

## **Critical Success Factors for the Construction Organization in the Malaysian Construction Industry: A case study in Penang**

Siti Hamidah Abdull Rahman

*Malaysia Institute of Transportation (MITRANS), Universiti Teknologi MARA (UiTM), 40450 Shah Alam, Selangor*

*Faculty of Civil Engineering, Universiti Teknologi MARA (UiTM), 40450 Shah Alam, Selangor*  
[hananbalqis\\_85@yahoo.com](mailto:hananbalqis_85@yahoo.com)

Ilias Said

*School of Housing, Building and Planning, Univeristi Sains Malaysia (USM), 11800 Minden, Penang*  
[ilias@usm.my](mailto:ilias@usm.my)

Intan Rohani Endut

*Malaysia Institute of Transportation (MITRANS), Universiti Teknologi MARA (UiTM), 40450 Shah Alam, Selangor*

*Faculty of Civil Engineering, Universiti Teknologi MARA (UiTM), 40450 Shah Alam, Selangor*  
[intan@salam.uitm.edu.my](mailto:intan@salam.uitm.edu.my)

### **Abstract**

The construction organisation plays an important role in the construction industry. It establishes buildings and infrastructure works required for social economic development which contributes to the overall economic growth. The success of the economic development will further lead to an increase in disposal income, generating the demand for additional construction activity. The study of project success and the critical success factors (CSFs) is considered to be a means to improve the effectiveness of a project. However, the concept of project success has remained ambiguously defined in the minds of the construction professionals. Consequently, this study is conducted in order to make an attempt to identify the factors that influence the success of a construction organisation, to establish critical success factors for the construction organisation, and to identify the strategies that are undertaken by the construction organisation in order to be more successful. The quantitative approach was used on 100 construction players in Penang. The results were analysed by using descriptive analysis, frequency analysis and the relative importance index (RII) technique. As a result, it was found that sufficient cash flow was the most influential factor that contributed to the success of a construction organisation, while the critical success factor for the construction organisation was the human factor. Yet, tight controls of labour and materials have become the most contributed strategies for success. Lastly, it could be concluded that there were many factors that influenced the success of a construction organisation with several strategies that could be adopted in order to be more successful.

### **Keywords**

Construction organisation, Critical success factors, Construction industry

### **1. Introduction**

The construction organisation plays an important role in the construction industry. It establishes buildings and infrastructure works required for social economic development which contributes to the overall

economic growth. The success of the economic development will further lead to an increase in disposal incomes, generating demand for additional construction activity. A country's economic development and its future prospects have implications for the growth and development of the construction organisation.

The construction industry of today is really a paradox. It is larger than the steel and automotive industries. In terms of the Gross National Product (GNP), it is the single largest industry, consuming tremendous amounts of materials from other industries. However, the majority of participants are small businesses, often specialising in only one phase of construction. As there is no central focus, construction tends to be highly fragmented (Dainty et al., 2001). The construction contractors have the lead role during the construction phase; however, the owner and designer have an important role as well. A cooperative environment of teamwork must be developed so that all parties can work together as a unit to achieve the project's goal. Contractors are independent business organisations and are only required to produce the end product of the contract.

This study is focused on the critical success factors (CSFs) of the construction organisation in the Malaysian construction industry. In the past, companies that completed projects in a timely manner within an established budget and met the required quality considerations were considered successful companies. However, in this current environment, technological and economic transformation is changing the construction industry from a local and regional business to a global business. Therefore, a shift in the emphasis from a project success to corporate success in the construction organisations must be examined so that they can compete in an ever-changing marketplace.

The main significance of this study is to identify the factors that influence the success of a construction organisation, to establish the CSFs and to identify the strategies that are undertaken by the construction organisation in order to be more successful. Since the establishment of the CSFs of the construction organisation is based on the identification of success and failure factors of contractor organisations, this study can be used as a guideline to improve their performance in order for them to be more successful.

## **2. Literature Review**

In construction as in many other industries, there are at least two sorts of formal organisations that cannot be classified as voluntary or charitable in their nature. There are those which operate in the private sector and those that operate in the public sector. All organisations are established for a purpose. In the private sector the purpose is usually to satisfy an effective demand; that is to undertake work for which they will be paid by clients who are personally or corporately bearing the financial risks of the project. Here the financial success or otherwise of the organisation will depend upon satisfying those clients. In the public sector, the emphasis is on the fulfilment of the needs of the individuals or the public at large as identified and funded by the government of one kind or another. In this sector profits and losses are usually the benefit or responsibility of the government's coffers (Langford et al., 1995).

