ATM ToolKit for Emerging Markets

Volume 1

Guide to Developing a Strategic Framework for Implementation and Modernisation of ATM Payment Services

By Barry Fraser Forbes
Payments System Consultant

The ATM Industry Association is an independent, non-profit trade association whose mission is: to promote ATM convenience, growth and usage worldwide; to protect the ATM industry's assets, interests, good name and public trust; and to provide education, best practices, political voice and networking opportunities for member organizations.

April 2009

Copyright Information

Should you be interested in a workshop or consultancy work on the ATM Toolkit, please, e-mail Mike Lee, ATMIA's CEO, at mike@atmia.com

Disclaimer

The ATM Industry Association (ATMIA) publishes this best practice manual in furtherance of its non-profit and tax-exempt purposes to enhance the governance of ATM networks. ATMIA has taken reasonable measures to provide objective information and recommendations to the industry but cannot guarantee the accuracy, completeness, efficacy, timeliness or other aspects of this publication. ATMIA cannot ensure compliance with the laws or regulations of any country and does not represent that the information in this publication is consistent with any particular principles, standards, or guidance of any country or entity. There is no effort or intention to create standards for any business activities. These best practices are intended to be read as recommendations only and the responsibility rests with those wishing to implement them to ensure they do so after their own independent relevant risk assessments and in accordance with their own regulatory frameworks. Further, neither ATMIA nor its officers, directors, members, employees or agents shall be liable for any loss, damage or claim with respect to any activity or practice arising from any reading of this manual; all such liabilities, including direct, special, indirect or inconsequential damages, are expressly disclaimed. Information provided in this publication is "as is" without warranty of any kind, either express or implied, including but not limited to the implied warranties of merchantability, fitness for a particular purpose, or freedom from infringement. The name and marks ATM Industry Association, ATMIA and related trademarks are the property of ATMIA.

Acknowledgements

The ATM Industry Association (ATMIA) would like to express its sincere appreciation to the author, Mr. Barry Forbes, an outstanding payments consultant, for researching and writing the manual, and to Mr. John Hardy, former Chief Executive and founder of the UK's national LINK Interchange Network, for providing editing services *pro bono* to the association and for his moral support of this project. Mr. Forbes and Mr. Hardy are leading international experts in payments systems as well as excellent servants of this industry. Finally, ATMIA would like to thank the Africa Technology Forum for its support and encouragement throughout this lengthy assignment with its many twists and turns.

Contents

Preface

This document addresses the ATM domain as a vertical slice through a total Payment System.

1.1. Scope

An attempt is made to cover the governance, regulation, operation and implementation aspects of a generic ATM Payment Solution. As the various elements of a payment system are often shared between different services (for example, ATM, POS, and so forth) much of the content of this guide appears generic; whilst some defined functions can be used by multiple services, all of it is required for each service and is defined here for ATMs assuming non-ATM services do not yet exist.

The scope of this Guide does not include the details of a National Payment System, nor of its related Settlement systems.

Such an entity and its governance, regulation and supporting infrastructures are adequately covered in other information in the public domain and are the subject of various past and present activities undertaken by national, regional and international bodies.

Neither does it cover the issuance of, and rules and regulations surrounding, payment cards nor their various supporting systems and structures, although cards are acknowledged as the lifeblood of ATMs and need to be exhaustively researched, managed and understood. Either the existence of sufficient numbers of cards, or plans to generate significant numbers of card products, are usually a precursor to planning for a commercially viable ATM service.

1.2. Purpose

The purpose of this ToolKit is to provide a simple model for implementing a complex solution more easily and in a more controlled space, and therefore with a greater chance of success.

It is a combination of points of reference, a framework as a guideline, and the confidence that comes with the knowledge that it is all largely based on what has successfully been done before.

It is aimed at guiding and providing input to any initiatives related to modernizing a country's ATM services, and reducing unnecessary trial and error in the process. It is hoped that by providing the information contained in this ToolKit the path of learning by mistakes may be shortened and eased.

It is not a blueprint for any specific country; it cannot be because the conditions and requirements are so variable. Each country or region or customer looking for a solution must analyse the environment, define their requirements and design a custom solution, keeping in mind the needs for interoperability.

Neither is it meant to be prescriptive in any way, but suggests key aspects that should be considered for the implementation of a successful, sustainable and potentially regionally interoperable ATM services solution.

The main aims are:

- **To provide input to inclusive planning sessions and workshops between stakeholders, in-country or regionally, leading to a living set of information enhanced and enriched over time by the experiences of those involved, and helping those who attempt the task in the future.**
- **To provide a systemic approach for use in implementing or improving ATM services in developing countries. While each project will be different in many ways, it is hoped that having checklists and example processes to hand will encourage a structured programme.**
- **To provide a point of reference to those responsible parties concerned with designing, evaluating and selecting aspects of an ATM services solution; providing alternative views so that a more holistic approach can be taken to decision making.**

1.3. Synopsis

This ToolKit starts from the assumption that ATMs are here to stay as a growing service, supporting both the views of:

- "Cash is still king."
- ATMs play a simultaneous supporting role for cash-replacement products over time.

It proposes an approach that is "governance centric" rather than "switch centric" before a project is initiated, to build the business and technology structures required for an ATM Payment Service. In other words, a top-down approach where it is first established that:

- Sufficient, valid and efficient governance and regulatory structures are in place.
- The socio-economic, political and geographic environment is understood.
- The national requirements are defined, including those related to interoperability and financial inclusion.

