CASE CHAPTER 11: MEASUREMENT OF VARIABLES

THE STANDARD ASIAN MERCHANT BANK

The Standard Asian Merchant Bank is a Malaysian merchant bank headquartered in Kuala Lumpur. The bank provides financial services in asset management, corporate finance, and securities broking. Clients of The Standard Asian Merchant Bank are among others institutional investors, foundations, (semi) public institutions, companies, and high net-worth individual clients. Segments in which The Standard Asian Merchant Bank operates are small and medium-sized listed companies, real estate, and biotech firms.

Syafiq Aimi is a Business student from the National University of Malaysia which is located in Bangi, Selangor - about 35 km south of Kuala Lumpur. Syafiq is currently undertaking a research project for the Structured Products (SP) desk of The Standard Asian Merchant Bank’s securities department. The SP desk is responsible for developing and selling structured products: investments that consist of a portfolio of securities and derivatives. Structured products are investment instruments that are created to meet specific needs that cannot be met from standardised financial instruments. The products of the SP desk are tailor-made and they are developed based on the Standard Asian Merchant Bank’s niche specialisations which are Asian listed real estate companies, life sciences companies, and shares.

The SP desk of The Standard Asian Merchant Bank has its own website that is primarily used to provide information to the users of the website. The website contains information about the products offered (e.g., brochures, legal documents, and bid-ask spreads), publications, and contact information. The website can be classified as a services-oriented relationship-building website. There are two main groups of website users; financial advisors and institutional clients of the SP desk. They use the website to examine product features, prices of the products offered by the SP desk, and legal information.
For the SP desk, there are several reasons why they have asked Syafiq to undertake a research project:

1. Satisfaction with the website has never been measured. As a result, the SP desk does not know how the users experience the website. The current content and layout of the website are based on assumptions of what users are looking for on the website. For this reason, the website may contain elements deemed unnecessary by the users and it might lack features that are important to the users.

2. Users of the website only spend a small amount of time on the website. In 2011, more than 70% (75.4%) of the visitors spent less than 30 seconds on the website of the SP desk (AWStats, 2011). The products offered at the website are quite complex and clients often have a lack of knowledge concerning Structured Products. Therefore it is desirable to encourage website users to spend more time on the website.

3. The website is not self-explanatory. Consequently, people contact employees of the SP desk to ask for explanation and clarification. This is a time consuming process that is relatively expensive for a small desk.

Based on preliminary research, the following problem statement was created by Syafiq:

“What elements are of importance in driving Satisfaction with the Website in the Asian investment banking industry, to what extent do these variables influence Satisfaction with the Website, and how can the results of this study be used to create a website for the SP desk that is self-explanatory, that people use as their main information source and that website users spend more time on?”

Several research methods are used by Syafiq to answer the problem statement. In order to determine the variables relevant to his study Syafiq has carried out a literature review and face-to-face interviews. Based on the literature review and a rigorous analysis of the interviews Syafiq has developed the following conceptual model.
Syafiq now wants to collect quantitative data to be able to test this model with multivariate regression analysis. In order to collect these quantitative data, Syafiq is currently busy with designing a survey which he wants to post online. He has developed the following table that should help him to operationalize the constructs in his conceptual model.

Table 1: Overview of the Constructs/variables in my Model, “Subconstructs”, and Survey Questions

