

I-PERSONAL FINANCIAL ORGANIZER (I-PFO):  
A CYBER SECURITY FRAMEWORK FOR I-PFO

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AILIVING  
I-PERSONAL FINANCIAL ORGANIZER (I-PFO)  
A CYBER SECURITY FRAMEWORK FOR I-PFO

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Dissertation submitted as partial fulfilment of the  
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## DECLARATION

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The Challenges in Designing an Integrated Web Application for  
Multiple Online Banking

## ABSTRAK

Disertasi ini merupakan satu usaha perancangan perniagaan oleh AiLiving bagi memasarkan I-PFO (I-Personal Financial Organizer); yakni satu penggunaan integrasi web untuk perbankan peribadi secara atas talian yang membolehkan pengguna menguruskan beberapa tanggungan kewangan dalam satu laman web. I-PFO juga menyediakan sistem penjejakan tarikh tamat tempoh dan peringatan serta memudahkan penggunaan melalui pengurusan web secara intuisi dan reka bentuk yang diperibadikan. Cabaran utama sistem sedemikian ialah ciri-ciri keselamatannya. Oleh itu, tujuan utama disertasi ini ialah untuk mengenal pasti ancaman umum keselamatan dan meneliti sebarang penyelesaian keselamatan web yang ada. Tajuk disertasi ini ialah “Satu Rangka Kerja Keselamatan Siber untuk I-PFO”. Sistem perbankan atas talian yang sedia ada memerlukan pengguna untuk mendaftar masuk ke dalam beberapa laman web untuk memeriksa jumlah tunggakan yang tersenarai sebelum mereka boleh memulakan transaksi. Kemudahan untuk membayar beberapa bil/pinjaman dengan hanya mendaftar masuk sekali sahaja akan memberikan lebih keselesaan dan menjimatkan masa para pengguna. Namun, sistem integrasi yang memberikan keselesaan kepada pengguna ini sememangnya akan mempunyai risiko keselamatannya yang tersendiri. Disertasi ini mengenal pasti potensi jenis-jenis ancaman siber dan titik serangannya, cabaran-cabaran dalam reka bentuk penggunaan integrasi berasaskan web yang selamat dan akhirnya, satu usulan yang menyeluruh berkenaan rangka kerja keselamatan siber untuk I-PFO. Metodologi yang digunakan ialah “Penalaran dalam Proses Reka Bentuk” di mana kajian meliputi 5 fasa utama: kesedaran, cadangan, pembangunan, penilaian, dan kesimpulan. Adalah penting untuk mengenal pasti titik-titik kelemahan suatu sistem

di mana serangan biasanya berlaku untuk mengukuhkan sistem keselamatan dalam e-dagang. Berbekalkan pengetahuan ini, satu “model ancaman” digunakan sebagai asas dalam pembangunan rangka kerja keselamatan untuk I-PFO. Akhirnya, satu rangka keselamatan siber pelbagai aras untuk I-PFO disarankan: - SOAP-DSIG dan SSL untuk penyarian data, 3-faktor-pengesahan, halaman pengesahan dengan sijil SSL, perkhidmatan pengesanan penipuan, firewall server, dan didikan pengguna. Dalam fasa pertama, AiLiving merancang untuk menjadi rakan kongsi bersama dengan CIMB. Dengan pengaruh CIMB, AiLiving akan bekerjasama dengan syarikat perkhidmatan dan utiliti yang lain. Program pemasaran secara khusus yang akan digunakan oleh AiLiving ialah ikatan bersama di mana akaun I-PFO akan disediakan secara percuma kepada para pengguna akhir. Sebanyak 93% daripada aliran pendapatan adalah daripada rakan kongsi bersama, ikatan bersama, transaksi e-dagang, dan iklan atas talian.

## ABSTRACT

This dissertation is a business plan by AiLiving to market I-PFO (I-Personal Financial Organizer); an integrated web application for personalized online banking, allows users to manage multiple financial commitments in a single website. I-PFO also provides due dates tracking and reminders, and ease of use through the web's intuitive organization and personalization design. The main challenge of such system is security. Therefore, the purpose of this dissertation is to identify common web security threats and explore web security solutions. The title of this dissertation is called "A Cyber Security Framework for I-PFO". Current on-line banking system requires users to log in to several websites to check amounts due before they can remit transactions. Paying multiples bills/loans in a single login would provide greater convenience and efficiency of time. An integrated system that provides conveniences to users will come with a risk to security. This dissertation identifies potential types of cyber threats and points of attacks, challenges in designing a secure integrated web based application for I-PFO, and finally a comprehensive proposal of a cyber security framework for I-PFO. The methodology that is adopted is "Reasoning in the Design Process" where the research goes through 5 primary phases: awareness, suggestion, development, evaluation, and conclusion. It is important to identify the vulnerable points of a system where attacks commonly occur to reinforce security system in e-commerce. With this knowledge, a threat model is utilized as a base in the development of security framework. Finally, a multi-tier cyber security framework for I-PFO is recommended: - SOAP-DSIG and SSL for data extraction, 3-factor-authentication, site authentication with SSL certificate, fraud detection service, server firewall, and user education. AiLiving

plans to co-partner with CIMB for the first phase, and leverage against CIMB to collaborate with other services and utilities companies. The specific marketing program that will be adopted by AiLiving is co-bundle, and I-PFO account will be provided free to end-users. A total of 93% of the revenue streams will come from co-partnership, co-bundle, e-commerce transaction, and online advertisement.



