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Project Evaluation Trend in Thailand Based on Critical Factors Index

Kereboon Champathed, Chuvej Chansa-ngavej
Shinawatra International University, Thailand
katumboy@hotmail.com, chuvej@gmail.com

Abstract: This paper aims to investigate the recent trend of the use of project evaluation techniques based on opinions of financial managers in Thai firms. The research uses a questionnaire built on a Sense and Respond (S&R) method called Critical Factors Index (CFI). It examines the trend using such CFI terms as importance, experiences, expectations, gaps, deviations and direction of development. The results show several critical areas for improvement needed including customer perspective and the traditional use of payback technique for project evaluation in the firm. The results also show that the needed improvement is more critical in small firms than in medium and large firms. The results further show that the improvement needed is more critical for merchandizing firms than for manufacturing and service firms.

Keywords: *Financial measure, Non-Financial measure, Critical Factors Index, service, manufacturing, merchandize*

1. Introduction

The primary goal of the corporation is stockholders' wealth maximization or maximizing the price of the firm's common stock (Chansa-ngavej, 2009). Stock price maximization is an important goal for most corporations (Peterson & Fabozzi, 2002). Financial managers who make the actual decision are interested in knowledge in the areas of (1) money and capital markets; (2) investment; (3) financial management, all of which involve decisions within firms. It is well-known that apart from financial considerations, most firms also take non-financial factors into consideration. Financial managers need all sorts of information before selecting the appropriate project(s). Most investment decisions involve large amount of capital and long time period (Seitz and Ellison, 1990). Firms therefore have to take special care making the right investment decisions. Financial-based capital budgeting techniques have been found to be the standard tool that helps financial managers to make decisions (Ryan, 2002; Schall, Sundem and Geijsbeek Jr, 1978). However, since project evaluation typically involves both financial and non-financial measures to aid in deciding the best project(s), there have been several research works that emphasize the importance of both financial and non-financial techniques. Chen (2008), for example, found that most firms evaluate projects using both financial and non-financial measures and attempted to examine the circumstances in which the use of discounted cash flow (DCF) methods may or may not be beneficial.

Non-financial measures are deemed useful mainly as an aid to "traditional" financial-based capital budgeting tools. In a survey of 77 Malaysian firms, Ong and Teh (2009) found that firms mostly used financial measures including capital budgeting techniques namely Net Present Value (NPV), Internal Rate of Return (IRR), Profitability Index (PI), Payback Period (PB), Non-financial measures are found to be used mostly by larger firms. However, there is a recent trend toward the use of both financial and non-financial measures for project evaluation. Nadler and Takala, (2010) applied and validated the tool based on the Sense and Respond (S&R) method called Critical Factor Index (CFI) to indicate the relative critical importance of attributes, based on experience and expectation of decision makers. This paper uses the CFI to consider the relative importance or criticality of project evaluation techniques, both financial and non-financial, contingent on such factors as the type of firm, firm's age and firm's size. Firms in Thailand are known to use project evaluation techniques widely (Champathed & Chansa-ngavej, 2015). It is of primary interest in this paper to find out which techniques, financial or non-financial, is considered of critical importance and need immediate attention from the firm.

2. Literature Review

In this study, we will use CFI, Financial and Non-financial measures.

