Process of Developing Critical Success Factors (CSFs) For Effective Cyber Risk Management (CRM) Amongst Private Companies in Malaysia

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Abstract

In the past couple of years, cyber risks are becoming too familiar, leading to organizations being susceptible to being attacked and experiencing financial loss. Cyber Risk Management (CRM) can be a wise precaution for organizations. Now, organizations want and need to know more to gain assurance about the quality and effectiveness of the CRM implemented. They required this before saying whether the adopted CRM is reliable and suitable to implement continuously. Hence, it is critical to focus on what can help an organization fulfil its CRM mission and goals effectively, regardless of industry. Identifying Critical Success Factors (CSFs) can help achieve it and help the organization accomplish the CRM's short and long-term objectives. In other words, it requires organizations to adopt a process of developing the CSFs in the CRM, where it uses lead indicators or elements that are concerned with the processes in CRM to support the achievement of desired outcomes. Hence, when these crucial success elements are already in place, the organization can concentrate on improving the employees' skills to meet these CSFs. Subsequently, this research explores the process involved in developing CSFs to assure CRM effectiveness amongst private companies in Malaysia via a qualitative approach. This qualitative approach adopted open-ended interviews and content analysis techniques that involved six private companies in Malaysia selected based on their experience in CRM. In the end, this research provides a framework for the CSFs' development process implemented among private companies in Malaysia.

Keywords: *cyber risk management; critical success factor; process; development of CSFs; success factors.*

1.0 Introduction

Due to the pervasive implementation of technology, risk has become one of the problems faced by organizations that apply information technology (IT) in their management. However, the attributes of risk and solutions for handling the risk have shifted over time. During the 1950s and 1960s, the risk is most often discovered where the risks are all about the failure in the project and the failure to implement the system within allowable time frame and budget constraints [1]. Many examples of project failures could be seen to confirm the reality of this risk. One of the examples of project failure regarding the risk is United Airlines Company, in the late 1960s, where they were forced to abort the development of a reservation system [2]. Therefore, Böhme et al. [3] said it is crucial to perform active Cyber Risk

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Management (CRM). When effectively applied, CRM can be a powerful tool to make organizations proactively see the opportunities and the risk [4]. Hence, many organizations have taken action in CRM nowadays to protect their organizations from risks that can occur anytime and anywhere in the organization. Essentially, Critical Success Factors (CSFs) become the focus of the implementation of CRM, which it is the elements that are vital to the success of CRM.

Jæger [5] defines the CSFs as those that should blend well to assure the success of CRM implementation and the few key areas that must go right for the implementation to be effective. He also stated that if these areas do not produce satisfactory outcomes, the organization's efforts in implementing CRM for the period will be less than ideal. Although identifying CSFs appears to be relatively simple, producing a complete corporate setting is difficult [6]. Many researchers [5, 6, 7] mentioned that CSFs fail to show the important things that the organizations should have to accomplish their CRM's mission and its long-term endurance. Hence, many organizations happen to have a vague understanding of the CSFs. They often depend on their understanding of the meaning of "important" or "critical" rather than relying on an explicit statement of these factors. Jæger [5] had added that many organizations also tend to depend on external influences such as regulations and laws to offer them a default CSFs initiatives or strategy instead of formulating an internal strategy that is consistent with their CRM's mission which will provide them with the best implementation of CRM regulations and procedures in combating the arising of cyber risks. Therefore, there is a need to provide an effective way of identifying and developing CSFs in CRM as organizations can effectively manage the risks in today's challenging environment. This research aims to explore the process involved in developing the CSFs of effective CRM amongst the private companies in Malaysia. To achieve the objective, a comprehensive literature study is conducted to gain insight into this research area and analyze the formal process of developing the CSFs. Subsequently, a chosen methodology is carried out and finally, the data analysis findings are discussed with the future work recommendation provided.

2.0 Literature Review

This section helps the reader to understand the definitions of cyber risk and Cyber Risk Management (CRM) based on a comprehensive study on literature review. From this comprehensive study, this research also obtained various definitions of Critical Success Factor (CSF) based on the past research, as well as emphasizing the process of developing Critical Success Factors (CSFs) for effective Cyber Risk Management (CRM).

2.1 Cyber Risk

The perception of cyber risk research has been more than a thousand years of history. Due to the continuous collapses of large institutions worldwide, many organizations have started to feel the fear of cyber risks, and the feeling started to sweep the world in this recent years. Many researchers have studied cyber risk and come out with different interpretations. One of them is Böhme et al. [3], which suggests that cyber risk is the possibility of losses caused by the digital or physical cause of damage to the digital assets. Nieuwesteeg et al. [8] also mentioned cyber risk as to the possibility of physical damage (to people or property) and financial loss resulting from failure or corrupted data of a digital system. Besides that, cyber risk also is defined as a function of the likelihood of something happening and the degree of loss within an organization's information assets, computers and communication resources [2]. In general, the researchers [2, 3, 8] agreed that cyber risk is related to the losses in the organization, and these losses can be a direct loss or an indirect loss. Direct loss is a loss incurred due to direct damage to property against the time element. For example, a natural disaster such as an earthquake or flood can destroy all of the

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digital assets in the buildings in a blink of a second and cause direct loss to the organizations. Meanwhile, the indirect loss is a loss that is not a direct result, such as lost customer loyalty and trust, lost reputation, and the increasing operational cost during recovery.

