



# Development of Balanced Scorecard for Real Estate Development Companies by Modified Analytic Hierarchy Process

Kongkoon Tochaiwat<sup>1\*</sup>, Natchanok Hankamolsiri<sup>1</sup>, Vuttapong Larpcharoen<sup>1</sup>

<sup>1</sup> Faculty of Architecture and Planning, Thammasat University, THAILAND.

\*Corresponding author (Tel: +66-992893328, Email: kongkoon@gmail.com).

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## Abstract

This research was aimed to develop the organization performance measurement system of the real estate development companies according to the Balanced Scorecard (BSC) concept, which is the popular management tool used by many leading companies worldwide. The analysis was done by the Modified Analytic Hierarchy Process (Modified AHP), adopting the pairwise comparison and analysis of the original AHP. In this study, the mixed methodology was used by collecting the data from the in-depth interviews with five high-level management officers and from the questionnaires given to 48 managers of the real estate development companies in Thailand. The results achieved from Content Analysis and the Modified AHP are applied to develop the BSC which can be used as guidelines for real estate developers to properly develop an organization performance measurement system in the organizations.

**Disciplinary:** Real Estate Development, Real Estate Business & Management.

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## 1 Introduction

It takes many factors to be successful in business. In the old days, business entrepreneurs usually measure their success from the income or financial results which were the short-term perspective. (Neely, 2002; Kaplan & Norton, 2007) For modern business management theory, however, if the entrepreneurs aim to thrive and endure in the business, every main perspective of the business must be considered. A Balanced Scorecard is a tool frequently used to achieve such a goal. Nevertheless, other non-financial performance perspectives the entrepreneurs should take

into account include the customer satisfaction perspective, the internal business process perspective as well as the learning and growth perspective. Apart from the financial aspect, these factors should also be considered to help the operators see the risks and chances of business development to achieve better financial potential or the company income in the long term. (Kaplan & Norton, 2007; Decharin, 2008).

The real estate business is unique in terms of the business process. It is different from other fields of business. The performance measurement, therefore, is also unique and different from other types of commerce, whether it is the financial perspective, the customer satisfaction perspective, the internal business process perspective, and the learning and growth perspective. Anyhow, from the literature review, there is no research directly presenting the balanced scorecard for real estate developers. The researchers are therefore interested in developing such a balanced scorecard by using the Modified Analytic Hierarchy Process (AHP), which applied the pairwise comparison and analysis of the original AHP to analyze the weights of the Key Performance Indicators (KPI's) of real estate companies.

This research aimed to develop a balanced scorecard model for real estate developer companies in Thailand. The scorecard can be used as guidelines of the organization's performance measurement system that appropriately defines the organizational key performance indicators.

## **2 Scope of the Research**

The research was scoped to create the models of the organization performance measurement according to the concept of the Balanced Scorecard (BSC) for the companies in the real estate development business in Bangkok, Thailand. The research used in-depth interviews with five high-level management officers from five companies, who are responsible for determining the business indicators, as well as the information obtained from the questionnaires given to the 48 management officers from 10 real estate companies in Thailand.

## **3 Research Methodology**

This research adopted the mixed methodology by conducting the in-depth interview with 5 high-level management officers, who are responsible to set the main key performance indicators for the real estate companies, from 5 different companies to screen the organization performance measurement criteria obtained from literature reviews. In addition, the criterion which is suitable for classifying the real estate development companies into several models were also be inquired. The research quantitative part was performed by distributing the questionnaires to 48 management officers from 10 companies who are responsible to set the key performance indicators for various departments of real estate development companies. The Quota Sampling Method was used according to the type of project each real estate development company excels at, such as the company expert in the housing projects (house, townhouse, and other types of residences than condominium) and the company expert in the condominium projects. The results acquired from the questionnaires were analyzed by using the Modified Analytic Hierarchy Process which established three models of the Balanced Scorecard suitable for each type of company: company excelling at

housing projects, company excelling at condominium projects, and the company equally excelling at both types of projects. The data collection was done during June-July 2018.