### **2.1 Definitions and Types of Organisation Structure**

Hodge et al. (2003) defined an organisation as two or more people working together to meet a goal or objective within specific boundaries. Organisations are made up of people who become labourers among members and all these members will look for the same goals and objectives. However, Singh (1981) explained that the definition of an organisation is more about the managerial function of laying down the responsibilities of individuals and establishing a good relationship between each other for effectively achieving a common goal in an activity in a group.

According to Langford et al. (1995), one useful way of identifying the types of organisations is by looking at their structure which is the formal pattern of authority relationship between the people (managers and operatives) and / or departments that form the subsystems of the firm. Fryer (1997)

explained that most commonly, construction firms have an organization structure of the line and staff type which has dominated management thinking for many decades. The 'line' managers are responsible for production. They pass instructions and information down the hierarchy and monitor what happens. 'Staff' is the functional specialists, engineers, accountants, and estimators, among others, who provide a back-up service to the line managers. Some of the specialists run departments and therefore have both line and staff responsibilities but this is limited to their own specialism.

Langford et al. (1995) commented in their research that the matrix structure was initially adopted by both building firms and professional practices in their efforts to find an alternative to the purely functional approach of the classical school. It was felt that this type of organisation would allow both project/task problems and people problems to be dealt with separately, thus avoiding interference by one of the other and with benefits to both aspects of the organisation's operations and the employees themselves. Furthermore, a matrix organisation ensures that different kinds of tasks are staffed and accorded an amount of freedom or control commensurate with their type. In construction, this might typically range from routine jobs undertaken by technical personnel that require repetitive solutions, through to heuristic tasks that are unique, non-repetitive and with no clearly measurable output such as the work of architects. However, the difficulties with the matrix organisation have arisen through divided loyalties and the feeling by workers that they must try and satisfy two bosses who both have different concerns, strengths and weaknesses. Fortunately, some of the problems are also faced by other industries that have attempted to implement the matrix structure that is generally absent in construction.

Singh (1981) defined that those 3 types of organisation structures are suitable to apply in the construction industry. The type or organisation suitable for small work is a simple line type of organisation. The engineer in charge exercises full authority and is responsible for the timely and economic execution of the work in accordance with the specifications laid down. Under him, there might be a few section officers and a foreman, who are responsible for the execution of work at the site. For medium-sized work, a more elaborate arrangement is called for and the organisation is generally on the line and staff pattern. The engineer in charge may be assisted by a team of experts, such as architects, design engineers, accountants, planning engineers and personal officers. This constitutes the staff portion of the organisation. The staff are usually located at a permanent place, known as the headquarters. For large projects, the number of people involved may run into the thousands and the staff portion of the organisation may be departmentalised. Each departmental head looks after a particular aspect of the work, such as design, plan, purchase of materials, personnel, etc. and is assisted by a team of subordinates grouped under the charge of different heads. The grouping of work in the field could be on the basis of the type of work, such as civil works, mechanical works, electrical engineering works, piping or other specialised types of works.

## **2.2 Definitions of Critical Success Factors**

Success is the ultimate goal in any construction organisation. Construction project participants contribute in a variety of ways to the success level in the building process. Indeed, a construction organisation's success is attributed to a number of factors. With the different perceptions of success, it is not surprising that the checklist of success factors is varied and extensive.

Success is defined as the degree to which a company's goals and expectations are met. It should be viewed from the different perspectives of individuals and the goals related to a variety of 26 elements, including technical, financial, education and social. The criteria are a set of principles or standards by which judgments are made (Chan et al., 2004).

According to Hutching and Christofferson (2001), a success factor is a situation where it needs special attention in terms of management because of the importance that it brings to the organisation. It gives a positive and negative effect and influences the internal and external. It conveys the important

characteristics such as the need for special attention or observation to prevent a great shock which is not desirable or the missing opportunity or objectives. This success factor is identified by assessing the strategy, environment, source and corporate operation.

