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Studying the Circumstances of Productivity Improvement into Human Resource, Financial and Management Performance Productivity in State-owned, Partially Private and Private Banks in Mazandaran using FAHP

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ABSTRACT

Nowadays, productivity improvement in organizations is as one of executive managers and decision makers' main challenges in each country. In many countries, most of development programs are based on productivity improvement. Productivity is one of the most influential factors that lead to economical growth. On the one hand, productivity makes life level improvement, inflation rate decrease and on the other hand, it brings about changing relative prices, increasing real production and efficient resource allocation. In this paper, we study the importance degree of three effective dimensions (human resource, financial and management performance) on productivity improvement and also their sub criteria in state-owned, partially private and private banks in Iran. In this study, we apply Fuzzy Analytic Hierarchy Process (FAHP) and experts' opinion for evaluating productivity improvement under fuzziness. Our results indicate that among three productivity dimensions (human resource, financial and management performance), management performance productivity is of the greater importance than human resource and financial productivity.
KEYWORDS: Banking industry, Productivity, FAHP.

1. INTRODUCTION

In the last two decades, organizations become smaller on their management aspects due to posing concepts such as strategic business units, intensive and complicated competition, increasing the uncertainty of competitive environment, market globalization and elimination of governmental subsidy to national industries. Regarding to the key role of banking industry in economical, social and political development, productivity improvement on each of its branches will be an effective factor for society productivity improvement. Market share improvement and stability and capability in competitive environment depend on the constant monitoring and policy making from productivity growth analysis and also studying the existing strengths and weaknesses (Zuam, 2008).

In 1950, the Organization for European Economic Cooperation (OEEC), one of the oldest organizations espousing productivity enhancement issued a formal definition (OEEC): productivity is the quotient obtained by dividing output by one of the factors of production. In this way it is possible to speak of the productivity of capital, labor and management performance. This concept has been evolved gradually and has been included efficiency and effectiveness concepts, too. Overall, productivity indicates how successful a company is in resources applying.

2. REVIEW OF LITERATURE

Productivity is one of the most significant factors on an organization's general performance. In micro level, productivity improvement is always a useful tool for confronting with inflation effects and salary and wages policies. In a short, productivity results can be explained in: 1-reducing total cost and production continuation, 2-quality improvement, 3- products' market share growth, 4- raising employees' salary without any inflation pressure and 5- improvement on employees, employers and customers purchasing ability (Kazaz, 2007).

If we try to improve our ability to raise productivity, our real income and living standards will also improved. As a nation, ameliorating the living standards should be one of our main goals. Improving productivity is important in all levels including national, industrial, company and personal (O'Neill, Egelton, Hogue, 1999, Kendrick 1993, Ly Kirikal, 2004).

Having established what "productivity" means, it is appropriate to list those sub components that determine relative increases in wealth or well-being: (1) new technologies and methodologies; (2) energy utilization; (3) investment; and (4) attitudes (Smith 1993). Therefore, the first element in improving productivity is to develop new ideas and new processes – to do things in a new and better way. The next important

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component is improved energy utilization. Investments in new technology, energy-reducing or labour-saving equipment are necessary components for raising the level of prosperity. The attitudes of managers and employees are fundamental components in improving productivity. The managers must make sure that people and jobs match because employees have the skills and understanding necessary to achieve both the objectives of the company and their own personal goals. In sum, it is possible to increase productivity by managing these four well-being elements (Kirikal Ly, 2004).

Each manager's ability such as leadership, participation and the ongoing support are significant for the success of any productivity enhancement programs. Productivity improvement will bring about competitive advantages for a company (Eppolito, 2002). Unfortunately, companies seldom manage their productivity.
In this section, we present some recent studies about productivity in banks as presented in table1.