Financial Measurement: Financial managers have used financial-based project evaluation techniques for the past five or six decades. Financial measurement has retained its importance in investment evaluation and decision making. Techniques typically used in the financial measurement category are payback period (PB), net present value (NPV), internal rate of return (IRR), and profitability index (PI).
Payback period: This measure is still used as primary decision criteria for many firms. The technique is widely understood. The payback period shows the number of years it takes for benefits from the project equal the money invested. It is also the principal capital budgeting criterion for many firms for some time. Its popularity may be explained by the ease to explain the rule to staff members with no background in finance: the shorter time it takes to recover the original investment, the better. At the very least, payback period is used primarily as supplementary information.
Net Present Value: This method is the most typical of discounted cash flow (DCF) techniques. Following the wealth maximization goal, a project should be rejected if the NPV of its cash flows is negative. Whereas among various projects with positive NPVs, the one with the highest NPV should be chosen. According to Graham and Harvey (2001) NPV has been more widely used in the past forty years or so.
Internal Rate of Return: The decision rule for the Internal Rate of Return is to invest in a project if it provides a return greater than the cost of capital. The cost of capital, in the context of the IRR, is a hurdle rate, the minimum acceptable rate of return. According to Champathed & Chansa-ngavej (2015), most firms in Thailand use IRR to evaluate projects.
Profitability Index: PI is the ratio of the present value of benefits and the present value of costs. Often referred to as the benefit-cost ratio, it tells how much value we get for investment. The decision rule is to accept an investment project if PI is greater than one.

Non-Financial Measurement: While financial measurements have been advocated for capital investment decision making for several decades, non-financial measurement has not been similarly advocated by financial theorists. On the other hand it could be argued that non-financial measures have been in use from time immemorial owing to their comparative simplicity. Financial managers have in practice often used this type of measurement, along with financial measurement to evaluate projects (Champathed & Chansa-ngavej, 2012). Non-financial measurement has also been used in strategic role as performance indicators for strategy implementation and the adoption of non-financial indicators has begun to be advocated as theoretically correct measures (Chen, 2008). According to Ong and Teh (2009), non-financial indicators have been used in performance measurement systems within international organizations. Firms of different sizes and types of industries have increasingly implemented non-financial performance measures. Several studies found that most firms use both financial and non-financial techniques to evaluate projects. Chen (2008) stated that discounted cash flow methods were not always appropriate. The firms have been found to use both financial and non-financial measures not only in creating a firm's value or in improving perceptions of the firm. Large companies are significantly more likely to rely on both financial and non-financial performance measures than smaller companies (Ong & Teh, 2009). The reason may be that larger companies have more resources and expertise to invest, collect and analyze the results. The findings further enshrine the use of financial and non-financial performance measures in creating a firm's value or in improving perceptions of a firm's credibility.

Other studies advocate non-financial measures as the tool for evaluating projects due to short-term orientation of the financial markets. According to Eccles (1991), the solution to the problem of long-term financial uncertainty is for companies to place more emphasis on nonfinancial measures. On the other hand, Ong & Teh (2009) found that company use of non-financial measures in the determination of business strategy has not yet become a standard practice. According to Baiman & Baldenius (2009), while financial measurement is reliable, it has its problems of time lags and the question of verifiability of certain financial variables. It may be concluded that the trend is for the use of financial measures together with non-financial measures for project evaluation. At the firm level, performance measurement approaches combining non-financial measurement with financial measurement have been made popular with the introduction of balanced scorecard (Kaplan and Norton, 1992). Balanced scorecard posits four related perspectives that drive the performance of the firm, namely learning and growth, internal operations efficiency, customer or marketing orientation, and financial performance. Essentially, BSC therefore advocates the use of three aspects of non-financial measures in combination with the traditional use of financial measures for the

performance of the firm. Chareonsuk and Chansa-ngavej (2010) provide an empirical evidence of the linkages based on a survey of Thai firms. In the present research work, the three non-financial perspectives in the BSC framework are studied as the non-financial measures at the project evaluation level, together with the usual financial measures for project evaluation, namely PB, NPV, IRR, and PI.

