

## **Accounting vs. Market-based Measures of Firm Performance Related to Information Technology Investments**

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### **Abstract**

Several researchers consider the Information Technology (IT) and its flexibility as an enabler to achieve the desired competitive advantages, considered as a strategic weapon, and as a crucial support to operational and strategic business processes. Since companies that have achieved Information Technology (IT)-business strategic can build a strategic competitive advantage that will provide them with increased visibility, efficiency and profitability to compete in today's changing markets; this research aims to review and discuss the dimensions of firm performance metrics, and the ways in which Management Information Systems (MIS) researchers measure firm performance in relation to IT investments and IT-business strategic alignment.

**Keywords:** Firm Performance, Information Technology Investments, IT-business strategic alignment.

## 1. Introduction

Since the late 1980's strategic alignment has been an important concern to the business community (Abbasi *et al.*, 2015; Masa'deh, 2013), as it is not only helps firms realize the potential benefits from investments in IT (Alenezi *et al.*, 2015; Tarhini *et al.*, 2015a, b), but also enhances business performance (Chan *et al.*, 1997; Croteau *et al.*, 2001; Masa'deh, 2012, 2013, Abu-Shanab, 2014 *et al.*, 2014). However, it is known that no single measure of performance could fully account for all aspects of firm performance (Snow and Hrebiniak, 1980, Ibrahim *et al.*, 2010; Abu-Shanab *et al.*, 2015a; Masa'deh *et al.*, 2015). Additionally, although firm performance has been assessed using a diversity of measures, there is no universal guideline regarding the appropriate choice. Researchers measure performance objectively and/or subjectively, where objective measurements depend upon profit and financial data, and subjective measurements rely on managerial assessments. However, some researchers used both methods to ascertain firm performance, which enhances the reliability of their conclusions. Initially, the Financial Reporting Standards (FRS's) and Statements of Standard Practices (SSAP's) dealt with the accounting standards, and offered guidelines that covered a considerable variety of accounting issues. For instance, public companies are required to disclose in their financial statements several figures such as the chairman's statement; directors' report; profit and loss account; balance sheet; cash flow statement; notes to the accounts; and auditors' report. In addition, analysts use a well-known technique in analyzing the figures taken from company financial statement, ratio analysis. The major purposes of the analysis of ratios can be summarized as ascertaining the performance of the company, determining its financial strength, and using them for comparative purposes. Consequently, by applying ratio analysis, researchers use profitability (accounting) ratios and/or financial (market) ratios.

In addition, the "productivity paradox" (i.e. the relationship between IT investment and firm performance) has been a central concern for researchers and practitioners. Indeed, assessing the business value and organizational impact of IT investment was applied using two main research approaches. While the first approach utilises literature that studied the direct relation between IT investment and organizational performance at many diverse levels, such as the economy, industry and firm levels, the second one includes empirical studies that tried to establish an indirect linkage between IT investment and organizational performance through intermediate business processes. On the one hand, earlier studies at the national and industry levels failed to recognize the positive effects of IT spending, however, recent macroeconomic studies have shown that IT investments affect both labour productivity and economic growth. At the firm level, some studies were unsuccessful in finding a relationship between IT investment and firm profitability. On the other hand, some studies found a relationship between IT investments and firm performance through some intermediary variables, whereas others did not. Therefore, most MIS research identifies IT-business alignment as a missing link between IT and organizational performance (Henderson and Venkatraman, 1993; Chan *et al.*, 1997; Burn and Szeto, 2000; Sabherwal and Chan, 2001, Orozco *et al.*, 2015, Mas'deh *et al.*, 2015b).

Furthermore, several studies test the relationship between strategic alignment and perceived (subjective) firm performance. Some of the results were found to be positive (e.g. Sabherwal and Kirs, 1994; Chan *et al.*, 1997; Kearns and Lederer, 2000; Cragg *et al.*, 2002; Kefi and Kalika, 2005; Byrd *et al.*, 2006; Dong *et al.*, 2008), whereas others showed mixed results (e.g. Tan, 1997; Bergeron *et al.*, 2001; Sabherwal and Chan, 2001; Croteau and Bergeron, 2001; Bergeron *et al.*, 2004; Chan *et al.*, 2006; Masa'deh, 2013). Moreover, few researchers investigate the connection between strategic alignment and accounting /market (objective) firm performance. Furthermore, all of these studies showed negative linkages (e.g. Parthasarathy and Sethi, 1993; Li and Ye, 1999; Palmer and Markus, 2000). Also, a few studies (e.g. Bergeron and Raymond, 1995; Masa'deh and Shannak, 2012; Masa'deh, 2013)

examined the link between alignment and firm performance by using both measures of performance (i.e. perceptual and objective).