On the other hand, other researchers have defined cyber risk differently than the previously mentioned researchers [2, 3, 8]. National Institute of Standards and Technology (NIST) [9] defined cyber risk as to the possibility of something happening to the technologies implemented within the organizations that will affect the achievement of objectives of the organizations. Meanwhile, Hoppe et al. [1] mention that cyber risk is related to any risks arising from the use of information technology (IT) that jeopardizes data or service confidentiality, availability, or integrity. Hence, it can be stated that these two researchers agreed that cyber risks are more related to the impairment of operational technology that eventually leads to business disruption. The summary of the concept of risk from these different authors is stated in the table below (refer to Table 1).

TABLE 1
Concept of Risk

Authors	Concept of Risk
Böhme et al. [3]	Cyber risk is the possibility of losses caused by the digital or physical cause of damage to the digital assets.
Ginzberg and Moulton [2]	Cyber risk is defined as the likelihood of something happening and the degree of loss within an organization's information assets, computers and communication resources.
Nieuwesteeg et al. [8]	Cyber risk is the possibility of physical damage (to people or property) and financial loss resulting from failure or corrupted data of a digital system.
NIST [9]	Cyber risk is the possibility of something happening to the technologies implemented within the organizations that will affect the achievement of objectives of the organizations.
Hoppe et al. [1]	Cyber risk is related to any risks arising from the use of information technology (IT) that jeopardizes data or service confidentiality, availability, or integrity.

2.2 Cyber Risk Management (CRM)

NIST [9] emphasizes that an organization needs to understand, recognize and prioritize the overall potential level of cyber risks embedded within their processes and activities by implementing Cyber Risk Management (CRM). A successful CRM initiative can impact the likelihood and consequences of risks materializing and conveying advantages related to better informed strategic decisions, successful change delivery, and increased operational efficiency [1]. Therefore, in successfully implementing CRM in an organization, it is better to fully understand the meaning of CRM.

Distinct streams of academic literature exist in this research area, each of them focusing on a different facet of Cyber Risk Management (CRM). One of the streams is from Hoppe et al. [1], which deals with CRM among small and medium-sized enterprises (SMEs), and stated that CRM relates to the coordinated operations to steer and govern an organization regarding cyber risks. On the other hand, Quinn et al. [4] stated that CRM is a process of understanding the fundamental (i.e., significant) risks that organizations face. This process provides supplemental guidance in aligning the organization's cyber security with the organization's objectives. Kosub [10], which focused on the components and challenges of integrated CRM, discussed that CRM is the process of discovering, assessing, evaluating, and addressing the organizations' cybersecurity hazards. From these different researches, it can be understood that CRM is related to a strategic strategy to identify and prioritize cyber risks in cyberspace to guarantee that the most critical threats are handled quickly.

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For the process involved in CRM, all researchers [1, 4, 10] recommended using a standard framework from ISO (the International Organization for Standardization), which is ISO 31000:2018. This framework consists of seven iterative sub-processes that consist of: (1) establishing the context of risks, (2) identifying the risks, (3) analyzing the risks, (4) evaluating the risks, (5) treatment of the risks, (6) monitoring and reviewing the risks, and (7) communicate and consult. These processes are shown in the figure below (refer to Figure 1).