## **4 Related Theory and Research Results**

### **4.1 Balanced Scorecard (BSC)**

Balanced Scorecard (BSC), developed in 1990 by Professor Robert Kaplan from Harvard University and David Norton, an organization management consultant, is a widely accepted tool for measuring the success of the organization management. Yet in fact, the Balanced Scorecard is not only a tool to measure and assess organizational performance, but also a management tool that leads to efficient strategic management (Kaplan & Norton, 2007; Decharin, 2008). The BSC concept differs from the pre-existing notions that measure the success of business only from the financial perspective because it helps entrepreneurs look at their businesses from various and all-dimensions. This concept is widely accepted amongst both academic and business circles. It was estimated that in 2000, more than 60% of the companies in the Fortune 1000 use BSC as their success indicators (Gawankar et al., 2015).

According to the BSC concept, the organization performance measurement must be done through 4 perspectives including (1) financial perspective, (2) customer perspective, (3) internal business process perspective, and (4) learning and growth perspective. There are 7 steps to develop the BSC including (1) define the elements of the scorecard, (2) identify the performance drivers, (3) identify the performance measures, (4) communicate about the importance of BSC, (5) operationalize, (6) train, and (7) monitoring, evaluation and review (Gawankar, Kamble& Raut, 2015).

### **4.2 Key Performance Indicator (KPI)**

The performance indicator is the measurement of work results that help the members of the team or the organization precede in the same direction. It is also an instrument to assure that the organization members focus their time and work on the important factors for organizational success. A good Key Performance Indicator (or Key Performance Index) must be right in the amount and select from various factors but emphasizes only on the values that will indicate the organizational success, and cross out the unimportant factors or the normal activities of the organization. It must also be simple and aims to achieve good teamwork. The indicator should also have certain significant effects on the target or organizational success (Parmenter, 2015). The objectives or the factors to be measured must be determined first, then the indicators can be identified to measure the objectives according to the strategic map (Decharin, 2008).

### **4.3 Modified Analytical Hierarchy Process (Modified AHP)**

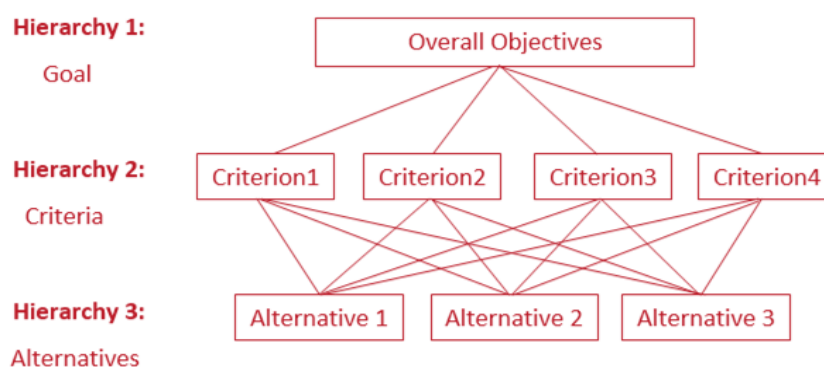
#### **4.3.1 Concept of Analytical Hierarchy Process (AHP)**

Analytical Hierarchy Process (AHP) is a method to analyze and find the best solution or option by applying various criteria and dimensions (Wuttiwanit, 2003; Vargas, 2010). The AHP was first implemented in the year 1980 by Thomas Saaty from the University of Pennsylvania in the

United States of America. It is nowadays an accepted and widely used technique due to its efficiency for decision-making for complicated issues. There are also multiple criteria for the decision making which helps the persons in charge prioritize each factor until the best outcome is achieved (Saaty, 2005).

The prominent points of the Analytical Hierarchy Process (TransparentChoice.com, 2021) are such as: (1) It is a proved theory. In the past decades, AHP was tested and practiced by thousands of organizations worldwide. In the present days, there are many studies explaining about why several well-known companies choose the AHP for strategic decision making for better outcomes. (2) It is easy to apply. The AHP users are able to divide complicated decisions into obvious goals and criteria which can be prioritized and estimated, making the process and comprehension much easier. (3) It is designed especially for the decision making of various criteria. For example, in order to achieve the best product and make profit at the same time, two criteria, “cut the cost” or to “maximize the product quality”, are in conflict, have the same importance level, and need to be taken into account. This is where the AHP plays a significant role to help consider all criteria and prioritize them in hierarchical order. (4) It helps the team compromise and achieve a consensus. The team members can give different opinions according to their perspectives and expertise and all these notions will matter. Compromising and consensus are therefore achieved from various options.

