

Strategic IT/IS Planning for a Radio Paging Company

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Abstract

The major aim of this paper is to critically assess an organization's current alignment between information technology and competitive strategy and to propose a set of recommendations to formulate a new IT strategy.

The organization to be analyzed is a radio paging service provider PageCom Sendirian Berhad. It begins with an overall description of the paging business and industry, of which PageCom are actively engaged in. An analysis of the current status of PageCom will include factors such as organizational business agenda, business objective and strategy. It further examines the strategic implications of the existing information technology and current alignment of the IT strategy with its business objectives.*

Recommendations will be made in light of the above factors to re-align the information technology strategy with the business strategy. The justification of recommendations will be discussed along with the critical success factors of implementing these recommendations.

* Not the real name of the company

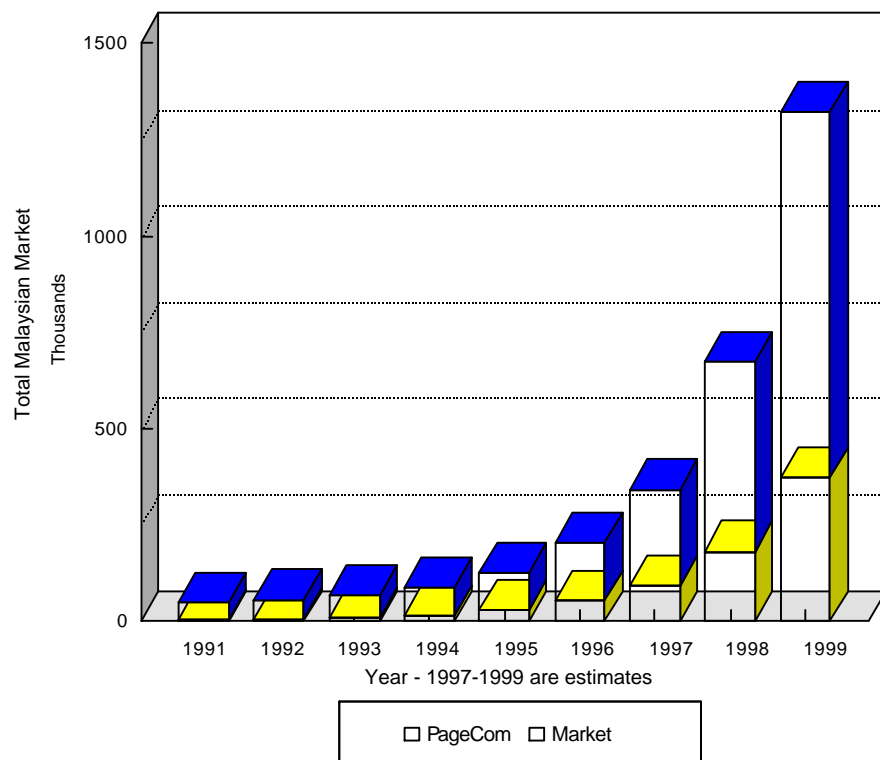
Introduction

In spite of all the latest and greatest in telecommunication technology, the pager continues to soar in popularity. One of the main reasons for its popularity is its low cost and light weight appeal.

Malaysia has a total of 38 paging licensees. Eight of the 38 companies with local paging licenses have also been awarded nationwide licenses. Only 20 of the licensed companies currently serve the market. The growth of the paging industry has been slower than the cellular phone market. The top three operators are offering national coverage. The penetration rate in 1994 is about 1 per cent as compared to Singapore's 20 per cent. Operators expect the paging penetration rate to reach five percent by the end of 1999. Industry sources estimate the total market potential for the paging industry to be 500,000 subscribers, but currently there are about 150,000 (1996) subscribers in Malaysia. There is therefore great potential for the paging market.

