

## CHAPTER 4 : RESEARCH METHODOLOGY

Chapter 4 presents the research instrument used in the study of iDCs and iDC customers. It also describes the sampling design, the data collection procedure and the data analysis techniques.

### ***4.1 Research Instrument***

This research is an exploratory study that covers two different aspects of iDCs in Malaysia. Part one: A study on the physical and IT infrastructure, facilities and services offered by the iDCs; Part two: A study on the requirements of iDC customers and their level of satisfaction on the services offered by the iDCs. The study uses primary data obtained by personally interviewing the respondents wherever possible. Due to the small sample size available for used in this research, only exploratory study could be carried out.

#### Internet Data Centres

To study the physical and IT infrastructure, facilities and services offered by the iDCs, a questionnaire is designed based on the infrastructure, facilities, services and basic features of a list of established iDCs in other parts of the world such as Exodus and Sprint. IT infrastructure or data centre design blueprints by several major IT players in the industry such as Intel, Cisco and HP are referred to as well. This questionnaire as shown in Appendix B, serves as a checklist with seven different sections. The short-listed iDCs in Malaysia were interviewed and the services, facilities and features of these local iDCs were compared against this checklist.

Section A of the questionnaire looks into the locality of the iDCs and the reasons the data centres are located at the chosen areas.

Section B then checks on the physical infrastructure of the iDCs. Firstly, the building layout of the data centres is looked into – the total floor space, racking system practised, the organisation of electrical cabling and the dedicated areas for specialised data centre operations. Secondly, Section B

of the questionnaire looks into the facilities available in the data centres. It checks on the power specifications, number of UPS and generator sets available in the event of power interruptions, data centre building security and access control, fire control, temperature and humidity control, last but not the least, staff facilities at the data centres.

Section C explores into the services offered by the iDCs. The services can, generally, be divided into co-location services and managed services. Managed services consist of services like web-hosting, Application Service Provider, total solutions as well as value-added services.

Section D categorises the iDC customers into two main categories, namely the Brick and Mortars, and the Dotcoms.

Section E switches the focus to the system and network infrastructure of the iDCs. There are five main elements in this section. Firstly, it looks into the Telecommunication Provider (telco) and Internet Service Provider (ISP) connectivity to the iDCs. Then, it takes into account the system and network security, commerce security, data security and storage capacity of the data centres.

Section F addresses the management and operation of the iDCs. It attempts to find out how well-equipped the data centres are, and the value-added services that they provide to their customers. The checklist includes 2 main parts: Service Management Centre which include services like the 24-hour call centres as well as first level support to its customers in the case of any incidents. The second part of this section checks on the maintenance and monitoring services. This includes dedicated management and monitoring tools for all operational managed services, the frequency of reporting and meeting with the customers, the list of basic and proactive system and network monitoring services, and last but not least, the targeted-optimum number of iDC personnel to customers.

Section G then lists down the general comments from the iDC interviewed. Questions such as the reasons iDCs think why their customers acquire iDC services in general, total estimated cost savings by the iDC customers upon them engaging the iDC services and the greatest selling point of the iDC, are pondered upon.

Each question asked in the above questionnaire translates the iDC services' value to its customer, as shown in the most right column of the questionnaire in Appendix B.

### Internet Data Centre Customers

To study on the requirements and the satisfaction of the iDC customers, a questionnaire as shown in Appendix C, is designed. This questionnaire is used to interview the iDC customers, to obtain an insight into the reasons why they outsource their IT infrastructure to iDCs as well as their satisfaction level to the service quality of the iDCs for the investments they have made.

The questionnaire for iDC customers is divided into seven sections.

The first section categorises the customer into the appropriate industry. Section B listed down the 10 most frequently quoted reasons to outsource an organisation's infrastructure to iDCs. Section C then compile the different services in which the iDC customers obtained from the data centre.