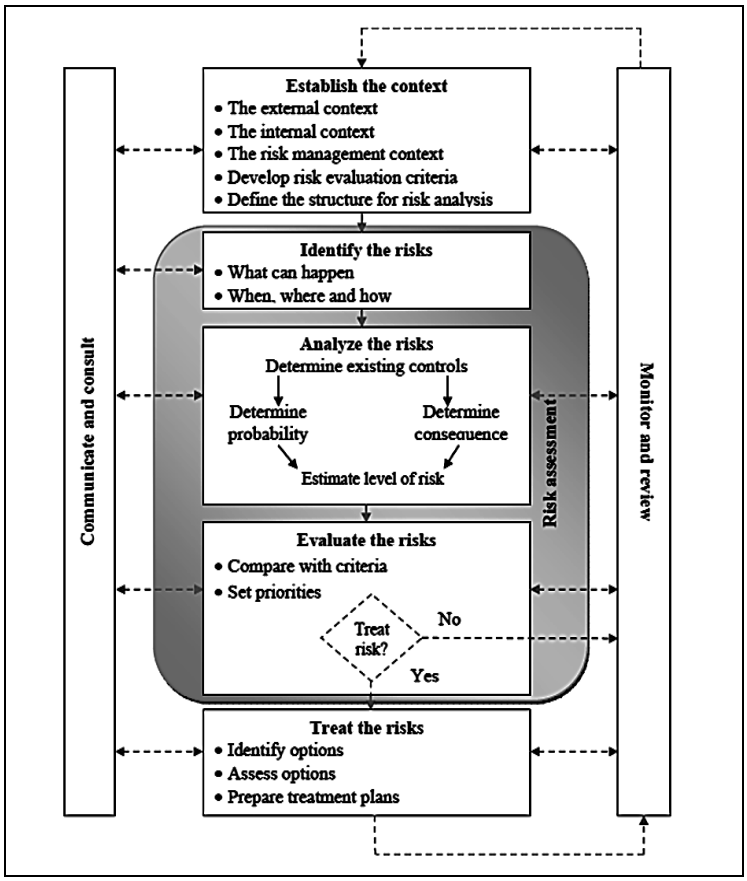

Figure 1. CRM Framework from ISO 31000:2018.

2.3 Critical Success Factor (CSF)

The application of IT in the organizations' processes is already a reality since the existing market needs professionalism from the organizations in matters related to technological advances as a competitive edge. In this sense, discovering the Critical Success Factor (CSF) becomes essential for organizations to define their priorities for successfully implementing CRM. This section proposes understanding the definition of CSFs based on past research.

As the starting point, the definition of CSF is introduced by Rockart [11], which defines it as the restricted number of areas in which, consequently, if acceptable, will ensure the achievement of competitive performance for the organization. There are certain key areas where things must go accurately for the business to be doing well. If outcomes in these areas are not sufficient, the organization's

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endeavours for the periods will be less than needed. In the first part of Boynton and Zmud's article [6], they have discussed CSF in which they give the definition of CSF and analyze a range of uses of the CSF method. They clarify CSF as one of the few things that guarantee success for an organization.

On the other hand, Jæger [5] mentions that the CSF concept is essential for the overall organizational mission, objectives, and strategies. Meanwhile, Epizitone and Olugbara [7] have stated that CSF is the limited number of areas in which acceptable results will ensure the effectiveness of competitive performance for the individual, department or organization. CSF is suitable for each unit of business and overall organization drive to fulfil the organization's objectives. Below is the summarization of the CSF concept by different authors (refer to Table 2).

TABLE 2
Concept of Critical Success Factor (CSF)

Authors	Concept of Critical Success Factor (CSF)
Rockart [11]	CSF is the restricted number of areas that will assure the achievement of competitive performance for the organization if it is acceptable.
Boynton and Zmud [6]	CSF is one of the few things that guarantee success for an organization.
Jæger [5]	The concept of CSF is the most essential for the overall organizational mission, objectives and strategies.
Epizitone and Olugbara [7]	CSF is the limited number of areas in which acceptable results will ensure the effectiveness of competitive performance for the individual, department or organization.

2.4 Process of Developing Critical Success Factors (CSFs)

There are several processes of developing the Critical Success Factors (CSFs) mentioned by various authors, but the famous one is from Fortune and White [12] that many researchers have used [5, 6, 7, 13]. Based on Fortune and White [12], there are several steps in the process of developing the CSFs for an organization. These steps are shown in the figure below (refer to Figure 2).

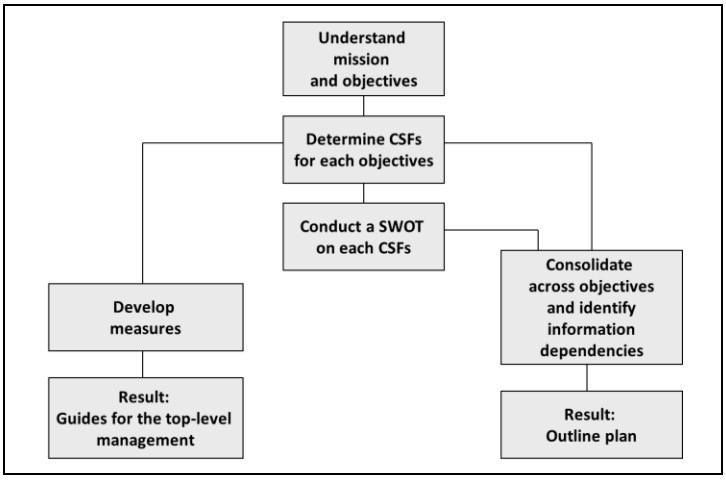

Figure 2. Process of Developing Critical Success Factors (CSFs) [12].

Based on the figure above, Fortune and White [12] said that to develop CSFs, the organization must

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first understand their mission and objectives well. The CSFs cannot be identified well if the organization does not fully understand their own mission and objectives. The second step is determining the CSFs for each objective of the organization. In this step, Fortune and White [12] explain that each of the objectives is given one or more CSFs based on the organization itself.

Fortune and White [12] also stated that in the next step, the organization could choose whether to conduct a SWOT (strengths, weaknesses, opportunities and threats) analysis on each CSFs identified or consolidated across objectives and identify the information dependencies or develop measures for CSFs. They added that the organization must choose well the third step of developing the CSFs because the different steps yield different results when finished. When the organization chooses to develop measures for CSFs, the result obtained is guidelines for the top-level management in managing the organization. Meanwhile, when the organization chooses to conduct a SWOT analysis in each CSFs as their next step in developing CSFs, they will have to continue consolidating each CSFs across objectives and identifying the information dependencies. This step, lastly, will yield an outline plan as a result.