## **CHAPTER 1.0 EXECUTIVE SUMMARY**

AiLiving is introducing a new product called, I-Personal Financial Organizer (I-PFO), a new online service that combines the successful trends of financial e-commerce to provide users with a ONE-STOP-SOLUTION for organizing, monitoring, planning, checking, and settling monthly financial commitments anytime and anywhere.

I-PFO targets existing online users which is 60% out of the whole Malaysia population (Internet World Statistics, 2009). This percentage consists of a total 16.9 million people out of 28.3 million total population of Malaysia (Department of Statistic, 2009).

I-PFO is a web-based tool that allows users to easily organize their personal financial information anytime and anywhere in the world. It is an integrated ONE-STOP-SOLUTION tool that enables users to personalize their own financial commitments, settle their dues monthly with drag and drop features, simplified steps, tracks due dates and alert user. With all the advantages offered, this tool could emerge to be the future sought after technology in the market through network effect.

Overall, this product is meant to offer customers convenience, mobility, ease-of-use, innovative features, affordable price, anytime, and anywhere. Current on line banking system only allows payment to be transferred to various financial institutions, but, there is no updated amount due published to user in one single interface. Hence, user needs to log in to several websites to check the amounts due before they could settle the dues monthly. Paying multiples bills/loans in a single login would provide greater convenience. Thus, I-PFO allows user to settle their multiples financial commitments in a single website. The uniqueness about I-PFO is

that it provides an integrated platform with one interface, designed with simple steps of settling bills of various types of accounts, allow users to personalize their page, and the ability to manage with one user login.

First, I-PFO is targeting at the 60% of existing online users. In terms of revenue streams, I-PFO would generate the majority of its revenue from e-commerce transaction charges (80%) and online advertisement (13%), please refer Chapter 2.0, 5.0 and 6.0 for details. The rest would come from licensing, yearly/monthly subscriptions, online affiliate programs, and business model replication.

In terms of business model, the company is looking at co-partnership with CIMB bank. With this partnership, AiLiving would leverage against CIMB to collaborate with all existing online network customers of CIMB, for example, Maxis, Astro, Digi, PBA, TNB, etc. Besides, this product has been presented and introduced to the assistant branch manager of CIMB to gauge the feedback and we achieved positive response from him. So, it is indeed a good start.

AiLiving requires a total startup fund of RM150, 000. Firstly, the fund will be utilized on product development, mainly on recruitment of system developers. Secondly, a portion of the funds will finance company operations, e.g. purchasing servers and software licenses for product development and maintenance. In the initial phase, AiLiving projects to break-even in the first year (December) as the product takes its time to create public awareness and build market share. As the product enters introductory phase in the first year, AiLiving will undergo marketing strategies efforts like online and media advertising to create awareness. At the same time, the product will continuously improve and enhance through customer feedback and product design reviews.

In the second year, the sales are projected to gradually increase by 30%, and consequently 55% in the third year. On the fourth year onwards, AiLiving plans to penetrate neighborhood countries to expand globally. The following table shows the projected sales and profits of AiLiving for the first three years of operation.

Along with the company growth of 30% and 55% from sales projection of RM632k (Year 1); RM826K (Year 2); RM1.27M (Year 3); AiLiving also anticipates that Net Profit will grow proportionately with Gross Sales from RM64K (Year 1) to RM82K (Year 2) and a further increase of 350% to RM371K (Year 3). The staggering jump of Net Profit from second year of operations to its third is primarily contributed by expanding sales as the product moves into growth stage of the life cycle. A further analysis show that net profit constitutes 10% of gross sales for the first and second year, with a further increase to 30% in the third year of operations – a positive sign for a growing company that successfully manages to contain its expenses while at the same time, expand sales and revenue.

The challenges of such system are security, value proposition to attract collaboration from banks and user acceptance. All of the challenges will be addressed in this dissertation. However, the concentration will be on security solutions for I-PFO. Thus, the research title is ‘A Cyber Security Framework for I-PFO’.

## **CHAPTER 2.0**

### **INTRODUCTION TO THE COMPANY**

#### **2.1 Company Background**

This company's name is AiLiving. "Ai" stands for Love in Mandarin, and literary it means "Love Living". It means providing an environment of improve living and lifestyle. The founder of this company is Annie Ng. Further details of her background will be explained in Chapter 3.1 Management Team.

AiLiving's mission is utilizing technology to create a better living condition. AiLiving's vision is to optimize web-based technology through creative and innovative ideas to offer products and services in improving lifestyle. AiLiving's business would coincide with the company's theme of "Sustainable Tomorrow".

The group of management team is formed by personnel carefully selected for their experiences, passion and creativity. Therefore, with the collaboration of various expertise and background, AiLiving is working towards the success of common objectives and goals.

#### **2.2 Business Intent**

##### **2.2.1 Product and Services Offered**

AiLiving is involved in projects which would create solutions that provide the environment of improving lifestyle and living, which aligns with the company's mission and vision. Every product and service by AiLiving would be designed for compatibility with any technology, easy to be enhanced and used, and possible to be enjoyed by both the retirees, students, working-adults, and disadvantaged population.

The projects currently in the company's pipeline are I-Personal Financial Organizer (I-PFO) and Ai-Home.

However, I-Personal Financial Organizer (I-PFO) will be the first launch, a new online service that combines with the successful trends of financial to provide users a ONE-STOP-SOLUTION for organizing, monitoring, planning, checking, and settling monthly financial commitments anytime and anywhere. Further details about I-PFO will be explained in Chapter 4.0 Product and Service Development.