In Section D, the needs and expectations of the customers are pondered upon. First, the customer is asked to rank the importance of the major criteria of an Internet Data Centre. Then, a five-point Likert Scale is used to rank the customer's satisfaction level on 8 major elements in the services offered by an Internet Data Centre. These 8 basic elements expected in iDC services were compiled base on the major factors required in an e-business infrastructure in order to meet the stringent on-line business requirements as well as service support expected by customers.

In Section E and F, customers are asked to comment on any problems dealing with the iDC or any future expectations required from the data centre.

Last but not least, in Section G, customers are asked some general questions with regard to their general feelings towards iDCs in Malaysia, and if they would recommend others to subscribe to iDC services.

## ***4.2 Sampling Design***

Sampling design of the research involves two different groups of participants: the iDCs and the customers of these iDCs, which are elaborated in the sections below.

### Internet Data Centres

The study was confined to the iDCs in Klang Valley with the following characteristics:

- (a) It is a commercial iDC.
- (b) The iDC has a customer base of 3 and above.

Commercial iDCs are chosen for this study because non-commercial ones are normally for internal use within organisations. One of the main purposes of this research is to investigate if the iDCs studied in general, have the pre-requisites to compete in the outsourcing market of IT infrastructure and services. Hence, it is crucial that the iDCs under study are commercialised in nature. Providing outsourcing of IT infrastructure services must be the main business model of the iDC Company.

Furthermore, in this study, the iDCs under study need to have at least 3 customers. This is to ensure these iDCs have already made its presence in the market, and not just a mere business plan going start-up. This study sets a customer base of 3 as the cut-off point by considering the infancy of this industry, as elaborated in the earlier chapters.

From the list of registered iDCs obtained from HSPstreet.com's website, 15 iDCs, which are more well-known in the market, were short-listed for this study.

Although this is an exploratory study with sample size of only 15 iDCs, it actually represents more than 50% of the iDCs identified in HSPstreet.com. Hence, findings from this study would be substantial enough to provide a general overview of physical and IT infrastructure, facilities and services offered by iDCs in Malaysia.

#### Internet Data Centre Customers

The study was confined to the customers of iDCs in the Klang Valley with the following characteristics:

- (a) It acquires at least one of the services offered by iDC.
- (b) It has at least 3 months of experience dealing with iDC.

The iDC customers who acquire at least one of the services offered by iDC for a period of at least 3 months would be able to provide reasonable feedback on the services they acquire from iDC. Some iDC customers acquire more than one service from iDC. The usual service combinations are combination of web-hosting and total solution services, or dedicated hosting and value added services.

The 3-month period is set as the minimum required period in this sampling design to enable capturing of as many iDC customers as possible in this infancy industry.

Most of the iDCs were quite reluctant to reveal the identity of their customers. However, after much persuasion, a few of these iDCs finally agreed to provide names of 2 to 3 of their customers to be interviewed. As the sample size available for this study consists of an average of 3 iDC customers from each iDC interviewed earlier, it would be meaningless to carry out any statistical analysis on the collected data. Therefore, descriptive analysis would be more

appropriate and the findings would be good enough to provide a general overview on iDC customers' feedback about iDC services.

### **4.3 Data Collection Procedure**

Two separate surveys was conducted to collect the data on iDC and iDC customers respectively.

#### Internet Data Centres

For surveys conducted on the iDC, primary data was obtained by personally interviewing the iDC director / manager or iDC business development director / manager at the iDC.

Based on the two characteristics mentioned earlier:

- (a) It is a commercial iDC.
- (b) The iDC has a customer base of 3 and above.