3.0 Methodology

A qualitative methodology is chosen alongside a content analysis to get a deeper insight into the practices of process development of CSFs for effective CRM amongst private companies in Malaysia. A qualitative approach is undertaken to explore the issues because this method is often used when the researcher is interested in obtaining detailed and rich knowledge of a specific phenomenon [14]. In this qualitative approach, interviews are conducted with the stakeholders of private companies in Malaysia that have implemented CRM, which will help to achieve this research's objective by identifying the process involved in developing CSFs for effective CRM based on the stakeholder's viewpoint. A semi-structured interview has been chosen as a data collection method because this research focused on identifying the stakeholder's viewpoint, which can only be obtained using interviews. Rahman [15] emphasizes that semi-structured interviews are especially advantageous in obtaining the story behind a participant's experiences. Hence, it also benefits the interviewer to get in-depth information about the topic. In addition, Newcomer et al. [16] stated that semi-structured interviews provide adequate flexibility in approaching different respondents differently while the data collection is still going around in the same areas. The table below (Table 3) shows each part of the questionnaire for this research:

TABLE 3
The Three-part of the Questionnaire

PART A		**Organizational and Respondent Profile** Q1. Please state your organization's name, the industry sector and years of business operation with CRM. Q2. Please state your name, age, position and years of experience to date concerning CRM.
PART B		**Success Factors and Critical Success Factors** Q1: What is your understanding of success factors and Critical Success Factors (CSFs)? Q2: Who held responsibility for identifying the CSFs in your organization? Q3: How the CSFs are integrated into your organization's CRM?
PART C		**Process of Developing Critical Success Factors (CSFs)**

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		for Effective Cyber Risk Management (CRM) Q1. From your perspective and drawing on your experience, please state from the given flow of the process which of the process of developing the CSFs for effective CRM that has been implemented in your organization. Q2. Are there any additional steps involved that are not stated in the flow given?

In this research, content analysis is being used in analyzing the data obtained from the interviews of stakeholders of private companies in Malaysia. Based on Neuman [14], content analysis is a technique of analyzing written, verbal or visual communication messages. It is also known as a technique for analyzing documents. Besides, the content analysis also helps the researcher analyze the theoretical issues, which can enhance understanding of the data. The words can probably be distilled into some of the content-related categories through content analysis because many researchers believe that when the words, phrases, and the like are being classified into the same categories, they will share the same meaning [15]. The content analysis carried out in this research is deductive because, in this research, the data analysis is carried out to identify the process of developing CSFs for effective CRM based on the stakeholder's viewpoint. Newcomer et al. [16] said that deductive content analysis is usually used when the structure of the analysis is practically based on previous knowledge and the purpose of the study is theory testing. On the other hand, Neuman [14] emphasizes that a deductive approach is based on an earlier theory or model, and therefore it moves from the general to the specific. Hence, the deductive approach of content analysis is suitable for identifying the process of developing CSFs for effective CRM based on the stakeholder's viewpoint. The phases involved in this research methodology are displayed below (refer to Figure 3).

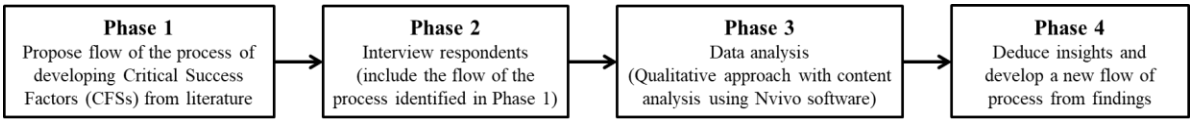

Figure 3. Phases of Research Approach and Methodology.

4.0 Result and Discussion

This research's central research question is to identify the process of developing CSFs for effective CRM amongst private companies in Malaysia. The details of the analysis are explained below.

4.1 Organizational and Respondent Profile

In order to gain in-depth knowledge and collect data for this research, six managers from private companies in Malaysia are interviewed. The organizations that have been selected have been identified as meeting the requirements needed in collecting the data which the requirements are private companies within Selangor and Kuala Lumpur and have already practised and implemented CRM in their organizations. The managers of the private companies that have been interviewed are in the range of 28 – 52 years old and have experience in CRM. Of all the managers that have been interviewed, two of them are women. In order to protect the anonymity and confidentiality of the data given by the private companies that have been selected, they will be referred to as Organization A – Organization F. Hence, the managers of the private companies that have been interviewed will be referred to as a manager. The table below (Table 4) shows this research's organizational and respondent profile.