The steps of the Analytical Hierarchy Process begin with setting a goal of the decision making (about what to decide), then the criteria for such decision making must be established. There can be more than 1 criterion (primary and secondary criteria). Then they will be estimated to accomplish the best option by processing and prioritizing, as shown in Figure 1.



**Figure 1:** Example of Criteria and Alternatives Hierarchy

Once we obtain the criteria for decision making, we can continue to do the pairwise comparison and use the results to calculate the value of importance. The best score (by comparison) after the calculation refers to the best alternative.

### 4.3.2 Modified Analytical Hierarchy Process

Many researchers apply the Modified Analytical Hierarchy Process to better respond to the research objectives. Examples of such research works include those of Kallas (2011) and Tochaiwat

& Likitanupak (2012) which used the Likert Scale instead of the pairwise comparison to reduce the number of questions. As well as the work of Tochaiwat et al. (2017) which used the pairwise comparison of the Analytical Hierarchy Process to calculate and figure out the factor weights of the models for the selection of land for residential development projects as

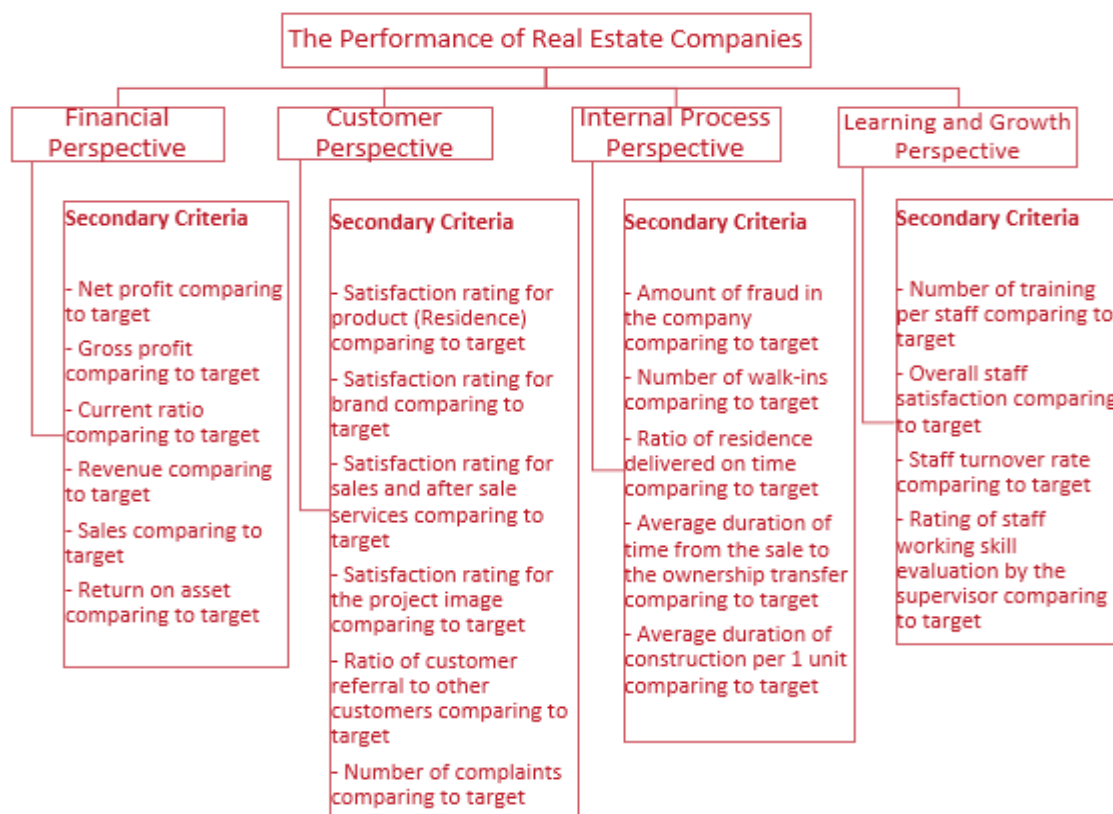
$$Y = a_1X_1 + a_2X_2 + a_3X_3 + \dots + a_nX_n \quad (1).$$

Where Y is the score for the decision to choose the alternatives compared by the analyst.

