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FIRM AGE, FIRM SIZE AND INFORMATION TECHNOLOGY INTENCITY INDUSTRY FACTORS IN INFLUENCING INFORMATION TECHNOLOGY CONTRIBUTION TO IMPROVE PERFORMANCE

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ABSTRACT

This study's objective was to measure the effect of Information Technology (IT) usage on performance by analyzing the contribution of IT Resources. It was affected by Firm Age, Firm Size and Firm dependence (IT Intensity Industry) level to IT. The Study was conducted to Small and Medium Enterprises (SMEs) in Rural Bank as object. There were 101 rural banks as study sample. The method used was a survey. Data were collected using a cross-section questionnaire. The respondents were Top Level Management that responsible for IT planning and usage. Data analysis techniques used was Structural Equation Modelling-Generalize Structure Component Analysis. The results showed that Firm Age, and IT Intensity simultaneously with IT resources has a positive effect on Firm performance. Firm Size did not affect performance. Hence, Information Technology usage was affected by Firm Age and IT Intensity Industry to improve organizational performance, but not by Firm Size
Keywords: *IT Resources, Firm Age, IT Intensity Industry, Firm Size, Performance.*

1. INTRODUCTION

Since last three decades, competition of information technology (IT) usage in the industry has begun to improve performance of the United States, Europe, Japan, and continuing to other parts of the world. Higher competition in enterprise IT expenditure happens across the country. In United States, North America and Europe, since 2000 nearly 50% business investment was invested in IT (Strassman, 2002; Woodal, 2000). Indonesia's IT expenditure in 2011 according with International Data Corporation (IDC), was U.S. $ 10.9 billion, and then increased to U.S. $ 15 billion in 2012. This was the largest IT expenditure in Southeast Asia. This increment was fantastic, because in the early 2000s corporate IT expenditure in Indonesia was only U.S. $ 858 million.

The management believes and considers IT expenditure as a necessity. Although empirical evidence was not enough, they hoped it would improve productivity, cost savings, improved business performance or other benefits. Actually, was computer usage able to make business more productive and increase profit, or whether computer becomes a burden? (Siegel, 1998). Solow (1987) said "We see the computer age everywhere except in the productivity statistics". Later, it was known as Solow Paradox or Information Technology Productivity Paradox (Brynjolfson et al. 1998). Brynjolfson (1998) stated, "there was no correlation between expenditures for IT and know any measure of profitability".

Research or empirical evidence about increased productivity or performance because IT usage presents a puzzling fact. Part of IT proved a positive effect on performance (Lichtenberg, 1995; Brynjolfsson et al. 1996; Gurbaxani et al. 1998; Stratoupoulus et al. 2000; Kraemer et al. 2001; Woodal, 2002), while other states do not have a relationship (Strassman, 1990, 1997; Weill, 1992; Dos Santos et al. 1993) or even shown IT has a negative affect on performance (Brynjolfsson,

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1995; Roach, 1987; Ho and Mallick, 2005; Europidis and Ioakim, 2005). Recent interesting phenomenon was term of New IT Productivity Paradox (Anderson, 2003; Bruke and Medina, 2002) where IT has a positive effect on performance, but performance increase was not comparable with IT investments made. Therefore Bovasso (2011) asserted vagueness about IT contribution on productivity or profitability, "It isn't the actual investment in IT that seems to be what makes employees productive or unproductive, or what makes a company profitable or unprofitable." In Japan, Harada (2005) concluded that effects of IT investment on economy of Japan cannot be identified clearly and proved convincingly.

Information Technology can be defined as a set of diverse resources, such as semiconductor technology, computer systems, hardware and software, and telecommunications networks, which together with human resources can affect company performance or country. Referring to Grant (1991) on Resource-Based View of the Firm, then IT can be said has six aspects in comprehensive resource namely financial, physical, technological, reputation, organizational, and human. It was therefore appropriate that many parties expect IT to optimize performance. Even though so, the effect of IT resource usage on performance achievement cannot be separated from a number of factors or attributes inherent in company. Firm Age (Aldrich and Auster, 1986; Hannan and Freeman, 1984; Fichman and Kemerer, 1993; Kalyanaram and Wittink, 1994), Firm Size (Grover et al. 1997; Aldrich and Auster, 1986), and IT Intensity Industry (Byrd et al. 2006; DeLone and Mc Lean, 1992) were factors that can affect IT resources to improve performance.

This study provides empirical evidence and clarity of IT contribution on performance by exploring the relationship of Firm Age, Firm Size and dependence level on IT (IT intensity industry) on IT resources to improve performance. The results were expected to provide an enrichment theory on Resource-based View about how interaction with IT resource attributes inherent in company to improve performance.

2. LITERATURE REVIEW AND CONCEPTUAL MODEL

Productivity was a simple concept. Productivity was defined as the amount of output obtained from a number of input units (Brynjolfsson, 1998). Within certain limits, the more a given input into a business process, it was expected the resulting output will greater. During its development, productivity measurement as reflection of organization performance was no longer as simple a definition. The cause was business process output was not only tangible products (goods or services), but covers the entire value received by the consumer, such as quality, delivery time, comfort, and other intangible value.