### **2.3 Critical Success Factors (CSFs) for the Construction Organisation**

Advantages of the approach of the CSFs are that it focuses on critical high-payoff factors, is relatively fast and inexpensive to administer, and frequently reveals new insights to the executives involved. Its major disadvantages are that it is not comprehensive and results in a snapshot of the business, which can quickly become obsolete if any major change occurs in the business (Rowe et al., 1985). There are several factors that influence the success of the construction organisation. However, these are divided into six main categories as follows:

#### **(i) Human Factor**

Effective construction organisation is characterised by good communication. Team members convey messages, verbally and nonverbally, to each other in ways that are readily and clearly understood. Also, feedback helps to guide team members and to correct misunderstandings. According to Langford et al. (1995), construction is a labour-intensive industry; each project has inputs from a wide variety of disciplines and organisations. So, efficient and effective communications are vital. The effectiveness of the organisation also depends on the ability to integrate the workforce into a well-motivated and productive team that is committed to the completion of projects and overall success of the firm. Undoubtedly, a sense of collective purpose and meaning needs to be achieved among the diversified and fragmented workforce (Langford et al., 1995). In order for the construction organisation to succeed, there is need for cooperative team members and sufficient knowledge and experience among them. The contractor's public relationship skills also help to create a favourable image in the community and area of operations. Using the services of a good public relations firm will ensure an effective professional result (Volpe, 1972).

#### **(ii) Financial Factor**

Financial strength is one of the important company strengths in a construction company. The general wisdom dictates that the stronger a company's financial position, the better its capacity to carry out far-reaching and ingenious strategic plans. It also takes higher risks with prospects of higher returns. It enjoys a higher credibility and reputation among its clients and suppliers. For these reasons, Warszawski (1996) considers the financial strength of a company to be an important strategic asset.

#### **(iii) Organisational Factor**

According to Gunhan and Arditi (2005), companies with a strong track record are considered to have a competitive edge. An experienced firm has either a ready solution or a cheaper one to a technical problem because it has encountered a similar problem in the past and has invested in its solution. It has demonstrated through previous performances that it has the organisation and technical know-how and experience to overcome technical challenges that may emerge in the course of a construction project. Track record is most important in specialist engineering contracts, project management contracts and large contracts. Track record in the form of references shows a firm through its past successes, creates goodwill, and provides the conditions for a reactive entry strategy. Organisational infrastructure serves the direct activities of a company – the construction, procurement and marketing. It comprises the organisational setup, its procedures for planning and control, and its information system. The measure of performance, in this respect, is a company's ability to plan its operations and to conform to the plan in terms of quality, cost and schedule. It is also a company's ability to adapt itself to changes and new tasks (Warszawski, 1996).

#### **(iv) Technical Factor**

Strategy ensures the company's longevity by developing, pursuing and maintaining a programme to successfully compete with other rivals. Additionally, with a competitive strategy in place, an organisation can protect itself from the changing market conditions and entrepreneurs entering their field of expertise (Abraham and Chinowsky, 2002). Effective staff development is most likely to be found in firms that recognise the potential for improving company performance. The term staff development is used by personnel specialists to describe a range of activities wider than those traditionally linked with education or training. In staff development, the focus is on changing people rather than just teaching them. Most construction firms acknowledge the need for staff development (Fryer, 1997).

**(v) Environmental Factor**

Political environments and market conditions can significantly influence construction opportunities. In order to succeed, the construction organisation must identify new market opportunities to expand its share of the marketplace and utilise any process to assess the current political conditions.

**Table 1: Factors that Influence the Success of the Construction Organisation**

| No. | Factors that influence the success of the construction organisation |
|-----|---|
|     | <b>Human Factors</b>  |
| 1.  | Effective communication lines                                       |
| 2.  | Cooperative team  |
| 3.  | Personnel attitude  |
| 4.  | Sufficient knowledge and experience                                 |
| 5.  | Contractor's public relationship skills                             |
|     | <b>Financial Factors</b>  |
| 1.  | Financial strength of the company                                   |
| 2.  | Sufficient capital  |
| 3.  | Sufficient cash flow  |
| 4.  | Cost control  |
|     | <b>Organisational Factors</b>                                       |
| 1.  | Proper planning   |
| 2.  | Good site management  |
| 3.  | Effective training, education, motivation and skills development    |
| 4.  | Good management system  |
| 5.  | Sufficient specialised expertise personnel                          |
| 6.  | Effective organisational structure                                  |
| 7.  | Clear company missions and goals                                    |
|     | <b>Technical Factors</b>  |
| 1.  | Equipment and machineries availability                              |
| 2.  | Materials availability  |
| 3.  | Labour availability   |
| 4.  | Health and safety   |
| 5.  | Worker's experiences  |
| 6.  | Worker's skills   |
|     | <b>Environmental Factors</b>  |
| 1.  | Political stability   |
| 2.  | Good market conditions  |
| 3.  | Lack of knowledge on regulations                                    |
| 4.  | Contract changes  |
| 5.  | Limited business relations  |
| 6.  | Corruption  |
| 7.  | Delay in approvals  |