*PageCom -
Subscriber Base
1991 - 1996.*

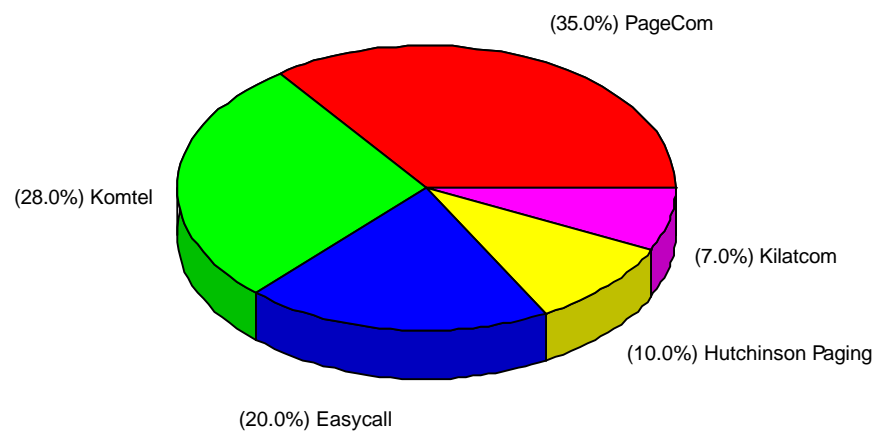
*Note : 1997, 1998,
and 1999 are
industry estimates.*



**Current
Business
Environment**

PageCom Sdn Bhd is the dominant paging operator in the country with a market share of about 35 per cent. Other major companies include Komtel Sdn Bhd, Easycall, Hutchinson Paging and Kilatcom.

With the high growth rate and increasing market potential, PageCom's paging services business can be regarded as the mainstay or in the "Star" quadrant base on the Growth-Share matrix analysis (or the Boston Consulting Group matrix - BCG matrix).

Radio Paging Market Share (1996)

Total Subscriber Base : 149,285
Source : Jabatan Telekom Malaysia

Company History

PageCom was officially formed in 1986 with a staff of 180. The business started with the provision of paging services within Kuala Lumpur and Petaling Jaya. Today, it is a RM140 million business supported by a 380 member team with nation wide paging. Majority of the PageCom's 1996 revenue (94% or RM71.44 million) comes from the paging business whereas the rest comes from support services (6% or RM 4.56 million).

PageCom's corporate headquarters is in Petaling Jaya and currently have 6 branch offices established in Kuala Lumpur, Penang, Johor, Kuantan, Kuching and Kota Kinablu. All of these offices serve their regional customers that is divided into Central, Northern, Southern, Sarawak and Sabah respectively.

Mission and Objectives

The mission statement of PageCom is :

"We are committed to be the leader in the pager services, the continued provision of quality products and services and to the achievement of customer satisfaction"

Current IT Environment

Currently the majority of information technology function falls upon the Engineering department whereas a skeleton team maintains the accounting and billing system under Accounting and Finance. Therefore the use of information technology is fragmented where both departments have their own IT equipment and applications. The decisions made for information technology required have been at the departmental level rather than the organizational level. Hence the current environment IT is primarily in support mode only (based on McKenny & McFarlan's application portfolio analysis matrix), there is effectively no IS/IT strategy nor is there any IS/IT alignment with business strategy at all.

For more details on the company's organizational structure and IT environment please refer to Appendix B : Organizational Structure and Appendix C : PageCom Information System Setup and Operations.

Business Objectives

The management of PageCom wants to target the an industry market share of 40% by 1999, which translates to a subscriber base of 370,500. In order to achieve that, PageCom would need to an average subscriber growth rate of 93% for the next two years. Given that the subscribers will reach a forecast of 90,000 by year end, PageCom will also need additional 90,000 and 180,000 in 1998 and 1999 respectively.

For more details on the company's competitive environment refer to Appendix D : Competitive Analysis

Business Strategy

In view of the Five Forces and SWOT analysis (as described in Appendix D : Competitive Analysis) and in consideration of business objectives discussed earlier, the management have formulated a business strategy to create :

1. Customer Awareness and Market Focus

Create public awareness of pagers via advertisement and the use highly focused marketing programmes targeting at specific user groups.

2. Advanced Services

Attracting customers with a set of technologically advanced and competitive value added services.

3. Cost Leadership

Target monthly subscription price of 5% lower than closest competitor (in terms of market share) by first quarter 1998.

For more details on the Five Forces and SWOT Analysis please refer to Appendix D : Competitive Analysis

Strategic Dependencies

Each of the business strategies varies with its dependency on information systems. This section discusses the of dependencies of the strategies is relation of information systems.

Strategy No. 1 Customer Awareness and Market Focus

PageCom want to target specific groups of potential users for more effective marketing. PageCom needs to have a very clear and objective understanding of their customer behavior.