2. 1 Organizational Performance

Performance was a reflection of company achievement or productivity. Performance measurement was a successful assessment of reaching the target. Organizational performance was an indicator that reflects how well an organization achieves its goals (Ho, 2008). Li et al. (2006) defines organizational performance in terms of how well market-oriented organization and achieve their financial goals. Venkatraman and Ramanujam (1986) stated Organization's profits, return on investments, and sales growth, business performance and organizational effectiveness were a reflection of organizational performance. Balance Score Card (BSC) defines and measure organizational performance through four perspectives, namely Financial, Customers, Internal Process and Learning and Growth (Kaplan and Norton, 1996). BSC was a performance measurement that includes comprehensive financial aspects as the main objectives for profit organizations, as well as non-financial aspects as supporting or complementary goals.

Performance in this study focused on company traditional goals (financial), because suitable with the main objective of industry types researched. Measurement be done through two dimensions: (i) market based performance, describing the company's ability to compete in seizing new markets or maintain market share, determined by ability to penetrate new markets opening and introduction of products or services, (ii) operating performance, which reflects company's economic profitability, productivity, and company position relative to competitors (Ravichandran and Lertwongsatien, 2000, 2005).

2. 2 Cobb Douglass Production Function

Cobb Douglas Production Function was theory expressed by Charles Cobb and Paul Douglas in 1900-1947an to see the relationship between input and output. In this theory, productivity or output was defined as a linear function of labor and capital.

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$$Y = AL^{\alpha}K^{\beta}$$

Where:

- Y = Production Total (equivalent to the dollar value of all products produced in a year).
- L = labor input - K = capital input - A = total factor productivity
- α and β was the output elasticity of labor and money (capital). Constant value of α and β based on the technology used.

  Example of this calculation method was quite simple, if α = 0.15%, an increase in employment 1% would lead to an increase in output about 0.15%

  If α + β = 1, then production function will be constant on measurement scale. So if L and K respectively increased by 20% then Y or production will also increase by 20%.

  If α + β <1, then it can be expected that the output increase was less than 20%, and conversely, if α + β> 1, output was expected to increase more than 20%.

Cobb Douglass theory was widely used to calculate the productivity level in various fields including information technology, labor input in the form of capital and IT capital. Dehning and Richardson (2002) use IT expenditure variable based on IT expenditure and expenditure and formulate II staff performance as a function of IT, Performance = F (IT). IT function was determined by three ways, namely: (i) the large amount of money spent on IT, (ii) type of IT expenditure done, (iii) management of IT assets. Performance measurement approach (i) was known as direct measurement in accordance with the principles of Cobb Douglass production function, namely to calculate the magnitude effect of total IT expenditure on output. Dans (2001) measure return on investment (ROI) for every dollar invested in IT. Dans define productivity or output (Q) with input factors capital (K), labor (L) and IT in specific industries (j), thus forming equation Q = F (K, L, IT; j).

Empirical research on theory of Cobb-Douglass Function gave facts that increment of inputs was not always proportional to the increment of outputs. Several studies confirm that there was no increment in production or profits resulting from the IT purchase or use. This phenomenon known as Productivity Paradox. Brynjolfsson (1994) stated an explanation in relation to debate about IT Productivity Paradox, namely: (i) Mismeasurement of output and input, (ii) Lags of learning and adjustment, (iii) Redistribution and dissipation of profit, (iv) Mismanagement of information and technology.

2. 3 Information Technology Resources

Wernerfelt (1984), revealed that resources and products were like two sides of a coin. Product or service requires some resources to shape it, while on the other side a set of resources can be used to produce multiple products. By identifying and setting resource profiles mastered, a company can optimize activity production to win the market. In other words, resources maximum exploitation was basis to develop strategies to achieve performance, through (i) to which resource usage will be prioritized to be developed for diversification, (ii) to which resources will be carried product diversification, (iii) resources usage priority order and to which markets types such diversification will be directed, and (iv) how companies shape to maximize existing resources. Stratopoulus and Dehning (2000) prove that company as effective use of IT assets can enjoy increased better financial performance than ineffective company.

Resource was an inventory in the production process of production factors owned, managed and controlled by the company (Amit and Schoemaker, 1993). Resources converted into final products using a complete set of other assets such as technology, management information systems, incentive systems, and confidence (trust) between management and workers. Study results of research-based Function Cobb Douglass concluded that generally IT resources were IT and Non-IT Capital (Dans, 2001; Hajkova, 2007). Based on opinion review of Grant (1991), Amit and Schoemaker (1993), Bharadwaj (2000), IT resources can be grouped into (i) tangible resources such as devices to support IT infrastructure (hardware, software, networking), physical structure as buildings, financial, and inventories of raw materials, (ii) intangible resources, such as reputation, brand image, supporting resources/complementary, partnerships quality or products quality (iii) personnel/human based resources, such as organizational culture, loyalty, training and procedures (know how). Barney (1991) divides company's resources into 3 main things: (i) physical capital resources, including: technology used by company, plant and equipment, geographic location, and access to raw materials, (ii) Human Capital Resources, including: experience, training, maturity, intelligentsia, relationships, and worldview of managers and workers to perceive and assessing the issue, (iii) Organizational Capital Resources, including: company's formal hierarchical structure, formal and informal planning, coordination and supervision system, as

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well as informal relations among groups within company to its environment.

