The Effect of ERP System on Relevance of Accounting Data and Quality of Financial Reporting Quality

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This research has been conducted to evaluate the effect of implementing ERP systems on relevance of accounting data and the subsequent effect of accounting data relevance (with a special emphasis on timing) on financial reporting quality (with a special emphasis on the quality of accruals).

For this purpose, samples selected from Tehran Stock Exchange data in 1387-1391 time spanusing systematic sampling method. Then, the collected data were processed and analyzed with appropriate accounting data relevance and financial reporting quality theories.

The results of regression models showed that there is a significant relationship between the relevance of accounting data and the financial reporting quality in a way that increased delay of reporting, would decrease the earnings management. Moreover, the implementation of ERP has a significant relationship to the relevance of accounting data and its application on Iran's stock enterprises has increased the reporting delay.

Keywords: Financial Reporting Quality, Accounting Data Relevance, ERP

INTRODUCTION

The rise of the capital market and its role in attracting capitals and small savings and leading them to other economic departments in order to further development of existing companies as well as founding new ones, can't be denied (Hall, 2012). Correct and reliable data are pivotal in this matter and the decision makings that are behind it. In economic matters, decision makings should have these conditions: possibility of identifying various options, determining the

eventual effects of each option, and finally, picking the best option. All these steps rely heavily on appropriate data. Without data, the decision making process is vague and unreliable. Financial numbers and statements are some of data required in decision making process (Chen, Yan Huang, Chiu, & Pai, 2012). According to Statement of Financial Accounting Concepts (SFAC), the main objective of accounting is to provide information on the financial effect of transactions, events, and

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circumstances that can cause changes in financial status, and the final results of enterprise operations, to help present and potential investors and creditors and other users making rational investment, credit, and similar decisions (Sonnenberg & vom Brocke, 2014). Accounting system can use the financial statement of enterprise operations to collect useful information for other interested parties. In order to achieve this goal, experts and scholars have turned their attention to empirical researches on the financial reporting quality (Khadamipour et al, 1390).

In fact, the main purpose of financial reporting is effective delivery of information to interested third parties in a timely and valid manner (Vasarhelyi, Kogan, & Tuttle, 2015). Managers can use their knowledge of enterprise's business affairs to improve effectiveness of financial statements, which are a main instrument to deliver appropriate information to present and potential investors and creditors. In spite of this, managers can use their power to manipulate the statement and mislead the final users if they have an incentive, which could lead to earnings management (Noorvash et al, 1388). On the other hand, one of the main aspects of financial reporting quality which has attracted a lot of interest from scholars, is the restriction of earnings management in accruals (Lubo et al, 2001; Noorvash et al, 1388).

So, the question is whether the power of manager in earnings management is a result of his authority on disclosure guidelines?

Most researches regarding reporting in capital market have focused on the nature of financial data and its relationship with variables such as turnover and the size of transactions as well as their role on determining stock prices (Amid, 2014). The delivery time of these data and the factors affecting this time and its timeliness or delay have not been explored enough. Identifying these factors and their nature of influence, either positive or negative, will have a considerable impact on the competence of the capital market. In order to understand the way that various enterprises react and respond timely to the obligations of the reporting, their timely reporting should get assigned to various factors (Anse and Liontis, 2006). Although a lot of factors could be in work, there are several main reasons that affect enterprise managers in their effort to provide a

timely report or reduce the costs of the delayed ones (Anse and Liontis, 2006).

One of these main factors could be information systems. Nowadays, it's almost a necessity for any manager to equip himself with a reliable and trustworthy information system to help him in his decision making regarding future planning, organization, and controlling activities (Moosavi, 1383, quoting from Farsad et al, 1390). One of the more popular information systems used by a wide range of organization, especially manufacturing enterprises, are ERP systems (Mola Hoseini et al, 1390).