Critical factor indicator (CFI): Ranta and Takala (2007) and Nadler and Takala (2010) report the development and validation of Critical Factor Index (CFI) as a fast and reliable tool for identifying which attribute of a process is of critical importance. The method is based on actual experience and ideal expectation of the decision maker. Its development follows the concept of Sense and Respond (Bradley and Nolan, 1998). CFI helps identify critical areas which should be developed, and which should not. It takes the standard deviations of actual experience and ideal expectation into account as well as indexes for measuring importance, the gap between actual experience and ideal expectation, and the direction of future development. As originally formulated, the smaller the index, the more critical the attribute becomes. Large values of CFI, on the other hand, show that any conclusion about the attributes may be ambiguous due perhaps to the large values of standard deviations among the respondents.

$$CFI = \frac{\text{SD of expectation} * \text{SD of experience}}{\text{Importance index} * \text{Gap index} * \text{Direction of development index}}$$

3. Methodology

This research work seeks opinions of financial managers via a questionnaire survey via mail, e-mail, and website. The questionnaire was distributed to a total of 1,000 firms in Thailand. The number of respondents was 135 firms. The research covers service firms, manufacturing firms and merchandizing firms, and firms of small, medium and large size. The first part of the questionnaire consists of firm's characteristics such as type of firms, size of firms. The second part covers the use of financial and non-financial measures for project evaluation in the firm. Non-financial measures included in the questionnaire are selected from the list of frequently used performance indicators reported by Dossi and Patelli (2010). Four financial measures for investment project evaluation are covered in the present research, namely, payback period (denoted by FN1), net present value (FN2), internal rate of return (FN3), and profitability index (FN4). Non-financial perspectives covered are internal operations efficiency perspective, represented by three measures, namely process productivity rate (IN5), product/services quality (IN6), and internal processes total costs (IN7). The learning and growth perspective consists of three non-financial measures namely people training expenses (LG8), people productivity rate (LG9), and employee turnover (LG10). The customer orientation perspective consists of three non-financial measures namely customer satisfaction (CM11), sales volume trend (CM12), and market coverage indicators (CM13).

4. Results and Discussion

CFIs are calculated based on the opinion survey of financial managers. Results are shown in Fig. 1 to Fig. 7, with red color (dark shade in black and white) representing the measures considered highly critical by the respondents, green color (grey shade in black and white) representing the measures with normal level of criticality, and yellow color (light shade in black and white) representing measures with ambiguous responses since the standard deviations of the questionnaire survey responses are likely to be high, meaning that the opinions of respondents do not concur well.

Figure 1: Critical factors indexes for the overall firms

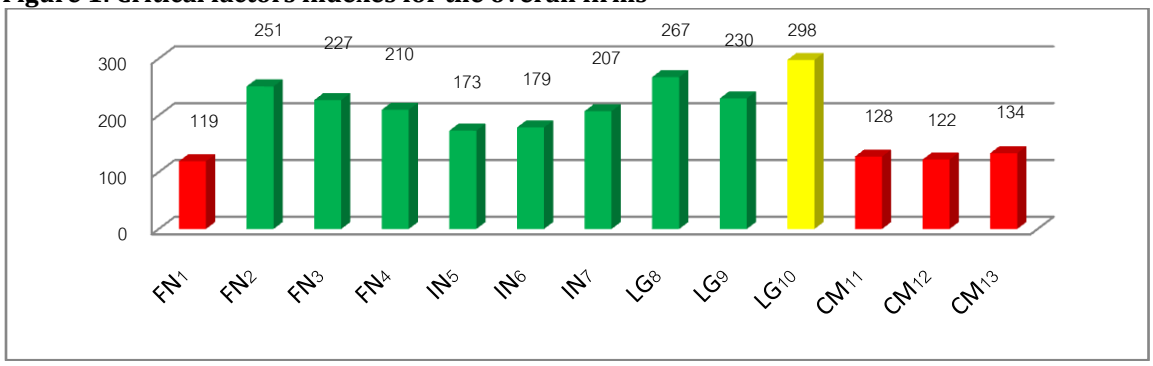

Fig. 1 shows the CFIs for the overall respondent firms. Measures found most critical are payback period, a financial measure (FN1), and the three non-financial measures in the customer orientation perspective namely customer satisfaction (CM11), sales volume trend (CM12), and market coverage indicators (CM13). Employee turnover (LG10) has the highest value among all the measures, which could mean the opinions vary widely among the respondents.