Business resources selection that defined as IT resources were crucial and unique (Teece, et al., 1997) because it really depends on the condition and availability on each company. Based previous research and theory that consistent with company profile of the research object, in this study IT resource defined as follows:

i. Human Resources, these resources have been selected in addition to representing tangible and resource-based personnel. Human resources were often used in any previous study and cannot be separated from each company existence. Human resources always used in methods that measuring the direct effect of IT resource investment on performance.
ii. IT Infrastructure Resources, represent tangible resources or technology to portray IT availability in the company. The presence of these resources becomes important because it was a manifestation of IT presence that can be perceived as physical and technological.
iii. Financial Resources, these resources have been selected because they represent tangible resources, which illustrate corporate interests to fund IT. Financial resources together with human resources were also always an option for methods that measures direct impact IT resource investment on performance.
iv. Partnership Quality Resource (IT Partnership Quality), representing intangible resources and personnel-based, describe nature IT relationship that was open and interlinked with other parties such as suppliers of IT devices, relationship between departments, trust and long-term commitment.
v. Supporting/Supplementary Resources, representing intangible and resource-based personnel to describe the importance of management support, openness, and changes acceptance that negate the conventional boundaries of space or departmentation.

Dans (2001) revealed, that every dollar invested in IT will provide an reinforcement ROI about 93.9% or 193.9% of total production, which was slightly higher than that reported by Brynjolfsson (1996) by 81% or 181% of total production. Brynjolfsson and Yang (1996) reported that every $ 1 invested in IT will make a market value 10 times that non-IT investments. While Lichtenberg (1995) said that an IT worker was equivalent to 6 non-IT employees without affecting output. Based on the above arguments and theoretical studies, IT resources will have an impact on performance. The better IT resources used by companies, the better performance achievement, so proposed hypothesis 1 as follows:

H1: IT Resource affects to improve company performance.

2. 3 Firm Age

Firm Age shows a legitimacy or recognition from external companies on business or industrial relations existence and corporate maturity to execute routine business activities (Fichman and Kemerer, 1993; Kalyanaram and Wittink, 1994). Firm Age also reflects the strength to survive in the competition. The more mature companies then the more mature to achieve core competencies. Nevertheless, refer to Hannan and Freeman (1984) opinion about novelty aspect, a company with a young age showed better performance due to its ability to absorb and utilize new technologies. It was a challenge for organizations today because IT changes very rapidly and often can only be utilized and adapted properly by young companies (Aldrich and Auster, 1986; Hannan and Freeman, 1984).

Based on description effect of Firm Age on performance, proposed hypotheses was:

H2: Firm Age affects IT resources contribution to improve performance.

2. 4 Information Technology Intensity Industry

IT Intensity Industry reflects usage level or reliance industry or company on IT. Byrd et al. (2006) illustrates that company's usage level or reliance on IT consistent with potential payoff or promised performance. The greater IT usage in business processes, the greater potential payoff that can be expected. At the lowest level, IT just could becomes a complement or accessories for organization, but for other organizations, the reliance on IT was at a very high level, where IT was reason to establishes company. IT presence in latter company was an absolute requirement. DeLone and McLean (1992) stated that combination of information system quality, usage level and user satisfaction will have an effect on organizational performance.

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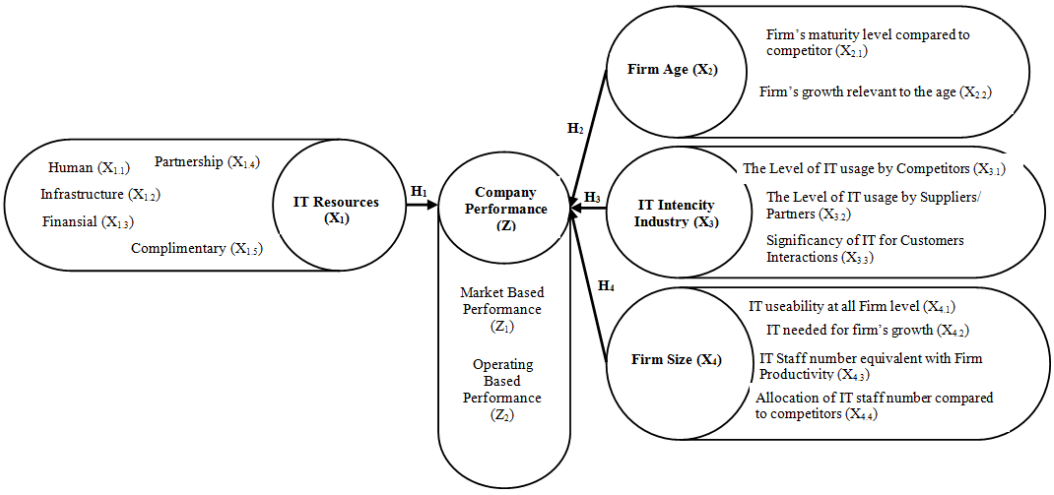