In addition, since most researchers and practitioners in the MIS field have devoted their efforts mainly to examining how strategic alignment influences firm performance, it is necessary to begin this research by understanding the multiple dimensions of organizational performance (section 2). In section 3 a detailed review of the ways in which MIS researchers have measured firm performance is provided. Subsequently, section 4 reviews the ways that researchers measured firm performance linked to IT investments and IT-business strategic alignment respectively. Finally, section 5 concludes.

## 2. Dimensions of Firm Performance

Researchers have used both 'hard' performance measures, i.e. financial outcomes such as return on assets, market share, sales, and other financial ratios; and 'soft' measures of performance, including innovation, learning, and customer satisfaction (Gentry and Shen, 2010; Subramanian and Nilakanta, 1996). Dess and Robinson (1984) suggested that performance could be measured either objectively or subjectively. While objective measurements in general relied on financial data, subjective measurements depended upon managerial assessments.

In addition, Brews and Tucci (2004) argued that objective criteria consist of sales growth (Fredrickson and Mitchell, 1984; Pearce *et al.*, 1987), return on assets (ROA), return on sales (ROS) (Pearce *et al.*, 1987), and stock price performance (Ansoff *et al.*, 1970). Moreover, Li and Ye (1999) argued that there is no single objective measure that can capture the overall performance effectively. Two measures could be used as the basis for business firms' performance assessment. While profit measures such as ROA and ROS demonstrate the efficiency of the firm's operation; growth measures such as sales growth show how open a firm is to new markets, or expansion in existing markets. Furthermore, subjective measurements include respondent ranking in comparison to the firm's overall industry (Pearce *et al.*, 1987; Brews and Hunt, 1999), or respondent perceptions of their firm's existing profitability, quality and social reactions (Hart and Banbury, 1994). For instance, Chan *et al.* (1997) found that strategic alignment was a better predictor of business performance when measured by using subjective metrics like market growth, product service innovation, profitability, and company reputation.

However, the limitations of these measures are widely acknowledged. Miller (1987) argued that subjective measurements are more valuable than objective measurements due to the lack of availability and reliability of accounting information, since they could be manipulated by owners and management. On the other hand, researchers cannot ignore the importance of the objective-secondary data due to their permit replication of the analysis. Nevertheless, some researchers highlighted the junction of using both methods for measuring firm performance, which enhances its trustworthiness by collecting perceptual data from company managers and secondary data from external resources (Ravichandran and Lertwongsatien, 2005). Some researchers (e.g. Kaplan and Norton, 1992; 1996) argued that firms usually depend on merely financial measures, which are insufficient to capture the overall success factors in a firm; therefore, firm performance should involve strategic success factors. For example, Kaplan and Norton (1996) set up an approach of Balance Scorecard that interprets and transforms a firm's mission and strategy into a full set of performance measures. Their model is based on four key perspectives: financial goals, customer perspective, internal business processes, and the learning and growth perspective. They argued that by using the four perspectives, all members in a firm will understand its strategic priorities and implement these priorities correctly.

In summary, some researchers suggest assessing a firm's performance by using both hard and soft performance metrics to compensate each other weaknesses. In other words, while some researchers recommend either objective measures or subjective metrics to measure performance, others propose both methods.

### **3. Accounting vs. Market-based Measures**

Before 1990 accounting standards were designed and issued (twenty-five Statements of Standard Practices (SSAP's)) by the Accounting Standards Committee (ASC). The ASC subsequently ceased to exist in 1990 when it was succeeded by the Accounting Standards Board (ASB), which has issued Financial Reporting Standards (FRS's). The FRS's and SSAP's, which contain both disclosure rules and measurement rules, are frequently referred to the ASB, and provide guidelines that cover a considerable variety of accounting issues. Hence, the SSAP's exist alongside the newly-issued FRS's.