<table>
<thead>
<tr>
<th>Information quality</th>
<th>Variable</th>
<th>Definition</th>
<th>Survey questions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Information content</td>
<td>Refers to the content of the information provided by the website (Hernandez et al. 2009)</td>
<td>The range of information is high. The information is applicable to the website’s activities (zie relevance). The information is detailed (zie accuracy). The main goal of the information on the website is clear. The website provides in-depth information. The information on the website is informative to your usage. The information on the website is valuable to your usage. The information on the website is of the appropriate detail. The content on the website supports its intended purpose.</td>
</tr>
<tr>
<td></td>
<td>Relevance</td>
<td>Refers to the degree to which the information meets the needs of the website user (Muylle et al. 2004).</td>
<td>The website provides information that exactly fits your needs. The information is applicable to the website’s activities. The information in the website is relevant. The information in the website is to the point. The information in the website does not help me at all.</td>
</tr>
<tr>
<td></td>
<td>Up-to-date</td>
<td>Refers to the currency of the information on the website (Mckinney et al. 2002).</td>
<td>Information is always updated in the site. The website provides up-to-date information. The information is current. You get the information you need in time.</td>
</tr>
<tr>
<td></td>
<td>Understandability</td>
<td>Refers to the clearness and goodness of the information (Cheung and Lee 2005, 2008).</td>
<td>The content of the website is easy to understand. The meaning of the information is clear. The information in the website is clear to me. The information in the website is presented clearly. The information is clear in meaning. The information is easy to comprehend. In general, information on the website is understandable for you to use.</td>
</tr>
<tr>
<td></td>
<td>Completeness</td>
<td>Refers to the completeness of the information on the website (Muylle et al. 2004)</td>
<td>The website provides comprehensive information. The website provides sufficient information. The information in the website is complete. The information in the website is sufficiently detailed.</td>
</tr>
<tr>
<td>Reliability</td>
<td>Refers to the degree of consistency and dependability of the information on the website (Cheung and Lee 2005, 2008; McKinney et al. 2002)</td>
<td>The website provides information that you trust. The information on the website is trustworthy. The information on the website is credible. In general, information on the website is reliable for you to use.</td>
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<tr>
<td>Accuracy</td>
<td>Refers to the degree to which the information on the website is perceived to be precise (Muylle et al. 2004; Zhang and von Dran 2002).</td>
<td>The website provides accurate information. The website provides precise information. The information on the website is detailed. The information on the website is accurate. The information on the website is not precise. I can rely on the information in the website. The information in the website is sufficiently detailed.</td>
<td></td>
</tr>
<tr>
<td>Usefulness</td>
<td>Refers to the degree to which the user believes that the information on the website will enhance their decision (Cheung and Lee 2005, 2008; McKinney et al. 2002)</td>
<td>The information on the website is useful. The information on the website is informative to your usage. The information on the website is valuable to your usage. In general, information on blackboard is useful for you to use.</td>
<td></td>
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## System quality

<table>
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<tr>
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<th>Survey questions</th>
</tr>
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<tbody>
<tr>
<td>Navigability</td>
<td>Refers to the ease with which users can find the needed information on the website (Schmidt et al. 2007; Evans and King 1999*).</td>
<td>I find the site easy to navigate. The navigation links are stated in every page. It is easy to find the information I need from this website. The organization of the contents of this site makes it easy for me to know where I am when navigating it. You obtain desired information quickly. It is easy to locate the information. The website is being easy to go back and forth between pages. The website is providing a few clicks to locate information. In general, the website is easy to navigate.</td>
</tr>
<tr>
<td>Access</td>
<td>Refers to the availability of the website at all times (Cheung and Lee 2005; 2008)</td>
<td>The website is responsive to your request. In general, the website provides good access. The website is available at all times. The website can be accessed using different browsers (OS).</td>
</tr>
<tr>
<td>Ease of use</td>
<td>Refers to the ease with which the website can be used (Tarafdar and Zhang 2006).</td>
<td>I find the site easy to operate. The website is easy to understand. This website is simple to use, even when using it for the first time. The website is easy to use. The website is user-friendly. It is difficult to operate the website. In general, the website is user friendly. The website is well organized. I find the website easy to use.</td>
</tr>
<tr>
<td>Speed</td>
<td>Refers to the degree to which the website users perceive the website to be fast or slow (Muylle et al. 2004).</td>
<td>I find the site download time acceptable. The speed of display between pages is high. There is very little time between my request for pages and having the pages displayed on my computer. The rate at which information is displayed is fast. The site doesn’t waste my time. The website is time consuming. It does not take much time to get from one place in the website to another. The website is fast. The website is quickly loading all the text and graphics. When I use the website there is very little waiting time between my actions and the website’s response. The website loads quickly. The website takes long too load.</td>
</tr>
<tr>
<td>Security</td>
<td>Refers to the users perceptions’ of the website’s reliability and safety (Awamleh and Fernandes 2005).</td>
<td>You feel the website is secure. The website has provisions for user authentication. The website has an information policy. The website has adequate security features.</td>
</tr>
<tr>
<td>Privacy</td>
<td>Refers to the elements that provide website users a sense of privacy (Schmidt et al. 2008).</td>
<td>I feel like my privacy is protected at this website.</td>
</tr>
<tr>
<td>System accuracy</td>
<td>Refers to the accuracy of the website in providing information to its users.</td>
<td>The system is accurate. Are you satisfied with the accuracy of the system?</td>
</tr>
<tr>
<td>System reliability</td>
<td>Refers to the reliability of the website in providing information to its users.</td>
<td>You get the information that you requested on the website.</td>
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</table>
### Interactivity