|    |   |
|----|---|
| 8. | Increase in the price of construction materials |
| 9. | Weather and environmental impact                |

Table 1 shows the factors that influence the success of a construction organisation. There are thirty one (31) factors that contribute to the success of the construction organisation based on the categories of factors.

### 3. Research Methodology

Methodological approaches to investigate the CSFs for the construction organisation are based on the objectives determined earlier. There were two methodological approaches involved which are from the literature review and questionnaire survey.

The Relative Importance Index (RII) is a technique to compute the strength of index familiarity, frequencies and agreements of the specific question. To determine the ranking of the different factors that influence the successful construction organisation, the RII was adopted. This method transformed the five-point Likert scale to determine the ranking of each factor using the following expression (Tam et al., 2004):

$$RII = \frac{\sum_{i=1}^5 a_i x_i}{5 \times N}$$

Where  $a_i$  is a constant expressing the weight of the  $i^{th}$  response,  $x_i$  is the frequency of the  $i^{th}$  response of the total responses for each cause,  $i$  is the response category index where  $i = 1, 2, 3, 4$  and  $5$  respectively, and  $N$  is the total number of respondents. The RII value ranges from 0 to 1 (Tam et al., 2004). The computation of the RII using this formula yielded the value of RII ranging from 0.2 to 1. The value 0.2 represented the lowest strength and the value 1 represented the maximum strength. The mean response for the Relative Index (RI) was allocated as in the following:

|    |     |   |    |   |     |                   |
|----|-----|---|----|---|-----|-------------------|
| 1. | 0   | ≤ | RI | ≤ | 0.2 | Strongly Disagree |
| 2. | 0.3 | ≤ | RI | ≤ | 0.4 | Disagree          |
| 3. | 0.5 | ≤ | RI | ≤ | 0.6 | Neutral           |
| 4. | 0.7 | ≤ | RI | ≤ | 0.8 | Agree             |
| 5. | 0.9 | ≤ | RI | ≤ | 1   | Strongly Agree    |

A hundred set of questionnaires were sent and distributed among the Malaysian construction companies from Grade 7 to Grade 3 according to the Construction Industry Development Board (CIDB) (CIDB, 2010) classification, from all over Penang that had some experiences in the construction industry. Feedback from the questionnaire was used as the basis information to the data collection and analysis towards the findings which resulted in achieving the objectives determined.

### 4. Results and Discussion

After all the data were collected through the questionnaire survey, the data were then analysed and discussed. Table 2 shows the percentage of the respondent's position in the construction companies. The highest number of questionnaires were distributed to engineers (31.6 percent), followed by project engineers (26.3 percent), executive officers and supervisors (18.4 percent) respectively and lastly directors (5.3 percent).

**Table 2: Positions of the Respondents in the Organisation**

| No.   | Position in the company | Frequency | Percentage |
|-------|-------------------------|-----------|------------|
| 1.    | Director                | 2         | 5.3        |
| 2.    | Engineer                | 12        | 31.6       |
| 3.    | Project Engineer        | 10        | 26.3       |
| 4.    | Executive Officer       | 7         | 18.4       |
| 5.    | Supervisor              | 7         | 18.4       |
| Total |                         | 38        | 100        |

Table 3 shows the percentage of the respondents who are registered with CIDB. The highest numbers of questionnaires were distributed to grade 7 contractors with 65.8 percent, followed by grade 6 contractors with 15.8 percent, grade 5 contractors with 13.2 percent and grade 4 contractors with 5.3 percent only.