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TABLE 4
The Organizational and Respondent Profile

Organization	Organization Industry	Organization's Years of Experience in CRM	Respondent's Position	Respondent's Years of Experience in CRM
Organization A	Information Technology (IT)	7 – 9 Years	IT Risk Manager	4 – 6 Years
Organization B	Information Technology (IT)	1 – 3 Years	Chief Risk Officer (CRO)	1 – 3 Years
Organization C	Electronics	More Than 10 Years	Operational Risk Manager	4 – 6 Years
Organization D	Banking and Financial Services	More Than 10 Years	Financial Services Risk Manager	More Than 10 Years
Organization E	Telecommunications	More Than 10 Years	Risk and Compliance Manager	More Than 10 Years
Organization F	Administrative and Support Services	More Than 10 Years	Senior Manager of CRM Department	7 – 9 Years

4.2 Understanding of Success Factors and Critical Success Factors

From the analysis, the understanding of success factors and CSFs from all managers involved in this research is quite similar, but they explained them differently. For example, Organization F defined success factors as criteria needed to be successful, and CSFs are the factors that organizations must have and are really critical. Similarly, Organization D defined success factors as combinations of important facts, while CSFs are defined as critical factors or activities.

> *"Success factors are the criteria that are found in achieving the success of the projects. The Critical Success Factors are the elements or factors that are crucial and vital for projects to be successful, which is very critical." [Organization F]*

> *"Success factors are the combination of important facts required to accomplish one or more desirable business goals. Critical Success Factors are the critical factors or activities required for ensuring the business's success." [Organization D]*

The manager of Organization F also explained in more detail that success factors are described with objectives or aims and measured by the Key Performance Indicator (KPI). On the other hand, the Critical Success Factors are said as critical because they can determine the success or break the success of the projects. In contrast, the manager of Organization D said that the Critical Success Factors used in the organizations significantly present the factors that the organizations have been focusing on to be more successful in the present and the future.

> *"Success factors contribute to some activities or functions. Critical Success Factors are the mandatory components of success." [Organization B]*

> "*Many factors determine an organization's success, which is called success factors, but critical success factors define what must be achieved." [Organization A]*

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Both of the managers agreed that success factors are just factors to be successful, while the CSFs are the most important ones and should be achieved by the organizations. The manager of Organization B also added that achieving all of the CSFs is a necessary and sufficient condition for a successful project. The manager also said that CSFs could change according to the organizations' objectives. Meanwhile, based on the manager of Organization A, CSFs are a management tool designed to ensure company objectives are met.

Managers of Organization C and Organization E shared the same understanding of success factors and CSFs in which they said that success factors are elements or components of success, while the CSFs are the strategy for the organization to stay longer in their business lines.

> "*Components of success are Success Factors, while Critical Success Factors refer to specific activities that the organization depends on for continued survival." [Organization C]*

> *"Success Factors are the elements of success. Critical Success Factors are the core elements of business for its long-term operations." [Organization E]*

Therefore, all the managers seem to understand the concept of success factors and Critical Success Factors in the same way in which they see success factors and Critical Success Factors as a way to success, but they explain it differently when it comes to Critical Success Factors, as stated above.

4.3 Responsibility in Identifying the CSFs

All of the managers interviewed stated that the top-level management is the person responsible for identifying the Critical Success Factors. In Organization A and Organization D, the managers said the people responsible for identifying the Critical Success Factors in the organizations are the top-level management, which involves the organizations' shareholders and the Chief Executive Officer (CEO). When asking the reason, the manager of Organization D stated that the CSFs need to consider several factors when want to identify them and these factors are industry, environmental, strategic and temporal factors. Simultaneously, the manager of Organization A stated the reason is that the CSFs are derived from the CRM mission and objectives that are decided by top-level management.

> "*Top management is the one that responsible for identifying the CSFs because these factors need to consider industry, environmental, strategic and temporal factors." [Organization D]*

> *"I think it is the responsibility of top-level management because these factors are totally derived from the CRM mission and objectives, which they are the ones that make the decision in determining them." [Organization A]*

Meanwhile, the CSFs are identified by the organizations' presidents and vice-presidents for organization B.

> *"For our company, the presidents and vice-presidents are the ones that are responsible for determining the CSFs." [Organization B]*

On the other hand, Organization C, Organization E and Organization F stated that the people who take responsibility for identifying the Critical Success Factors are the general managers and senior managers in the organization, which the Board then approves of Directors and CEOs of the organization.

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"The person responsible often differs from organization to organization. It is general managers' and senior managers' responsibility for our organization because it can be used to clarify strategic and business-wide targets. This decision will drill down into the team objectives in the CRM. Of course, the decision needs the CEO or Board of Directors' approval before it can be applied." [Organization C]

"Senior managers in CRM have the significant responsibility in determining CSFs to ensure that it is compliant with the CRM. They also need to include the approval from senior executives, including the CEO, CFO, and other directors in our organization." [Organization E]

"The senior management influences the decision in determining CSFs because they are the most experienced in the CRM. Then, the CEO and directors need to acknowledge the determined CSFs to implement in CRM." [Organization F]

4.4 Integration of Critical Success Factors (CSFs) into Cyber Risk Management (CRM)

The managers of Organizations A, B and D stated that the development of CSFs is one of the methods in strategic planning of the CRM. The manager of Organization A explained that strategic planning is the process of defining an organization's intentions when implementing CRM to achieve its mission. Hence, in strategic planning, the organizations identify the CSFs to ensure the success and effectiveness of the current implementation of CRM within the organizations. Meanwhile, the manager of Organization F said that the organization integrates the CSFs in the operational and strategic planning of CRM. The manager clearly explained that the operational planning involved CRM in the organization's daily operation planning process. Thus, the development of CSFs is integrated with both plannings to enhance the process and result in a strategic and effective CRM plan in the organization.