#### **3.1. Financial Annual Reports**

Since the Companies Act (1985), accounting standards issued by the ASB have been recognized by UK legislation. Therefore, public companies are required to disclose in their financial statements to check whether they have materially departed from the requirements of an accounting standard. Indeed, the ASB has demanded that the financial statements include the assessment of the stewardship of the management. This conceptual exposition of accounting defines the objective of financial statements, as being to provide information about the financial position, performance, and financial adaptability of an enterprise that is useful to a wide range of users, for assessing the stewardship of management and for making economic decisions (Stittle, 1997). The statement declared financial statements are required to meet the needs of providers of risk capital to the enterprise, and most of the needs of other users that financial statements can satisfy. Therefore, the statement identifies the users to be: employees; lenders; suppliers and other creditors; customers; government and their agencies; and the public. The statement spots the main qualitative characteristics that relate to content (relevance and reliability) and to presentation (comparability and understandability). The qualitative characteristics are defined as the characteristics that make the information provided in financial statements useful to users for assessing the financial position, performance, and financial adaptability of an enterprise (Stittle, 1997). In defining relevance, the statement needs information to have the ability to affect users by helping them assess past, present, or future events, or confirming or correcting their past evaluations. Additionally, the statement defines information as being reliable when it is free from material error and bias, and can be depended on by users to represent what it purports to represent, or could be expected to represent. The statement emphasizes that financial statements should be willingly understandable by users; however, the statement remarks that financial information is prepared on the assumption that users have a realistic knowledge of business, accounting, and economic activities, and also a readiness to read the information with rational diligence.

In general, company financial statements normally consist of the following requirements: the chairman's statement; directors' report; profit and loss account; balance sheet; cash flow statement; notes to the accounts; and auditors' report (Nobes and Parker, 2004, p. 141). Although a chairman's statement is not a legal requirement, it is customarily included as a marketing and public relations exercise (Stittle, 1997). The chairman's statement usually contains a commentary on the year's financial and operating results; features or events that had main trading implications; major developments and initiatives that happened during the year; new or different strategies that being adopted; reference to new or retiring directors; comments on employee performance; and prospects for the coming year. The directors' report contains a mixture of legally-produced information, details required by the Stock Exchange, and any information that the directors wish to voluntarily comment upon. It is designed to

complement the financial statements, and to provide comments on the financial information and on the firm's general affairs. Such information could cover group results, and dividends; business review and future developments; share capital, payment of suppliers and amount of interests; directors, employee relations and involvement, and disabled persons; annual general meeting (AGM) special business; and political and charitable contributions and auditors (Laidler and Donaghy, 1998, p. 24).

In addition, the profit and loss account (P&L) presents a historical record of a firm's financial performance during its last financial year. Essentially, the profit and loss account records and compares a firm's revenue and expenses; this is to find out if a profit (i.e. revenue exceeded expenses) or loss (i.e. expenses exceeded revenue) was made. In addition, the balance sheet offers a list of a firm's assets and liabilities. It identifies in monetary terms what a firm owns (the assets), and what it owes (the liabilities), at a particular moment in time, usually the end of the accounting period of the firm. Also, the Companies Act 1985 permits firms to either show assets at their original cost (i.e. historical cost accounting) or alternatively at their current value (i.e. replacement cost). Furthermore, since cash is the life-blood of all business activities, a cash flow statement is vital and shows the movement of cash in the company and identifies its origin; highlights dependency on external funding; and enhances the stewardship function of management in assessing the firm's solvency and liquidity. As well, notes to the accounts provide extra crucial information, which supplement the figures given in the profit and loss account, balance sheet, and cash flow statement. Also, the extra information is extremely important when conducting a meaningful analysis of company performance.

The objective of the auditor's report is to determine whether the financial statements give a true and fair view of the firm's financial position and profit or loss. The auditors must express a clear opinion with respect to the extent to which the firm complied with current regulations (Fellows *et al.*, 2002, p. 266). The areas where the auditor may possibly censure the firm's accounts include if the firm has not complied with legislation, or accounting standards; the firm has inappropriate accounting policies; the auditors disagree with the way things have, or have not been disclosed in the accounts; and the auditors disagree with the amounts, or the facts, disclosed in the accounts (Mckenzie, 1994, p. 12).

### **3.2. Financial Ratio Analysis**

Essentially, all firms in the world measure performance to guarantee that they are operating as efficiently and effectively as possible, and also to find out whether a firm is achieving its goals. Also, performance measures can be used to support continuous improvement by focusing attention on the areas where managers want a certain level of performance. In addition, there is a temptation for managers to consider lots of performance measures; consequently they believe with confidence that everything vital is being monitored. However, this is not realistic because of the time and cost of producing such large quantities of information, and also with so much information the results sometimes lack quality, and give rise to uncertainty. Therefore, only key measures can be produced, and as a result managers have to make sure that the measures employed are the most efficient ones.