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<th>Variable</th>
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| Customer support    | Refers to the facilities and communication channels that a company offers to establish direct contact with users in order to help them with questions or problems (Chen and Yen 2004; Hernandez et al. 2009; Wan 2000; Wolfinbarger and Gilly 2003**). | I can send my feedback about the site.  
Think of all the possible ways that you can contact our bank when you need to. Based on this information and on your own preferences, how easy do you think it is to contact us?  
You are satisfied with the customer support provided by the website.  
You are satisfied with the after-sales support provided by the website.  
The website understands your problems and requests.  
The website responds to your requests fast enough.  
The website provides the personalized customer support you need.  
The website responds to your problems and requests promptly.  
The company is willing and ready to respond to customer needs.  
When you have a problem, the website shows a sincere interest in solving it.  
Inquiries are answered promptly. |
| Customisation       | Refers to the ability of websites to present customized information to fulfill the individual needs of users (Tarafdar and Zhang 2006; Chen and Hitt 2002***; Greer and Murtaza 2003****) | The website provides information that exactly fits your needs.  
The website can understand what you need via interactive communication.  
The website has personalization characteristics.  
The website offers customized information.  
The level of personalization is about right, not too much or too little.  
The website provides the precise information you need.  
The website provides reports that seem to be just about exactly what you need.  
The website allows me to interact with it to receive tailored information.  
I can interact with the website in order to get information tailored to my specific needs. |
| Control             | Refers to the features on the website that influence the users' sense of control (Wolfinbarger and Gilly 2000)****. | The site provides value added features.  
When I am using this website, I feel that I am in control of what I can do.  
The user controls the order or sequence of information access.  
The user controls how fast to go through the website.  
The user controls opportunities for interaction.  
Users control the difficulty level of the information accessed.  
The website has features, which help me accomplish my task. |

### System design quality

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<tr>
<th>Variable</th>
<th>Definition</th>
<th>Survey questions</th>
</tr>
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</table>
| Visual appeal       | Refers to the aesthetics of the website (Loiacono et al. 2002).            | The site has an attractive appearance.  
The website has an attractive layout.  
I like the layout of the website.  
The layout of the website is visually comforting.  
The layout of the website is annoying.  
The website is visually attractive.  
The website has an attractive screen layout.  
The website is visually pleasing.  
The website displays visually pleasing design.  
The website is visually appealing. |
| Innovativeness      | Refers to the uniqueness and creativity of the website (Loiacono et al. 2002). | The design is appropriate to the type of the site.  
The website is innovative.  
The website design is innovative.  
The website is creative. |
| Legibility          | Refers to the ease of reading of the information on the website (Palmer 2002). | The site presents the information in an appropriate format.  
The output format is easy to read.  
The layout of the information is easy to understand.  
The website is well organized.  
The website has a simple layout for its content.  
The website has a clear design.  
The information on the website is easy to read.  
The text on the website is easy to read. |
| Consistent image    | Refers to the consistency of the image projected by the website with the image of the firm (Loiacono et al. 2002). | The design is appropriate to the type of website.  
I find the site has consistent page layout.  
You are satisfied with the image of the website.  
The company to which the website belongs has a well-known brand.  
The website projects an image consistent with the company’s image.  
The website fits with my image of the company. |
The website's image matches that of the company.

Satisfaction with the Website

<table>
<thead>
<tr>
<th>Satisfaction with the website</th>
<th>Definition</th>
<th>Survey questions</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>The discrepancy between a customer's expectations and perceptions of</td>
<td>In general terms, I am satisfied with the way that this website has carried out my actions. In general, I am satisfied with the service that I received from the website. Please think of your overall experience with the website. On a scale of 1-7, overall, how satisfied are you with the website? You are satisfied with the website.</td>
</tr>
<tr>
<td></td>
<td>performance</td>
<td></td>
</tr>
</tbody>
</table>

Note. The “survey questions” in the last column are questions from various studies on website quality. I have tried to find as many questions as I could. Every single survey question is taken out of (one of) the papers presented in the reference list.