Considering the general effect of ERP systems as well as their interactions with the characteristics of their environment such as dynamism and market competence (Mola Hoseini et al, 1390), a question arises whether the implementation of ERP systems in the enterprises listed on Tehran Stock Exchange (TSE) has a significant effect on the timeliness of financial reporting.

This research tries to answer this question. The contents are categorized as following: Section 2: Expansion of the Theories, Section 3: Research Plan Report, Section 4: Presenting the Empirical Results, and finally, Section 5: Conclusions.

A Quick Look at Other Similar Researches

Lodhia, Allam, and Lymer (2003) argued in their research that the main reason enterprises are not interested to use internet for their financial reporting is because they don't trust it, and they don't have the sufficient IT knowledge for it.

Brosell et al (2005) assessed the effect of ERP implementation on the usefulness of accounting data in his article. According to its results, ERP implementation would decrease the reliability of the data, but increase their relevance for enterprises receiving good news.

Stefano et al (2012), argued in their article that several main changes of management accounting resulting from ERPs are focused on these elements: the quality of accounting data, reports, creative actions, development of methods and technics, decision making process, the role of accountants, and doing assigned jobs. In this article, they also evaluated users' satisfaction regarding ERP system, the success of ERP implementation, the extensive

field of business process re-engineering (BRP), as well as a look on more important effects of ERP systems on management accounting methods.

Kim et al (2013), evaluated the relationship between the implementation of ERP systems with the delay in presenting the audit report in their research. They concluded that generally ERP implementation has a negative relationship with audit report delay; but, the significance of this relationship is only evident in the fourth and fifth year of initial ERP implementation.

Dorants et al (2013), argued in their article that the implementation of organizational systems would increase the manifestation probability of management's predictions as well as their accuracy. Therefore, investing in information technology systems would improve enterprises' information environment.

Shaw (2003) demonstrated in his research that enterprises with higher disclosure quality tend to use discretionary accruals much more than enterprises with lower disclosure quality. Thus, high disclosure quality could lead to increased earnings management.

Joe and Kim (2007) evaluated the relationship between disclosure frequency and earnings management and concluded that they have inverse relationship.

Expansion of the Theories

Previous researches on earnings management demonstrate two viewpoints, an opportunistic view which states that managers using their authority to mislead investors, and an information exchange view which argues that manager's authority is an instrument helping him to present his personal expectations regarding the enterprise's future cash flow to potential and present investors (Badaghi et al, 1378).

Lubo and Joe (2001), demonstrate the amount of enterprise's earnings management as a main factor in disclosure quality-related decision makings. Empiricalanalysis presented in their research concluded that there is a negative relationship between disclosure quality and earnings management in case of opportunistic earning management, while there is a positive relationship

between said parameters in case of information exchange management (Badaghi et al, 1387).

One of the main factors demonstrating the quality of disclosure, is the timely publication of financial reports (Noorvash et al, 1388). Moreover, timeliness of publication is also indicates the relevance of accounting data.

Therefore, we can evaluate this theory:

There is a significant relationship between the relevance of accounting data and the quality of financial reporting.

Considering the aforementioned restriction of earnings management and two management viewpoints, if the test of this theory confirms a positive relationship, the earnings management is a result of information exchange, while a negative relationship could be an indication of opportunistic earnings management.

Another issue circulating in capital markets and is also assessed in this article, is modern information systems such as ERP.

The implementation of modern systems or a prominent change in information trends would prompt new challenges such as employees' resistance, lack of sufficient knowledge, etc. So, the question is whether the increasing implementation of these software systems in enterprises listed on Iran's stock market, is actually beneficent and helping their organizations to publish reports in a more timely manner, or on the other hand, the aforementioned challenges and hurdles are taking their toll. Thus, this theory is presented:

There is a significant relationship between ERP systems and the relevance of accounting data.