In addition, there are several techniques being used to analyze a company's financial performance. An important one is analyzing the figures taken from a company's financial statement is the use of ratio analysis. Indeed, financial statement analysis is vital, since past performance is usually a good indicator of future performance, and the current position is the platform upon which future performance will be built (Hornngren and Sundem, 1990). Ratios are concerned with the relationships among figures in the financial statements. This is to say that by using ratio analysis technique, data from the accounting statements can be examined. In addition, ratios can not merely be calculated within the same firm for a specific financial year, but can also be used to establish a trend of ratios over the years and to compare figures

between different firms. Furthermore, either a time-series or cross-sectional approach to ratio analysis could be used (Walton, 2000). Time-series analysis would compare the figures for one year with those of the previous year. However, this is not preferable from a statistical point view, since such a short period may possibly not reveal trends. Therefore, analysts generally (and particularly when making predictions) use at least a five-year base, and often prefer ten years. Cross-sectional analysis enables making a comparison with other firms in the same industry for the same year. This can potentially yield insights if firms have similar products, since differences in business performance will be the consequence of different management strategies in facing the same problems.

### **3.3. The Objectives of Financial Ratio**

Financial ratios can be calculated from any figures that are obtained, not only from within a set of accounts, but also from other external sources, including trade and other statistical sources. Also, ratios are particularly helpful when a pattern or trend can be established over the years. For instance, by identifying and monitoring changes in a ratio over a period such as five or ten years, then any discrepancies or variations from the five or ten year trend-line can be easily discerned. However, the main functions of ratios are finding out the performance of the company; determining the financial strength of the company; and applying them for comparative purposes (Stittle, 1997). Firstly, in assessing performance, it should be known that because of the nature of the accounting statements, the figures are historical in nature. Therefore, ratios can reflect on the financial performance of what has happened, and not what will happen in the future.

In addition, performance can provide some prediction of the future if the only available ratio data are historical. Secondly, the financial strength of the business is helpful in assessing the degree of security inherent in the business. It is useful to external parties (e.g. banks and other lending institutes), who will be able to assess the degree of stability and asset security for lending purposes. Creditors and suppliers are also interested in financial strength as an indicator of credit worthiness, and to assist in the assessment of being able to meet their payment demands. Also, shareholders and employees place importance on the degree of financial strength in the business as an indicator of investment potential. Finally, for comparative purposes, ratios can be valuable in firm interpretation. It is probable to use ratios to compare successive years of data. Furthermore, within the same firm it is possible to establish a trend pattern over the years.

Indeed, the value from using ratio analysis comes from knowing which ratios to select, and being able to interpret them. However, it must be known that ratio analysis is an extremely crude and approximate technique; and the use of such a technique without exercising caution will produce sweeping and often inaccurate conclusions (Stittle, 1997). For example, the items in the financial statements are affected by company policy (e.g. the rate of depreciation to use, and the policy of assets replacement and policies adopted), and for that reason they directly influence the ratio analysis. In addition, year-end data may not be typical of the firm's position during the year. Knowing that certain ratios are computed at year-end, management may well improve a ratio by entering into certain types of transactions near the end of the year. Although the ratios can identify specific areas of concern or interest, the user should consider them as 'indicators' or 'pointers', and always try to subsequently locate other support to substantiate the initial findings or suspicious, since a ratio by itself has very slight value. Nevertheless, whichever ratios are being selected, they should be treated with a degree of caution and apprehension.

### 3.4. Categorizing the Ratios

Although there are no definitive classifications of ratios, it is often convenient to group them into two categories, namely profitability (accounting) ratios, and investment (market) ratios. Most financial statement analysis examines aspects of a firm's profitability. Examining the profitability of a firm in the recent past provides information to help the analyst to project its future profitability, and the expected return from investing in the firm's equity securities. The second technique is to compare the firm's market value or share price to the firm's fundamentals of profitability and growth. This technique include commonly-used market multiples such as market-to-book ratio and the price-to-earnings ratio.

#### 3.4.1. Profitability Ratios

Profitability can be defined as the ability of a firm to generate profit. Profitability ratios show how much the firm has earned, and the profits made on sales. Profitability ratios take account of return on investment, return on sales, and return on capital employed.

**1. Return on Investment (ROI):** ROI is a critical ratio for evaluating a firm's profitability. The ratio is considered to be the most important financial ratio in financial statement analysis. The two common ROI measures are return on total assets (ROA) and return on equity (ROE).

**A. Return on Assets (ROA):** This ratio measures the return by using assets to produce income. Analysts use ROA to assess a firm's operating performance relative to investments made without considering whether the firm used debt or equity capital to finance the investments (Stickney, 1996). The ratio measures the relationship between the amount of profit before interest and tax, and the total assets number expressed as a percentage.

$$\text{ROA} = (\text{Net Profit before Interest and Tax} / \text{Total Assets}) * 100$$

Although ROA shows how productive the firm's total assets are in producing profit, Stickney *et al.* (2007) emphasised that it ignores the means and costs of financing the assets (i.e. the proportion of debt versus equity financing, and the cost of those forms of capital).