$a_1, a_2, a_3, \dots, a_n$  are the coefficients displaying the importance of each criterion for the decision-making numbers 1, 2, 3, ... n, respectively.

$X_1, X_2, X_3, \dots, X_n$  are the rating (1 to 5) for the criterion 1, 2, 3, ..., n of each alternative being compared, respectively.

This research selects the Modified Analytical Hierarchy Process similar to the one of Tochaiwat et al. (2017) where the process is completed only when the weights of all criteria are figured. Both primary and secondary criteria must be evaluated without any decision to choose a specific alternative (organization), hence no option should affect such decision. As a result, the diagram showing the hierarchical order of the analytical process will only display Hierarchy 1 Goal, and Hierarchy 2 Criteria (Primary and Secondary), as shown in Figure 2:



**Figure 2:** Hierarchy of the Research Analytical Process.

## 5 Analysis and Results

This research was conducted from the related literature reviews and interviews with 5 experts who are the high-level management officers of real estate development companies. The personal details of each informant are listed in Table 1. After analyzing the acquired data, the



researchers concluded the key performance indicators (KPIs) which affect the success of the companies according to 4 perspectives of the Balanced Scorecard Theory as shown in Table 3.

**Table 1: Summary of the Informants' Details**

Company	Position	Experience	Company Registered Capital (Million US Dollar)*
A	Managing Director	4 Months	35.2
B	Chief Executive Officer	3 Years	342.6
C	Managing Director	1 Year	47.2
D	Chief Financial Officer	22 Years	63.0
E	Chief Financial Officer	3 Years	384.7

**Table 3: Summary of Key Performance Indicators (KPIs) obtained from this study's in-depth interviews with the experts.**

Perspective	Key Performance Indicator (KPI)
Financial Perspective	<ol style="list-style-type: none"> <li>1. Net Profit Margin</li> <li>2. Gross Profit Margin</li> <li>3. Capital Management Efficiency</li> <li>4. Revenue</li> <li>5. Sales</li> </ol>
Customer Perspective	<ol style="list-style-type: none"> <li>1. Overall Satisfaction of Customers</li> <li>2. Ratio of Customer Referral to Other Customers</li> <li>3. Number of Complaints</li> </ol>
Internal Process Perspective	<ol style="list-style-type: none"> <li>1. Amount of Frauds in the company</li> <li>2. Number of Walk-in Customers of the Project</li> <li>3. Ratio of the Residence Delivered on Time</li> <li>4. Continuation in Operation</li> </ol>
Learning and Organizational Growth Perspective	<ol style="list-style-type: none"> <li>1. Number of Training for Each Staff</li> <li>2. Overall Staff Satisfaction</li> <li>3. Evaluation of Staff Skill</li> </ol>

In this research, the researchers divided the types of residences into 2 categories which are the housing projects (houses and townhouses) and the condominium projects and categorized real estate development companies into 3 groups: (1) the companies majorly invest in housing projects, (2) the companies majorly invest in condominiums, and (3) the companies invest in both types of projects in general (not specific of type). Then, each type of company was prioritized the importance from each perspective of the BSC by using the Modified AHP, as shown in Table 4.

**Table 4: Importance of Four Perspectives**

Perspectives	Weight of Importance (in Percentage)		
	Company Majorly Invests in Housing Projects	Company Majorly Invests in Condominium Projects	Company Equally Invests in Both Housing and Condominium Projects
Financial Perspective	59.20	37.20	51.46
Customer Perspective	20.80	34.80	25.46
Internal Process Perspective	12.40	15.40	13.58
Learning and Organizational Growth Perspective	7.60	12.60	9.50
Total	100.00	100.00	100.00

From the research results, among 4 perspectives of the BSC, the financial perspective still seems to matter the most in determining the company's success level. Other perspectives, e.g. customer perspective, internal process perspective, and learning and growth perspective, seem to

respectively have less significances. This finding can be universally applied for all types of real estate companies, whether it is the housing, condominium, or both in general.