RESEARCH PLAN

Sampling and Data Sources

At first, a list of enterprises accepted in Tehran Stock Exchange (TSE) between 1387 and 1391 was created using general stock information and Rahavard Novin software. Then, in order to preserve the homogeneity of data, some adjustments were made

Selected enterprises should not be financial resellers, holdings, and banks. The reason for their omission is their dependency on other enterprises, and in case of banks, their uniqueness.

Their fiscal year should end on 12/29 of each year. Enterprises listed on stock market have various fiscal year end date due to their diversity of operations. The 12/29 date is the most common end date in Iranian enterprises.

Should have not changed their fiscal year in the research period (1378-1391)

Their financial statements should be available constantly and completely from 1386 on.

Their stock should have been actively traded during the research period.

After preparing the final list, the sampling process were done using the systematic method.

Dependent Variables

The quality of financial reporting in the first theory, and the relevance of accounting data in the second theory, are the dependent variables.

The quality of financial reporting: in this research, earnings management is an indicator for determining the financial reporting quality, and the restriction of earnings management in financial reports would demonstrate the quality of those reports. Therefore, in order to calculate this variable, we should determine the earnings management indicator. In this research, corresponding to previous articles, accruals were used as an indicator for earnings management.

Traditional balance sheet methods would calculate total of accruals as following:

$$TACC_{i,t} = \Delta CA_{i,t} - \Delta CL_{i,t} - \Delta CASH_{i,t} + \Delta STDEBT_{i,t} - DEPTN_{i,t} \quad (1)$$

In which i=enterprises, t=fiscal years of 1387-1391, TACC=total of accruals, ΔCA=changes in current assets, ΔCL =changes in current liability, $\Delta CASH$=changes in cash flow, $\Delta STDEBT$=changes in current portion of long term debts and other short term debts listed under current liabilities, and DEPTN=deprication costs of fixed and Intangible assets.

Discretionary accruals mean the difference between the total of accruals and non-discretionary accruals. In order to estimate the non-discretionary accruals, first we used this modified Jones model (?, 2006):

$$TACC_{i,t} = \alpha_0 \left(1/A_{i,t-1} \right) + \alpha_1 \Delta REV_{i,t} + \alpha_2 \Delta REC_{i,t} + \alpha_3 PPE_{i,t} + \varepsilon_{i,t} \quad (2)$$

Where TACC=total of accruals, A= total assets, ΔREV=changes in income divided to total assets, ΔREC=changes in accounts receivable divided by total assets, and PPE=properties, machineries, and equipment divided by total assets.

This equation can be estimated by general least square method. Then, the resulted α_1, α_2, and α_3 would be used for the estimation of non-discretionary accruals as following:

$$NDACC_{i,t} = \widehat{\alpha_0} \left(1/A_{i,t-1} \right) + \widehat{\alpha_1} \Delta REV_{i,t} + \widehat{\alpha_2} \Delta REC_{i,t} + \widehat{\alpha_3} PPE_{i,t} \quad (3)$$

Where NDACC=non-discretionary accrual divided by total assets.

Finally, discretionary accruals are calculated as following:

$$DACC_{i,t} = TACC_{i,t} - NDACC_{i,t} \quad (4)$$

Relevance of accounting data: relevance is one of qualitative characteristics of accounting data. In this research, we focused on timeliness of financial reports as an effective element of related decision makings. So, in this article we used reporting delay as a measuring scale for the relevance of accounting data which is calculated as the difference between the end date of fiscal year and the date of annual general meeting and annual profit declaration.

Independent Variable

In the first theory, the relevance of data indicator (reporting delay) is the independent variable; while in the second theory, it's the binary variable of ERP implementation.

The relevance of the accounting data (LAG) Implementation of information systems (AFT); is binary variable which is set to one for the years after the ERP implementation, and zero for other years.

Control Variables

For the evaluation of the first theory, current performance indicator, future performance indicator, financial leverage and the size of the organization were considered as control variables.