Figure 1 Conceptual Framework and Hypothesis

IT governance has changed the way businesses operate. IT affects overall business processes for the company's products, business values and other performance targets. The higher the intensity of IT usage in an industry, the higher company's dependence on IT. These changes will result changes in competition to achieve performance. Porter (1985) suggested three ways IT will affects competition in achieving performance, (i) to change the structure of industry or organization, (ii) to provide a new competitive advantage position, (iii) to create new business opportunities.

Based on the description above, the proposed hypotheses effect of Industry IT Intensity on performance was:

H3: IT Intensity Industry affects IT resources contribution to improve performance.

2. 4 Firm Size

RBV-based studies describe IT position for competitive advantage and performance in term marketing and operating profit at the level of business units, enterprise, industry and even country. Most of them use large companies as research object, as Arslan and Ozturan (2011), Melville et al. (2004), Hult et al. (2005) or others. Logical explanation for this phenomenon was a natural trait carried by IT. The bigger the company, the greater potential impact could be felt from IT existence. Conversely the smaller company, the impact of IT implementation was no longer significant. Based on firm size or organization, Aldrich and Hauster (1986) revealed that the greater organization, technology usage will bring the change that was more massive, tangible and contribution can observe clearly. IT usage in large enterprises will be more effective than the smaller companies because IT will be very helpful in simplifying operating complexity of bureaucratic organization based on larger firm size. Firm size also a factor that can be explored for large company with sufficient resources, but weak in motivation to utilize IT more effectively than small companies (Grover et al. 1997).

Based on description the effect of Industry IT Intensity on performance, proposed hypotheses was:

H4: Firm Size affects IT resources contribution to improve performance.

Conceptual framework of research model to investigate the effects of IT resources on performance was proposed with a variable-indicator of IT resources, Firm Age, IT Intensity, Firm Size, and Performance, as presented in Figure 1.

3. RESEARCH METHODS

The main research method was a survey. The sample was decided from population and determined using questionnaire as a data collection tool. Likert scale of 1 to 5 was used to measure the response of an itemized statement.

3. 1 Population and Sample

This study was directed to Small and Medium Enterprises (SMEs) in East Java. Rural Bank (BPR) was chosen as research object. Samples taken from 101 BPR member which was the total number of rural bank's headquarters in Gerbangkertasusila region, so the sample was saturated.

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3. 2 Data Collection and Analysis Techniques

Primary data was collected through questionnaires to 101 respondents specified. Secondary data obtained from relevant institutions as Indonesia Bank, published or through the mass media. From the 101 questionnaires distributed, 6 questionnaires were not returned, 1 questionnaires incomplete, so only 94 were eligible to be analyzed. After passing validity and reliability test, data was analyzed with Generalized Structured Component Analysis (GSCA), because its ability to analyze construct with reflective formative indicators (Hwang and Takane, 2004).

4. ANALYSIS AND RESULT

Linearity relationships assumptions of equation model must fulfilled for GSCA analysis. Testing linearity with Curve Fit method shows all relationships between latent variables have significance below 5% ($p < 0.05$). It concluded relationship between latent variables in structural model was linear.

Therefore, analysis can proceed with GSCA tools. Model evaluation of GSCA begun with fitted model measurement, to test whether research instruments used were valid and reliable or reflect latent variable. Validity and reliability test results showed that entire instrument has met validity and reliability requirements, with a correlation coefficient> 0.3 and Cronbach's Alpha coefficient> 0.5 (Nunally and Bernstein, 1994). Measurement results of mean, estimate loading, estimate weight, and Alpha AVE of each variable were presented Table 1.

Examination of convergent validity and discriminant validity on Reflective variables, namely Firm Age, Industry IT Intensity, Firm Size and Performance, suggests that AVE (average variance extracted) or square root of AVE was greater than the correlation value between all latent variables. Thus overall reflective variable was a good and viable constructs to describe each variable.

Examination of IT Resources variable (Table 1) suggests only an Infrastructure Resource that significant in contributing to performance achievement. Human, Financial, Partnership and Complimentary Resources did not contribute significantly on performance achievement. Nevertheless due to relationship nature and indicator of IT resources variable were formative, then existence of the four resources that were not significant can not be ignored. Analysis of data showed that based contribution from Firm Age, Firm Size and IT Intensity to IT resources, only resource infrastructure factor that have a significant effect on performance. Positive change of infrastructure resources will provide better performance, and vice versa. While changes to Human Resources, Financial Resources, Partnership Resources and Complimentary Resources will not provide a significant effect to IT resources formation that affect performance.

