Development of Knowledge Assets Valuation Model

Wong Man Wai\textsuperscript{1}, Ammuthavali Ramasamy\textsuperscript{2} and Marini bt Othman\textsuperscript{3}

\textsuperscript{1} Universiti Tenaga Nasional (UNITEN), Malaysia, calebmw@yahoo.com
\textsuperscript{2} Universiti Tenaga Nasional (UNITEN), Malaysia, ammutha@uniten.edu.my
\textsuperscript{3} Universiti Tenaga Nasional (UNITEN), Malaysia, marini@uniten.edu.my

ABSTRACT
Knowledge assets which are related to an organization’s core business can ensure its competitive edge in business competition by transforming knowledge into goods and services. By understanding the value of their knowledge assets, it will help the companies to manage and retain their precious knowledge. However unlike physical asset, Knowledge Asset is intangible and there are inadequacy techniques to measure the Knowledge Asset. The value of the Knowledge Assets varies, depending on human cognition and awareness which includes context sensing, personal memory and cognitive processes. This paper reviews existing framework in measuring intangible assets and proposes to develop a model that defines the value of Knowledge Assets.

Keywords: knowledge asset, knowledge management, value of information, valuation model.

I INTRODUCTION
Many organizations are transforming business model into knowledge based core competence because they are aware that knowledge asset is essential to design and perform business process efficiently and effectively. It is important to have knowledge asset to sustain a competitive advantage in the market place. But due to the nature of many knowledge assets which are not tangible and provide wrong impression that they are less important causing organizations to lose their valuable knowledge assets unintentionally. In some scenarios of losing knowledge assets may cause the organization to lose its productivity and creativity in business process, ultimately it may cause the organization to lose its competitive advantage in the market place. It could be time consuming and costly in order to regain the lost of knowledge assets. Some experts believe that to regain the lost knowledge could cost 2 years of salaries of an employee.

Knowledge assets are important as physical and financial assets. It allows organization to design and perform business processes efficiently and effectively. Also increases the possibility to create new products and services to enable a business to create its value.

Many organizations enjoy contributions by the knowledge assets, but it is difficult to determine actual value of the knowledge assets in a tangible way. Below are some examples on how to determine the lost of the organization if they experience knowledgeable workers leaving the company? What is the cost to discover, capture new knowledge and transfer to the employees? A framework that is able to interpret the values of knowledge assets into money term which helps the organization to understand the importance of their knowledge assets in a tangible way, to allow them to determine the essential knowledge which requires to support organization business process from time to time and to manage knowledge assets more effectively.

The paper is organised as follows. The Literature review section defines Knowledge Assets in detail and several methods of measuring intangible assets is discussed. The Measuring Intangible Assets discusses the four (4) methods of measuring intangible assets and comparisons between the 4 methods. Methodology section describes data collection instruments and procedures. The final section of the paper, “Conclusion” contains concluding remarks.

II LITERATURE REVIEW
According to InvestorWords.com, “Asset” is defined as “Any item of economic value owned by an individual or corporation, especially which could be converted into cash.” This is including current assets (liquid cash), long-term assets (real estate, equipment), prepaid and deferred assets (insurance, interest), and intangible assets (trademarks, patents, copyrights, good will).

In the book of “Knowledge Asset: Securing Competitive Advantage in the Information Economy” by Max H. Boisot (1998) has defined Knowledge Assets as “stocks of knowledge from which services are expected to flow for a period of time that may be difficult to specify in advance.”

Knowledge is intangible and varies towards human cognition and awareness. It is a combination of...
context sensing, personal memory and cognitive processes. To measure the Knowledge Asset also means to put value on people, both as entities and their collective capability (Skyrme, 1999). Unlike physical asset which have limited life time due to wear and tear, Knowledge Assets can extend its existence and may last forever. It depends on the duration of the updated knowledge base to adapt the change of the world. One good example is the knowledge of aerodynamics, Sir George Cayley discovered and identified four aerodynamic forces of flight –weight, lift, drag and thrust in 18 century and the knowledge has been utilized for three centuries. Another good example is the law of motion which is discovered by Newton that standardize of measuring in terms of mass length, and time which has been used for more than three hundred years (Boisot, 1998). From the examples above, we can say that knowledge itself is not perfect (and it will never be) but it will continue to evolve and grow by going through series of experiments, trial and errors bringing best solution at that moment of time.