Besides, all of the managers that have been interviewed agreed that the integration of CSFs in the CRM can support the goals and objectives of their CRM implemented within the organizations. The manager of Organization F said that the CSFs represent key performance areas that are essential for the organization to accomplish its CRM's goals and objectives. This is supported by the managers of Organizations A and D, who stated that the CSFs provide processes that help the organizations to establish a strong way of thinking, communicating and making the decision in CRM, which can help in supporting the CRM's goals and objectives.

4.5 Process of Developing Critical Success Factors (CSFs) for Effective Cyber Risk Management

From the interview, the process of developing the CSFs for effective CRM based on the six organizations is being analyzed. Each step in the development process is obtained from the comprehensive study of the literature review and is bought to the interviews with a modification to suit the implementation of effective CRM. The table below shows the steps taken to develop CSFs for effective CRM based on the manager's viewpoint (refer to Table 5).

TABLE 5
Process of Developing Critical Success Factors (CSFs) for Effective CRM based on Six (6) Organizations.

Organization	Process of Developing CSFs for Effective CRM
Organization A	*Step 1:* Understand the missions and objectives of Cyber Risk Management (CRM)

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	Step 2: Determine Critical Success Factors for each objective *Step 3:* Develop measures *Step 4:* Produce a list of Critical Success Factors for effective CRM
Organization B	*Step 1:* Understand the missions and objectives of Cyber Risk Management (CRM) *Step 2:* Determine Critical Success Factors for each objective *Step 3:* Conduct a SWOT analysis on each Critical Success Factors *Step 4:* Consolidate across objectives and identify information dependencies *Step 5:* Determine a list of Critical Success Factors for effective CRM
Organization C	*Step 1:* Understand the missions and objectives of Cyber Risk Management (CRM) *Step 2:* Determine Critical Success Factors for each objective *Step 3:* PEST analysis *Step 4:* Develop measures *Step 5:* Create a list of Critical Success Factors for effective CRM
Organization D	*Step 1:* Understand the missions and objectives of Cyber Risk Management (CRM) *Step 2:* Determine Critical Success Factors for each objective *Step 3:* Develop measures *Step 4:* Provide a list of Critical Success Factors for effective CRM
Organization E	*Step 1:* Understand the missions and objectives of Cyber Risk Management (CRM) *Step 2:* Determine Critical Success Factors for each objective *Step 3:* Conduct a SWOT analysis on each Critical Success Factors *Step 4:* Consolidate across objectives and identify information dependencies *Step 5:* Develop a list of Critical Success Factors for effective CRM
Organization F	*Step 1:* Understand the missions and objectives of Cyber Risk Management (CRM) *Step 2:* Determine Critical Success Factors for each objective *Step 3:* Consolidate across objectives and identify information dependencies *Step 4:* Determine a list of Critical Success Factors for effective CRM

Based on the interviews, it is shown that all of the organizations implemented the first and second steps of the process in the development of CSFs for effective CRM. The first step is understanding of missions and objectives of CRM. For this step, the managers of six organizations agreed that they must understand well the missions and objectives of implementing CRM within the organizations before doing anything else.

> *"First, of course, understands the mission and objectives of CRM. We always take some time to look through our CRM missions, values and objectives that we would prioritize and focus on right now." [Organization A]*
> *"I agreed that the first step is understanding the mission and objectives of CRM. This is because these factors are usually linked with the missions and objectives, likely which these factors help our risk teams to achieve the strategic objectives." [Organization C]*

For the second step, which is determining the CSFs for each of the objectives that have been established, all of the managers stated that these are linked to the CRM objectives defined by cantering on how to achieve each of the objectives. Organisations B and F managers added that many things might need to happen to achieve each of the objectives, and these are the CSFs that might be considered potential candidates. When asking why the CSFs need to be identified for each of the objectives instead of having general CSFs for the objectives, the manager from Organisation D stated:

> *"CSFs, in my opinion, are elements that can impact and impede the achievement or failure of each of the CRM objectives and strategies. Thus, it is important to determine them for each of the objectives selectively."*

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The manager from Organization F supported the above statement by mentioning:

> *"CSFs contribute substantially to the CRM strategies' planning method because they are the expected causative variables of a specific desired outcome in the CRM objectives."*

Moving along, the managers have different opinions in the third step of developing the CSFs. The managers of Organization A and D stated that the third step of identifying the CSFs is developing the measures for the CSFs that have been determined in the second step.