Examination of variable Firm Age (Table 1) shows two indicators of Maturity Relatives and Growth Competitor that relevant with Firm Age were significant in describing Firm Age. With moderate (3) to good (4) mean level, this research result show that generally respondents consider that company was already quite mature than competitors according company's growth with age. Both indicators were correct and illustrate Firm Age.

Table1. Loading, Weight, AVE, and ALPHA

Construct/ Variable	Indicators (Formative)	Mean	Weight			AVE	Alpha
			Est	SE	CR		
IT Resources (X_1)	Human Resources ($X_{1.1}$)	3. 96	0. 108	0. 247	0. 44	-	0. 596
	Infrastructure Resources ($X_{1.2}$)	3. 85	0. 723	0. 207	3. 5*		
	Financial Resources ($X_{1.3}$)	3. 34	0. 304	0. 198	1. 54		
	Partnership Resources ($X_{1.4}$)	3. 77	0. 039	0. 171	0. 23		
	Complimentary Resources ($X_{1.5}$)	3. 98	0. 427	0. 250	1. 7		
Construct/ Variable	**Indicators (Reflective)**	**Mean**	**Loadings**			**AVE**	**Alpha**
			Est	**SE**	**CR**		
Firm Age (X_2)	Maturity Relatives to Competitor ($X_{2.1}$)	3. 2	0. 800	0. 080	9. 97*	0. 677	0. 509
	Growth Relevant to Age ($X_{2.2}$)	3. 99	0. 845	0. 099	8. 53*		
IT Intencity Industry (X_3)	IT Usage's Level by Competitor ($X_{3.1}$)	3. 61	0. 727	0. 066	11. 07*	0. 574	0. 741
	IT Usage's Level by Suppliers/Partner ($X_{3.2}$)	3. 4	0. 872	0. 028	31. 54*		
	IT for Customer's Interaction ($X_{3.3}$)	3. 6	0. 710	0. 072	9. 8*		
Firm size (X_4)	IT Usability at all Firm's Level ($X_{4.1}$)	4. 13	0. 609	0. 592	1. 03	0. 446	0. 574
	IT Needed for Growth ($X_{4.2}$)	3. 89	0. 568	0. 561	1. 01		
	IT Staff to Growth Equivalency ($X_{4.3}$)	3. 24	0. 714	0. 723	0. 99		
	Allocation of IT Staff Number ($X_{4.4}$)	2. 61	0. 761	0. 753	1. 01		
Performance (Y_2)	Market Based ($Y_{2.1}$)	3. 96	0. 906	0. 030	30. 1*	0. 808	0. 762
	Operating Based ($Y_{2.2}$)	3. 85	0. 892	0. 060	14. 96*		

CR * = significant at 0. 05 level

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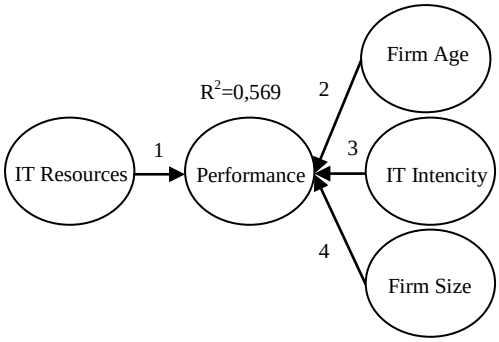

Model Fit	
FIT	0.448
AFIT	0.436
NPAR	33

Figure 2 Diagram For Hypothesis Testing And Path Coefficient Of GSCA

Examination of IT Intensity variable showed that all indicators were significant. With moderate (3) to good (4) mean level, IT Usage's Level by competitor, IT Usage's Level by Suppliers/Partners, IT for Customer's Interaction, was good and right in describing IT Intensity that can affect IT usage to reach performance. Performance examination showed that both indicators were significant. With mean close to 4, market-Based and Operating-Based was good and right in describing Performance.

Examination of Firm size shows all indicators were not significant. With poor (less than 3) to good (more than 4) mean level, then these data indicate that IT usability at all Firm's Levels, IT Needed for Growth, IT Staff to Growth Equivalency, and Allocation of IT Staff Number were moderate to provide an overview of Firm Size and the effect of IT resources to achieve performance. This fact was also confirmed that Firm Size does not significantly affect performance.

Structural model evaluation was done to determine relationships among latent variables. For models with formative and reflective indicators, examination of goodness of fit model was based on FIT and AFIT value. FIT values in Figure 2 were total variance of all variables that can be explained by structural models. FIT value 0.448 means that the model was able to explain 44.8% variation in variance of IT Resources, Firm Size, and Firm Age Intensity IT, affects performance. While remaining 45.2% was explained by other variables. Description ability of 44.6% could mean that model was good enough to explain the phenomenon wanted to know. AFIT value of 0.436 was alternative comparison to accommodate 43.6% variable variance to explain studied constructs.