Figure 2: Critical factors indexes for small firms

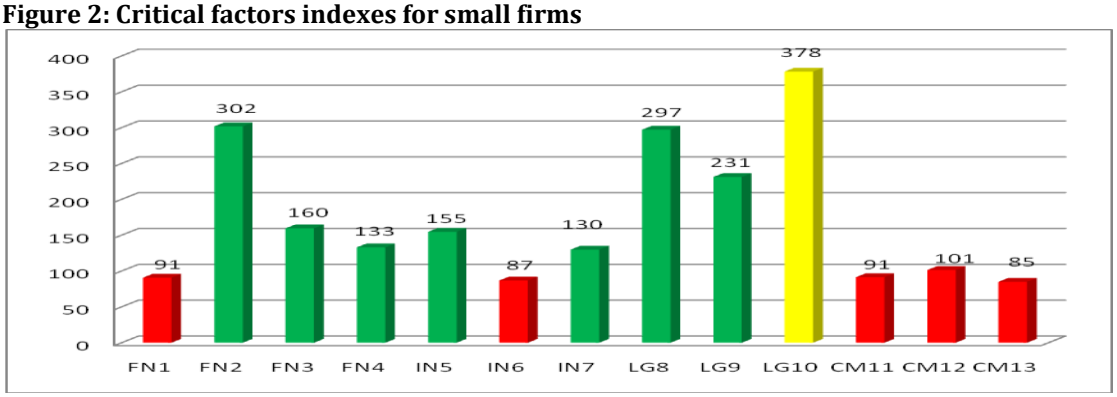

Fig. 2 shows the CFIs for small firms. The critical measures among these firms are found to be payback period (FN1), product/services quality (IN6) and all three non-financial customer orientation measures, namely customer satisfaction (CM11), sales volume trend (CM12), and market coverage indicators (CM13). Employee turnover (LG10) again turns out to be ambiguous for small firms, just like the result found for the overall firms in Fig. 1.