**B. Return on Equity (ROE):** Return on equity relates to the return made by a firm for its shareholders with the finance made available to the firm by the shareholders. In other words, it indicates the management's success or failure at maximizing the return to stockholders based on their investment in the firm (Alexander and Nobes, 2001).

The formula for ROE from Elliott and Elliott (2005) is:

$$\text{ROE} = (\text{Net Profit before Interest and Tax} / \text{Shareholder's Fund}) * 100$$

However, although ROE is at the apex of the ratio pyramid, it does not tell the owners if firm is creating shareholders' wealth or destroying it (Duffy, 1995).

**2. Return on Sales (ROS):** This ratio is one of the 10 key performance indicators that are being used by firms to benchmark their performance. ROS (or so-called net profit margin) indicates how successful the management is in creating profits from its sales. It is calculated by dividing net profit by sales. The formula to calculate ROS ratio from Walton (2000) is:

$$\text{ROS (Net Profit Margin)} = (\text{Net Profit before Interest and Tax} / \text{Sales}) * 100$$

In general, although a higher margin indicates good performance, it ignores balance sheet and cash flow statements and looks merely at the profit & loss account. Therefore, it provides an incomplete view of management performance (Hennell and Warner, 2001).

**3. Return on Capital Employed (ROCE):** This ratio is frequently regarded as a fundamental indicator of the profitability levels in a firm. It is normally defined as the owners' equity, plus the long-term borrowings of the business. Therefore, it looks at the business efficiency as a whole. Furthermore, ROCE is a vital indicator of management efficiency, since it contrasts the net profit generated by the firm with the total value of fixed and current assets. Return on capital employed is calculated using the following formula (Elliott and Elliott, 2005):

$$\text{ROCE} = (\text{Net Profit before Interest and Tax} / \text{Capital Employed}) * 100$$

Where:

$$\text{Capital Employed} = \text{Total Assets} - \text{Current Liabilities}$$

Generally, the higher the ROCE, the more effectively managers have been utilizing the assets of the firm. However, it is extremely difficult to contrast ROCE across firms due to the accounting of intangibles. For instance, firms with a low level of intangibles, like goodwill, have higher ROCE than firms with a high level of intangibles (Duffy, 1995).

### 3.4.2. Market Ratios

Another technique for exploiting the financial statements is how to analyse and use the information in market value. Market ratios are those most commonly used by anyone interested in an investment in a firm. As Stickney *et al.* stated:

*The market price for a share of common equity is a very special and informative number because it reflects the aggregate expectations of all of the market participants following that particular stock. The market price reflects the result of the market's trading activity in that stock. It summarizes the aggregate information the market participants have about the firm, and the aggregate expectations for the firm's future profitability and growth (Stickney et al., 2007, pp. 969-970).*

Therefore, market ratios indicate how well a firm is performing in relation to the price of its shares and other related items, including dividends and the number of shares in issue. Furthermore, the three common market-based approach ratios are the price-to-earnings ratio, market-to-book ratio, and cash flow per share ratio.

**1. Price-to-Earnings (P/E) Ratio:** The price-to-earnings ratio is a measure of market confidence in the shares of a firm. The common way to compute the ratio (by dividing market price by earnings per share) is practical, since analysts can observe price per share and historical earnings per share for most firms. The Wall Street Journal reports P/E ratio as part of the daily coverage of stock prices and trading activities (Stickney *et al.*, 2007). The ratio is calculated using the current share price and current earnings, as the following formula indicates:

$$\text{P/E} = \text{Market Price per Share} / \text{Earning per Share}$$

Also, it is known that the higher the P/E ratio, then the better the expectations of the firm's future profitability. However, although the P/E ratio is efficient, since analysts do not need to produce a computation of value or a forecast of earnings, it creates a misalignment for



valuation purposes since it divides historical earnings into share prices that reflect the present value of future earnings.

**2. Market-to-Book (MB) Ratio:** Some researchers have used market-to-book ratio as a measure of market performance. The ratio can be calculated by dividing the firm's market value of common equity at a point in time by the book value of common shareholders' equity from the firm's recent balance sheet (Stickney *et al.*, 2007).

