

The Issuer's Business Case

U.S. issuers are moving toward the issuance of contactless chip cards, credit and debit cards with contactless RF chips inside them that establish two-way communication with card readers for authentication rather than merely giving information like magnetic stripe cards. Acceptance of these new cards at the gates and fareboxes of public transit systems will give issuers considerable benefits in terms of a “top-of-wallet” effect leading to more spending and borrowing on the chip card, card distinctiveness in general, and “stickiness”, whereby the card account becomes more difficult for the holder to terminate. We set out to estimate the largest of these effects, the “top-of-wallet” effect, on a mythical issuer with 10% of the market in an imaginary city of 5,000,000 population.

The approach in this model is to estimate the costs and benefits from the complete penetration of the system ridership by smart credit cards and then to multiply that estimate by the penetration percentage of the new cards year by year as use of the new cards becomes widespread.

Step 1 – Transit Market Assumptions

The system information is estimated based on the area's population generating a daily ridership, a daily fare income and thus a total annual fare estimate. Since some of the total fares are paid using credit and debit cards, we can later calculate the size of the interchange system-wide.

Step 2 – Issuer Business Assumptions

The typical issuer is assumed to have 10% of the total regional card market. The number of cardholders gained in a particular year is assumed, as are the number of current cardholders who will switch to the new cards, thus incurring issuance costs.

Step 3 – Issuance Costs

The increased cost of chip cards over normal cards, plus license fees, plus mailing and inventory costs are estimated based on these figures.

Step 4 – Market Data from Issuer

Here we estimate the average monthly spending and debt on normal cards and use this to calculate interchange and interest income.

Step 5 – Market Penetration Assumptions

We assume a slow rollout with card use increasing by 10% annually until remaining stable at 50%. This is very conservative.

Step 6 – Ratio of Cards to Transactions Based on Data from Seoul

The ratio of activated cards to system ridership was taken from the Seoul case, the only *in vitro* experiment in the world to date. We assume that there will be some ratio relationship between system ridership, the number of transactions per day, and the number of cards in the region necessary to generate these transactions.

Step 7 – Top-of-Wallet Assumption

Our last assumption is the size of the “top of wallet” effect, the sum of the current holders' increased interchange plus their increased debt. Debt was assumed to grow proportionally with spending. We chose a very conservative estimate—one-third of the Seoul statistic.

Step 8 – Total System Transit Interchange

Transit interchange less processing and customer service costs are multiplied by total system annual fares and the ratio of cardholders who charge transit fares rather than paying by other means, to yield total system transit interchange. A year-by-year estimate of outstanding cards is calculated, and the transit interchange per outstanding card is then derived.

Step 9 – Proforma Cash Flow to Issuer—Card Data

Here we calculate the number of cards issued and activated each year by our issuer, as well as new cardholders gained and the number of chip cards our issuer must issue to their existing customers who request the new chip cards.

Step 10 – Market Data from Issuer

The next two sections estimate additional issuer income and costs from the chip card enterprise, with a view to calculating net profit and return on income.

Step 11 – Issuer Additional Income

Transit incremental income from existing cardholders is calculated by finding total interchange income from the new cards and then subtracting existing transit interchange income from the current cardholders who switched to the new cards.

Incremental income from new cardholders is the interchange income from new cards plus interest generated from lending to the new holders, including the top-of-wallet effect on their spending and debt.

Finally, the top-of-wallet increase in spending is applied to the current cardholders who requested and switched to using the new chip cards.

Step 12 – Issuer Additional Expense

Expenses here include the increased cost of the new cards less savings from not having to issue magnetic stripe cards to switchers, plus the cost of inventory, mailing and the license fee charged by the patent holder.

Step 13 – Net Additional Income

Subtracting expenses from income yields net income.

Step 14 – Return on Investment by Issuer

Dividing net income by total expenses yields the return on investment year by year. The Net Present Value of the cash flow through year 6 is also calculated.

Findings

The “top of wallet” effect dwarfs the other factors. Next, the incremental income realized from new cardholders is an order of magnitude larger than the total expenses. Finally, in comparison to both of these, the expenses of beginning the system are negligible.

Exclusions

In comparing the magnetic stripe and contactless credit card business factors, this model ignores the following factors:

1. The most obvious exclusion is profits from years after the 6th year.
2. Savings from better fraud prevention and interchange fees earned on chip cards in non-transit uses. This will depend on the distribution of new chip-based POS devices to merchants.
3. Chargebacks resulting from increased activity to existing accounts or from new account activity are assumed to be proportional to current chargebacks.
4. Computer system integration cost is ignored.
5. Administrative costs and overhead of project evaluation and legal costs to initiate the new system, are ignored.