### **2.2.2 Market Needs**

I-Personal Financial Organizer (I-PFO) will help to avoid the hassle of being physically present at long queues in the post offices, banks, utility payment centers (TM, TNB) etc. This would save people's time and utilize it for other more beneficial activities. In addition, people who practices online banking, the simple steps of settling bills/loans will surely save their time instead of toggling and navigating a few websites before they could finally pay their bills. Moreover, I-PFO eliminates the hassle of having to memorize different login names and passwords for each bank or web accounts.

Through an interview conducted with the USM CIMB assistant branch manager, Mohd. Zaki bin Ayob, he commented that the personalization feature is a good idea. This will prevent accidental transferring of money to other people's account while paying bills/loans. He also commented that the simple steps and drag & drop feature will attract more customers to use the service, especially the older generation who are usually not so IT savvy, would greatly benefit from the conveniences. According to Mr. Zaki again, the rate of online banking users is not up to their expectation due to the concern of security and process complexity involving

multiple steps. Thus, he said, with the conveniences and security brought by I-PFO, perhaps this may convince more people to sign-up to online banking. With the survey and interview conducted directly with our target partners, he has shown positive interest especially in the feature of personalization.

Mr. Zaki has signed the acknowledgement statement to prove that AiLiving has shared the idea with him and he sees potential in this product and would be interested to explore further. The acknowledgment statement is attached in this report. However, with one person's opinion may not represent the overall population. In this dissertation, the concentration is on improving the product and makes it viable in the market. The interview session is the complement to this research to gauge users' feedback on the product. However, it has re-affirmed the market needs and feasibility of this product. The security solution, benefits and customers values will be addressed in Chapter 4.0.

### **2.2.3 Degree of Innovation**

Below is the list of innovation features found in I-PFO. Please refer Figure 4.40, which shows the example of an innovation personalized finances page.

1. **One-stop-solution:** Integrated application management enable consumers to manage their multiple online accounts in one-stop-solution interface easily.
2. **Personalization:** Customers are able to personalize their own page, configure their own online financial and services account in one page.
3. **Drag & Drop feature:** I-PFO interface is user-friendly, simple, and easy to use. It allows users to manage and navigate through graphical interface by 'drag & drop' the icons.

4. **Due dates tracking:** I-PFO would track payment due dates and will prompt user X days before the due dates.

#### **2.2.4 Feasibility and Profitability**

AiLiving Corp continuously improves on the business plan, research solutions, and product features through feedback and comments from various parties. This idea has been presented in business plan competition, technopreneur talk and review forum by MDEC and to the USM lectures and panels. Online survey has also been conducted to gauge end user's feedback over this product with a positive 94% of majority saying 'yes' to this product. Moreover, CIMB branch assistant manager, Mr. Zaki has shown positive feedback to this product during a survey and interview session with him on 8<sup>th</sup>, March, 2010. With the positive feedback and recommendation from Mr.Zaki, AiLiving hopes to be able to get approval for co-partnership with CIMB to enhance and build I-PFO concept in the existing CIMB clicks online website. The I-PFO profitability and value proposition is written in more detail in Chapter 2.5 revenue model.

### **2.3 Growth Strategies**

AiLiving Corporation operates along with the company's theme of 'Sustainable Tommorrow'. AiLiving will continue to participate in seminars like WCIT (World Conference of Information Technology), SMIDEX (Small and Medium Size Industries Expo and Convention) and others to ensure that the company always stay abreast with the fast pace growing ICT (Information and Communication Technology Industry). AiLiving Corporation plans to maximize the

project's value and penetrate into the global market strategically through co-partnership, after the company stabilizes in the next 3 years.

For every product that is produced by AiLiving, the company would review, revise, improve and upgrade the product every 2 years plus as to ensure that the product stay competitive in the market. The company would continue to research and develop new products in the coming years.

In the first phase of the company growth, AiLiving plans to approach and pitch the product to CIMB headquarters. AiLiving plans to leverage CIMB as the company's primary partner to obtain confidence and collaborations from other services institutions such as PBA, Digi, Maxis, etc. to foster growth in the initial phase. This collaboration will benefit the service institutions in the long run through reducing resources because I-PFO will help them to do data consolidation electronically. AiLiving's second phase growth would be positioning towards the disadvantaged population such as the visually and/or hearing impaired and the handicapped.

