Chua, Milan January 28, 2013

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ITM189

Ateneo de Manila University Loyola Schools Octopus Cards Application

The problem that this technology is trying to address is the occurrence of transacting costs based on cash and the effect of the inefficiency that it has on students and establishments (long lines, maintaining change in the cashbox for large bills, etc.). Through the use of the octopus cards, the technology simply addresses the issue by introducing a new way of doing payments without the use of cash and the inefficiency that it produces. This makes business transactions much easier from both the students and the businesses’ points of view.

**System**

The whole Octopus Card system is powered by its Clearing House Architecture made possible by components such as cards and readers (discussed below), and its mainframe and service providers. The system uses a frame relay network and is powered by a frame service relay provider.

**Cards and Products**

    The Octopus Cards that are used in Hong Kong were originally manufactured by Sony. These cards are the ones used to replace the need to bring cash all the time. These cards have the capacity to be used for daily living. For example, these cards can be used for public transportation may it be bus or train. They also have the capacity to be used in stores whenever the stores have the system that may allow the transaction.

    These cards also have these qualities:

* Transactions are as fast as 0.3 seconds
* More stable and reliable due to the non-contact transactions
* Environmentally friendly materials were used
* Easily reloadable

**The Universal Reader/Writer Platform (URP)**

    The Octopus URP reader/writers are designed to provide a fast, reliable, cost-effective and convenient payment means for service providers. Different kinds of URP reader/writers have been developed to cater for different operating environments. The URP works by communicating with the RFID chip embedded in an Octopus card, then reading/writing information stored in it.

Characteristics

* A universal reader/writer platform supports ISO/IEC 14443 Type A & B and Sony FeliCa card reader.
* Capable of integrating with existing Octopus devices.
* Capable of integrating with various payment solutions such as parking systems and vending machines.
* Supports LED display, sound and voice messaging to provide a user-friendly payment environment.
* Supports multiple SAM card slots for security and key management.
* Runs on embedded Linux Operating System.

Cost-Benefit Analysis Draft (Octopus Card)

**Cost**

1. Server (SPARC T4-1B Server Module– P30,000)

This will serve as the Octopus Clearing House System. As the Ateneo is smaller compared to Hong Kong in scope, so will a smaller server serve its purpose.

1. Workstation – (P20,000)

A computer workstation will also be needed

1. Octopus Card (Year 1 - 8,000 units on first year to cover all and 2,000 units in succeeding years for covering only freshman and transferees)

Each student will have an octopus card with him or her. The cost will be included in the tuition fee. It will be charged at P300 per student.

1. Add value-machines (4 units x P100,000 per unit) – 400,000

Just like ATM machines, add-value machines (for top up) will be strategically displaced. One unit of add-value machine for each of the following buildings: Xavier, Rizal Library, LS Bookstore, and JSEC.

1. Reader/Writer (75 units x P10,500 per unit)

Each retail establishment will need a Universal Reader/Writer(URP) in order for cashless transactions to be enabled. The retail establishments are divided into three categories: photocopy stalls(8 units), printing(3 units), and food stalls(41 units).

1. Data requirements will be based on Frame Relay Service quoted by service providers such as PLDT Brains or PLDT Accasia.

**Benefit**

Economically, the benefit of this project would be the ease of payment and the gradual decrease in transaction cost which would increase the revenue of establishments integrated in the Octopus system. Therefore, the revenues could be derived from these establishments through a sales commission of 0.3% in each establishment.