Table 1: Summary of the Recent Studies

No.	Authors' name	Place & year of the Study	Research Findings
1	Paroma Sanyal & Rashmi Shankar	United States, 2011	This paper investigates the effect of ownership and competition on Indian bank productivity since the 1991 reforms. They find that Indian private banks dominate the public and foreign Banks both in terms of productivity levels and productivity growth, with the new Indian private banks leading the charge. Competition has a positive impact on productivity for the old Indian private banks, and all the other banks are hurt by competition — the worst hit being new Indian private banks.
2	Mircea Epure, Kristiaan Kerstens, Diego Prior	Spain, 2011	The purpose of this paper is twofold. First, in the framework of the strategic groups' literature, it analyzes changes in productivity and efficiency of Spanish private and savings banks over an eight-year period (1998–2006). Empirical results demonstrate that productivity improvements are partially due to technological innovation. Furthermore, it is shown how the competition between private and savings banks develops in terms of the analyzed productivity and efficiency components. While private banks enjoy better efficiency change, savings banks contribute more to technological progress.
3	Heru Margono, Subhash C. Sharma, Paul D. Melvin II	United States, 2010	This study estimates cost efficiency, economies of scale, technological progress, and productivity growth among Indonesian banks from 1993 to 2000. Average cost efficiency for the banking sector over this period was 70%.The results indicate that private-owned banks and joint venture foreign banks were more efficient than public-owned banks.
4	Hung-Yi Wu, Gwo-Hshiung Tzeng, Yi-Hsuan Chen	Taiwan, 2009	This paper apply F MCDM to evaluate banking performance based on BSC. In this research the evaluating performance index are prioritized based on the four perspectives of a Balanced Scorecard (BSC), then the three MCDM analytical tools of SAW,TOPSIS, and VIKOR were respectively adopted to rank the banking performance and improve the gaps with three banks as an empirical example. The analysis results highlight the critical aspects of evaluation criteria as well as the gaps to improve banking performance for achieving aspired/desired level. Applying the three mentioned MCDM tools among three banks, bank C has gotten the first rank. It indicates that all the ranking results are identical. However, the final values of the three banks calculated by SAW and TOPISIS are extremely close to each other. In this case, the VIKOR method is found to be a better method of assessment to clearly discriminate the banking performance.
5	Shabbar Jaffry, Yaseen Ghulam, Joe Cox	United Kingdom, 2008	The focus of this paper is the estimation of productivity and efficiency of labor use in the banking sectors of the Indian sub-continent. The results show that the efficiency of labor use across the Indian sub-continent is improving over time and that foreign banks are more efficient compared to domestically owned banks in their usage of labor.

3. RESEARCH METHODOLOGY

3.1. Fuzzy AHP method

Fuzzy AHP is applied to make decision more logically by prioritizing the market segment selection criteria and weighting them in the existence of ambiguity. Fuzzy AHP has been utilized in many previous researches which propose systematic approaches for alternative selection and justification of problem by using fuzzy set

theory and hierarchical structure analysis (Efendigil *et al.,* 2008) (Önüt *et al.,* 2010). DMs usually perceive it more convenient to convey interval judgments than fixed value judgments due to the fuzzy nature of the comparison process (Bozdag *et al.* 2003). This study used a fuzzy AHP approach introduced by Chang (1992), in which triangular fuzzy numbers are selected for pairwise comparison scale. For the synthetic extent values of the pairwise comparisons, Extent analysis method has been chosen. The fuzzy AHP procedure based on extent analysis method has been applied in some papers to illustrate its application procedure in problem solving (Cebeci and Ruan, 2007; Kahraman *et al.* 2003, 2004). The framework of the fuzzy sets and extent analysis method for fuzzy AHP are given below.

Fuzzy numbers are a special fuzzy sets F = {(x,μ_F (x), x ∈R}, where x takes its values on the real line, R: $-\infty \leq x \leq \infty$ and μ_F (x) is a consecutive mapping from R to the closed interval$[0, 1]$.A triangular fuzzy number (TFN) demonstrates the relative strength of each pair of factors in the same hierarchy and can be symbolized as M = (l, m, u), where $l \leq m \leq u$. The parameters l; m; u; designates the smallest possible value, the most promising value, and the largest possible value respectively in a fuzzy event. The recent applications of fuzzy AHP method in shortly are listed below:

° Ahmet Can Kutlu, Mehmet Ekmekciog˘lu (2011) studied Fuzzy failure modes and effects analysis by using fuzzy TOPSIS-based fuzzy AHP.
° Tolga Kaya and Cengiz Kahraman (2011) studied Fuzzy multiple criteria forestry decision making based on an integrated VIKOR and AHP approach
° Fouladgar *et al* (2011) used fuzzy AHP and fuzzy TOPSIS for prioritizing strategies of the Iranian mining sector.
° Lin *et al* (2011) used fuzzy Delphi method, fuzzy AHP and fuzzy theory to develop an evaluation system of knowledge management performance.
° Heo *et al.* (2010) used fuzzy AHP for analysis of the assessment factors for renewable energy dissemination program evaluation.

Chang's extent analysis method (Chang, 1996) has been utilized in this paper. According to Chang's extent analysis method, the standard fuzzy arithmetic has been used to define the value of fuzzy synthetic extent, as below:

$S_i = \sum_{j=1}^{m} M_i^j \otimes \left[\sum_{i=1}^{n}\sum_{j=1}^{m} M_i^j\right]^{-1}$ (2)

Where M_i^j is a triangular fuzzy number representing theextent analysis value for decision element i with respect to goal j.M_i^j is the generic element of a fuzzy pair-wise comparison matrix like the one used in the AHP method.

The degree of possibility of $M_1 \geq M_2$ is defined as:

$V(M_1 \geq M_2) = \text{Sup}_{x \geq y}[\min(\mu_{M_1}(X), \mu_{M_2}(y))]$ (3)

And can be equivalently expressed as follows:

$$V(M_1 \geq M_2) = hgt(M_2 \cap M_1) = \begin{cases} 1, & if\ b_1 \geq b_2 \\ 0, & if\ a_2 \geq c_1 \\ \frac{c_1 - a_2}{(c_1 - a_2) - (b_2 - b_1)}, & otherwise \end{cases} \quad (4)$$

The degree of possibility for a convex fuzzy number to be greater than k convex fuzzy number M_i $(i = 1, 2, \ldots, k)$ can be defined by

$V(M \geq M_1, M_2, \ldots, M_k) = V[(M \geq M_1)\ and\ (M \geq M2)\ and \ldots and\ (M \geq M_K)] =$
$\min V(M \geq M_i),\ i = 1, 2, 3, \ldots, k.$ (5)

Assume that:

$d'(A_i) = min\, V(S_i \geq S_k)$ (6)

For $k = 1, 2, \ldots, n;\ k \neq i.$ then the weight vector is given by

$W' = (d'(A_1),\ d'(A_2), \ldots, d'(A_n))^T$ (7)

Where A_i $(i = 1, 2, \ldots, n)$ are n decision elements. Via normalization, the normalized weight vectors are

$W = (d(A_1), d(A_2), \ldots, d(A_n))^T$ (8)

Where W is a non-fuzzy number, compared to conventional AHP, The fuzzy AHP approach allows a more accurate description of the decision making process.

Paired comparisons are done based on the information of table 2.

Table 2: Triangular fuzzy conversion (Önüt *et al,* 2008)

Linguistic scale for importance	Triangular fuzzy scale (a, b, c)
Just equal	(1.0,1.0,1.0)
Equal importance	(1.0,1.0,3.0)
Weak importance of one over another	(1.0,3.0,5.0)
Essential or strong importance	(3.0,5.0,7.0)
Very strong importance	(5.0,7.0,9.0)
Extremely preferred	(7.0,9.0,9.0)
If factor i has one of the above numbers assigned to it when compared to factor j, then j has the reciprocal value when compared whit i Reciprocals of above $M_1^{-1} \approx \left(\frac{1}{c_1}, \frac{1}{b_1}, \frac{1}{a_1}\right)$.	

3.2. Research Conceptual Model

The conceptual model of present study is illustrated in figure 1.