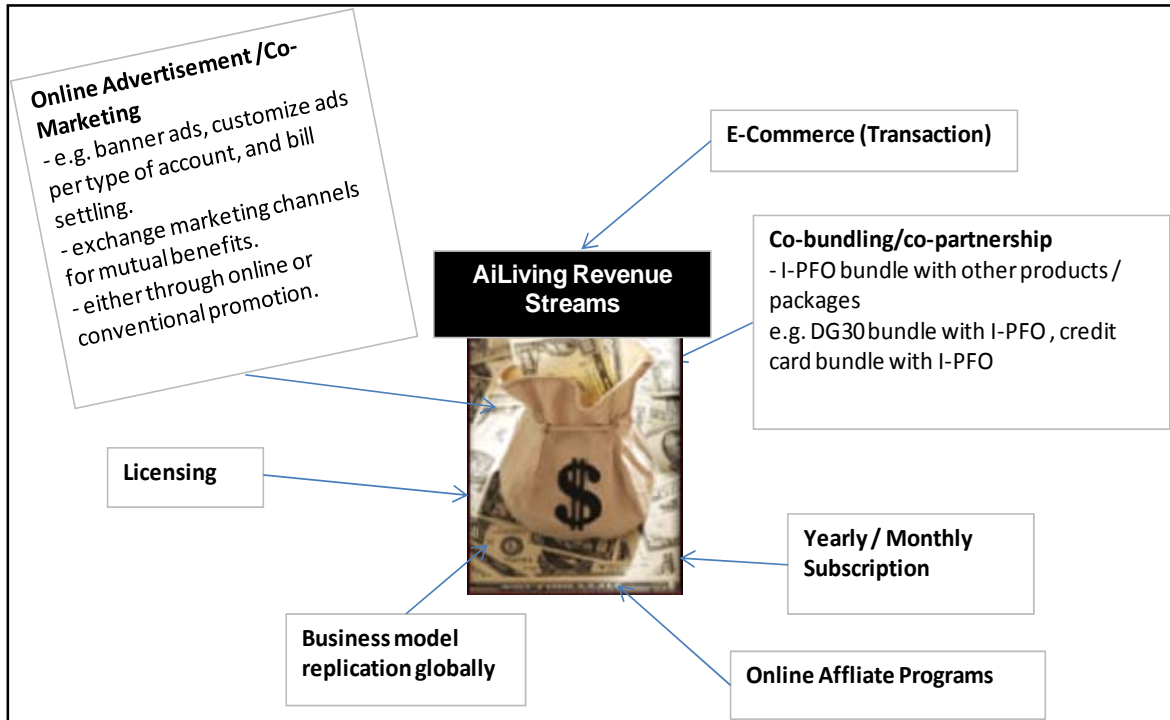
### **2.3.1 Financial Strategies**

AiLiving hopes to acquire the funding from venture capitalist or angel capitalists via capital injection in exchange of equity or dividend returns. Overall, AiLiving is seeking a total of RM150,000 as a start up fund. Alternatively, AiLiving will also apply for Cradle Investment Program to finance the startup cost. For further details, may refer to Chapter 6.0.

However, as a start, AiLiving will use minimum cost start up strategy. AiLiving will utilize SOHO concept such as home, MSN, skype, and email as its base of operations. The management directors would assume the tasks of



management staff. Only 2-3 technical staff would be hired during the first 3 years and will expect a reasonably competitive salary. Overall, AiLiving would generate revenue from multiple sources. Figure 2.1 shows the revenue streams of AiLiving.



**Figure 2.1 AiLiving Revenue Streams**

The online advertisement, co-partnership/co-bundle, licensing, and yearly/monthly subscription will be contributed by AiLiving's business partners such as the banking (e.g. CIMB, Maybank), services (e.g. ING, Tokyo Marine, Maxis), government (e.g. PBA) and utilities (e.g. Telekom) sectors.

### **2.3.2 Technology and Product Development Strategies**

The prototype and overall model of I-PFO is currently being developed by 2 developers from USM undergraduate programs. Both of them have high technical proficiency to fulfill the basic model of I-PFO. The end result that is expected from both of them is a system simulation and the concept of I-PFO. The tools that they are using are PHP, Flash, and MYSQL.

Once the funding is acquired, AiLiving Corporation plans to outsource the product development to a team of specialized software developers. Thus, the model of the system simulation developed by the two undergraduates would be used as the reference to the outsourced developers. The internal IT team will continuously improve its technology and product development through research and development.

AiLiving Corporation will allocate 10% of the company's revenue every month for Research & Development of technologies, framework, infrastructure, innovation, creativity, and human capital (i.e. training). Through time, AiLiving will engage users to co-design the products to ensure that the products fulfill customers' needs.

### **2.3.3 Marketing Strategies: Increase Wallet Share**

AiLiving's market strategies are continuously improving people's living by optimizing technologies. The convenience of customers is our main priority. Thus, AiLiving will maintain the integrated marketing communication with our customers. AiLiving will fully utilize the internet to market the products' update and lock-in our customer, for example, to get customers feedback in the online communities and social networking site. AiLiving Corporation will engage customer to co-design the product. The objective is to get customers' involvement in the development process

and to create a unique online experience, called “experience branding”. Hence, AiLiving Corporation will ensure that the product will bring purpose and value to customers at all times.

## 2.4 Target Markets

The target market of I-PFO is categorized into internet users (60%) and non-internet users (40%). The 60% internet users consist of 16.9 million people out of 28.3 million total population of Malaysia (Internet World Statistical Report, update 2009). Further details about marketing strategies are explained in Chapter 5.0.