REFERENCE LIST


QUESTIONS CHAPTER 6

1. Measurement is the assignment of numbers to characteristics (or attributes) of objects according to a pre-specified set of rules. Describe the object and characteristics of Syafiq’s study.

2. The measurement of more abstract and subjective characteristics (or attributes - such for instance the attributes in Syafiq’s study) is more difficult than the
measurement of other, more tangible attributes such as weight, length, gender, age, and marital status. Why is that?

3. One way of tapping more abstract and subjective attributes is operationalizing these attributes.
   a. What is operationalization?
   b. Describe the process of operationalizing variables.

4. Based on a review of the literature Syafiq has developed a table (Table 1) that should help him to operationalize the variables of his conceptual model. Use this table to discuss the attribute ‘Information Quality’ in terms of dimensions and elements. In other words, which dimensions of ‘Information Quality’ has Syafiq found in the literature and how have these dimensions further been broken into elements by researchers who have investigated this issue in the past?

5. Syafiq could decide to use the survey questions he has found in the literature as a basis for his questionnaire. Is it, in general, a good or a bad idea to use existing scales? Why?

6. Syafiq discusses the table and some ideas about measuring the variables of his conceptual model with his supervisor. Syafiq has prepared the following questions:
   a. Is it really necessary to use more than one question per construct to measure the constructs of my model? In other words, why can’t I for instance just ask “How do you judge the system quality of our website?”
   b. If I cannot ask just one question per construct, would it be a good idea to combine survey questions from the studies I have found? That is, can I take the best question or questions from each study and develop my own measure for the constructs in my model in order to combine the strengths of all the existing measures I have found?”
   c. Should I still measure “Satisfaction with the Website” bearing in mind that I will measure information quality, system quality, interactivity, and system design quality in order to be able to assess the effect of these constructs on satisfaction? Or are these constructs dimensions of ‘Satisfaction with the Website’ and is it therefore unnecessary to measure Satisfaction? After all, I expect that these constructs correlate with satisfaction. I am very confused about this issue.
Provide an answer to Syafiq’s questions.

7. Do you like the survey questions in Table 1 for “Satisfaction with the Website” in the light of Syafiq’s definition of this construct?

QUESTIONS CHAPTER 7

1. Syafiq hesitates between using a dichotomous (Yes/No) scale and the following Likert scale to examine whether (in case of a dichotomous scale) or how strongly (in case of a Likert scale) users of the website agree with statements about (for instance) the information quality of the website (e.g., “The content of the website is easy to understand” and “The website provides accurate information”).

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

What type of scale do you prefer? Why?

2. What type of scale is a Likert scale? Nominal, Ordinal, Interval, or Ratio? Explain.

3. Which measures of central tendency and dispersion can Syafiq calculate if he decides to use Likert scales?

4. Syafiq has found the following survey questions for Satisfaction with the Website in the literature.
   - In general terms, I am satisfied with the way that this website has carried out my actions.
   - In general, I am satisfied with the service that I received from the website.
   - Please think of your overall experience with the website. On a scale of 1-7, overall, how satisfied are you with the website?
   - You are satisfied with the website.

Pick one of the items and turn this item into:
   a. A dichotomous scale
   b. A semantic differential scale
   c. A numerical scale
   d. A Likert scale
To assess “accuracy” (a dimension of ‘Information Quality’ defined as “the degree to which the information on the website is perceived to be precise”) Syafiq wants to use the following items:
- The website provides accurate information.
- The website provides precise information.
- The information on the website is detailed.
- I can rely on the information in the website.
- The information in the website is sufficiently detailed.

Syafiq now wants to assess the validity and reliability of this scale. He has decided to use “face validity” and “inter-item consistency” as the main indicators of the goodness of his measure.

5. Why is it important to assess the goodness of a measure?

6a. Define validity.
6b. What is face validity?
6c. How can Syafiq establish the face validity of his measure?
6d. Compare the concepts convergent and discriminant validity and indicate how these two types of validity can be established for Syafiq’s measure of accuracy.

7a. Define reliability.
7b. What do we mean with interitem consistency reliability?
7c. How can Syafiq test the interitem consistency of the “accuracy” items?

8. Has Syafiq used a reflective or a formative scale to measure information quality?
   Explain.