> *"When developing CSFs, you must have the appropriate measures in place to accurately determine whether the determined CSFs are meeting your CRM mission and objectives." [Organization D]*

Additionally, the manager of Organization A stated that when selecting the best CSFs for their CRM, SMART measurement is used, which it is an acronym for specific, measurable, attainable, realistic and timely. The excerpt statement is:

> *"We usually develop measures as the third step when determining the CSFs which we use SMART measurement by asking and answering the questions in this SMART measurement."*

The manager from Organization C took PEST analysis as the third step in developing the CSFs, which the managers said is more systematic to be used. The manager added that the PEST analysis implemented looks at the big picture of CRM related to political, economic, social, and technological factors.

> *"As an organization in the electronics sector, we always use PEST analysis as the third step because it is important for us to analyze the external environment that is linked to our CFSs to guarantee the quality of our production." [Organization C]*

The managers from Organizations B and E, on the other hand, stated that the third step of identifying the CSFs is by conducting SWOT analyses (strengths, weaknesses, opportunities and threats) on each of the CSFs that have been determined in the second step.

> *"The third step is the SWOT analysis, where we examine both internal and external factors linked to our CSFs. This process might appear simple, but it can be a powerful tool when applied carefully in determining the CSFs." [Organization E]*

When asking about the difference between these two analyses carried out by Organizations B, C and E, the managers (from Organizations B, C and E) explained that the PEST analyses measure a market, whereas the SWOT analysis measures a business. The fourth step stated by the managers of Organization C is developing measures. In contrast, the managers from Organizations B and E mentioned that the fourth step is consolidating across objectives and identifying information dependencies, which this step becomes the third step based on the manager of Organization F.

> *"We usually review the determined CSFs and consolidate them along with the objectives of CRM with the identified information dependencies as the fourth step, which would lead us to a more efficient and effective implementation of CRM." [Organization E]*

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For the last step in developing CSFs for effective CRM, all the managers from all organizations involved come to an agreement that the last step is the result obtained which is a list of CSFs. The manager from Organization A added that when this list has been obtained, organizations can use and implement it to help achieve their CRM strategies and goals. Additionally, the manager from Organization C mentioned that ongoing communication could help enforce the implementation of these CSFs and having everyone onboard in understanding each of the CSFs can help lead to the CRM's successful execution.

5.0 Conclusion and Future Work

This research sought to explore theories on cyber risk, Cyber Risk Management (CRM), Critical Success Factors (CSFs) and the process of developing the CSFs for effective implementation of CRM. Generally, from the six organizations involved in this research, it can be concluded that organizations at various levels have been implementing determined CSFs in their CRM previously. With the implementation, all of the managers have a depth understanding and knowledge of the concept of CSFs and success factors, even though they explained the concept differently from each other. These differences might be due to all the managers that come from various industries, experiences and different positions. In every experience, each manager carries their own schemas, attitudes, and expectations to every concept that they apply in the organization. Indeed, the process of interpretation ensures that the concepts being asked will not have the same meaning for each of them.

They also have different opinions on the people that are responsible for identifying and developing the CSFs in CRM, where the managers from Organizations A and D mentioned the top-level management, and the managers from Organizations C, E and F mentioned the general and senior managers, whereas the manager from Organization B mentioned the organizations' presidents and vice-presidents. As Freund [13] clarify that "our previous experiences shape our current perspectives". This sentence evidently shows that people perceive things differently. The managers choose the people that are responsible for identifying and developing the CSFs in CRM differently based on what is familiar to them, and their working context and environment might influence the result.

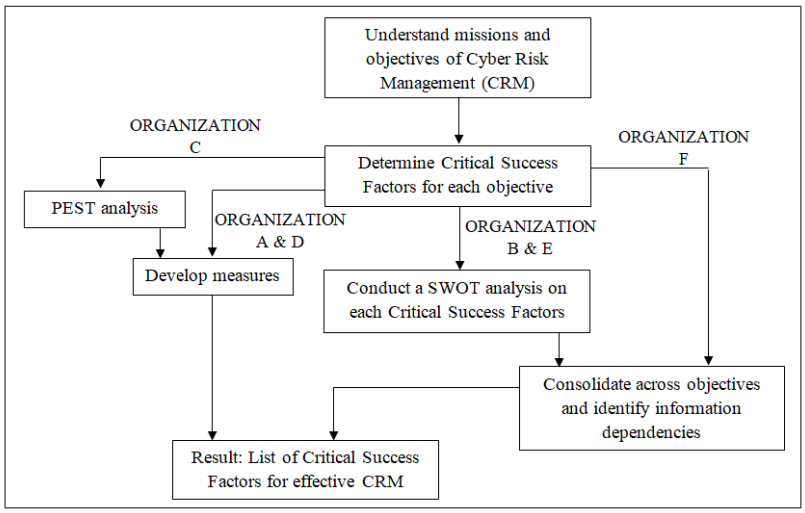

Figure 4. Process of Developing Critical Success Factors (CSFs) for Effective CRM based on Six (6) Organizations.

