 16. The given results are as the following:

Fresh employees' adoption questionnaire: $\alpha = 0.72$, old employees' adoption questionnaire: $\alpha = 0.76$, fresh employees' agility: $\alpha = 0.81$ and old employees' agility: $\alpha = 0.79$. The achieved figures show the significant reliability in all questionnaires of this study which are shown in Table 1.

Table 1: Cronbach's Alpha of the Studied Questionnaires

Internal Consistency Reliability				
Questionnaire	Fresh Employees' Adoption	Old Employees' Adoption	Fresh Employees' Agility	Old Employees' Adoption
α	0.72	0.76	0.81	0.79

To measure the accuracy of research questionnaires in this study, exploratory factor analysis with principle component analysis method is applied through SPSS while in each analysis one component is extracted. The results show the KMO tests have ideal standard with the level of significance of 0.00. Besides, the components have significant factor loadings and the percentage of variances is displayed significantly as well. The given results are shown in Table 2.

Table 2: Factor analysis

Factor Analysis				
Questionnaire	Fresh Employees' Adoption	Old Employees' Adoption	Fresh Employees' Agility	Old Employees' Adoption
KMO	0.82	0.84	0.84	0.81
Variance	37%	41%	48%	44%
Factor Loadings	> 0.4	> 0.4	> 0.4	> 0.4

Through testing the reliability and validity of the instruments, it is found the consistency and accuracy of questionnaires are proved since the results show the significant figures for each. So the data analysis of comparison between fresh and old employees' adoption and agility is presented in the next section carried out through descriptive and inferential statistics. As far as the respondents are asked for filling two different questionnaires about two categories of fresh and old employees' adoption and agility, Wilcoxon Signed Ranks Test is conducted in this study.

DATA ANALYSIS

The data of this study achieved through instruments are analyzed through statistical analysis tool. After testing the model and analyzing the data, the interpretations of this data analysis would be showed. The results of the data analysis are presented through descriptive and inferential statistics.

Table 3: General Descriptive Statistics for Each Category

Category	N	Mean	Std. Deviation	Minimum	Maximum
fresh employees' adoption	324	12.9630	3.35217	7.00	22.00
fresh employees' agility	324	14.6852	4.28761	7.00	28.00
old employees' adoption	324	17.3148	4.19268	7.00	31.00
old employees' agility	324	12.2346	3.74999	7.00	28.00

It can be said from Table 3 that old employees' adoption with the mean of 17.3 is strongly higher than fresh employees' with the mean of 12.9. While fresh employees' agility with the mean of 14.7 is higher than old employees' with the mean of 12.2.

The correlation between fresh and old employees' adoption and agility is tested and the results are shown in Table 4.

Table 4: Pearson Correlation of Four Variables N = 324

Row	Studied Variables	1	2	3
1	Fresh Employees' Adoption	-		
2	Old Employees' Adoption	0.06	-	
3	Fresh Employees' Agility	0.38**	0.006	-
4	Old Employees' Agility	0.13*	0.32**	0.31**

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

As it is clear from Table 4, there is a significant correlation between fresh employees' adoption and agility of 0.38 with the level of significance of 0.01 as well as between old employees' adoption and agility of 0.32 with the level of significance of 0.01. On the other hand, old employees' agility has a significant correlation with fresh employees' adoption and

agility as well with the level of significance of 0.05 and 0.01, respectively.

The respondents are the top level managers of IT companies asked for showing their perception about fresh and old employees' adoption and agility. As there are two categories (fresh and old employees) with the same respondents, Wilcoxon Signed-Ranks Test is applied to compare top level managers' opinion about fresh and old employees' adoption and agility. The results of the Wilcoxon test are showed in Tables 5 and 6.

Table 5: Ranks of Wilcoxon Signed-Ranks Test

Category		N	Mean Rank	Sum of Ranks
oldAD - freshAD	Negative Ranks	52[a]	88.46	4600.00
	Positive Ranks	251[b]	165.16	41456.00
	Ties	21[c]		
	Total	324		
oldAG -freshAG	Negative Ranks	212[d]	161.64	34267.00
	Positive Ranks	83[e]	113.17	9393.00
	Ties	29[f]		
	Total	324		
a. oldAD < freshAD				
b. oldAD > freshAD				
c. oldAD = freshAD				
d. oldAG < freshAG				
e. oldAG > freshAG				
f. oldAG = freshAG				

It is clear from Table 5 that 52 respondents out of 324 show lower old employees' adoption than fresh employees' adoption. While 251 respondents show higher old employees' adoption than fresh employees' adoption. Besides, 21 respondents show equality between old and fresh employees' adoption. On the other hand, 212 respondents show lower old employees' agility than fresh employees' agility. Meanwhile, 83 respondents show higher old employees' agility than fresh employees' agility. Further, 29 respondents show equality between old and fresh employees' agility. These figures show old employees' adoption is higher than fresh employees' adoption whereas old employees' agility is lower than fresh employees' agility. It can be interpreted there is a significant difference between old and fresh employees' adoption as well as their agility.

Table 6: Test Statistics of Wilcoxon Signed-Ranks Test

Test Statistics[c]		
	oldAD - freshAD	oldAG - freshAG
Z	-12.088[a]	-8.496[b]
Asymp. Sig. (2-tailed)	.000	.000
a. Based on negative ranks.		
b. Based on positive ranks.		
c. Wilcoxon Signed Ranks Test		

As it is clear from the given figures in Tables 6, there is a significant difference between fresh and old employees' adoption and agility. It can be seen from Table 6 that P-value = .000 that shows strongly the significant difference between the categories.