The book value of an ordinary share is the value that would be attributable to each ordinary share if the assets and liabilities of the firm were sold or settled at the figures shown in the published balance sheet. The market value per share (the share price) is easily obtained from reports and newspapers (Alexander and Nobes, 2001). Also, MB ratio is calculated using the following formula:

$$MB = (\text{Market Value} / \text{Book Value}) * 100$$

Where:

$$\text{Market Value} = \text{Ordinary Shares} + \text{Minority Interest} + \text{Short-term Debt} + \text{Long-term Debt} + \text{Other Long-term Liabilities.}$$

$$\text{Book Value} = \text{Shareholders' Equity} + \text{Minority Interest} + \text{Short-term Debt} + \text{Long-term Debt} + \text{Other Long-term Liabilities.}$$

In addition, since market values are determined not by the cash that has been invested in the acquisition of assets but by the cash flow that can subsequently be generated out of them, the MB ratio reflects what the market value is. However, it does not tell analysts what the ratio should be.

**3. Cash Flow per Share:** Some analysts and investors calculate other ratios and statistics that can provide additional information (Stittle, 1997). Therefore, some analysts use the ratio of cash flow per share (also known as cash flow to capital expenditure). This ratio examines the cash (i.e. profit) that is generated for each share in the firm to cover capital expenditure and cash dividends (Bernstein, 1993). Furthermore, cash flow per share is calculated using the following formula (Stittle, 1997):

$$\text{Cash flow per Share} = (\text{Cash from operating activities} / \text{Number of ordinary shares issued})$$

The ratio measures a company's effort to acquire long term purchases to better equip it to do business. A high or increasing cash flow to capital expenditure ratio is usually a positive sign, indicating that the company has the financial flexibility to invest in it and make upgrades to its buildings, machinery, and processes.

In summary, since the Companies Act of 1985, public companies are required to disclose in their financial statements whether they have materially departed from the requirements of an accounting standard. Financial statements normally consist of several items, such as the chairman's statement; directors' report; profit and loss accounts; balance sheet; cash flow statement; notes to the accounts; and auditors' report. Therefore, in order to analyse the figures taken from a company's financial statement, researchers use the technique of ratio analysis. In addition, it is often convenient to group ratios into two categories: profitability (accounting) ratios and investment (market) ratios. Profitability ratios show how much the firm has earned and the profits made on sales. It takes account of return on investment, return on sales, and return on capital employed. The two common ROI measures are ROA and ROE. Furthermore, market ratios indicate how well a firm is performing in relation to the price of its shares and other related items, including dividends and number of shares in issue. The

three common market-based approach ratios are the price-to-earnings ratio, market-to-book ratio, and cash flow per share ratio.

**4. The Relationship between IT Investments and Firm Performance:** The relationship between investment in IT and productivity, which is referred to as the 'productivity paradox', has been a focal concern for researchers and practitioners in the MIS field. They seek to test the correlation between IT investment and economic performance (e.g. Strassmann, 1990; Alpar and Kim, 1991; Weill, 1992; Brynjolfsson, 1993; Loverman, 1994; Brynjolfsson and Hitt, 1996; Brynjolfsson Yang, 1996; Strassmann, 1997; Mahmood *et al.*, 1998; Shannaket *al.*, 2010; Shannaket *al.*, 2012; Orozco *et al.*, 2015). Some researchers defined IT investment as including investments in computers, telecommunications, hardware, software, and services (Dedrick *et al.*, 2003). Also, Dedrick *et al.* (2003) argued that economic performance could be interpreted in different ways at economy or country, industry, and firm levels. At the country level, it refers to economic growth, labour productivity growth, and consumer welfare. Economic growth is the rate of change in real output or gross domestic products (GDP), which is measured at the country level. Labour productivity growth or growth in output per worker is an evaluation of the efficient use of resources to create value. Consumer welfare could be achieved when the economy provides lower-cost goods and services relative to the income of domestic consumers. Measures that spotlight the output of an industry sector like financial measures are used at the industry level. Also, at the firm level labour productivity growth and profitability are the metrics of economic performance. However, the main issue concerning researchers for a long time was assessing the business value and organizational impact of IT investment, and was applied using two main research approaches. The first approach contains literatures that studied the direct linkage between IT investment and organizational performance at many diverse levels, as Bakos and Treacy (1986) suggested, such as the economy, industry, and firm levels. The second approach includes empirical studies, which tried to establish an indirect association between IT investment and organizational performance through some intermediary processes.