Hypothesis testing was done by looking at the relationships significance between variables, as shown Table 2. If it was significant (CR > 1.96), the hypothesis was accepted, whereas if it was not significant (CR <1.96), the hypothesis was rejected. Thus hypothesis H_1: IT Resource affect to improve company performance was accepted. Hypothesis H_2: Firm Age affects IT resources contribution to improve performance was received. Hypothesis H_3: Industry IT Intensity affect IT resources contribution to improve performance was accepted. Hypothesis H_4: Firm Size affects IT resources contribution to improve performance was rejected.

5. DISCUSSION AND CONCLUSION

Correlation analysis between IT Resources with performance shows positive results and significant. It was confirmed that IT resources will significantly affect performance improvement. The better IT resources, the better company performance. Even though, not all exploration efforts on IT resources will have a significant impact on performance. Infrastructure Resources Utilization would have a significant effect to increase performance. The other four IT resources, namely Human, Financial, Complimentary and Partnership did not significant effect to shape IT resources that will contribute to performance. If this theory was reviewed with Cobb-Douglass function, where performance was a function of IT Resources on Performance = F (IT Resources), performance improvement was not always linear with all components of IT Resources increase. There was a potential futility on IT resources as well as indicating IT Productivity Paradox. Opinions of Brynjolfsson (1994) about mismanagement as one causes of IT Productivity Paradox can be confirmed. Mismanagement in optimizing and maximizing IT Resources were not significant, it will provide a futile hope to increase performance. This study findings prove the principle of Teece, et al. (1997) that resource benefits depend on proper placement and selection.

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Table 2 Hypothesis Testing and Path Coefficients

Hypothesis/Correlation	Estimate	SE	CR	Empirical	Evidence
[1] IT Resources->Performance	0.430	0.087	4.94*	Significant	Accepted
[2] Firm Age->Performance	0.450	0.159	2.83*	Significant	Accepted
[3] IT Intencity->Performance	0.356	0.091	3.93*	Significant	Accepted
[4] Firm Size->Performance	-0.319	0.346	0.92	Insignificant	Rejected

Infrastructure Resource was able to synergize with Firm Age factor in supporting company growth in accordance with company age and growth that more mature and superior than competitors. Infrastructure Resource also able to synergize with industry IT Intensity where IT exploited by competitors, Supplier/Partner and to interact with customers. Related to Firm Size, although it was believed Infrastructure Resource greatly contribute to all levels of the organization, or was required for growth of the company, but because Firm Size has insignificant effect on Performance, the effect was negligible. This fact was also confirmed by Teece, et al. (1997) that resource companies selection as IT resources were crucial and unique

Correlation analysis between Firm Age with performance, confirming that age factor has significant effect on performance. Measurements reflection of Firm Age influences, where the company grows with age and more mature than competitors, proving the effect of Firm Age on IT usage to contribute a success in achieving performance. This study confirms Fichman and Kemerer (1993), Kalyanaram and Wittink (1994) that strength reflection to survive in competition and company external legitimacy toward business or industrial relations existence and maturity have a significant effect on company performance. Related to newness aspects (Hannan and Freeman, 1984; Aldrich and Auster, 1986), where young age company able to achieve better performance because its ability to absorb and utilize new technologies, this research confirm that IT usage can be absorbed by all levels of company and adapted according to individual interests.

Correlation analysis between Industry IT intensity and performance informs that IT usage intensity or company's dependence to IT affect positively on performance. Measurement of IT Intensity effect that reflected a high level of IT usage by competitors, suppliers, partners and important role of IT to interact with customers shows that industry type has a high dependence on IT. The higher dependence level of IT, it suggests that IT role in order to achieve targeted performance become increasingly valuable. The study's findings justify Byrd et al. (2006) where potential payoff or performance was achieved in accordance with usage level or reliance company with IT. Nevertheless, the high dependence level on IT may affect negatively. If Brinjolfson (1994) allegation on four causes of IT productivity paradox (mismanagement, mismeasurement, lags of learning, redistribution of profit) indicated in a company, potentially lost level also will be greater. Research conclusively confirms De Lone and Mc Lean (1992) that the higher IT usage level accompanied with user satisfaction with IT at all levels of competitors, customers, or partners will have a positive effect on performance.

To other perspective, usage level and IT dependency will lead to fierce competition, because it affects the overall IT business processes to produce a product, business values and other performance targets. Porter (1985) said this dependence affect competitive landscape in order to achieve performance and will force company to continue to make better IT expenditure compared to competitors. At a certain equilibrium point, IT expenditure will not longer improve performance, because the results obtained were less than the costs incurred, as the findings of Anderson (2003) and Bruke and Medina (2002).