FINDINGS

The given results show from top level managers' point of view that old employees' adoption is higher than fresh employees' adoption in technological changes. While, fresh employees' agility is higher than old employees' agility in technological changes. On the other hand, there is a significant difference in fresh and old employees' adoption and agility in technological changes. Besides, there is a significant correlation between fresh employees' adoption and agility in technological changes. Further, there is a significant correlation between old employees' adoption and agility in technological changes. Meanwhile, there is a positive relationship between fresh employees' adoption and agility in technological changes. And there is a positive relationship between old employees' adoption and agility in technological changes.

Through these findings it can be discussed from managerial perspective that in technological changes, both fresh and old employees' human capital are needed. In other words, it can be said that vintage-specific human capital can make sense when fresh and old employees' human capital is involved in technological changes. Besides, in fulfilling new vintage, both fresh and old employees' human capital is needed. Fresh and old employees' human capital is complementary to each other.

Further, there is an informal discussion with the top level managers. 60% of respondents point out the rate of adoption and agility depends on the project employees are dealing with which is not mentioned in the questionnaires. Around 70% of the top level manager board claim

that unlike fifty years ago, nowadays change in technologies does not occur entirely and abruptly. But this occurs partially for example just new versions of technologies may come to an organization requiring skills and experience together. So these days technological change is a planned type of changes. So instead of change of technology, it can be called updation and upgradation of technology welcomed by fresh and old employees similarly. Besides, the top level managers assert in managerial affairs they themselves prefer to involve old employees instead of fresh ones. Since old employees are more trustful and are more familiar toward managerial and organizational affairs. They believe sometimes skills or experience are not essential but ethical issues.

DISCUSSION

This study is a comparison between fresh and old employees' adoption and agility in technological changes. So it is questioned whether there is any difference between fresh and old employees' adoption and agility in new technology since they hold specific human capital related to their current vintage. Besides, it is inquired that whether adoption and agility have a positive relationship to prepare for, accept and fulfill new technology or not. The findings of the comparison between fresh and old employees' adoption and agility show a significant difference between fresh and old employees' adoption and agility in technological changes (Tables 5 and 6). Besides, it is found that fresh employees' agility and old employees' adoption have the highest mean. So it can be showed that both fresh and old employees' adoption and agility are needed for satisfactory change management due to their vintage-specific human capital. As the respondents declare that both skill and experience are needed in increasing employees' adoption and agility for handling a satisfactory technological change. Since the achieved results show skill leads to agility and experience leads to adoption. Similarly, Weinberg (2004) found out experienced employees are more adoptable in technological changes, although he reminded that vintage human capital models suppose that young employees are the first adopters in technology diffusion. While, in their model Chari and Hopenhayn (1987) remarked that Pareto optimal would be achieved only if old employees already hold needed skills for diffusing new technology. On the other hand, Svedaite and Tamosiunas (2013) declared advantages of temporary employees in their survey. They found out similarly skilled employees under 25 years old would more quickly adopt technological development in compare with other groups of employees.

Taken as a whole, it is worth mentioning the findings of previous researches surrounding the impact of human capital on technology diffusion are not comparable with the recent ones. As stated before, technological change in its early emergence was an organizational world-shaking phenomenon resulting in an entirely chaos in organizations. Meanwhile these days technological change is recognized as a strategy development leading to updation and upgradation technology. So both fresh and old employees are interested in dealing with these kinds of changes. So, old employees' adoption and fresh employees' agility play a deterministic role in diffusing new technology. Because of combinations of their experience and skill, respectively; it is showed both fresh and old employees' human capital is needed in increasing adoption and agility of technological changes.

Despite achieving these findings, the scope of this study is confined to a comparison between fresh and old employees' adoption and agility based on their human capital. So human capital is not studied separately as a variable. Further, the respondents are top level managers in IT companies then other hierarchical staff levels are not included in the present study. Additionally, the rate of adoption and agility in a change process are not measured in this study. Therefore, due to the mentioned limitations, the suggested model of this study could not be tested. Then it is recommended that in further studies this model can be scrutinized and expanded through involving other determinants of succeeding in a technological change and evaluate and test other variables as well.

Conclusion and Scope of Future Study

The present work infers that fresh employees are more agile during technological changes in comparison with old employees. While old employees are more adopted in technological changes rather than fresh ones. Therefore, both fresh and old employees' human capital is needed to agilely adopt technological changes. In other words, it is inferred the more obsolescent experience, the more adoption while the more updated skill, the more agility. As far as organizations accustom themselves to technological change phenomenon, this event would not be a challenging issue in organizations, recently. Therefore, from a managerial perspective it can be implied that organizations need to recruit and retain fresh and old employees, respectively. Since the former ones have updated skill leading them to be more agile in fulfilling technological changes and the latter ones have needed experience leading them to be more adopted in fulfilling

technological changes. Therefore, the further researches with the same area of study can strategically concentrate on both categories to improve their strengths and dwindle their weaknesses for further development of human resources in future. So the findings suggest to involve both categories in technological changes instead of comparing them with each other and considering only one's strengths. So through involving fresh and old employees' abilities in fulfilling technological changes, this study proves that different modes of human capital are influentially applied in technological change. Additionally, organizations can prepare fresh and old employees in large-scale technological changes as far as both categories have related vintage-specific human capital to fulfill organizational goals.

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