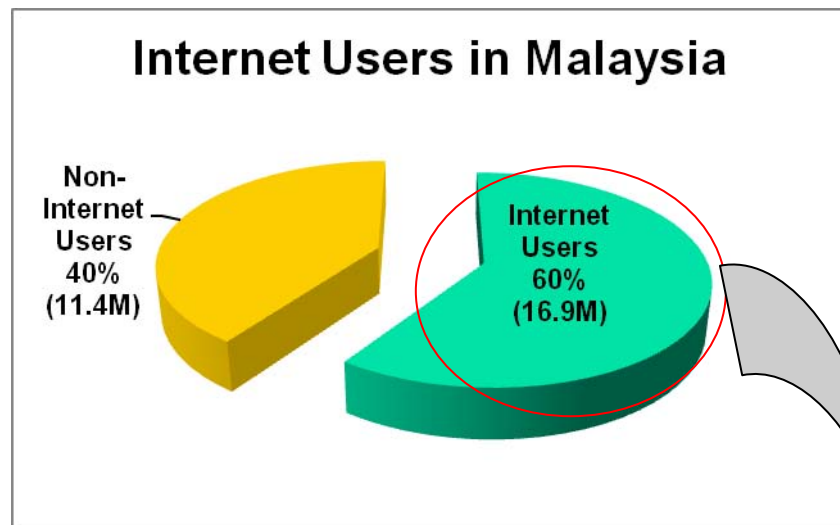


Figure 2.2 Internet users in Malaysia

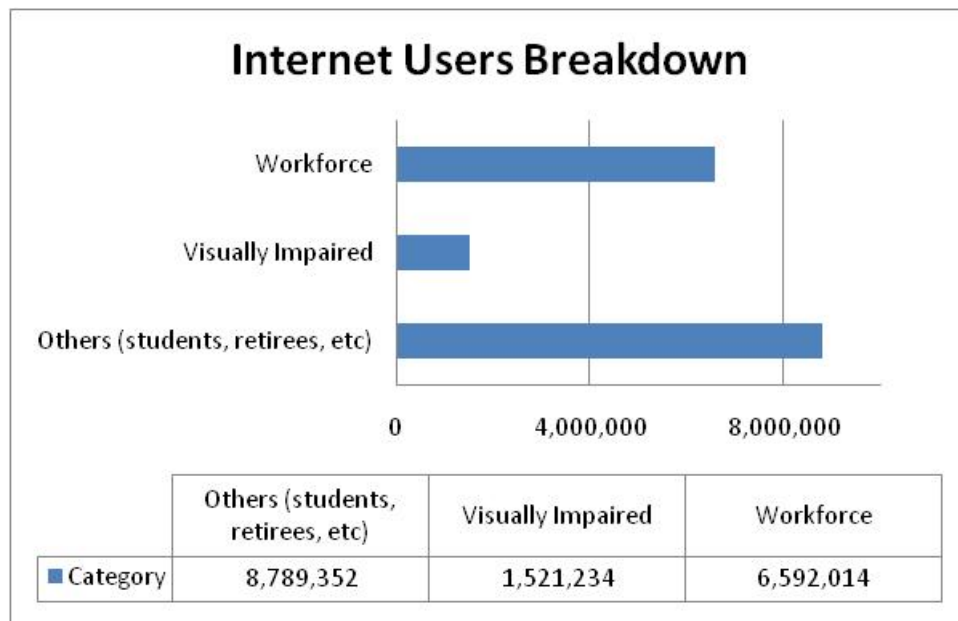


Figure 2.3 Breakdown of Internet Users

Figure 2.3 shows the internet users breakdown. I-PFO first target market segment would be the workforce internet users, which consists of approximately 6.6

million people. This is followed by others category who are mainly students, retirees, etc., which consists approximately 8.8 million people. Visually impaired which consists of approximately 1.5 million people would be I-PFO last target market segment. The product, one of AiLiving's future expansions, will be positioning towards them once the product is ready.

## **2.5 Business Model**

The business model that I-PFO employs is co-bundling and co-partnership. Co-bundling or product bundling is the marketing strategy that involves offering several products/services for sale as one combined product. With I-PFO, co-bundling of both banking and integrated payment services can only be achieved through co-partnership, which is a business alliance formed with another firm to jointly offer the service.

This model allows partnering companies to work together on their greatest competitive advantage to provide a win-win situation for the partnership. For example, this model is used effectively between Maxis and Apple to market the wireless communication services and iPhone product. Similarly, AiLiving will be partnering with CIMB to design, develop and market the I-PFO product along with CIMBClicks online banking services.

### 2.5.1 Revenue Streams

For the start up, I-PFO will co-partner and co-bundle with other companies. Therefore, majority of the revenue streams are generated through co-partnership. Figure 2.4 shows the revenue streams of I-PFO. The major portion of the revenue streams will come from Co-partnership/co-bundle, e-commerce transaction, and online advertisement. These 3 revenue streams will produce approximately 93% of the overall revenue from I-PFO.