At the countrywide and industry levels, earlier studies did not recognize positive impacts from IT spending. Nevertheless, recent macroeconomic research has shown that IT investments impact upon labour productivity and economic growth. This is in part because IT takes a place in the investments proportion. For instance, Roach (1987) studied the IT impact of productivity on information and production workers, and found that information worker productivity had neither decreased in some sectors, nor fluctuated with production worker productivity in the manufacturing sector. However, he concluded that the tremendous increase in computerization had little effect on economic performance. Also, Baily and Chakrabarti (1988) showed no correlation between IT investments and productivity. They claimed that when production becomes gradually more information intensive, the relative productivity drops as a result of the declining IT price, thus, IT is a poor replacement for information workers. In addition, Loverman (1988) examined the period from 1978 to 1984 on some business units of a manufacturing sector and concluded that the contribution of IT capital investment to productivity as output is about zero. Furthermore, he showed that the marginal dollar would be better employed if spent on non-IT input like non-IT capital. Also, Strassmann (1990) found no association between spending on computers and profits or productivity. He concluded that it is not how much is spent on IT, but how IT assets are managed which makes the difference.

Kraemer and Dedrick (1996) noted a positive relationship between IT investment associated with GDP and productivity growth, based on a period from 1984 to 1990, in twelve Asian-Pacific states. Furthermore, they found in their 2001 study (Kraemer and Dedrick, 2001) of forty-three states that the level of IT investment as a percentage of GDP was not statistically significant to productivity growth. However, Litan and Rivlin (2001) found that the internet and electronic commerce contributed to productivity. They tested the impact of the internet on productivity in eight industry sectors that account for 70% of the nation's GDP. They found

that the impact of the internet over five years might increase an annual contribution to the productivity growth from 0.2% to 0.4%. A study of the Mexican banking industry in the period from 1982 to 1992 was conducted by Navarrette and Pick (2002). They used time series technique for eleven years to test the correlation between IT expenditure and three performance measures, namely net profits, return on assets (ROA), and return on equity (ROE). They found a positive relationship between IT spending and the industry's net profit and ROA. Thus, in their study the productivity paradox was rejected.

Furthermore, at the firm level, some studies have failed to find a relationship between IT investment and firm profitability. Markus and Soh (1993) tested the correlation between firm profitability and a set of IT-related variables like IT expenditure, extent of computerization, and proportion of IT services outsourced. They controlled for bank size and diversity of banking activities. They found that smaller banks achieved returns on their IT spending more than larger banks. Nevertheless, when they considered a lagged IT expenditure accumulated over four years, they found that, within larger banks, the more extensive computerization was correlated with greater firm profitability than in smaller banks. However, Hitt and Brynjolfsson (1996) found that IT investments affected productivity and contributed to consumer welfare through better services and lower prices, but this did not necessarily improve profitability. This was because productivity benefits passed to consumers through lower prices, and not directly to superior profitability. Hitt and Brynjolfsson (1996) explained that the reason behind the non-improvement of business profitability from IT investment was that buyers decrease their costs for searching for low-cost products and services and selecting for new suppliers. Therefore, the lower price that buyers pay for products or services could reduce profitability. Consequently, firms should try to protect their profitability by relying on business strategies like diversification and product differentiation.

On the other hand, some studies investigated the relationship between IT investments and firm performance through some intermediary variables. For instance, Barua *et al.* (1995) investigated a relationship between IT investments and intermediate measures of operational performance (e.g. inventory turnover, relative quality, relative prices, and new products), and the impacts of these intermediary variables on firm performance. The researchers found that IT investment affected most of the intermediate measures as inventory turnover, which affected firm performance, as the latter was measured by return on assets (ROA) and market share. Rai *et al.* (1997) studied the impact of IT investment on firm performance by using firm-level IT spending data as the input, and financial data as the output. They used three IT investment measures: aggregate IT, client/server systems, and IT infrastructure. Whereas their outputs expressed three different performance items including: firm output (sales and value-added), financial (ROA and ROE) and intermediate (labour productivity and administrative productivity) performance. They found that IT investments partially associated with firm output positively, indicating a lack of a clear correlation between IT investments and business performance. That is only when IT capital and client/server expenses were positively correlated with ROA. The explanation of such findings was that financial performance might be significantly affected by variation in the links between IT, business strategy, and competitive context across firms. They emphasized that the integration of these contingencies could better explain correlations between IT investments and financial performance. Indeed, studies at the firm level show that the value of IT investments is influenced by the structure, strategy, and business practices of the firms. For example, Weill (1992) explained that the quality of management in a firm and its commitment to spend in IT increases the contribution of IT investments to firm performance. Tallon *et al.* (2000) showed that aligning IT with business strategy increased the value of IT investments, and those firms with higher levels of investments gained enormous benefits from alignment. In addition, Dedrick *et al.* (2003) suggested that IT investments affect profitability, but the modelling techniques and datasets used in previous studies were unable to measure the impacts. Thus, if developed models are able to control for more factors that affect profitability, then IT investments and firm performance could be revealed.