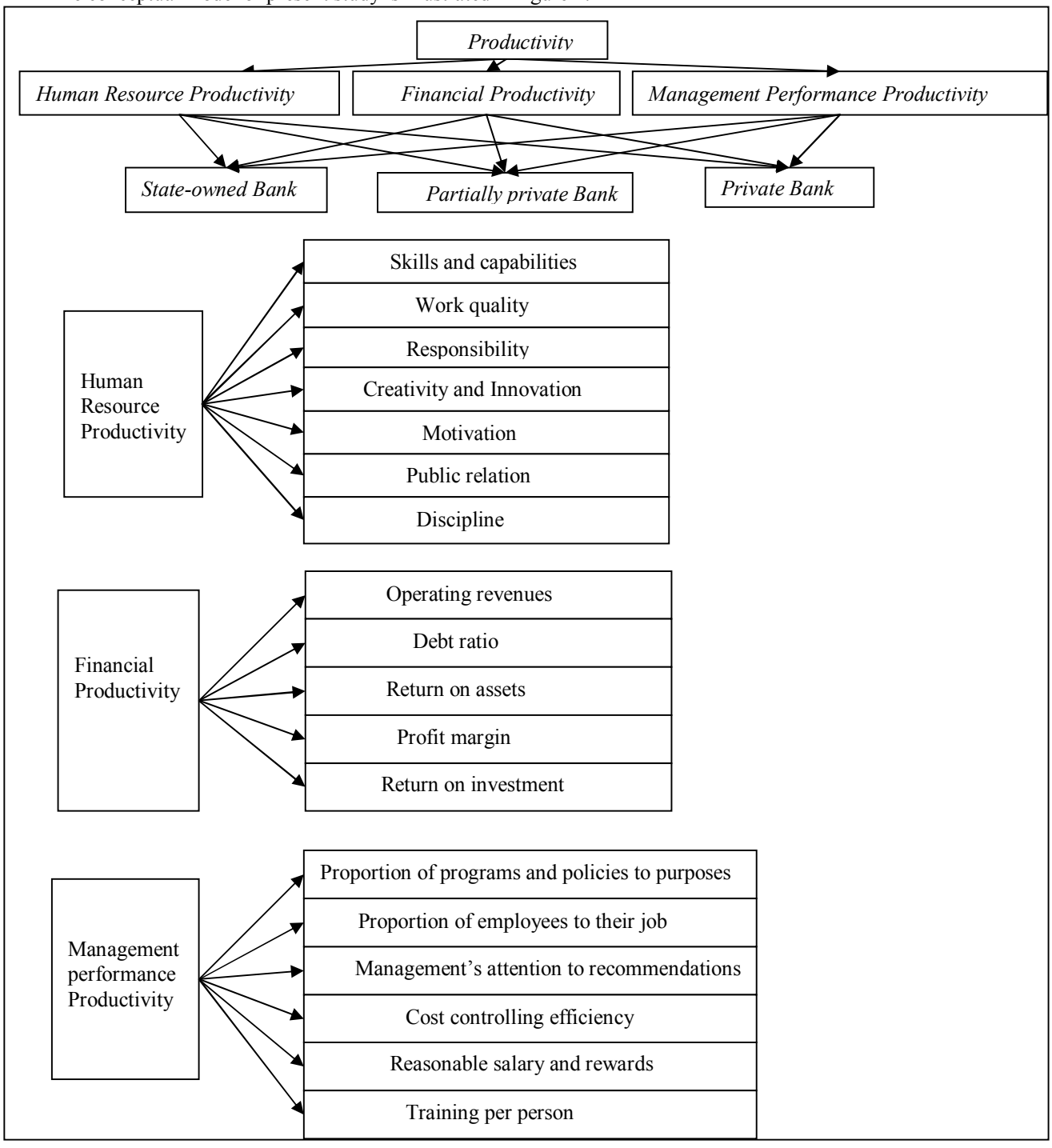

Figure 1: The conceptual model of the present study

In this conceptual model, the three productivity dimensions (human resource, financial and management performance) are extracted from Gill's paper (2011) and Eshraghniae Jahromi et al. paper (2010), human resource indexes from Azadeh et al. paper (2011), Financial indexes from Hung Yi Wu paper et al. (2009), management performance indexes from Eshraghniae Jahromi et al. paper (2010). The fuzzy analytic hierarchy process using Chang's extent analysis technique is employed as the main statistical method of the study [3]. Regarding to our subject essence of research model and the experts' viewpoint in Iran's central bank, Melli bank, Saderat bank and Parsian bank are selected as the representatives of state-owned bank, partially private bank and private bank, respectively due to their high market share among other Iranian banks, hence the three mentioned banks constituted our case study. The experts are the head masters or high rank managers with at least 10 years service and Bachelor degree in the three mentioned banks.