Figure 3: Critical factors indexes for medium-sized firms

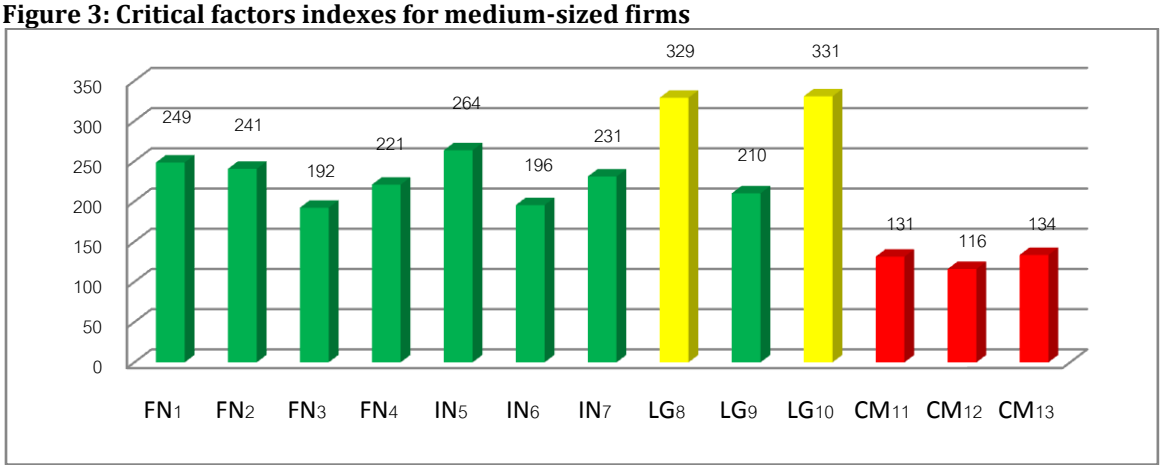

Figure 4: Critical factors indexes for large firms

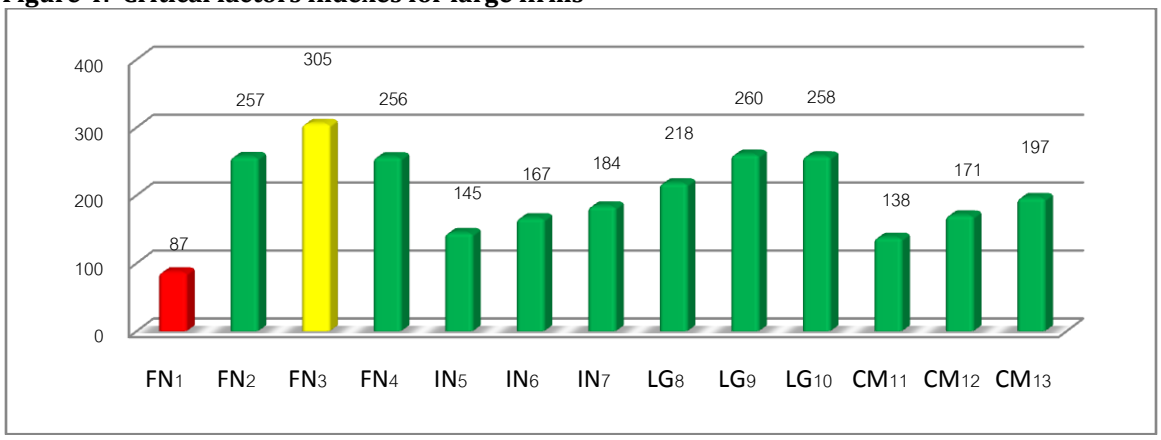

Fig. 3 shows the CFIs for medium-sized firms. The critical indexes for the medium-sized firms are found to be the three customer orientation measures, namely customer satisfaction (CM11), sales volume trend (CM12), and market coverage indicators (CM13). Two of the non-financial learning and growth measures are ambiguous, namely people training expenses (LG8) and employee turnover (LG10). Fig. 4 shows the CFIs for large firms. The most critical measure for large firms is found to be the financial measure of payback period (FN1). By contrast, the result for another financial measure, namely internal rate of return (FN3) is ambiguous as shown in yellow in Fig. 4.