Official letters were sent out to the 15 short-listed iDCs. The following is the list, in no particular order:

1. Skali
2. Timenet
3. DataOne Asia
4. Maxis Net
5. FreeNet
6. ION DOTCOM (NTT-MSD)
7. Mimos
8. Solsis
9. Megacenter
10. Netmyne
11. Myloca
12. Silicon Internet
13. IPXcess
14. Asia Online

## 15. Malaysia Online

Then, it was followed up by telephone calls to try to secure an interview with iDC director / manager or iDC business development director / manager. Out of the 15 short-listed iDCs, only 9 agreed to participate in the survey. The reasons given by the non-participating iDCs are reasons like: it is company policy not to participate, worry that might reveal any trade secret, normally do not respond to this kind of surveys, no time and not interested.

On the day of the appointment, a 20 – 30 minute face to face interview was conducted base on the questionnaire designed. A guided tour at the iDC was a norm after each interview, except one iDCs in which a telephone interview method was used, and two other iDCs filled in the questionnaire over email due to time constraint on the iDC side.

If a personal interview or a telephone interview was conducted, the questionnaire was completed after the interview ended. For questionnaires sent over email, the questionnaires were collected between 7 – 14 days later. Upon completing the interview or returning of the completed questionnaires, respondents were promised a copy of the final research report as a token of appreciation. The data collection period stretched over a period of 20 weeks from the months of July to November 2001. The long duration was due to difficulty in arranging suitable time for the personal interviews as well as difficulty in convincing the iDCs to participate in the survey.

### Internet Data Centre Customers

For surveys conducted on the iDC customers, primary data was obtained through telephone interview method. iDCs interviewed earlier was asked to provide a few names of their customers to be contacted.

iDC customers were called upon, and a short telephone interview that lasted 5–10 minutes was conducted on the spot if the iDC customers were convenient at the time. Otherwise, a follow-up call was made on the appointed time and date.

The questionnaire was completed after the interview ended with a note of thanks to the participants. The data collection period stretched over a period of 8 weeks from October to November 2001. The survey was time consuming because all 25 interviews were conducted personally through phone. There was not much of problem in securing the interview, as most of the participants were eager to provide feedback on the services acquired from iDC. However, there has been some difficulty in persuading the iDCs interviewed to reveal the identity and particulars of their customers.

#### ***4.4 Data Analysis Techniques***

As the sample size adopted in this study is quite small, statistical analysis was not possible. However, descriptive analysis was carried out to obtain a general overview of the industry, as well as answering the research question in a descriptive manner.

The data analysis process involved compiling, listing, tabulating and finally summarising the findings. Simple tabulation and basic comparison method were used in data analysis. In the final part of the analysis, the findings from the data analysis of iDCs and iDC customers would be matched to obtain an insight of the iDC industry.

##### **Internet Data Centres**

Although the sample size is small, it represents nearly 50% of the iDCs registered in HSPstreet.com. The data obtained from interviewing the iDCs is able to provide the general characteristic of the respondents. Frequency counts and percentage were obtained for all elements of iDCs studied in the analysis.

Due to the fact of confidentiality agreement between the research party and the iDCs, the findings of iDCs are tabulated respectively with no names identified. This is to avoid competitive comparisons that might not be of advantage to the iDCs interviewed.

### Internet Data Centre Customers

The data obtained from interviewing the iDC customers was analysed to provide the general characteristic of the respondents as well. Frequency counts and percentage were obtained for the elements studied.

There was a prior agreement with the iDCs that the names of their customers will not be revealed to any third party. Hence the findings of iDC customers are compiled and tabulated together with no names identified.

### Matching of iDC services with iDC Customers' requirements

Findings obtained from the iDCs and iDC customers studied were reorganised to enable comparisons between the services offered by iDCs and the requirements and expectations of iDC customers.

The first comparison put in juxtaposition the reasons, given by the iDCs and their customers respectively, why iDC services are acquired in general. This would show if the iDCs are indeed aware of the reasons why their customers outsource their IT infrastructure and services.

The second analysis compared the importance ranking in "Top criteria for choosing an iDC" by the iDC customers, with services and IT infrastructure these iDCs offer. This provides a general overview of how these iDCs, by emphasising on the right elements, meet their customers' requirements.