Successful achievement of effective and strategic CRM is directly tied to delivering on appropriate

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and targeted CSFs. It is also important to keep in mind that the process of developing these CSFs of CRM within the organizations involved is different from each other even though they might have the same CSFs defined. As shown in Figure 4 above, it can be concluded that Organizations A and D used the same ways in developing the CSFs, which they implemented four steps of the development. In contrast, Organizations B and E determined that there are five steps in developing the CSFs for effective CRM. However, Organizations C and F implemented totally different development steps compared to other organizations. As Jæger et al. [5] stated, the development of CSFs might be different for each organization due to several factors, which are the differences in information system boundaries, the culture of cybersecurity and CRM throughout the organization, information sharing, and priorities in cybersecurity and CRM. With these factors in place, it is more difficult to pinpoint the exact steps for organizations to develop the CSFs for effective CRM. Besides, these factors will likely lead to those organizations finding new and innovative ways of developing CSFs to be implemented throughout the organizations.

With the framework provided as the finding in this research, it is hoped that organizations can successfully avoid failure in executing their CRM strategy, and for those that do not have it yet, it is now to start pulling their teams and employees together in working and facilitating the process of developing the CSFs. While it is important to have CSFs being defined when implementing CRM, there is also a need for discussion and monitoring of these CSFs regularly to properly execute these CSFs into the organizations' CRM strategy and achieve success. In fact, developing CSFs in business is not a one-time project. It requires a complete cultural shift and does not have a lifespan; hence organizations must work on it on a regular basis to ensure the implementation of CRM runs smoothly.

This research paper focuses on the stakeholders' viewpoint since this research aims to look in terms of Malaysian private sectors perspectives in identifying the development process of CSFs in CRM. Although the results provide valuable insights into the development process, the need for further work in this area is strongly recommended. It is suggested that future studies can be conducted in public sectors or public listed companies.

6.0 References

[1] F. Hoppe, N. Gatzert, and P. Gruner, "Cyber risk management in SMEs: insight from industry surveys", *Journal of Risk Finance,* vol. 22, no. 3/4, pp. 240-260, 2021.

[2] M. J. Ginzberg, and R. T. Moulton (2010), *Information Technology Risk Management,* Case Western Reserve University, BP America, Inc., 2010.

[3] R. Böhme, S. Laube, and M. Riek, "A fundamental approach of cyber risk analysis", *Vaiance,* vol. 12, no. 2, pp. 161-185, 2018.

[4] S. Quinn, N. Ivy, M. Barret, L. Feldman, G. Witte and R. K. Gardner, *Identifying and Estimating Cybersecurity Risk for Enterprise Risk Management,* U.S.: National Institute of Standards and Technology, 2021.

[5] B. Jæger, S. A. Bruckenberger, and A. Mishra, "Critical Success Factors for ERP Consultancies. A case study," *Scandinavian Journal of Information Systems*, vol. 32, iss. 2, 2020.

[6] A. C. Boynton, and R. W. Zmud, "An Assessment of Critical Success Factors", *Sloan Management Review (pre-1986),* vol. 25, iss. 4, pp 17, 2011.

[7] A. Epizitone, and O. O. Olugbara, "Critical Success Factors For ERP System Implementation to Support Financial Functions", *Academy of Accounting and Financial Studies Journal,* vol. 23, iss. 6, pp. 1-11, 2019.

[8] B. Nieuwesteeg, L. Visscher, and B. de Waard, "The Law and Economics of Cyber Insurance Contracts: A Case Study", *European Review of Private Law,* vol. 26, no. 3, pp. 371-420, 2018.

e-ISSN 2821-3394

[9] NIST, *Guide for Conducting Risk Assessments,* U.S.: National Institute of Standards and Technology (NIST) Special Publication, 2012.
[10] T. Kosub, "Components and challenges of integrated cyber risk management", *Zeitschrift für die gesamte Versicherungswissenschaf*, vol. 104, no. 5, pp. 615-634, 2015.
[11] J. F. Rockart, "Critical success factors", *Harvard Business Review*, pp. 81-91, 1979.
[12] J. Fortune, and D. White, "Framing of Project Critical Success Factors by A Systems Model", *International Journal of Project Management*, vol. 24, iss. 1, pp. 53-65, 2006.
[13] Y. P. Freund, "Planner's Guide Critical Success Factors", *Planning Review*, vol. 16, iss. 4, pp. 20-23, 2008.
[14] L. W. Neuman, *Social Research Methods: Qualitative and Quantitative Approaches, 7th ed.,* London: Pearson Education Ltd, 2014.
[15] M. M. Rahman, "Semi-Structured Interview: A Critical Analysis", M. S. Thesis, University of Derby, Derby, United Kingdom, 2019.
[16] K. E. Newcomer, H. P. Hatry, and J. S. Wholey, *Handbook of Practical Program Evaluation, Fourth Edition (Chapter 19 – Conducting Semi-Structured Interviews),* New Jersey: John Wiley & Sons, Inc., 2015.

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