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| Cost Benefit Analysis | |  |  |  |
|  |  | **Cost(Monthly)** |  |  |
|  | Development | Production |  |  |
| Server | Php2,500.00 |  |  |  |
| Workstation | Php1,666.67 |  |  |  |
| Octopus Card | Php200,000.00 |  |  |  |
| AV Machines | Php33,333.33 |  |  |  |
| Reader/Writer | Php45,500.00 |  |  |  |
| Personnel |  | Php13,500.00 |  |  |
| Project Team | Php40,000.00 |  |  |  |
| Frame Relay | Php141.67 | Php3,000.00 |  |  |
| Maintenance Cost |  | Php4,841.67 |  |  |
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|  |  | **Benefit(Monthly)** | |  |
| **Photocopy stalls** |  |  | **Printing** |  |
| Rizal (2nd floor) | 1 |  | Rizal | 1 |
| Rizal (3rd floor) | 1 |  | Old Rizal | 1 |
| Sec A | 1 |  | CTC | 1 |
| Sec B | 1 |  | *Total units* | 3 |
| SOM | 1 |  |  |  |
| ISO | 1 |  | **Food stalls** |  |
| Kostka | 1 |  | Gonzaga | 25 |
| Old Rizal | 1 |  | JSEC | 15 |
| *Total units* | 8 |  | Bellarmine | 1 |
|  |  |  | *Total units* | 41 |
| **Students** |  |  |  |  |
| *Total* | 8000 |  |  |  |
|  |  |  |  |  |
| **Category** | **Total units per category** | **Estimated Sales** | **Commision Rate** | **Octopus Revenue per month** |
|  |  |  |  |  |
| Photocopy stalls | 8 | PHP 1,248,000.00 | 0.3% | Php3,744.00 |
| Printing | 3 | PHP 390,000.00 | 0.3% | Php1,170.00 |
| Food stalls | 41 | PHP 27,716,000.00 | 0.3% | Php83,148.00 |
| Total Benefit (Monthly) | |  |  | **Php88,062.00** |
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| Development Period | | 8 |  |  |
| Interest rate |  | 0.08 |  |  |
| Projected Changes(Annual) | |  |  |  |
| Production Cost |  | 0.04 |  |  |
| Production Benefit | | 0.06 |  |  |

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| Projected Costs |  |  |  |  |  |  |
|  | Year 0 | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
| Server | 20000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Workstation | 13333.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Octopus Card | 1600000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| AV Machines | 266666.67 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Reader/Writer | 364000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Personnel | 0.00 | 178200.00 | 203860.80 | 233216.76 | 266799.97 | 305219.16 |
| Project Team | 320000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Frame Relay | 1133.33 | 36000.00 | 37440.00 | 38937.60 | 40495.10 | 42114.91 |
| Maintenance Cost | 0.00 | Php58,100.00 | 60424 | 62840.96 | 65354.5984 | 67968.78234 |
|  |  |  |  |  |  |  |
| Annual Costs | 2585133.33 | 272300.00 | 301724.80 | 334995.32 | 372649.67 | 415302.85 |
| NPV of Annual Costs | 2585133.33 | 252129.63 | 258680.38 | 265930.08 | 273908.63 | 282648.14 |
| NPV of Cumulative Costs | 2585133.33 | 2837262.96 | 3095943.35 | 3361873.43 | 3635782.06 | 3918430.21 |
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| Projected Benefits |  |  |  |  |  |  |
|  | Year 0 | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
| Annual Gross | 0 | 1056744.00 | 1120148.64 | 1187357.56 | 1258599.01 | 1334114.95 |
| NPV of Annual Gross | 0 | 978466.67 | 960346.91 | 942562.71 | 925107.85 | 907976.22 |
| NPV of Cumulative Gross | 0 | 978466.67 | 1938813.58 | 2881376.29 | 3806484.14 | 4714460.36 |
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|  |  |  |  |  |  |  |
| Annual Net | (2585133.33) | 784444.00 | 818423.84 | 852362.24 | 885949.34 | 918812.10 |
| NPV of Annual Net | (2393641.98) | 672534.29 | 649691.23 | 676632.63 | 651199.21 | 625328.08 |
| NPV of Cumulative Net | (2393641.98) | (1721107.68) | (1071416.45) | (394783.82) | 256415.39 | 881743.47 |
|  |  |  |  |  |  |  |
| Payback Period | 3.39375876 |  |  |  |  |  |
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