Correlation analysis between Firm Size and company performance inform that firm size does not significantly affect company performance. The findings of this study show that there has been a generalization of IT usage in all companies sizes. IT has been used at all levels, hierarchies and departments. IT was needed and used for company growth, where number of IT staff was also equivalent to growth, led from size, IT cannot be used to win the competition. IT superiority relatively eliminated to each other because competition in the same industry will use same the technology. Important information related firm size indicator was IT staff allocation factor has a mean value at bad level. Generally, large companies will have more IT staff than smaller firms. This implies that the companies size (big-small) no longer become distinction or barrier to achieve performance with IT usage. IT resources allocation more consistent with the goals/ performance desired, company character, its placement and utilization in business processes has a more significant impact to achieve organizational goals. This study rejects notion of Aldrich (1986) or (Grover et al. 1997).

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At the end, it can be concluded that: (i) IT resources affect significantly to improve performance, (ii) Firm Age and IT intensity affect IT resources significantly to improve performance (iii) Firm Size did not show a significant effect on performance with IT usage.

6. LIMITATION AND FUTURE RESEARCH

The limitation of this study was research object, only use one type of small industry (Rural Banks), with IT top level management as respondent. This was a barrier to generalize research results to all SMEs in general. Further research by integrating all IT users, including internal, supplier, partner and customer, will enrich perspectives on research results. Study object can be extended to various industry types to test whether conclusions the correlations analyzed between variables provide a consistent results.

Accuracy of our model was 0.448 (FIT = 0.448). This means that only 44.8% variance of IT Resources, Firm Age, Intensity IT Industry, Firm Age and Performance variables were described by the model, leaving 55.20% chance to explain by other variables. R2 = 0.569 on performance variables indicated that performance variable only 56.9% explained by IT Resources, Firm Age, Intensity IT Industry and Firm Size, leaving 43.1% can be explained by other variables not included in the model. In addition, the Firm Size variable does not affect significantly on performance, provide opportunities for further exploration by proposing a new variable-indicator for a more comprehensive model refinement. Further studies were recommended to adopt a new variable-indicator to complement attributes attached to the company, such as cultural and organizational behavior to see IT acceptance in achieving performance.

REFRENCES:

[1] Aldrich, H.E., and Auster, E.R. Even dwarfs started small: Liabilities of age and size and their strategic implications. *In B.M. Staw and L.L. Cummings (eds.). Research in Organizational Behavior* Greenwich, CT: JAI Press, 1986, pp. 165-198.

[2] Amit, R., Schoemaker, P.J.H, 1993, Strategic Assets and Organizational Rent, *Strategic Management Journal* (14:1), pp. 33-46

[3] Anderson, Mark C., Banker, Rajiv D dan Ravindran Sury, 2003, The New Productivity Paradox, *Communication of The ACM*, March 2003/Vol. 46, No. 3

[4] Arslan, Birgul., Ozturan, Meltem, 2011, The Path to Information Technology Business Value: Case of Turkey, *Technology and Investment*, 2, 52-63

[5] Baradwaj, A. S., 2000, A Resource_Based Perspective on Information Technology Capability and Firm Performance: An Impirical Investigation, *MIS Quarterly*, 24 (1), 169-196

[6] Barney, J., 1991, Firm Resources and Sustained Competitive Advantage, *Journal of Management*, Vol 17, no. 1

[7] Brynjolfsson, Erick dan Lorin M. Hitt, 1998, Beyond the Productivity Paradox, *Communication of the ACM*, August 1998/ Vol 41, no. 8

[8] Brynjolfsson, Erick, 1994, The Productivity Paradox of Information Technology: Review and Assessment, *Communication of ACM and Japan Management Research*

[9] Brynjolfsson, Erick., Yang, S, 1996, Information Technology and Productivity: A Review of the Literature, *Advances in Computers, Academic Press*, Vol. 43, pages 179-214, 1996.

[10] Brynjolfsson, Erick., Yang, S, 1997, The Intangible Benefits and Cost of Investment: Evidence from Financial Market, *Proceeding of 18th International Conference on Information System*, Atlanta, December 1997

[11] Byrd, T. A., Thrasher, E.H., Lang, T., Davidson, N.W., 2006, A Process Oriented Perspective of IS Success: Examining the Impact of IS on Operational Cost, *Omega, Elsevier*, Vol 34, No. 5

[12] Dans, Enrique, 2001, IT Investment in Small and Medium Enterprises: Paradoxically Productive?, *Electronic Journal of IS Evaluation*, Vol. 4, no. 1, Marc. 2001

[13] Dehning, Bruce., Vernon J Richardson, 2002, Return on Investment in Information Technology: A Research Synthesis, *Journal of Information System*, Vol 16, no.1

[14] DeLone WH, McLean ER, 1992, Information systems success:the quest for the dependent variable. *Information Systems Research* 1992; 3(1):60–95.

[15] Fichman, R.G., and Kemerer, C.F, 1993 Toward a theory of the adoption and diffusion of software process innovations. In L. Levine (ed.). Diffusion, Transfer and Implementation of Information Technology: *IFIP TC8 Working Group Conference Proceedings, Elsevier Science*, New York, pp. 23-31.