Currently, PageCom have been relying on word of mouth from their market representatives which may be unreliable at times. PageCom want to target specific potential customer groups who will have a higher probability of subscribing to pager services rather than rely on the

traditional “shot gun” approach. The management believe that this approach will result in more new customer with less effort i.e. more effective marketing.

Other segments of the telecommunication industry especially the cellular service providers are leveraging on the customer databases through the use of data warehousing technology to attain that competitive advantage.

Strategy No. 2
Advanced
Services

PageCom intend to increase it range of value added services to match its competitors’ at the very least. In addition, PageCom’s management want to have more unique services at a faster pace.

Today, it would take 4 to 6 months to add an additional service. That need to be reduced to 1 month to catch up with the competitors in 4 months, then overtake Komtel’s range by mid 1998. The information technology component is key because the applications would need to be designed, developed and tested before the service is rolled out. The management feels that application development process is taking too much time. An recent inquiry has concluded that this is mainly due to lack of focus in IT planning, low programming skills and lack of manpower.

Strategy No. 3
Cost
Leadership

PageCom envision that the increase of its market share will lead to it cost leadership due to economies of scale. If PageCom can achieve first and second strategies, the advantage of cost leadership would follow. Current estimates by the Accounting and Finance department show that PageCom will achieve the cost leadership when the subscriber base reaches 80,000.

This estimates takes into the account of the acquisition and implementation of the Flex technology radio paging equipment.

For more details on the current operations please refer to Appendix C : Information Systems Setup and Operations

Impact of IT on
Business
Strategy

Base on the above analysis, it can be concluded that the information system and technology does have a major impact in terms of :

1. The continuous business operations of PageCom where the function information systems is critical to the business operations, e.g. if the paging information systems fail, the paging services will cease to function.
2. The future competitiveness of PageCom where the industry becomes increasingly reliant on information systems to deliver its services in an automated and efficient manner.
3. Strategic advantages can be achieved through the understanding of customer needs and behavior.

Information Systems Strategy

Base on the business strategy, an information system strategy will define what type of information that the system needs to deliver to the business in order for it to achieve its objectives. For PageCom, the following areas are critical :

- Proactive Systems - Availability of information on customer behavior to effective planning and execution targeted marketing programmes.
 - Business Effectiveness - Acceleration of connections to content providers and application development efforts to develop competitive value added informational services.
 - Cost Containment - Reducing the cost of service provision via automation.
-

Information Technology Strategy

With the establishment of an information system strategy, the next step would be to identify the information technology strategy that defines how IT can supply the necessary information infrastructure that will help PageCom accomplish the business targets.

This section discuss the current state of PageCom's IT strategy (if any) and recommend how PageCom can control and evolve its current IT environment to reach a stage where it closely supports the firm competitive strategies.

Current IT Strategy

The analysis and justification of PageCom's IT strategy shall be based on the McFarlan's information management evolution grid that describes the stages of information management within an organizations. There are a total of 5 stages starting from the support quadrant and moves progressively to achieve stage 5 at the strategic quadrant where information systems and technology contributes to the strategic success of the company.

The successful implementation of the IT strategy depends on how soon PageCom can reach the later stages of the evolution. Base on the analysis of PageCom's current IT operations, most of PageCom's application portfolio is in Stage 1 of the evolution of McFarlan's model IS/IT planning which centers around the support quadrant. This is evident with the fragmented and uncoordinated approach to the IS requirements at the departmental levels. Each department have and maintains its own systems that do not share its data, the Accounting and Finance department's Financial Accounting system is one such example. Although PageCom's

current system can meet its requirements, it will need to further automate and improve the daily operational activities such as time recording and payroll.