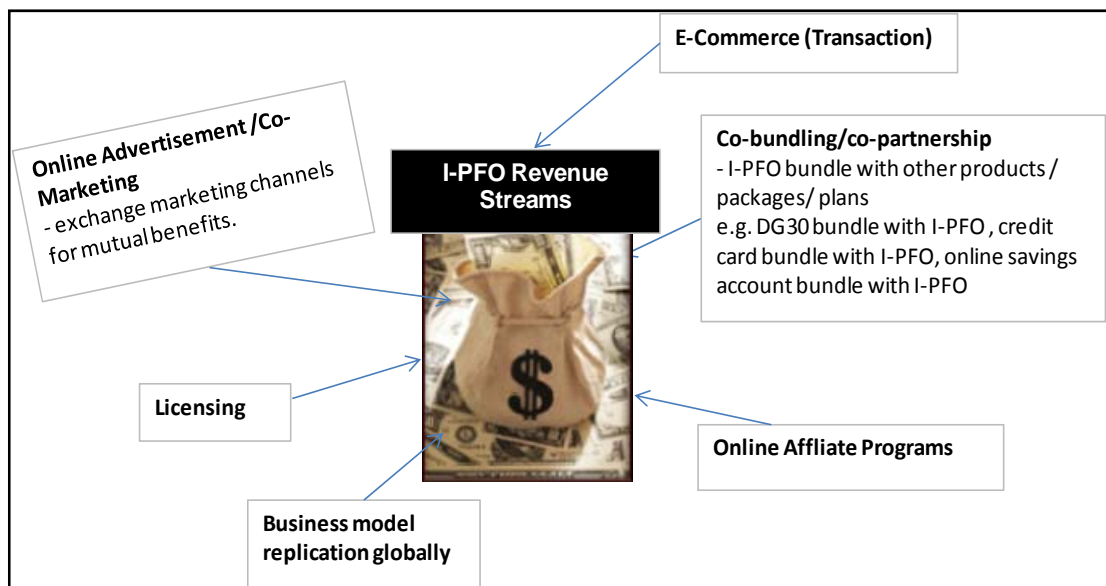


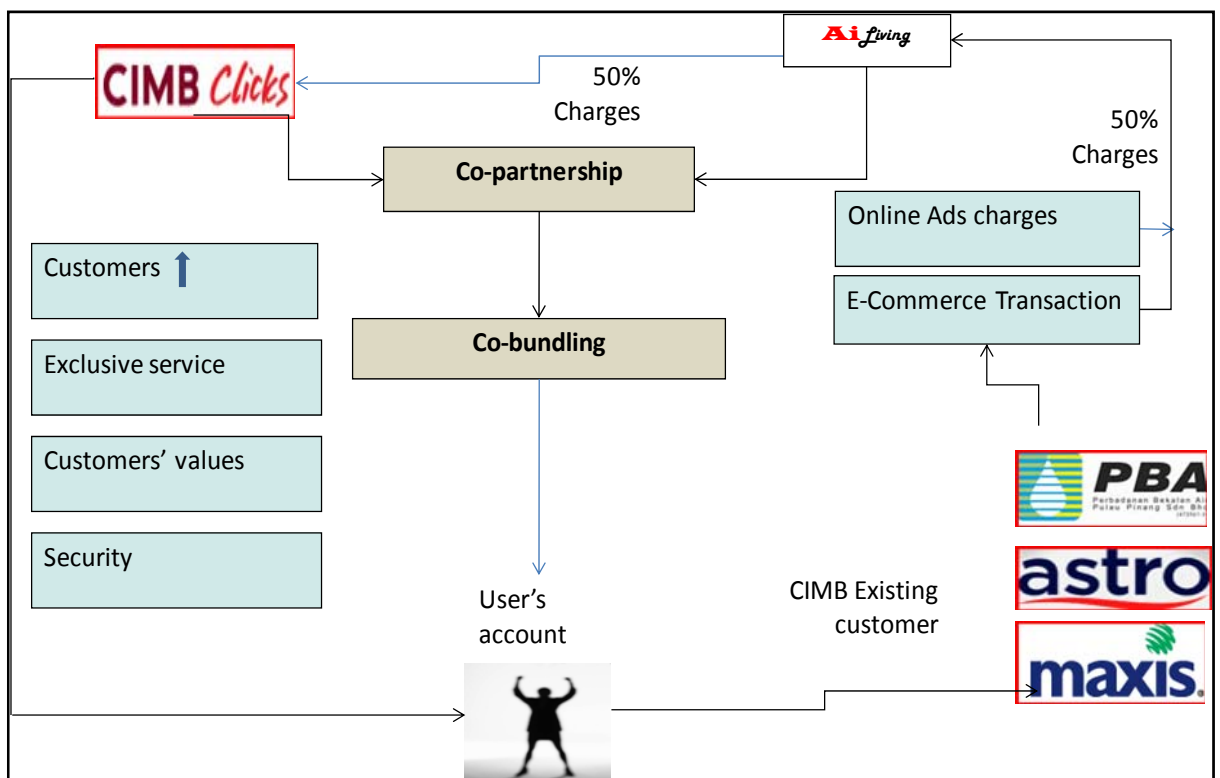
Figure 2.4 I-PFO Revenue Streams

### 2.5.2 Value Proposition

AiLiving conducted a survey and interview with Mr. Mohd. Zaki, CIMB assistant branch manager in USM on the 8<sup>th</sup> March, 2010, at 10am. The objective of this interview and survey was to gauge CIMB opinion about the product of I-PFO. The good news is CIMB gave positive feedbacks on the product. Mr.Zaki's recommended that the idea of I-PFO be implemented inside the existing CIMB clicks website to attract more customers to sign up for online banking, given that I-PFO

provides convenience, simplified steps, personalization, and tracking of bills' due dates. Besides, the infrastructure and servers would be resided in CIMB to minimize potential online threats.

Thus, with all the opinions from CIMB assistant branch manager, the value proposition is revised and proposed as below. Figure 2.5 shows value proposition between CIMB, AiLiving and other institutions.



**Figure 2.5 Value Proposition**

CIMB and AiLiving will co-partner to enhance the existing CIMB clicks website. The concept of I-PFO would be implemented inside CIMB clicks. The idea of I-PFO is introduced FREE OF CHARGE to CIMB. Upon commencement of this project, AiLiving would share 50% of the online transaction fees and online ads charges. The value proposition for each party is as follows:

- **CIMB**

1. Free concept of I-PFO from AiLiving
2. Exclusive consultation services from AiLiving
3. Bring values to end customers, with all the features that I-PFO provides
4. Addition security features in the system (as proposed in the research)
5. Attract more customers to sign up for online banking with all the conveniences I-PFO provides
6. 50% Third party online ads charges

- **AiLiving**

1. 50% share from e-commerce transaction
2. 50% share from online ads charges to third party

- **Other Institutions (CIMB existing customers)**

1. Electronic data consolidation





**Figure 2.6 Co-bundle**

Figure 2.6 shows the co-bundle model, any CIMB online customers may have the option whether to use I-PFO or not. Every CIMB online customers will be given free account to I-PFO, however, choice is given to customer whether to take it or not, else they may still use the existing CIMB clicks. Meaning that, I-PFO features will only be included in the end customer's profile if they choose to use it.