Figure 5: Critical factors indexes for service firms

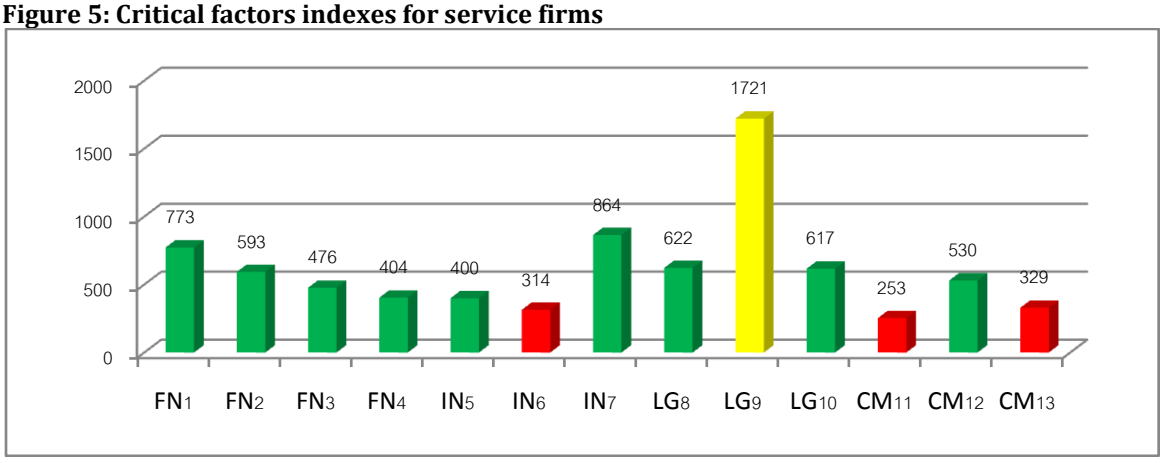

Fig. 5 shows that the CFIs for service firms. All the critical measures for these firms are found to be non-financial ones, namely product/service quality (IN6) in the internal operations efficiency perspective, and customer satisfaction (CM11) and market coverage indicators (CM13) in the customer orientation perspective. The CFI result for people productivity measure (LG9) in the learning and growth perspective is ambiguous, perhaps indicating that service firm respondents do not seem to concur well in their opinion about this particular measure.

Figure 6: Critical factors index for manufacturing firms

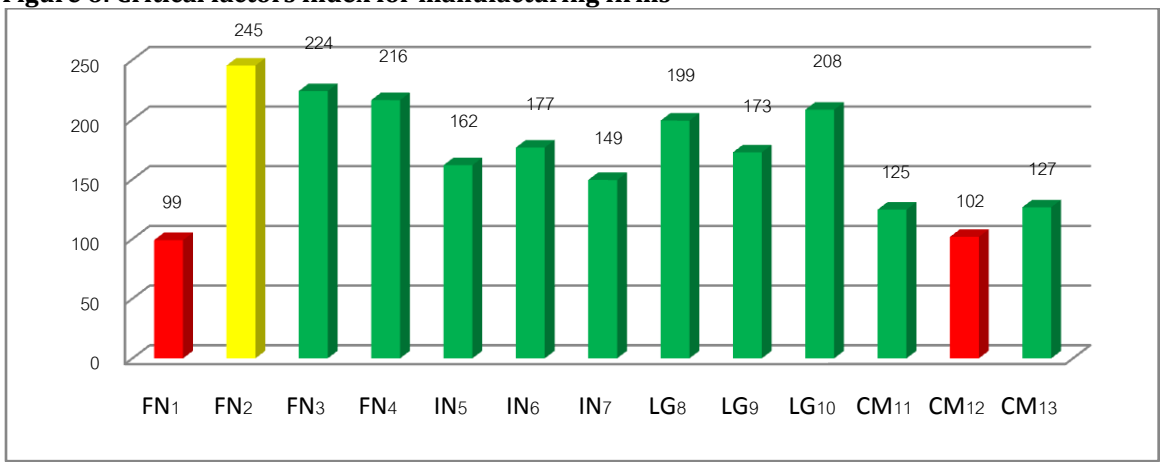

Fig. 6 shows the CFIs for manufacturing firm respondents. It is found that two measures are critical, namely payback period (FN1) in the financial measure and sales volume trend (CM12) in the non-financial customer orientation perspective. It is interesting to note that for the manufacturing firms, the CFI result for the financial measure of net present value (FN2) turns out to be ambiguous.