PageCom's IT Evolution

Evolution of Information Management

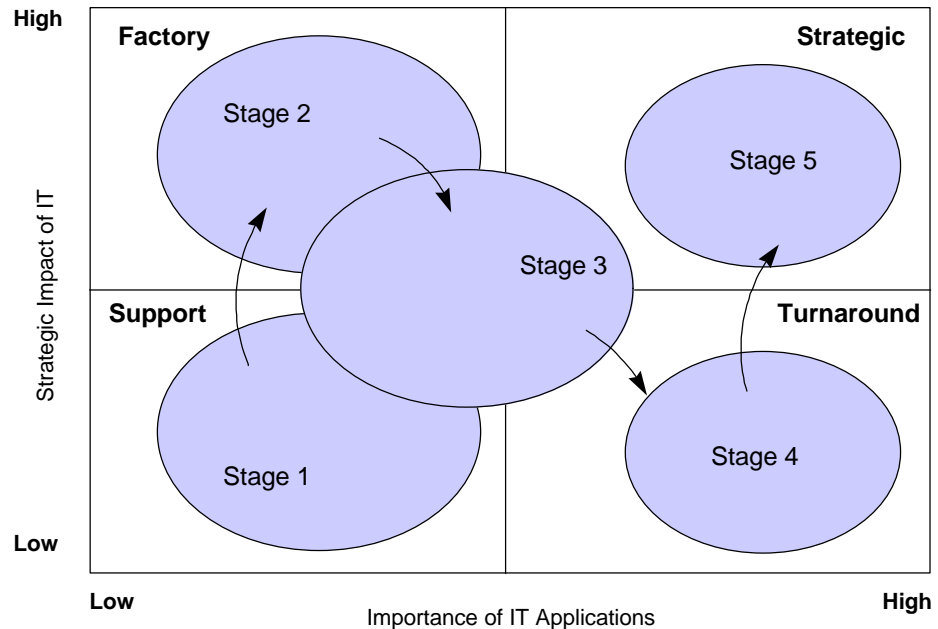


Figure 1 : Mapping PageCom's the evolution of the IS/IT Planing.

Migrating to Stage 2

At the same time PageCom's management is becoming aware of the importance of IT and how it can contributed to the business. Given that there is currently no centralized planning and coordination of information technology needs, PageCom would need to setup an independent information systems (IS) department that will consolidate and effectively manage all organizational IS/IT resources and realign them with PageCom's business strategies. The accomplishment of this top down approach will effectively migrate PageCom into Stage 2 with the establishment of more factory type applications. The increased efficiency of developing applications that support the value added services is key to sustaining the existing competitiveness of the business and therefore should be given a higher priority.

Other areas that will need improvement and enhancements will be the Paging Management System which the operators use to enter and transmit messages to the radio paging equipment. The current application is obsolete and not user friendly, client/server and graphical user interface application should be developed to help reduce learning curve and user training.

In addition, PageCom should consider using Internet Paging and Phone Paging technology where the public and enter the pager number and messages directly via the Internet or telephones thereby reducing the need

to increase the number of staff to meet the future increase in subscribers.

*Integrating
Stage 3*

Once efficiency is achieved at the departmental level, the next stage is to extend it to the organizational level with the integration of these systems. Stage 3 is achieved when both factory and support application systems operate in an integrated fashion that allows free flow information between departments. The successful integration of the IT equipment and applications of both Accounting and Engineering is critical to the reduction of inconsistencies that lead to inefficiency in operations. This stage is will form the foundation of the subsequent stages where turnaround and strategic applications will draw information from these operational systems.

Therefore, it is highly recommended that PageCom formulate an information technology architecture as soon as possible which will form a blueprint along with IT procurement guidelines that will ensure the ease of future integration of equipment and applications. The accomplishment of Stage 3 will form the foundation for applications in Stage 4 and 5.

*Competing
Effectively in
Stages 4 & 5*

Stage 4 and 5 can be achieved with the introduction on applications such as decision support systems (DSS) and Business Intelligence such as Sales Forecasting systems.

Marketing personnel will need information on customer needs and behavior to plan their marketing activities. The use of data warehousing and data mart technologies will greatly improve the current marketing operations. The DSS can perform operations such as customer segmentation analysis, where the system will analyze the customer database and provide feedback on what are the key characteristics of their customers i.e. who are their customers. For example, if they know that the majority of their Central region customers reside within the Cheras suburb, they can target other suburbs such as Puchong that are not as saturated. They can subsequently set up more dealers and services points in the Puchong vicinity to better reach the potential customers.

These information does not just support external activities such marketing but internal activities such as man power planning. For example, if their customer base in the Northern region is 75% Chinese and whereas in the Southern region is 80% Malays, the regional offices should employ marketing and support personnel with the corresponding ethnic background to better serve the customers.