## 5. Conclusion

Prior studies failed to capture the positive effects from IT spending, whereas, recent studies discerned more encouraging results (Altamony *et al.*, 2012; Masa'deh, 2012; Kannan *et al.*, 2013; Masa'deh, 2013; Masa'deh, Gharaibeh, Maqableh, and Karajeh, 2013; Masa'deh, Maqableh and Karajeh, 2014). Also, researchers indicated that productivity enhancements were superior within the manufacturing sector than in the service sectors. In addition, earlier research at the firm level was unable to show that IT investments led to productivity. This is in part because of inadequate data on IT investments, and small sample sizes (Brynjolfsson and Hitt, 1996, 2000; Brynjolfsson and Yang, 1996). Brynjolfsson (1993) has given four explanations of the reasons behind the paradox existence: measurement errors in input and output variables that used in different studies; the lagged effect of IT, due to learning and adjustment; redistribution and dissipation of profits; and mismanagement of IT. The final reason could occur when managers mimic the investment decisions of other managers, and ignore important information, or the overload negative effect from adopting new technology, which affects the organization strategically structurally. Brynjolfsson and Hitt (1998) called for more research into how IT can become more effective, specifically identifying the right mix of growth and innovation strategies, and the business processes and organizational structures that best complement IT investment. This necessitates the testing of the associations between business and IT strategy, and business and IT structure, with organizational performance. Therefore, the debate on the effects of strategic alignment on firm performance is needed. Indeed, several studies test the relationship between strategic alignment and subjective firm performance. Some of the results were found to be positive (e.g. Sabherwal and Kirs, 1994; Chan *et al.*, 1997; Kearns and Lederer, 2000; Cragg *et al.*, 2002; Kefi and Kalika, 2005; Byrd *et al.*, 2006; Dong *et al.*, 2008), while others showed mixed results (e.g. Tan, 1997; Bergeron *et al.*, 2001; Sabherwal and Chan, 2001; Croteau and Bergeron, 2001; Bergeron *et al.*, 2004; Chan *et al.*, 2006; Masa'deh and Shannak, 2012; Masa'deh, 2013). In addition, few studies investigate the connection between strategic alignment and objective accounting/market firm performance (e.g. Parthasarathy and Sethi, 1993; Li and Ye, 1999; Palmer and Markus, 2000; Masa'deh and Shannak, 2012; Masa'deh, 2013, Abu-Shanab *et al.*, 2015b); whereas few studies (e.g. Bergeron and Raymond, 1995) examined the link between alignment and firm performance by using perceptual and objective measures of performance. Based on the above discussion related to this research, it seems that MIS researchers have offered a diverse range of perceived measures of organizational performance. Also, subjective measures were preferred rather than objective measures, since subjective measures have been shown not only to capture a broad concept like business performance, but also link the firm strategy with its performance. Nevertheless, this research calls for further research in developed and developing countries in order to overcome the above concerns.

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Measuring marketing is highly challenging. For example, marketers generally agree that a firm's brand is a key marketing asset but different marketers all have subtly different views of what is meant by a brand. It is hard to measure something when you don't know what exactly you are trying to measure. We, therefore, suggest that the first thing a marketer needs to establish is a clear definition of what they are trying to measure. This allows us to create metrics to keep track of how a firm is performing against the operational definitions specified. This book aims to improve measurement validity, how well you translate your ideas into numbers; we do not seek to provide new ways of looking at marketing, or argue which concepts are more important than any others.

**Head to Head Comparison between Cost Accounting vs Financial Accounting.** Below is the top 13 difference between Cost Accounting vs Financial Accounting.

**Key Differences Between Cost Accounting vs Financial Accounting.**

1. Cost accounting is an internal instrument for the management to measure efficiency and make a decision related to the operations of a company. On the other hand, Financial accounting prepares financial statements to show performance to the entities external to the company like investors and creditors, etc.
2. Popular Course in this category.
3. Based on performance, how much should be invested in a firm?

**Cost Accounting vs Financial Accounting Comparison Table.**

**Information Technology in Marketing**

Marketing information system MkIS mobile banking Technology in Marketing Class note.

**Account information**

1. Mini-statements and checking of account history
2. Alerts on account activity or passing of set thresholds
3. Monitoring of term deposits
4. Access to loan statements
5. Access to card statements
6. Mutual funds / equity statements
7. Insurance policy management
8. Pension plan management
9. Status on cheque, stop payment on cheque
10. Data about competitors can also be part of this category

3. Problem related or customized information: Developed in response to some specific requirement related to a marketing problem or any particular data requested by a manager.