Figure 7: Critical factors indexes for merchandizing firms

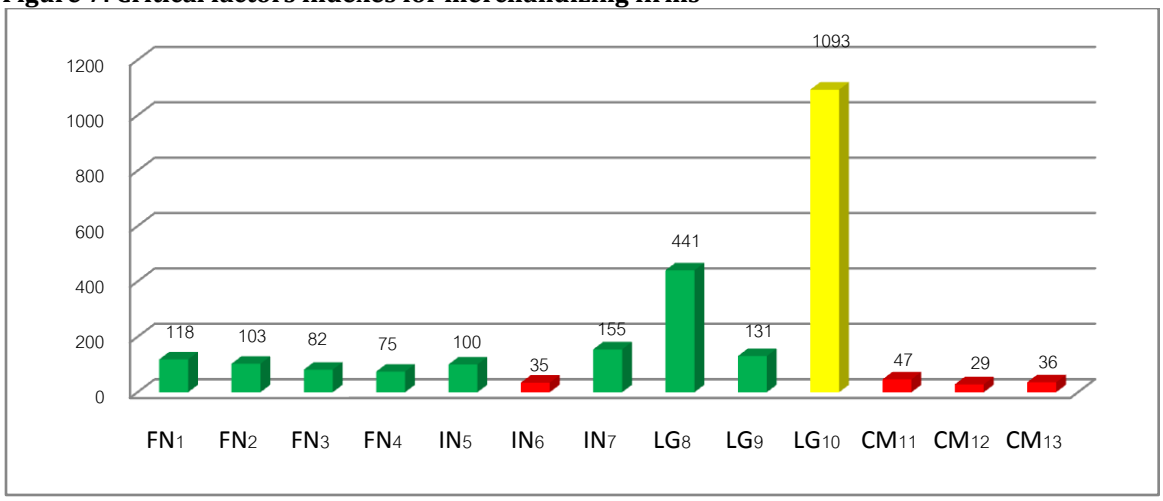

Fig. 7 shows the CFIs for merchandizing firms. Four non-financial measures are found to be critical, namely product/services quality in the internal operations efficiency perspective, and all the three customer orientation perspective which are customer satisfaction (CM11), sales volume trend (CM12), and market coverage indicators (CM13). For merchandizing firms, the CFI result for employee turnover (LG10) is ambiguous.

Discussion: Critical measures used for evaluating investment projects by Thai firms are shown in Table 1.

Table 1: Critical measures for project evaluation by Thai firms

Code	Measure	Over all	Small Firms	Medium-sized Firms	Large Firms	Service Firms	Manu-facturing Firms	Merchan-dizing Firms
FN1	Payback period	√	√				√	
IN6	Product/services quality		√		√	√		√
CM11	Customer satisfaction	√	√	√	√	√		√
CM12	Sales volume trend	√	√	√			√	√
CM13	Market coverage indicators	√	√	√	√	√		√

The only critical financial measure listed in Table 1 is payback period, which is listed under overall respondents, small firms, and manufacturing firms. According to Peterson and Fabozzi (2002), payback period is still used as the primary decision criterion for some firms owing to its intuitive appeal which tells the number of years until the cumulative cash benefits equal the money invested. Our results tend to confirm the observation made by Scheepers (2003) that payback period would be more important for a small company, but less so for a large company. For non-financial measures, product/services quality stands out as the only measure in the internal operations efficiency perspective. It is a critical measure for small firms as well as large firms, among service firms as well as merchandizing firms. It appears therefore that the respondents concur about the importance of product/services quality. Among the non-financial measures, customer orientation perspective is prominently listed with all three of its measures listed in Table 1. Customer satisfaction and market coverage indicators are found to be critical for overall firms as well as for small firms, medium-sized firms, and large firms, service firms and merchandizing firms. Sales volume trend is critical tools for overall firms as well as small firms and medium-sized firms, manufacturing firms and merchandizing firms.

5. Conclusion

Many firms have used quantitative measures to evaluate the projects more widely for decades. According to Chen (2008), more and more firms now use both financial and non-financial measurement for evaluating projects. Thai firms also tend to use both types of measures for project evaluation (Champathed and Chansa-ngavej, 2015). The present work shows the critical areas based on an opinion survey of financial managers. Customer orientation perspective is the found to be focal point in non-financial measures. Small firms and merchandize firm should be improved. According to Ong and Teh (2008), the recent trend is for firms to use non-financial measurement. Our results confirm that observation, with particular emphasis on non-financial measures in the customer orientation perspective. The expectation and experience of financial managers support the trend of the use of non-financial measurement.

6. Recommendations

Measurement evaluates projects in the firms that are still important. The CFI help to find the tools that should be improved. It was expectation and experience's financial manager. Further development Nadler and Takala (2010) developed CFI to BCFI (balanced critical factor index), it can easily be identified which attributes compared to the standard BCFI.

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