4. Research Findings

After processing the fuzzy data for the second level of conceptual model (the three productivity dimensions), according to table 3, each indicators weight shows that management performance productivity is the most important indicator based on 27 experts of all banks and also in each bank, separately. Hence, regarding to productivity improvement, management performance productivity is at first priority and human resource productivity and financial productivity are on the second and third priority level, respectively.

Table 3: The final weights of effective factors on productivity improvement

	Human resource productivity	Financial productivity	Management performance productivity	
All banks	0.397	0.126	0.477	W
State-owned bank	0.386	0.169	0.444	
Partially private bank	0.427	0.124	0.449	
Private bank	0.363	0.071	0.567	

The considerable point is the decrease of financial productivity importance degree comparing state-owned bank with private bank.

In the next step, human resource productivity indexes are compared. Their final weights are presented in table 4.

Table 4: The final weights of effective factors on human resource productivity

	Skills & capabilities	Work quality	Responsibility	Creativity & innovation	motivation	Public relation	Discipline	
All banks	0.070	0.081	0.219	0.112	0.236	0.100	0.182	w
State-owned bank	0.0949	0.116	0.1865	0.137	0.1861	0.0951	0.184	
Partially private bank	0.041	0.074	0.266	0.082	0.314	0.084	0.140	
Private bank	0.140	0.067	0.187	0.092	0.197	0.117	0.199	

Comparing 7 sub criteria of human resource productivity, motivation has the first priority as has been specified in table 4.According to state-owned banks' experts view, responsibility has attained the first priority with a very minor weight variance comparing to motivation and in private bank, discipline has got the first priority with a very minor weight variance comparing to motivation. In partially private bank, motivation is at first priority with an obvious weight variance comparing to other indicators. It can be concluded that paying attention to indicators of human resource productivity is not balanced in this bank.

In the next step, financial productivity indexes are compared. Their final weights are presented in table 5.

Table 5: The final weights of effective factors on financial productivity

	Operating revenues	Debt ratio	Return on assets	Profit margin	Return on investment	
All banks	0.1419	0.0847	0.2396	0.2666	0.2672	W
State-owned bank	0.123	0.118	0.263	0.239	0.252	
Partially private bank	0.161	0.006	0.315	0.245	0.273	
Private bank	0.132	0.059	0.122	0.368	0.319	

Comparing financial productivity sub criteria, return on investment has attained the first priority with a very minor weight variance comparing to profit margin as illustrated in table 5. According to state-owned bank and private bank experts' view, return on assets has the first priority, while in private Bank; profit margin is at the first priority.

In this step, management performance productivity indexes are compared in banking industry. Their final weights are illustrated in table 6.

Table 6: The final weights of effective factors on management performance productivity

	Proportion of programs and policies to purposes	Proportion of employees to their job	Management's attention to recommendations	Cost controlling efficiency	Reasonable salary and rewards	Training per person	
All banks	0.165	0.190	0.112	0.137	0.199	0.197	W
State-owned bank	0.205	0.145	0.128	0.080	0.255	0.186	
Partially private bank	0.069	0.303	0.164	0.074	0.186	0.204	
Private bank	0.194	0.160	0.104	0.150	0.176	0.217	

Comparing management performance productivity sub criteria, reasonable salary and rewards has attained the first priority with a very minor weight variance comparing to training per person as illustrated in table 6. According to state-owned bank experts' view, reasonable salary and rewards has the first priority, while in partially private bank, Proportion of employees to their job is at the first priority and in private bank, and training per person has gotten the first priority. The results shows that in private bank, training is the most significant factor for management performance productivity improvement while partially private bank experts believe that proportion of employees to their job is the most significant factor regarding to management performance productivity improvement.