In addition, the strategic links to information content provider is also key to the strategic success. In order to provide up to the minute counter information to its subscribers, PageCom will need to have networked links to organizations such as the KLSE that will provide up to the minute counter information compared to the competitor's half hourly updates on the KLSE index.

Application Portfolio

Information Management Strategic Grid

Strategic Impact of IT	High	Factory Inventory Management System Customer Billing System Phone Paging System Internet Paging System	Strategic Links to Information Content Providers Marketing Management System Customer Data Mining System Sales Forecasting System
	Low	Support Financial Accounting Systems Office Automation Expense Claims System Time Recording Systems	Turnaround Value Added Service Applications Electronic Mailing Paging Management System Customer Information System Paging Network Support System
		Low	High
		Importance of IT Applications	

Figure 2 : Mapping PageCom's application portfolio

Implementation PageCom can engage a system integrator or an IT consulting firm to help plan and execute the information technology projects. Given that most of the application requirements are highly customized, a turn key development approach is recommended.

Critical Success Factors

The successful implementation of the IT strategy is contingent on the following :

- The establishment of an IS/IT Department with clear goals and objectives that is in line with PageCom's business objectives.
- Setting up of management and technical steering committee that adequately represent all stakeholder of the firm to guide and agree on priorities and direction of IS/IT strategy.
- Setting up requirements study team that involves the end users from each department to ensure usability and acceptability of applications
- Ensure proper training for the end users to fully utilize the features and function of the system.
- Formulation of a technology and application architecture that will

serve as guideline for procurement and the integration of current and future technologies.

- Capacity planning and sizing of the information systems will ensure the system can continually meet the business growth and demands in terms of functionality and response time.

Conclusion

PageCom's continued success in the paging services industry will be increasingly dependent on the effectiveness of its information systems on various levels, from management decision making to the daily operations of the paging systems. Therefore it is absolutely critical that PageCom establishes an effective IS/IT department that is adequately skilled and competent in tackling the important issues of systems integration and distributed computing.

Although PageCom can engage consultants to assist in its planning, but the long term effectiveness of its IT personnel is key to its success in the business. In addition, the adaptability of the information systems and technology and more importantly its people to meet the changing landscape of the business is just as critical.

References

Ward, John. (1990). *Strategic Planning for Information Systems*. John Wiley & Sons.

Tozer, Edwin E. (1996) *Strategic IS/IT Planning*. Butterworth-Heinenmann.

Appendix A : Industry Figures and Positioning

This section contains the details of industry figures and PageCom's industry positioning. The financial history and positioning is unavailable due to confidentiality issues.

Year	Malaysian Subscribers	Industry Growth	PageCom Mkt. Share	No. of Subs.
1991	42442		10%	4244
1992	49083	15.65%	12%	5890
1993	57839	17.84%	15%	8676
1994	73403	26.91%	19%	13947
1995	98934	34.78%	27%	26712
1996	149285	50.89%	35%	52250
1997	250000	67.46%	36%	90000
1998	490000*	96.00%	37%	181300*
1999	950000*	93.88%	39%	370500*

Table A1- PageCom Market Share and Industry Growth (- Projected)*

Appendix B : Organization Structure

Company Background

PageCom is organized into the following departments :

- Marketing,
- Personnel,
- Engineering
- Customer Support departments.

Marketing

The marketing department handle the sales channels that comprise of approximately 45 outlets nationwide. These channels market the Motorola pagers and PageCom's services to the general public. The other portion of the marketing department handles corporate customers. The major corporate customers include Motorola Malaysia, Nationwide Courier Services, General Hospital (KL). Currently, the marketing department has 40 marketing personnel and administrative support staff.

Engineering

The engineering department maintains the nationwide page radio broadcast systems. Their job is to maintain the radio stations located in major towns in the Peninsular and east Malaysia. Currently there are 6 broadcast stations in each of the region. They are serviced by 28 field engineers and there are 6 system analysts and programmers in the HQ who maintain the information systems that link to the 6 nationwide broadcast stations.

Customer Support

The customer support is essentially a call center that handles customer calls and paging calls. There are call centers located in Petaling Jaya, Penang, Johor, Sabah and Sarawak. Each center comprise of approximately 8 operators, each equipped with personal computers to key in the messages and send them to the radio broadcast system. The call center is Petaling Jaya is the largest, with 48 operators (18 full time and 30 part time). The operators also handle customer calls, billing, deactivation and reactivation of accounts and other inquiries.