[16] Grant, Robert. M, 1991, The Resource-Based Theory of Competitive Advantage: Implication

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

for Strategy Formulation, *California Management Review;* Spring 1991; 33, 3; ABI/INFORM Global, pg. 114

[17] Grover, V, Teng, J, Segars, Albert H, 1998, *The influence of information technology diffusion and business process change on perceived productivity: The IS executive's perspective*, *Information & Management* 141-159

[18] Hajkova, D., Hurnik, J., 2007, Cobb-Douglas Production Function: The Case of a Converging Economy, *Czech Journal of Economics and Finance*, 57, 2007, no. 9-10

[19] Hannan, Michael T; Freeman, John, 1984, Structural Inertia and Organizational Change, *American Sociological Review*, Vol. 49, No. 2. (Apr., 1984), pp. 149-164.

[20] Harada, Tsutomu, 2005, The IT Paradox and its Economics Impact on Japan, *USJP Occasional Paper 05-04, Program on U.S.-Japan Relations*, Harvard University, 61 Kirkland Street, Cambridge, MA 02138-2030

[21] Henderson, John., Venkatraman, N.,1993, Strategic Alignment Model for Organizational Transformation Via Information Technology, Center for Information System research, *Center for Information Systems Research*, Massachusetts Institute of Technology, Sloan School of Management

[22] Hitt, Lorin M; Brynjolfsson, Erick, 1996, *Productivity, Business Profit Ability, and Consumer Surplus: Three Different measures of Information Technology Value*, MIS Quarterly

[23] Ho, L.A. (2008), "What affects organizational performance? The linking of learning and knowledge management", *Industrial Management & Data Systems*, Vol.108 No.9.

[24] Hwang H. & Takane Y, 2004, Generalized Structured Component Analysis, *Psychometrika*, Vol. 69, pp. 81 – 99.

[25] Kalyanaram, G., and Wittink. D.R. Heterogeneity in entry effects between nondurable consumer product categories, *International Journal of Research in Marketing, 11,* 3 (June 1994), 219-231.

[26] Kraemer, Kenneth L., Dedrick, Jason., 2001, Payoffs From Investment in Information Technology: Lesson From The Asia-Pacific Region, *Center for Research on Information Technology and Organizations*, University of California, Irvine

[27] Li, S., Ragu-Nathan, B., Ragu-Nathan, T.S. and Rao, S.S. (2006), "The impact of supply chain management practices on competitive advantage and organizational performance", *Omega,* No. 34, pp. 107-24.

[28] Lichtenberg, Frank R., 1995, The Output Contributions of Computer Equipment and Personnel: A Firm Level Analysis, *Working Paper No. 4540, National Burau of Economic Research,* 1050 Massachusetts Avenue, Cambridge, MA 02138

[29] Loukis, Eurupidis., Sapounas, Ioakim., 2005, The Impact of Information System Investment and Management on Business Performance in Greece, *University of the Aegean, Greece*, 2005

[30] Porter, M., and Millar, V, How information gives you competitive advantage. *Harvard Business Review, 63,* 4 (1985), 149-160.

[31] Ravichandran, T., Lertwongsatien, 2005, Effect of Information Systems Resources and Capabilities on Firm Performance: A Resource-Based Perspective, *Journal of Management Information Systems / Spring*, 2005, Vol. 21, No. 4, pp. 237-276

[32] Ravichandran, T., Lertwongsatien, C., 2000, Strategic Implications of Information Systems, Resources and Capabilities: A Competence-BasedModel, *Association for Information Systems*, AIS Electronic Library (AISeL)

[33] Siegel, M., 1998, Do Computers Slow Us Down? *Fortune,* March 30 1998,

[34] Solimun, 2012, Pemodelan Struktural Generalized Structured Component Analysis GSCA, *Program Studi Statistika, Jurusan Matematika,* FMIPA Universitas Brawijaya.

[35] Solow, R, 1987, *"We'd better Watch Out", New York Times Book Review,* July 12, p.36

[36] Strassman, Paul A, 2002, Why ROI ratios are now crucial to IT investment, *Strasmann. Inc*

[37] Venkatraman, N., Ramanujam, V. Measurement of business performance in strategy research: a comparison of approaches, *Academy of Management Review,* 1985, Vol. 11 No. 4, pp. 801-14.

[38] Weill, P 1992, The relationship between investment in information Technology and Firm Performance: a study of the valve manufacturing sector, *Information Systems Research,* Vol. 3, No. 4, pp. 307-33

[39] Wernerfelt, Birger, 1984, A Resource-based View of the Firm, *Strategic Management Journal,* Vol.5, 171-180 (1984)

[40] Woodal, P, 2000, Solving the paradox: IT is making America's productivity grow faster at last, but for how long? *The Economist,* Vol. 356, no. 8189, pp. S11 S19