In the next step, state-owned bank, partially private bank and private bank are compared regarding to human resource productivity, financial productivity and management performance productivity based on the experts' point of view. Their final weights are presented in tables 7, 8 and 9 respectively.

Table 7: The final weights of the banks importance order regarding to human resource productivity

State-owned bank	Partially private bank	Private bank	
0.001	0.333	0.665	W

Table 8: The final weights of the banks importance order regarding to financial productivity

State-owned bank	Partially private bank	Private bank	
0.001	0.324	0.674	W

Table 9: The final weights of the banks importance order regarding to management performance productivity

State-owned bank	Partially private bank	Private bank	
0.071	0.285	0.644	W

In three mentioned dimensions, private bank has the first priority with an obvious weight variance comparing to partially private and state-owned bank. The important point is that according experts' point of view, the state-owned bank has not been successful with the aim of productivity improvement in all three mentioned dimensions.

The elements' weights at two levels are combined together and final weights of productivity improvement dimensions are attained as indicated in table 10.

Table 10: Combining the weights of two levels and computing the final weight of the three banks with objective of productivity improvement

	human resource productivity	financial productivity	management performance productivity	
	0.397	0.126	0.477	
State-owned bank	0.001	0.001	0.071	0.034
Partially private bank	0.333	0.324	0.285	0.309
Private bank	0.665	0.674	0.644	0.656

5. Summary and Conclusion Remarks

In this paper, the importance degree of three effective dimensions (human resource, financial and management performance productivity) on productivity improvement and the dimensions' sub criteria are studied in state-owned bank, partially private bank and private bank in Iran using Fuzzy Analytic Hierarchy Process (FAHP) and based on experts' views. The results suggest that private bank has performed better than state-owned bank and partially private bank in three mentioned dimensions as presented in table 10. In fact, according to experts' point of view, private bank has accomplished better in gaining productivity improvement comparing with state-owned bank and partially private bank.

Comparing the three productivity dimensions, management performance productivity is at the first priority (table 3) that implies in order of having better productivity circumstances, enjoying high performance managers has a great effect. The considerable point is the decrease of financial productivity importance degree comparing state-owned bank with private bank. In human resource productivity, motivation is of the greater importance

along with responsibility and discipline (table 4). According to table 5 in financial productivity, return on investment has attained the first priority with a very minor weight variance comparing to profit margin. According to state-owned bank and private bank experts' view, return on assets has the first priority, while in private bank; profit margin is at the first priority. Comparing management performance productivity sub criteria, reasonable salary and rewards has attained the first priority with a very minor weight variance comparing to training per person as illustrated in table 6. According to state-owned bank experts' view, reasonable salary and rewards has the first priority, while in partially private bank, Proportion of employees to their job is at the first priority and in private bank, and training per person has gotten the first priority.

Comparing the results of present study with Azadeh *et al.* study (2011) in which work quality was announced as the first priority in human resource productivity while in this study motivation is of the greater importance along with responsibility and discipline.

Comparing the results of present study with Hung Yi Wu *et al.* paper (2009), In financial productivity, return on assets was announced as the first priority that is the same as private bank managers' point of view, but according to all three banks experts' view, return on investment has attained the first priority with a very minor weight variance comparing to profit margin.

Comparing the findings of present study with Sanyal *et al.* study (2011), Indian private banks dominate the public and foreign banks both in terms of productivity levels and productivity growth that the present study finding has proved the domination of private bank in terms of productivity improvement.

Comparing the findings of present study with Margono *et al.* paper (2010), the results indicate that private-owned banks and joint venture foreign banks were more efficient than
Public-owned banks, hence our finding emphasizes theirs.

Comparing the results of present study with Jaffry *et al.* paper (2008), their results show that the efficiency of labor use across the Indian sub-continent is improving over time and that foreign banks are more efficient compared to domestically owned banks in their usage of labor. Their result has been verified by our result.

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