Accounting and Finance Department

This department handle the billing and collection of fees from the customer. In addition, it is also responsible for the financial accounting of the company. Currently, the billing and accounting systems are partially automated with mailing list and simple billing application developed in house. The accounting information system is managed by an accounting and finance personnel who is proficient in IT.

Personnel

The personnel department oversee the hiring and training of staff at all levels.

Management

The senior management comprise of the Managing Director and the heads of each department. Together they manage the performance of the company with weekly management meetings.

Appendix C : Information Systems Setup and Operations

Background

This section describes the current PageComs's Paging systems setup and operations. It is mean to give an overview of how PageCom's core business is run and to provide details of the current problems and issues faced by PageCom.

There are really two IS departments that focus on the support of their departmental functions. This section briefly describes the two and the challenges each face.

Engineering Department

The core Engineering information system is locate in the Petaling Jaya HQ that comprise of a pair of IBM RISC/6000 UNIX servers in a high availability configuration serving the 48 operators. There are 48 personal computers in a local area network used by the paging operators, all of them are linked to the UNIX server in a computer room. The UNIX servers are connected to the Glenayre radio broadcast system that covers the Klang Valley and the central region. In addition, the UNIX servers are connected to the rest of the 5 regional servers via 5 leased line at 9600 bps. The regional servers are also UNIX servers with similar configuration but without the high availability setup. Each regional server also have 5 leased line connected to the rest of the servers. Each of the regional call centers have 8 operators with personal computers connected to the server via local area network.

Currently, the IBM UNIX servers are linked via a serial (RS232) cables to Glenayre radio paging system within each regional office. Additional 5 serial cables are linked to modems (leased line at 9600 bps) that link directly to the radio paging system of other regional branches. When a paging transaction is executed by the operators (after entering the pager number and messages) and the message packet is sent not only to the radio paging system in that regional branch but also to the rest of the 5 branches as well. The current bottleneck seems to be at the wide area network links. Capacity planning finding show that if PageCom were to meet its subscriber target in 1999, with an average of 270,000 transactions per day, there is a need to upgrade the wide area communications channel to at least 128kbps.

Note : One paging call is considered a transaction, there are on average 3 page calls per subscriber per day, at the current rate there are 160,000 to 200,000 transactions per day.

The Engineering department also supports the personal computers and the applications used by Customer Support department. The call

center in Petaling Jaya is supported by 4 system analysts whereas the Penang center is supported by 2 system analysts. The call centers in Johor, Sabah and Sarawak which have very few operators do not have any direct support. By far, the majority of the customers are within the central and northern regions, with the southern region catching up in terms of transaction volumes. Sabah and Sarawak regions are largely untapped.

Accounting & Finance

The Accounting and Finance department have another server that handles billing and the company's accounting system located in the Petaling Jaya HQ.

There are payment collection offices for each of the 6 regions to serve walk in customers who want to pay their bills, alternatively, customers can pay their bills via Bank Simpanan Nasional branches. PageComs also receive payments via cheques. All billing processes are carried out at the HQ. Collection centers send the records of their daily takings to the HQ at 5 p.m. each working day.

The accounting and finance department currently have a basic accounting system that adequately accommodates is departmental functions.

However, there are some problems with the customer account management function. Currently, the customers are being charged at a flat rate payable every quarter. The accounting and finance department have their own customer database which they base their billing operations on rather than sharing the same database as the Engineering Department. This is due to the fact the each department is responsible with its own information technology requirements, this led to the purchase of incompatible equipment that are unable to share the departmental data. This have led to some data consistency problems where the customer billing process uses data that are not up to date. Sometimes billing was sent to customer whose account have been canceled. Other problems are the delays in deactivating of accounts by the Engineering Department for the customers who fail to pay (based on feedback from the accounting and finance department).

The management have express the intent to start billing according to air time. This billing structure allows customers have a number of pages every month or quarter, but if the number is exceeded, this will be charged for the additional usage. This restructuring will see an increase in revenue by an estimated 15% for PageCom given the current usage patterns of its customers. The restructuring of the billing system is contingent upon the availability of an efficient customer account management process and its support system. Management wishes to implement this by mid 1998.