The partnership contract will be reviewed every 3 years. As for the intellectual property protection, the product concept and business model will be filed under the lawful copyright of AiLiving. For more details about market and monetization charges model, please refer chapter 5.0.

## **2.6 Operational Setup**

AiLiving Corporation will start up with 6 key positions, namely: One Chief Executive Officer (CEO), One Chief Technology Officers (CTO), One Chief Marketing Officer (CMO), One Chief Operation Officer (COO), Two Technical Developer, and One Consultant.

The first product that will be launched is I-PFO. This product idea comes from the CEO. The prototype development, security research, and overall business plan studies are assisted by the CMO, CTO, and COO. The I-PFO system model is developed by two technical developers from USM. The consultant provides guidance and advice of the overall project.

Eventually, once funding is secured, AiLiving Corporation plans to inject additional capital to hire technical expertise such as developers in specific specializations, such as in Asp.net and server programming. Besides, AiLiving Corporation will setup a basic physical office with work necessities like servers, computers, and office equipment.

## **2.7 Long Term Goals of Company**

AiLiving Corporation plans to expand the market from Malaysia to South East Asia such as Singapore, Thailand, Indonesia, Philippines, and Vietnam in the next 3 years. This would be done either through self-start-ups or establishing partnerships and strategic alliances with local firms.

Besides, AiLiving Corporation would enhance the product to include more features. One of the major focuses would be on functions of in the system that may help the disadvantage population especially the visually impaired. At the same time,

our firm would also develop other AiLiving's products. Within the next 3 years, our company would secure more funds for potential partnerships and joint ventures.

## **2.8 Market & Competitors Information**

The primary factors that strongly influence the business are described as below:-

### **2.8.1 Technology**

The ever changing phases of technology is a mixed blessing to IPFO as new discoveries will continue to enhance the developments of new technology especially on .Net Windows and server architecture, while on the downside will be a constant need to keep the firm updates on others latest technology to keep up with the technology trend. For example, the growth of mobile Internet demands for a different type of e-commerce technology that requires banks, government and private sectors to update and upgrade their systems for mobile transactions management.

AiLiving's primary product, I-PFO, is developed based on PHP Windows architecture for its user design and server specifications. For data management, SQL database management protocols are employed.

### **2.8.2 Society**

Changes in consumer needs, trends and online behaviors' will be determining factors on the success and failure of most website services. With this realization, AiLiving must strive to keep up with trends to meet customers' needs and wants. For example, the demise of once popular social networking pioneer Friendster failed to sustain its growth and eventually become unpopular was due to the lack of effort to understand the needs of youths and teenagers ever changing needs.

### **2.8.3 Economic**

With the internet becoming more and more of a free or affordable commodity to users, the Internet is becoming easily accessible in majority parts of the world. The lower cost of Internet facilities across the globe as well as mega educational programs (e.g. One Laptop Per Child by Nicholas Negroponte – [www.laptop.org](http://www.laptop.org)) helped accelerate the growth and expand the outreach of Internet to third world countries. With Internet becoming easily accessible worldwide, this will help spur growth in e-business transactions to meet global needs. I-PFO can boast of global accessibility as long as an Internet connection is available for its users to access to their information.

### **2.8.4 Government**

There are initiatives from government to encourage the use of the Internet through education, subsidies, internet laws, and even subsidies to build Internet facilities (i.e. Penang's WIMAX project). Government encouraging efforts to promote the use of Internet (e.g. LHDN's e-Filing campaign) has helped create awareness and create demand for more e-business transactions. As government sites become Internet-accessible, this will help set an example to businesses and consumers to utilize the Internet as an alternate medium for managing transactions.

Table 2.1 is a competitor analysis matrix that analyzes I-PFO’s potential competitors through key aspects of Strengths, Weaknesses, Sales Volume, Revenue, Growth, Market Share, Product Lines, Customer Support, Target Groups, and Distribution Lines. The matrix is important to analyze what are the superior and/or inferior aspects of competitors’ products that may consequently be viewed as threats or opportunities for I-PFO.