Snowden has further elaborate 5 types of Knowledge as below (Snowden, 2000):

1. Artefacts
   It is a result of knowledge that has been captured and codified. Examples of artefacts include documents, database and processes.

2. Skills
   It is combination of set of movements which follow in sequence to make a smooth, efficient feat in order to complete a task. Skills are acquired by going through set of training to improve competency.

3. Heuristic
   Technique that has mastered for problem solving, learning, and discovery which enable a person speed up a process. Most of people refer heuristic as “rule of thumb”;

4. Experience
   Knowledge which is job dependence and exercised to perform a task, which many refer it as “hands on experience”

5. Natural Talent
   Some people are born with natural talent. This type of knowledge is practically unmanageable. The best method is to discover the talent and develop it whenever possible by providing chances to individuals to put their talents to best use.

Measuring the value of intangible asset such as Knowledge Asset is never been an easy task due for few reasons (Kaplan, 2004). First of all, the value of the intangible assets are subjective, the worth of intangible assets varies in difference of people. In an oil company for an example, it is very important for a retail firm to get hold of retailers as it can ensure the oil company could sell out smoothly; but to the Customer Service Department in the same company, they give more value to the customer service quality and satisfaction more than retailer. Second, the intangible assets are almost never creating value by themselves; they need to be combined with other assets in order to realize their full potential. A good example like investment in IT has little value unless it has complemented with HR training, the IT investment and HR training must be incorporated and associated towards corporate strategy in order to realize their full potential. Third, the impact of the intangible assets to financial performance is not immediate. For an instance, providing training Total Quality Management and Six Sigma could improve the process quality and to improve customer satisfaction and loyalty. However the investment of the training will be paid off if only the company is able to transform customer satisfaction and loyalty into financial benefits from the sales.

Despite the challenges mentioned above, it is still very crucial to recognize intangible assets as the tangible assets. Compared to the tangible assets, the intangible assets is more difficult to replicate by competitors, which makes the organization sustain their competitive advantage due to the distinct uniqueness. If the company manage to find a way to identify the value of their intangible assets, they could measure and estimate the company’s competitive position and its strength easily and accurately. Thus differences of framework have developed to attempt measuring intangible assets which will be discussed in next topic.

III MEASURING INTANGIBLE ASSETS

This paper reviewed four (4) methods with different classification for measuring intangible assets:

A. Intangible Asset Monitors

The intangible Assets Monitor is the framework was introduced by Karl-Erik Sveiby. This framework measures the intangible asset by using table that classified employee into three categories: Competence, Internal Structure and External Structure. Each category is measured with four perspectives: Growth (e.g. number of years in the profession.), Innovation (E.g. new concept or ideas development), Efficiency (E.g. value added per professional) and Stability (E.g. average of employees) of intangible assets. The format mentioned is for companies with large intangible assets. The Intangible Assets monitor can be implemented into management information system or
to make an audit (Sveivy, 2001). Below is the diagram of Intangible Assets Monitor.

<table>
<thead>
<tr>
<th>Growth</th>
<th>Innovation</th>
<th>Efficiency</th>
<th>Stability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. Snapshot of Intangible Assets Monitor.

The choice of the indicators vary to the company strategy and require adjust to the reality of the company. Each of the perspective which corresponds to three categories should be measured by one or two indicators. The monitor should not exceed more than a page and should be accompanied with some comments. The diagram below illustrates how to utilize Intangible Assets Monitor by filling in indicators accordingly:

- **Customer Focus** – indicates how well a company serve customers via products and services.
- **Process Focus** – captures processes which create products and services to meet the need of a customer which by providing an efficient customer support services.
- **Renewal & Development Focus** – focus to reassure a long term development and sustainability of an organization including areas of focus in attaining and developing knowledge which are needed to distinguish and satisfy customer needs.
- **Human Focus** – the core of the navigator where the knowledge creation is visualized in this area to satisfy the employees’ work situation in order to satisfy customer needs and to improve the company’s performance and sales.