Current performance indicator (CRP): is equaled to net profit divided by total assets.

Future performance indicator (FRP): is calculated as estimated net profit of next year divided by total assets.

Leverage (LEV): is the relation of total debts to total assets.

Enterprise size (SIZE): is calculated as natural logarithm of total sales.

For evaluating the second theory, the profit growth of each share, and information environment were set as control variables:

Profit growth of each share (ESURP): is equaled to changes in the profit of each share in current period divided by the same amount in previous period.

Information environment (IMPYR): each year enterprises are sorted based on the quality of the available information and disclosure rate and subsequently higher quality enterprises are put in the first quarter as the enterprises with the most powerful information environment and get a value of one, and rest are set to zero.

Another control variable used here is the ERP implementation multiplied by profit growth of each share which can demonstrate the effect of profit growth of each share on the relationship of ERP implementation and accounting data relevance (timeliness of reporting).

Regression Models

In order to test the theories, an appropriate model created which involved all dependent, independent, and control variables. The final multiple regression models are as following:

$$DACC_{i,t} = \alpha_0 + \alpha_1 LAG_{i,t} + \alpha_2 CRP_{i,t} + \alpha_3 FRP_{i,t} + \alpha_4 LEV_{i,t} + \alpha_5 SIZE_{i,t} + \varepsilon_{i,t} \quad (5)$$

$$LAG_{i,t} = \delta_0 + \delta_1 AFT_{i,t} + \delta_2 ESURP_{i,t} + \delta_3 IMPYR_{i,t} + \delta_4 AFT_{i,t} * ESURP_{i,t} + \varepsilon_{i,t} \quad (6)$$

All variables have been described in 3.2, 3.3, and 3.4 sections.

The equation shown as (5) is a regression model for evaluating the relationship between the quality of financial reporting and the relevance of accounting data (first theory). If reporting delay indicator proves to be significant, a significant relation demonstrated in the first theory is confirmed.

Considering the two viewpoints regarding earnings management and timeliness of reports, as well as empirical results of previous researches, a positive and significant relationship would declare an earnings management resulting from information exchange while a negative relationship would confirm an opportunistic earnings management.

EMPIRICAL RESULTS

Descriptive Statistics

TABLE 1 HERE

As is evident from the above table, the variable with the highest average is the size of enterprise while the lowest is changes in net receivables. Note that these variables are completely different in nature and their comparison would not indicate anything. The dispersion of enterprise's size is too much compared to other variables. Skewness coefficient for indicators of data relevance, profit growth per share, current and future performance is negative whereas for others it's positive; so, for the first group the skewness of observations are to the left, while for the others are to the right. Kurtosis coefficient of observations is greater than normal distribution for all variables.

Considering the outliers and the effect of them on research results, before the application of regression models, we should evaluate the normalization of dependent variables. Normalized distribution of the variables is summarized on Table 2.

TABLE 2 & 3 HERE

Regression Model

$$DACC_{i,t} = 0.0802 - 1.0261 * LAG_{i,t} + 0.488 * CRP_{i,t} - 0.44 * FRP_{i,t} - 0.0969 * LEV_{i,t} - 0.0000005 * SIZE_{i,t} + \varepsilon_{i,t}$$

As is evident from the results, Fisher statistic ($F_{df_1=6,df_2=611=3.0797}$)is higher than its correspondent in Fisher table, thus the fitting model is significant and efficient (*P-Value*=0.009362<0.05).