Proforma Issuer Cash Flow

Assumptions

Transit market assumptions

		Notes
Area population	5,000,000	Imaginary area data
Daily ridership as % of population	25%	
Daily ridership	1,250,000	Calculated
Average fare	\$ 1.00	Assumption
Daily fares, thousands	\$ 1,250	Calculated
Annual fares, thousands	\$ 456,250	Calculated

Issuer business assumptions

Issuer's market share of all transit cards	10%		< - Issuer: Fill in your own numbers for blue data.
Percent of current holders who get new cards	60%	Assumption	
Percent of current holders who charge transit	65%	Used for calculating current transit income	
Percent of requests who are new customers	5%	Assumption	
Expected life of normal cards in years	3.00		
Current issuer cardholders in region	500,000	Calculated	
Current rate of increase in holders	5.00%	Annual historical increase in issuer's customers	

Issuance costs

Cost of chip card	\$ 3.00	
Cost of normal card	\$ 0.50	
License fee, annually	\$ 1.26	Smart Systems' license, 10.5 cents / acct / month
Cost of mailing to holder	\$ 2.00	
Card inventory as % of annual issued	25%	

Market data from issuer

Current average interchange fee	1.70%	
Less processing, customer service costs	1.00%	
Net profit on interchange	0.70%	Calculated
Current holders' average spending	\$ 5,000	
Current holders' average debt	\$ 2,750	
Current holders' average interest rate	12.00%	
Issuer's cost of money	3.00%	
Current holders' average interest income	\$ 248	Calculated
Retention rate on renewal	85%	Estimate
Activation rate for transit-ready cards	80%	

< - Seoul experienced an 83.7% activation rate with transit-ready cards.

Market penetration assumptions

	Assumed Penetration	
1st year after installation	10.0%	Extremely slow rollout assumed
2nd year after installation	20.0%	
Year 3	30.0%	
Year 4	40.0%	
Year 5 on	50.0%	

Seoul data

System ridership	13,000,000		< - Actual statistics.
Penetration	48.0%	From 2003; now over 50%	
Transactions per day	6,240,000	From 2003; now over 6.5 million	
Activated cards	30,000,000	Current estimate	
Ratio: cards / transactions	4.81	Calculated	< - This vital statistic is difficult to estimate. We use the Seoul number. Holders will eventually carry multiple cards.
Activation rate in Seoul	83.7%	Experience of BC Card, a major issuer in Seoul	
Increase in spending and debt due to primary card	15%	Seoul issuer experienced 43.6%	< - "Top-of-wallet" effect, assumption

Total System Data

System Transit Interchange

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
Bank profit on Interchange	0.70%	0.70%	0.70%	0.70%	0.70%	0.70%
Total system transit interchange, thousands	\$ 319	\$ 639	\$ 958	\$ 1,278	\$ 1,597	\$ 1,597
System activated cards, in thousands	601	1,202	1,803	2,404	3,005	3,005
System issued cards, in thousands	751	1,502	2,254	3,005	3,756	3,756
Transit interchange income per activated card, annual	\$ 0.53	\$ 0.53	\$ 0.53	\$ 0.53	\$ 0.53	\$ 0.53
Transit interchange income per issued card, annual	\$ 0.43	\$ 0.43	\$ 0.43	\$ 0.43	\$ 0.43	\$ 0.43

Issuer-Specific Data

Proforma Cash Flow to Issuer

Card Data	thousands of cards					
	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
Issuer cards issued that year	75	75	75	139	139	64
Issuer cards issued, cumulative	75	150	225	300	376	376
Issuer cards activated that year	60	60	60	60	60	-
Issuer cards activated, total	60	120	180	240	300	300
Cardholders gained that year	3	3	3	3	3	-
New cardholders, cumulative	3	6	9	12	15	15
Current holders activating new cards that year	57	57	57	57	57	-
Cumulative current holders who switched	57	114	171	228	285	285

	thousands of dollars					
Issuer additional income						
Current and new cardholders						
Transit interchange income	32	64	96	128	160	160
Less current transit income	(12)	(25)	(37)	(50)	(62)	(62)
Plus new holders' retail spending						
New holders' interchange	121	242	363	484	605	605
New holders' interest	855	1,710	2,566	3,421	4,276	4,276
Plus "top-of-wallet" effect on current accounts switched to chip cards						
Switchers' increased interchange	300	599	899	1,199	1,499	1,499
Switchers' increased interest	<u>2,120</u>	<u>4,239</u>	<u>6,359</u>	<u>8,478</u>	<u>10,598</u>	<u>10,598</u>
Total additional income	<u>3,415</u>	<u>6,830</u>	<u>10,245</u>	<u>13,660</u>	<u>17,075</u>	<u>17,075</u>
Issuer additional expense						
Cards	225	225	225	417	417	192
Less cost of normal card to existing holders	(10)	(19)	(29)	(38)	(48)	(48)
Increase in inventory	56	56	56	56	56	-
Mailing to customer	150	150	150	278	278	128
License fee	<u>76</u>	<u>151</u>	<u>227</u>	<u>303</u>	<u>379</u>	<u>379</u>
Total additional expense	<u>498</u>	<u>564</u>	<u>631</u>	<u>1,016</u>	<u>1,082</u>	<u>650</u>
Net additional income	<u>2,917</u>	<u>6,265</u>	<u>9,614</u>	<u>12,644</u>	<u>15,992</u>	<u>16,424</u>
ROI	6.9	12.1	16.2	13.4	15.8	26.3
NPV @ 15% cost of capital	35,876					

Conclusion: Top-of-wallet additional income and new cardholder gains dwarf expenses from issuance by a factor of 30