The Skandia Navigator was developed by Edvinsson (2007). The framework is a collection of intangible measurement methods which provides a holistic view based on performance and goal achievement. The Skandia Navigator is used to measure the Intellectual Capital and Knowledge Assets of the company. The framework consists of 5 perspectives which are listed below:

- **Financial Focus** – captures financial outcome of activities. It establishes long term goal and overall condition to the rest of perspective
- **Customer Focus**
- **Human Focus**
- **Process Focus**
- **Renewal & Development Focus**

B. Skandia Navigator

C. Meritum Guidelines

Meritum Guidelines is a framework which provides specific definitions of the terminology and present comprehensive model for the management of intangible assets (Meritum, 2001). (Refer to Figure 4)
phases (Refer Figure 5). The first phase is to guide company to identify the vision of the company; the
vision should come with a statement which is described in a depiction form of how stakeholders
could benefit from the company’s intangible assets for an example of the value creation and its key
factors. The vision should be directly related to company’s core competence and to illustrate methods
of intangible help to achieve its Strategic Objective. In the second phase, the company needs to identify
the intangible resource which is aligned to their strategic objectives and the activities that could affect
the intangible resources. The intangible resources and activities are to be categorized as Human Capital,
Structure Capital and Relational Capital; these capitals are the elements used to create value for the
company. Next, the company will need to design support activities to be used to examine and improve
intangible activities which is possible to impact on the intangible resources. The relationship between
activities, resources and the vision should be transparent. Finally, a system of indicators will be
used to assess how well the company is fulfilling its objectives. The system is considered as indicator of
how the company manages their intangible resources. Although there are no fixed indicators required for
the system indicator but the indicators must be verifiable for auditing purpose and should reflect the
Human Capital, Structural Capital and Relational Capital which are important to be managed and monitored.

![Figure 5. Three Phases of the Meritum.](image)

### D. Danish Guidelines

The Danish Guideline is another framework which is designed to measure the intangible assets (Danish,
2000). What makes Danish Guidelines different compared to other frameworks is the guideline of
constructing an Intellectual Capital (IC) statement. Similar to the financial statement, an IC statement is
a report which focuses on the KM strategy of an organization. It is designed based on four elements:
Knowledge Narrative, Management Challenges, Initiatives and Indicators. These four elements
represent the analysis of the company’s KM in the IC statement (Refer to Figure 6).

![Figure 6. The Intellectual Capital Statement Model.](image)

The first element is Knowledge Narrative; it is a written description which describes the value of the
company’s goods and services to their customers. The Knowledge Narrative describes types of the
knowledge resources that create the value of the company which needs supply. The second element is
Management Challenge which is derived from Knowledge Narrative; this element emphasizes on
reinforcing knowledge resources through in-house development or outsourcing. This could be done by
cooperative with innovative customer, developing greater expertise in specific field or to improve the
company processes. The third element is Initiatives which is used to tackle the Management Challenges.
In this element, the focus is on resolving challenges of a management in practical ways by composing
developed and procured knowledge resources. The last element is the Indicator which is used to examine
whether Initiatives is being used or Management Challenges being met.

To measure performance of the IC statement, an Analysis Model has been developed. (Refer to Figure 7).

![Figure 7. Analysis Model for IC Statements.](image)
A comparison was made among four of the models and are summarised as Table 1:

<table>
<thead>
<tr>
<th>Intangible Assets Monitor</th>
<th>Skandia Navigator</th>
<th>Metric Guidelines</th>
<th>Danish Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Procured in the area of measurements of intangible assets for management and external reporting.</td>
<td>• Design to measure intangible assets for management and external reporting.</td>
<td>• Design to guide the company identifies and measures intangible resources</td>
<td>• Framework provides guideline that constructing an IC statement similar like financial statement.</td>
</tr>
<tr>
<td>• Basis model of many current measurement solutions.</td>
<td>• First model that attempts measures intangible assets in general ways.</td>
<td>• Framework that providing specific definitions of the terminology and present comprehensive model for the management of intangible assets.</td>
<td>• The measurement basis is specific on company management challenges.</td>
</tr>
</tbody>
</table>

These models have different approaches to measure the intangible assets. But they share two common actions while defining the measurements:

1. Discover factors to be measured.
2. Define performance measures for the identified factors.

Such actions are taken place as the foundation in measuring performance of the intangible assets. In general point of views, factors are related to objectives of the company where quality performance must be performed. Meanwhile to define performance measures to identify factors is to serve as benchmarking of the performance. Based on the purpose of the measurement; the result of the benchmarking could be used to control, motivate and guide the company. Figure 8 below is illustrated is a common state of four models in managing factors into measurement.