Since it is essential for every organization to have the success indicators considered from all 4 perspectives according to the BSC to achieve a balanced performance, the researchers therefore establish an additional analysis of the importance value of each key performance indicator, which contribute to the organizational scorecard (see Table 5).

**Table 5: The Balanced Scorecard for Real estate Development Companies**

Perspective/KPI	Weight of Importance (in Percentage)					
	Company Majorly Invests in Housing Projects		Company Majorly Invests in Condominium Projects		Company Equally Invests in Both Housing and Condominium Projects	
	% in the Perspective	% in the Model	% in the Perspective	% in the Model	% in the Perspective	% in the Model
<b>Financial Perspective</b>	<b>100.00</b>	<b>59.20</b>	<b>100.00</b>	<b>37.20</b>	<b>100.00</b>	<b>51.46</b>
Net Profit Comparing to Target	40.03	23.70	34.65	12.89	37.97	19.54
Gross Profit Comparing to Target	23.57	13.95	17.53	6.52	21.32	10.97
Current Ratio Comparing to Target	11.88	7.03	14.35	5.34	13.37	6.88
Revenue Comparing to Target	11.30	6.69	10.94	4.07	11.02	5.67
Sales Comparing to Target	8.78	5.20	11.94	4.44	10.04	5.17
Return of Asset Comparing to Target	4.44	2.63	10.59	3.94	6.28	3.23
<b>Customer Perspective</b>	<b>100.00</b>	<b>20.80</b>	<b>100.00</b>	<b>34.80</b>	<b>100.00</b>	<b>25.46</b>
Satisfaction Rating for Product (Residence) Comparing to Target	30.08	6.32	31.29	10.89	31.26	7.96
Satisfaction Rating for Brand Comparing to Target	18.32	3.81	12.01	4.18	15.43	3.93
Satisfaction Rating for Sale and After Sale Services comparing to Target	21.83	4.54	21.24	7.39	21.64	5.51
Satisfaction Rating for the Project Image Comparing to Target	12.26	2.55	11.95	4.16	12.22	3.11
Ratio of Customer Recommendation to Other Customers Comparing to Target	8.94	1.86	8.65	3.01	8.96	2.28
Number of Complaints Comparing to Target	8.27	1.72	14.86	5.17	10.49	2.67
<b>Internal Process Perspective</b>	<b>100.00</b>	<b>12.40</b>	<b>100.00</b>	<b>15.40</b>	<b>100.00</b>	<b>13.58</b>
Amount of Fraud in the Company Comparing to Target	47.66	5.91	11.62	1.79	27.39	3.72
Number of Walk-ins Comparing to Target	19.76	2.45	16.17	2.49	29.90	4.06
Ratio of Residence Delivered on Time Comparing to Target	16.21	2.01	38.31	5.90	21.28	2.89
Average Duration of Time from the Sale to the Ownership Transfer Comparing to Target	9.52	1.18	20.13	3.10	11.86	1.61
Average Duration of Construction per 1 unit Comparing to Target	6.85	0.85	13.77	2.12	9.57	1.30
<b>Learning and Growth Perspective</b>	<b>100.00</b>	<b>7.60</b>	<b>100.00</b>	<b>12.60</b>	<b>100.00</b>	<b>9.50</b>
Number of Training per Staff Comparing to Target	43.29	3.29	29.60	3.73	39.68	3.77
Staff Satisfaction in General Comparing to Target	26.58	2.02	33.17	4.18	34.00	3.23
Staff Turnover Rate Comparing to Target	15.66	1.19	21.51	2.71	14.00	1.33
Rating of Staff Working Skill Evaluation by the Supervisor Comparing to Target	14.47	1.10	15.72	1.98	12.32	1.17

From Table 5, it can be concluded that the Balanced Scorecard for real estate development companies in Thailand consists of 3 scorecards as shown in Equations 2 to 4:

(1) The real estate development companies majorly invested in the housing projects,

$$Y = 0.592 (\text{Fin}) + 0.208 (\text{Cus}) + 0.124 (\text{Pro}) + 0.076 (\text{Lrn}) \quad (2).$$

(2) The real estate development companies majorly invested in the condominium projects,

$$Y = 0.372 (\text{Fin}) + 0.348 (\text{Cus}) + 0.154 (\text{Pro}) + 0.126 (\text{Lrn}) \quad (3).$$

(3) The real estate development companies equally invested in both housing and condominium projects (or in case of unclear data about the investment portfolio),

$$Y = 0.515 (\text{Fin}) + 0.255 (\text{Cus}) + 0.136 (\text{Pro}) + 0.094 (\text{Lrn}) \quad (4).$$

Where Y = Percentage of Achievement in General (%)

Fin = Percentage of Financial Achievement (%)

Cus = Percentage of Customer Satisfaction Achievement (%)

Pro = Percentage of Internal Process Achievement (%)

Lrn = Percentage of Learning and Growth Achievement (%)

The percentage of each perspective's achievement can be calculated from the KPIs, such as, the percentage of learning and growth achievement of the real estate development companies who are more invested in condominium projects can be calculated by the equation:  $Y = 0.2960$  (achievement percentage on number of trainings) +  $0.3317$  (achievement percentage on staff satisfaction) +  $0.2151$  (achievement percentage on staff turnover rate) +  $0.1572$  (achievement percentage on staff working skill).

For example, the Company A, who is equally good at both housing and condominium projects, has the percentages of financial achievement, customer satisfaction achievement, internal process achievement, and learning and growth achievement in the past year as follows: 105%, 80%, 60% and 70%, respectively. The company's general achievement score is  $0.515 (105\%) + 0.255 (80\%) + 0.136 (60\%) + 0.094 (70\%) = 0.8922$  or only 89.22%, even though the company has better financial performance than its goal.

## 6 Conclusion

From this study, a balanced scorecard is a necessary and effective tool to measure the success level of a company. Apparently, it can be notified that the financial perspective has the greatest effect on business success. Financial success, hence, is one obvious short-term accomplishment, while other perspectives such as learning and growth take much more investment of money and time and can only be continuously progressed in major organizations or companies. The customer satisfaction, the internal process, and the learning and growth perspectives seem to have respectively less important in accordance with their relationships with the financial success of



the organization. However, they should not be neglected by the organization management because they finally contribute to financial success. Financial success occurs when customers are so satisfied that they decide to buy residences from the companies. Customer satisfaction is generated by the internal processes of the organizations. Finally, the learning process and growth process enhance staff's competencies in performing internal processes effectively. In addition, the companies majorly invest in condominium projects seem to have less gap between financial perspective and customer satisfaction perspective than other types of companies. This reflects the higher competition in the condominium industry than in the housing industry. The results match with other studies stating, for example, that the financial indicators have relationships with the company's stock price as well as the corporate credit rating (Khunjan, 2009; Prapatwimol et al., 2013).

Finally, the researchers would like to suggest those who are interested in performing a further study by considering the effects of some factors that affect the indicators or the importance values of the indicators into the scorecard. These factors consist of the internal factors of real estate companies such as products' price ranges or competitive strategies, as well as the external factors, such as political factors or economic condition factors, as mentioned by Buathong & Bangchokdee (2015) that the different situations affect the organizational scorecard.

## 7 Availability of Data and Material

Data can be made available by contacting the corresponding authors.

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**Dr. Kongkoon Tochaiwat** is an Associate Professor at the Faculty of Architecture and Planning, Thammasat University, Thailand. He received Ph.D. in Civil Engineering (Construction, Engineering and Management) from Chulalongkorn University, Thailand. His research focuses on Real Estate Business and Development.



**Natchanok Hankamolsiri** is a Master's Degree graduate from Innovative Real Estate Development Program at the Faculty of Architecture and Planning, Thammasat University. She received Bachelor's Degree from Kasetsart University.



**Dr. Vuttapong Larpcharoen** is an Assistant Professor at the Faculty of Architecture and Planning, Thammasat University, Thailand. He got a Doctor of Management degree. His research is Marketing Management.

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