**Table 3 : The Respondents Registered with CIDB**

| CIDB Grade | Frequency | Percentage |
|------------|-----------|------------|
| Grade 4    | 2         | 5.3        |
| Grade 5    | 5         | 13.2       |
| Grade 6    | 6         | 15.8       |
| Grade 7    | 25        | 65.8       |
| Total      | 38        | 100.0      |

Sufficient cash flow (RII = 0.853) had the most influence on the success of a construction organisation. Therefore, it is worthwhile to note that the success of the organisation is dependent upon the management of the cash flow. Johnson and Kaplan (1987) argued that management accounting reports were of little help to operating managers as they attempted to reduce costs and improve productivity. Frequently, the reports decreased productivity because they required operating managers to spend time attempting to understand and explain the reported variances that had little to do with the economic and technological reality of their operations. So, the cash flow of the construction organisation is a very important factor that influences the success of the construction organisation.

The RII for cooperative team and effective organisational structure was 0.847, which was quite high. The RII for cost control was 0.842. Good cost projection and control of the cash flow are effective ways that should be considered. Proper planning (RII = 0.837) in the construction organisation involved activities of forecasting and planning, organising, commanding, co-coordinating and also controlling.

Safety and health had the lowest rank in this study with the RII = 0.726. Dester and Blockley (1995) briefed that safety and health held less awareness among the construction industry players. In construction, they suggested that 'unsafe behaviour' was the most significant factor in the cause of site accidents and therefore provided evidence of a poor safety culture.

Table 4 shows the list of the main factors according to the rank of importance. The critical success factor for the construction organisation was the human factor with the average RII = 0.8208. Therefore, it needs special attention from the management because of the importance that it brings to the organisation.

**Table 4: Ranking of Factors that Influence the Success of the Construction Organisation.**

| No. | Factors | Categories | Rank | RII |
|-----|---------|------------|------|-----|
|-----|---------|------------|------|-----|

|     |  |                        |    |       |
|-----|--|------------------------|----|-------|
| 1.  | Sufficient cash flow   | Financial Factor       | 1  | 0.853 |
| 2.  | Cooperative team   | Human Factor           | 2  | 0.847 |
| 3.  | Effective organisational structure                               | Organisational Factors | 2  | 0.847 |
| 4.  | Cost control   | Financial Factor       | 4  | 0.842 |
| 5.  | Proper planning  | Organisational Factors | 5  | 0.837 |
| 6.  | Good site management   | Organisational Factors | 6  | 0.836 |
| 7.  | Good management system   | Organisational Factors | 7  | 0.826 |
| 8.  | Effective communication lines                                    | Human Factor           | 7  | 0.826 |
| 9.  | Delay in approvals   | Environmental Factor   | 7  | 0.826 |
| 10. | Contractor's public relationship skills                          | Human Factor           | 10 | 0.821 |
| 11. | Materials availability   | Technical Factor       | 10 | 0.821 |
| 12. | Financial strength of the company                                | Financial Factor       | 12 | 0.816 |
| 13. | Labour availability  | Technical Factor       | 12 | 0.816 |
| 14. | Equipment and machineries availability                           | Technical Factor       | 14 | 0.810 |
| 15. | Good market conditions   | Environmental Factor   | 15 | 0.805 |
| 16. | Personnel's attitude   | Human Factor           | 15 | 0.805 |
| 17. | Sufficient knowledge and experiences                             | Human Factor           | 15 | 0.805 |
| 18. | Worker's experience  | Technical Factor       | 18 | 0.800 |
| 19. | Political stability  | Environmental Factor   | 19 | 0.789 |
| 20. | Sufficient specialised expertise personnel                       | Organisational Factors | 19 | 0.789 |
| 21. | Increase in the price of the construction materials              | Financial Factor       | 21 | 0.784 |
| 22. | Lack of knowledge in regulations                                 | Environmental Factor   | 22 | 0.779 |
| 23. | Contract changes   | Environmental Factor   | 22 | 0.779 |
| 25. | Effective training, education, motivation and skills development | Organisational Factors | 24 | 0.774 |
| 25. | Weather and environmental impact                                 | Environmental Factor   | 24 | 0.774 |
| 26. | Enough capital   | Financial Factor       | 26 | 0.763 |
| 27. | Worker's skills  | Technical Factor       | 27 | 0.758 |
| 28. | Limited business relations                                       | Environmental Factor   | 28 | 0.753 |
| 29. | Clear company's missions and goals                               | Organisational Factors | 29 | 0.742 |
| 30. | Corruption   | Environmental Factor   | 29 | 0.742 |
| 31. | Health and safety  | Technical Factor       | 31 | 0.726 |

From the previous analysis, the results showed that the sufficient cash flow most influenced the success of the construction organisation. However, the critical success factor for the construction organisation was the human factor.