Figure 8. Flow of Managing Factors into Performance Measurement.

IV METHODOLOGY

This research will focus on studying the current practices to valuation of Knowledge Assets at Company A. It will investigate the possibility to implement new method to measure value of Knowledge Asset and develop a model that defines and reflects the value of the Knowledge Assets.

In this research, the exploratory approach is to investigate the way to value the Knowledge Asset which is possessed by Company A and to identify the factors which affects the value of the Knowledge Asset. The qualitative method used to deal with cases which cannot be measured but can be investigated in depths via the observation, interviews and documents review. It helps the researcher to gain deep understanding of the subject and to identify how it can be related to a new concept. The data collected via qualitative method is used as recommendation and foundation to implement concept model to value the Knowledge Asset. The best approach to study the subject is to be led by the purpose of the study and with the research questions as guidelines (Yin, 2009). With that justification, below are the approaches which will be conducted for this research:

A. Perform literature review to understand the nature, characteristic and relationship between the value, knowledge and intangible assets. Through the literature review, the operational key words will be defined and described. A brief discussion about the challenges which measures value of the intangible assets will provide a better and comprehensive understanding for the research.

B. Study and explore process of Knowledge Script creation and maintenance which being implemented at Company A.

C. In this research, a single case study method will be applied to provide a better understanding of the under study event being supported with the relevant document. An investigation will be conducted to understand process that manages Knowledge Script at Company A. The case study will be used to describe the situation and the requirement which is needed to value Knowledge Asset in this company. After documents from Company A are reviewed and analyzed, an initial concept model will be developed. The model will be reviewed by Knowledge Engineer (KE) and Subject Matter Expert (SME) via survey to provide the inputs to improve the model and to validate proposed model. KE is responsible for periodically reviewing the knowledge documentation being stored, being cognizant of expiration dates of knowledge assets, ratings, and confidence levels to perform the review.

The study will start off with existing process that measures the Knowledge Asset at Company A (If any) and identify the factors which are initiated to create, maintain and dispose Knowledge Script. To accomplish these, an interview will be conducted...
with OSO’s personnel and review documents which are related are analyse. Also, identify the events which triggers to create, maintain and dispose the Knowledge Scripts which will helps to develop model to value the Knowledge Asset.

Next is to investigate existing frameworks which is developed and implemented by other companies. This is achieved based on studying existing models. This is including Intangible Assets Model, Skandia Navigator, Meritum Guidelines and Danish Guidelines. These models provide a fundamental concept in the process of model development. Later the model practiced by Campany A will be compared to other models to identify the gap and opportunities which will be used to implement new model.

For data gathering, an interview method will be used through the development of a series of semi-structured interview questions related to the units-of-analysis. This method was chosen in order to have a better guide and produce a more informative interview session. This shall involve the use of multiple data collection methods such as data, methodological and interdisciplinary triangulation (Yin 2009 ; Denzin,2005).

In addition to the interviews, data shall be collected through several other sources such as archival documents, minutes for meetings and consultancy reports. Eisenhardt suggests that the usage of multiple data collection methods supports triangulation and provides a concrete and solid foundation of theory. Interviews shall be recorded and transcribed. A copy of the transcription shall be provided as soon as possible after each interview for further verification (Eisenhardt, 1989).

Concept model will be developed based on understanding of the process and procedures which are undertaken in the managing knowledge scripts at the company A. Development of the model is required to support evaluation of knowledge assets of the organization. A model is used to interpret the value of the knowledge assets in currency to provide significant ways to view the knowledge assets similar to the physical asset in an organization. The model should be able to generalize the cost of the knowledge including i) identified knowledge; ii) preserved knowledge; iii) foster the growth of knowledge and updated frequently iv) knowledge sharing. Later, the concept model will be reviewed by KEs and SMEs, their feedbacks and opinions of the concept model become the references on improving the model before it is proposed.

V CONCLUSION

Knowledge Assets is one of the valuable assets and crucial for the growth of the companies and enable them to sustain their competitive edge. By understanding the value of their knowledge assets will help the companies to manage and retain their precious knowledge. This research is attempted to provide solution where the knowledge assets can be tagged with value and be recognized by the people.

In our future work, we shall proceed with the case organisation from which we shall acquire information pertaining to the requirements of the model development.

REFERENCES