Appendix D : Competitive Analysis

Competitive Environment

Being a dominant player of the market has its advantages. PageCom has achieved this level through its excellence in service. The service quality is measured by paging response time i.e. from the moment the message is keyed in to the moment the pager responds. The local industry average is 25 seconds and PageCom's is 15 seconds. However, its competitors are fast catching up. The international standard to match will be Hutchison Hong Kong's 1.5 seconds.

The features game is also heating up, other paging service providers are offering additional services such as KLSE information. The recent features war is a major contributor to PageCom's eroding market share.

Threat of New Entrants

The Malaysian pager market is a growing market. As previously mentioned there are a total of 38 paging licenses awarded by Jabatan Telekom Malaysia, eight of which have nationwide licenses. As of now Jabatan Telekom Malaysia has no intention of awarding any more licenses due to the market saturation, therefore the threat of new entrants is minimal.

Bargaining Power of Suppliers

PageCom's current radio paging network system is supplied by Glenayre. The system has been functioning reliably for almost two years already. However, the later models of the system uses "Flex" technology have many enhance features that competition do not have. The management is in the process of evaluating bids from both Glenayre and Motorola with the possibility of an upgrade within 1997. There is definitely a need to critically assess the benefits versus the price offered as well as long term competitiveness. In addition, the new system should minimize maintenance efforts in order for PageCom to achieve industry cost leadership.

Bargaining Power of Customers

The pager market is a price competitive one and the product differentiation is minimal. The average customer seldom switches the service provider once he/she starts subscribing. However, recent increase in the provision value added services by competitors has seen some customer migration, as a result, the project 1997 growth rate has fallen to 72.25% from the planned 82%. PageCom needs to catch up in this area in order to remain competitive. PageCom also maintains a competitive price margin of 5% with its closest competitor Komtel.

Threat of Substitute Products

The advent of cellular phones and large providers such as Maxis and Celcom does have an major impact on the pager business. This threat is compounded by the fact that the phones are heavily subsidized by their

service providers, one of them is ADAM which offer their products and services for a low price of RM400. An average alphanumeric pager costs RM195. There is a need to create market awareness of the benefits of pagers in order create new markets and new customers.

Rivalry of Competitors

Komtel is proving to be a strong competitor, its strength is in its ability to meet market demands with the availability its value added services within a short time frame. Its market share have doubled since 1994. PageCom will need to keep ahead of its competitors not just by providing better value added services but also the ability to roll out these services ahead of competitors in order to capture the market.

SWOT Analysis

Strengths

PageCom's strength lie in its excellence in customer services through experience. Customers who have purchased a pager will have the account activated within 2 hours. Prompt response in service where customer will receive the message within 15 seconds of the call being made has been the reason behind PageCom's popularity. Its reliable nationwide coverage is also an advantage over other nationwide operators. Corporate customers with their personnel all over the country prefer to subscribe to PageCom's services.

Weaknesses

PageCom has been slow in responding to the addition of value added services and this has contributed to its recent loss in market share. The competition have been offering KLSE information, Magnum, 3D, weather information which PageCom lack. There is definitely a need to respond quicker to the competitive challenges or even preempt their offers. This process typically involves the negotiation with content providers (such as KLSE and Magnum) to supply the information online, applications need to be developed to automate the signaling process of the required data to the subscriber. PageCom lack the resources and skills to develop this area of their service offerings.

Opportunities

With the potential of 500,000 subscribers nationwide by 1998, the Malaysian market offers a lot of opportunity for paging services. Regionally, PageCom intend to enhance marketing efforts in the southern region. PageCom also wants to target the general public to increase its future market share. Additionally, PageCom's also want to focus more on acquiring corporate customers in the health sector (hospitals), logistic and transport sector (courier and haulage companies). These sectors will see an increase in growth rate due to the nation's effort in improving transport infrastructures as well as increasing the number of "intelligent" hospitals being built by the Government as well as private sector..

Threats

Today, pager still remain as a one way communication device. The technology will see and improvement with the advent on 2 way communication pager systems. Cellular phones which offer voice communications is getting increasingly popular in Malaysia and therefore it can be perceived as a threat to the pager business. PageCom's management is seriously considering to entry into trunk radio service to diversify its revenue based and reduce its risks and reliance on the pager service business.