On the other hand, significance level corresponding to Dicky Fuller test for all variables shows that they are durable. Significance level test of Limer is greater than 0.05, so the estimation method of data is integrative. Coefficient of determination for this model shows that 24.4% of changes in discretionary accruals (or the quality of financial reporting) is because of changes in control and independent variables (the relevance of accounting data). For evaluating the first theory we should focus on the results shown in the second row of the table. The significance level for data relevance variable is 0.002 and is lower than 0.05 (*P-Value*=0.009362<0.05); thus the zero theory is significance and is rejected with a 95% certainty. Considering the collected data and the significance of zero theory, our first theory indicating "a significant relationship between relevance of accounting data and the quality of financial reporting" is confirmed with a 95% certainty. Of all control variables, only the effect of current performance indicator on the quality of reporting is significant with a 95% certainty; and considering the significance level of future performance indicator as well as the financial leverage which are lower than 0.1, its effect is confirmed with a 0.9 certainty.

TABLE 4 HERE

Regression Model

$$LAG_{i,t} = 85.318 + 7.93 * AFT_{i,t} + 0.211 * ESURP_{i,t} + 0.062 * IMPYR_{i,t} + 0.0158 * AFT_{i,t} * ESURP_{i,t} + \varepsilon_{i,t}$$

As the table results shows, Fisher statistic ($F_{df_1=5,df_2=611=3.352}$) is higher than its correspondent in Fisher table, thus the fitting model is significant and efficient (*P-Value*=0.00<0.05). Moreover, significance level corresponding to Hadri test for all variables shows that they are durable. Significance level test of Limer is lower than 0.05, and Hausman's Test is higher than 0.05, so the estimation method of data is panel data with random effects. Coefficient of determination for this model shows that 37.7% of changes in accounting data relevance are because of changes in control and independent variables of the (6) model.Using the resulted coefficients in this model, we can provide two separate models for when enterprises used ERP systems as well as when they didn't:

Regression model for when enterprises do not use ERP:

$$LAG_{i,t} = 85.318 + 0.211 * ESURP_{i,t} + 0.62 * IMPYR_{i,t} + \varepsilon_{i,t} \quad (7)$$

Regression Model for When Enterprises Use ERP

$$LAG_{i,t} = 85.318 + 7.93 * AFT_{i,t} + 0.2268 * ESURP_{i,t} + 0.062 * IMPYR_{i,t} + \varepsilon_{i,t} \quad (8)$$

According to the above models, in enterprises which are using ERP, profit growth rate per share increases with a higher coefficient; moreover, the significance level of the above models for binary variable and interaction of profit growth per share and binary variable with ERP implementation is lower than 0.05 (P-Value=0.0321<0.05), so due to the rejection of zero theory and its significance, our second theory indicating "a significant relationship between ERP implementation and relevance of accounting data" is confirmed with a 95% certainty.

CONCLUSION

In this article, we evaluated the relationship between the implementation of ERP systems and the relevance of accounting data as well as the relationship between the relevance of accounting data with the quality of financial reporting regarding the restriction of earnings management in them (Bürkland & Zachariassen, 2014). The results have shown that there is a significant relationship between the relevance of accounting data and the quality of financial reporting; in which increased reporting delay would reduce earnings management.

Therefore, there is a positive and significant relationship between earnings management and timeliness of reports; which indicates that Iranian enterprises listed on TSE using information exchange model of earnings management rather than the opportunistic model (Ostroukh, Gusenitsa, Golubkova, & Yurchik, 2014). According to Benish (2001), the information exchange viewpoint demonstrates that the manager uses his authority as an instrument to help him express his personal expectations regarding enterprise's cash flow to existing and potential investors.

Research's second theory confirmed that when enterprises using ERP systems, profit growth of each share increases with a higher rate. Moreover, there is a significant relationship between ERP implementation and the relevance of accounting data with a 95% certainty.

Therefore, ERP implementations in Iranian enterprises have increased their reporting delay. This research showed that in spite of the conclusions coming from previous researches regarding the positive effect of ERP on timeliness of financial reporting (for example, Etemadi et al, 1385); practically, it's not has been the case.