**Table 2.1 Market and Competitors Information**

	<b>Bank websites (e.g. CIMB Clicks, Maybank2u)</b>	<b>Government websites (e.g. MyEG)</b>	<b>Private Sector</b>
<b>Strengths</b>	<ul style="list-style-type: none"> <li>Established reputation</li> <li>Strong consumer confidence</li> </ul>	<ul style="list-style-type: none"> <li>Vast resources available</li> <li>Easily available</li> </ul>	<ul style="list-style-type: none"> <li>Strong technology expertise</li> <li>Easily available</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>Limited to consumers from the same bank</li> </ul>	<ul style="list-style-type: none"> <li>Technology unstable/unreliable</li> </ul>	<ul style="list-style-type: none"> <li>Expensive</li> </ul>
<b>Sales Volume</b>	<ul style="list-style-type: none"> <li>&lt;Based on customer population&gt;</li> </ul>	<ul style="list-style-type: none"> <li>Practically unlimited</li> </ul>	<ul style="list-style-type: none"> <li>Only for those with subscribed services</li> </ul>
<b>Revenue</b>	<ul style="list-style-type: none"> <li>No advertising income received</li> </ul>	<ul style="list-style-type: none"> <li>Commission from payment services</li> </ul>	<ul style="list-style-type: none"> <li>Limited advertising revenue</li> </ul>
<b>Growth</b>	<ul style="list-style-type: none"> <li>Competitive growth challenges (All banks offer similar services)</li> </ul>	<ul style="list-style-type: none"> <li>Practically unlimited</li> </ul>	<ul style="list-style-type: none"> <li>Current expanding (Astro, Mobile Phone companies, privatized firms)</li> </ul>
<b>Market Share</b>	<ul style="list-style-type: none"> <li>Vast (any customers with account holder status may access)</li> </ul>	<ul style="list-style-type: none"> <li>Practically unlimited</li> </ul>	<ul style="list-style-type: none"> <li>Dominant market share on certain industries (satellite tv services)</li> </ul>
<b>Product Lines</b>	<ul style="list-style-type: none"> <li>Various</li> </ul>	<ul style="list-style-type: none"> <li>Limited</li> </ul>	<ul style="list-style-type: none"> <li>Limited to subscribed services</li> </ul>
<b>Customer Support</b>	<ul style="list-style-type: none"> <li>24-hours service</li> </ul>	<ul style="list-style-type: none"> <li>Limited – Normal working hours</li> </ul>	<ul style="list-style-type: none"> <li>Mixed – depending on services</li> </ul>
<b>Target Groups</b>	<ul style="list-style-type: none"> <li>Working adults – Retirees/Senior Citizens (need for payment services)</li> </ul>	<ul style="list-style-type: none"> <li>Working adults – Retirees/Senior Citizens (need for payment services)</li> </ul>	<ul style="list-style-type: none"> <li>Working adults – Retirees/Senior Citizens (need for payment services)</li> </ul>
<b>Distribution Lines</b>	<ul style="list-style-type: none"> <li>Online, branches</li> </ul>	<ul style="list-style-type: none"> <li>Online, branches</li> </ul>	<ul style="list-style-type: none"> <li>Online, branches</li> </ul>

## 2.9 SWOT Analysis of the Company

Table 2.2 below analyzes the strength, weaknesses, opportunities, and threats of AiLiving.

**Table 2.2 SWOT Analysis of the Company**

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>- <b>Experienced leadership</b> in management and technology development</li> <li>- Small company, <b>less bureaucracies</b></li> <li>- Entre- and techno-preneurship activities are <b>supported by government and community groups</b></li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>- Firm is <b>small, limited capital and human resources</b></li> <li>- Lack support from <b>private and corporate organizations</b></li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>- Labor Market in Malaysia – <b>dominated by IT savvy workforce</b></li> <li>- Company is at growing stage, <b>opportunities to grow globally</b></li> <li>- <b>Partnership</b> opportunities with multinational banking organizations</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>- Firm maybe subjected to <b>take over</b> by bigger organizations.</li> <li>- E-Commerce technologies can be easily replicated (e.g. Facebook vs. Friendster, Google vs. Yahoo!)</li> </ul>

## **CHAPTER 3.0**

### **EMPLOYMENT OF KNOWLEDGE WORKERS**

#### **3.1 Management Team**

The management board of committee consists of 5 key positions, they are the CEO, CTO, CMO, COO, and the special advisor.

##### **3.1.1 Chief Executive Officer (CEO)**

###### **Annie Ng**

Annie is the founder and Chief Executive Officer of AiLiving Corporation. Prior to joining AiLiving Corporation, she was an IT Specialist in Intel Malaysia for 3 years. Later, she joined B Braun Malaysia as System and Business Solution Architect for 3 years. Annie holds a Bachelor Degree in Information Technology from the University Utara Malaysia. She has experiences in managing projects, solution architect for system and business process design specifically on SAP ERP and business intelligent developer. She is currently pursuing her Master in IT Technopreneurship in USM. She would be responsible for the entire business of the company and initiatives to maintain the venture development in order to achieve success.

##### **3.1.2 Chief Technology Officer (CTO)**

###### **Leopoldo Martinez**

Leopoldo is the Chief Technical Officer of AiLiving Corporation. Besides to joining AiLiving Corporation, he is an active contributor for Intel Costa Rica, during his career path at Intel he hold the position of DT (Dedicated trainer) for the production floor during 3 years, then he moved up as IT Specialist providing

first level support for Intel's applications; then he moved to IT MC organization as second level support, gaining high experience on applications implementation and project management; He hold this position for 4 years, during this time he implemented more than 50 projects successfully. Currently Leopoldo is the system engineer for the validation center at Intel Costa Rica, he is in charge of new applications landing and infrastructure coordination. Leopoldo holds a Bachelor Degree in Electronics Engineering from the University ULatina de Costa Rica. He has high experience in managing projects, solution architect for system and business process for manufacturing and engineering solutions. He is currently pursuing his Master degree in Project Management in Technology Projects.

### **3.1.3 Chief Marketing Officer (CMO)**

#### **Benjamin Chong**

Benjamin Chong is the Chief Marketing Officer of AiLiving Corporation. He graduated with a Bachelor of Science (double major in Computer Science and Business Management) from US and currently holds a MBA from Australia. Throughout his 8-year plus career, he has experience in various areas of business development ranging from HR Shared Services, Project Management, HR Business Process Redesign and Solutions, Payroll, H&B, Risk and Controls etc. He has worked in the US for 3 years and now with Intel Malaysia for the last 6 years. With his wide background and experiences in computer science and business management, he will be leading the marketing team.