From the results given in Table 5 it was found that tight control of labour and materials (RII = 0.847) presented the most significant strategies undertaken by the construction organisation in order to succeed. The RII for the implementation of quality control procedures and management system and motivating the personnel were 0.836 and 0.826 respectively. These results showed that these strategies had a very dominating contribution in the success of the construction organisation. Other strategies were viewed as having a moderate contribution to the success of the construction organisation.

**Table 5: List of Main Factors according to the Rank of Importance**

| No. | Categories | Rank | Average RII |
|-----|------------|------|-------------|
|-----|------------|------|-------------|



|    |                       |   |        |
|----|-----------------------|---|--------|
| 1. | Human Factor          | 1 | 0.8208 |
| 2. | Financial Factor      | 2 | 0.8185 |
| 3. | Organisational Factor | 3 | 0.8073 |
| 4. | Technical Factor      | 4 | 0.7885 |
| 5. | Environmental Factor  | 5 | 0.7022 |

Tight control of labour and materials with RII 0.847 was the most frequent strategy undertaken by a construction organisation. While the implementation of quality control procedures and management system with RII = 0.836 was ranked second of the highest degree of agreement from the respondents.

Motivating the personnel (RII = 0.826) also had a high contribution to the success of a construction organisation. It was worthwhile to note that motivation was a vitally important concern to both the employer and employee within an organisation.

## 6. Conclusion and Recommendations

As the conclusion, sufficient cash flow was the most influential factor for a successful construction organisation. However, the other factors fell in the range of 'Moderate' and 'High Influence'. This showed that in the construction organisation, there were many factors involved that influenced the success of an organisation such as a cooperative team, an effective organisational structure, cost control and proper planning. Therefore, each factor needs to be identified clearly. The results showed that among those six categories, Human Factor was the critical factor to bring about the success for the construction organisation. Special attention in terms of personnel development should be focussed upon due to the importance it brought to the organisation. Yet, the tight control of labour and material was the most frequent strategy used by the construction organisation in order to be more successful. Also, from the result of the analysis, most of the factors fell in the range of 'Moderate' and 'High Contribution'. Thus, it can be concluded that there are a lot of strategies that can be adopted or formulated in order to succeed. One company can adopt any strategy, but inevitably the constraint of the influences of the internal and external factors, and the strategies adopted can affect it.

The following are some of the recommendations for the better performance of a construction organisation:

- a) The top management must adjust the company's goals when the situation changes. The goals may change but the spirit of the personnel shall be maintained.
- b) There should be a good relationship constructed between the management staff and site staff. The needs of each other should be fulfilled to create a win-win situation for everyone

This study did not cover the implementation of the CSF methodology to enhance the construction organisation's success in the Malaysian scenario. Therefore, further studies on the CSF methodologies are required in order to be more applicable in the construction organisation in order to increase the awareness and the importance of the CSF in its organisation.

**Table 6: Ranking of Strategies that are Undertaken by the Construction Organisation to be more Successful**

| No. | Strategies | Rank | RII |
|-----|------------|------|-----|
|-----|------------|------|-----|

|     |   |    |       |
|-----|---|----|-------|
| 1.  | Controlling labour and materials tightly  | 1  | 0.847 |
| 2.  | Implementing quality control procedures and management system                               | 2  | 0.836 |
| 3.  | Motivating the personnel  | 3  | 0.826 |
| 4.  | Planning and working out in advance the long-term future of the company                     | 4  | 0.821 |
| 5.  | Selecting appropriate concepts and plans for recruitment, training and development          | 5  | 0.793 |
| 6.  | Utilising advanced technology equipment   | 6  | 0.779 |
| 7.  | Reducing the cost of establishing market presence by strategic alliances and joint ventures | 7  | 0.763 |
| 8.  | Developing corporate policy control procedures  | 8  | 0.763 |
| 9.  | Establishing marketing programme  | 9  | 0.763 |
| 10. | Standardising product/services  | 10 | 0.732 |
| 11. | Differentiating product/services  | 11 | 0.700 |

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