This can be explained as there are a lot of hindrances reducing the efficiency of ERP systems in Iran. In fact, it appears that in many stock enterprises ERPs have been installed without a proper infrastructure and preparations such as sufficient knowledge of employees and management, and using their output for analyze (Sonnenberg & vom Brocke, 2014). So, it's evident that if ERPs are implemented without the required knowledge and output usage, it would instead become a hindrance and would prevent the organization from reaching its expected and ideal heights (Gärtner, Feldbauer-Durstmüller, & Duller, 2013).

One of research's findings was that in enterprises which use ERP systems, profit growth would increase with higher rate (Mancini, Vaassen, & Dameri, 2013). In order to analyze it more closely, we should put it alongside other findings (Glowalla & Sunyaev, 2013). According to another finding, the implementation of ERP in stock markets has caused more delay in their reporting and based on the first finding, the delay in reporting would decrease earnings management, which indicates that these enterprises using the information exchange viewpoint.

This finding is in fact demonstrating one of the main incentives of earnings management resulting from information exchange; and is in line with the prior findings that the managers of enterprises with more investing opportunities use earnings management to express their growth opportunities in future. This argument can also be extended to Iran's stock enterprises.

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APPENDIX

Table 1: descriptive statistics for research variables

Variable	Average	Standard Deviation	Skewness Coefficient	Kurtosis Coefficient
Changes in Revenues	0.12	0.29	1.16	7.25
Changes in Net Receivables	0.049	0.16	1.62	14.57
Properties, Machineries, and Equipment	0.28	0.22	1.70	5.19
Total Accruals	0.08	0.29	1.14	3.61
Relevance of Accounting Data	92.25	44.39	-3.28	35.83
Profit Growth of Each Share	-2.54	34.80	-16.69	298.52
Current Performance Indicator	0.10	0.131	-0.043	1.45
Future Performance Indicator	0.101	0.119	-0.35	1.96
Financial Leverage	0.637	0.28	2.97	20.10
Size of Enterprise	2981771	11148927.15	6.49	46.50
Informational Environment	145.34	8697	0.093	-1.14

Table 2: Kolmogorov–Smirnov test for evaluating the normalization of dependent variables

	Before Omitting Outliers		After Omitting Outliers	
	Total Accruals	Data Relevance	Total Accruals	Data Relevance
Amount	620	620	615	612
Z Statistic of K-S Test	1.121	1.972	0.971	1.078
P-Value	0.062	0.014	0.303	0.196

Table 3: results of the regression model (5)

Variable	Coefficient Symbol	Coefficients	Standard Error	t Statistic	Significance Level	Hadri Test
Fixed Coefficient	α_0	0.0802	0.054	1.47	0.1399	
Relevance of Accounting Data	α_1	-1.0261	0.000257	-2.016	0.002	3.426
Current Performance Indicator	α_2	0.488	0.216	2.256	0.0244	2.234
Future Performance Indicator	α_3	-0.44	0.242	-1.833	0.0671	6.134
Financial Leverage	α_4	-0.0969	0.0563	-1.72	0.0857	3.321
Size of Enterprise		-0.000005	0.000000001	-0.557	0.5776	3.245

Table 4: General Results of the Model

Coefficient of Determination	0.244	F Statistic	3.0797
Durbin-Watson Statistic	1.982	Significance Level	0.009362
Limer Test	1.039		
(Significance Level)	(0.3806)		

Table 5: Results of the regression model (6)

Variable	Coefficient Symbol	Coefficients	Standard Error	t Statistic	Significance Level	Hadri Test
Fixed Coefficient	δ_0	85.318	5.43	15.69	0.00	
Binary Variable (Modern Software Applications)	δ_1	7.93	12.69	3.625	0.0321	5.624
Profit Growth Per Share	δ_2	0.211	0.0843	3.105	0.0491	7.210
Information Environment	δ_3	0.062	0.0293	2.118	0.0364	3.001
Interaction of Profit Growth Per Share and Binary Variable With ERP Implementation	δ_4	0.158	0.1054	2.058	0.032	2.306