Several different business models/architectures are introduced conceptually to emphasize the points:

- That there are alternatives that should be discussed and debated.
- That the solution proposed by a favoured vendor is not the only possibility.
- That different situations require different solutions.

It supports the view that a balance must be struck between innovation and regulation.

The need to follow internationally accepted standards (whether formalized or de facto) is stressed, as is the importance of preparing for interoperability.

It suggests that a Public Private Partnership approach could be suitable for a capital intensive task such as this.

The ToolKit includes a possible governance structure as well as examples of regulations and rules, all of which are meant only as input to the necessary inclusive process that must be established to define a suitable regulatory infrastructure for managing switching and clearing in an ATM payment service for a country (or region).

Finally, it provides some input and a suggested approach to establishing an infrastructure.

1.4. Future Work

There are several topics that require further study and later inclusion into this document. They have been mentioned for completeness but require more effort to give them justice. As a result, given sufficient support, it is the author's intention to produce a second edition of this document containing more detailed work on the following topics (at least):

1. Interchange and Fee Structures; covering the fees paid between various members of an ATM service and related switching services, including surcharges, direct charging, and so forth.
2. The structured inclusion of non-banks into the clearing system.

While this document is a Framework document, and these topics are Operational and Commercial subjects more logically included in Volume 2 of this ATM Guide (see below), they are of sufficiently fundamental nature to be included here in structural form.

The planned future development of this ATM Guide is a longer term effort in the creation of Volume 2 out of a second work phase. This is intended to cover the Operational and Commercial aspects of an ATM service and its associated switches, and so forth. As can be appreciated, these topics are both highly competitive in nature and of an almost infinite variety across the range of socio/economic/political/geographic landscapes that comprise developing countries worldwide. As such, and as stated elsewhere in this document, there is no "one size fits all" solution; therefore, the intention is to create the second document out of a series of case studies, implementation projects and workshop outputs over an extended period.

This is a task of significant proportions that can only be achieved with the cooperative and financial support of participants in the industry.

1.5. Summary of Guiding Questions

- Is sufficient and correct legislation in place?
- Do suitable governance structures exist?
- Do regulations exist that could control ATM related payment streams?
- What business model and architecture do we have or need to have?
- How will the development and operation of the governance structures and operational infrastructure be financed?
- Do we know what is needed and what is available?
- What is the geographical footprint of the ATM service?
- Do we have a vision, strategy and conceptual design for a standardised, interoperable, ATM service?

- Do we have a formal set of plans for development and operation of both the governance structures and the operational infrastructure?
- How do we choose partners and vendors to develop the infrastructure?
- How are we going to implement the infrastructure?
- How are we going to distribute and manage the cash?
- How are we going to educate the people?
- Who is going to maintain the infrastructure?

1.6. Summary of Guiding Processes

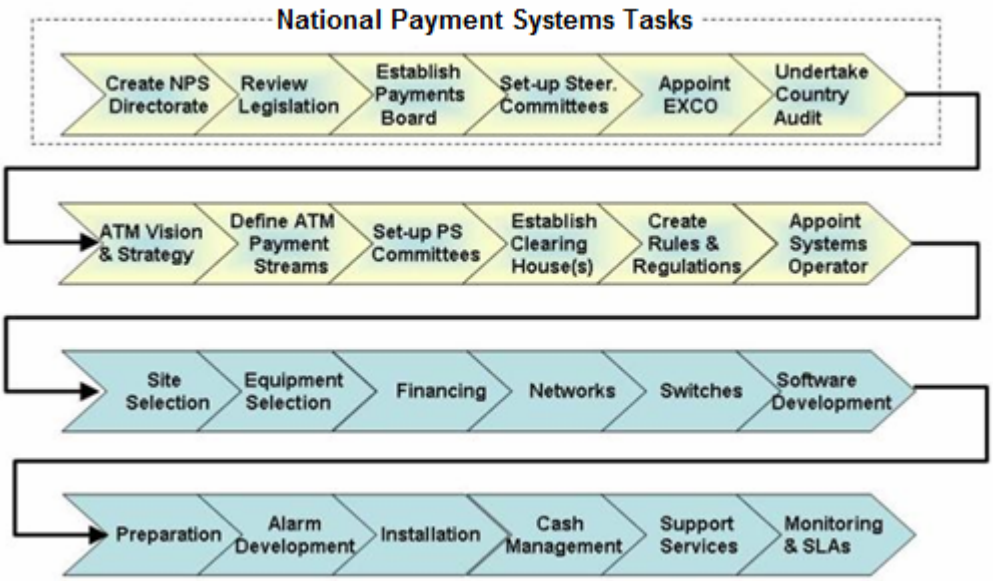

Figure 1. Summary of Guiding Processes diagram

1.7. How to Use This Guide

The ToolKit does not attempt to address all ATM services issues. It should be augmented by other publications and reference material as appropriate for the country or solution required. The contents are often at a conceptual level and the issues raised should be taken as ***checklists and input to debate*** amongst stakeholders.

This ToolKit has been developed in four (4) logical groupings, as described briefly below, each with its own intent. As this is a top-down approach, rather than a serial flow, it is suggested that content queries that may arise in the initial parts of the document may be answered later in the text; the document should thus be read in its entirety.

- **Introductory topics** introduce the topic and position it in terms of its business domain and its complementary services.
- **Business Definition topics** show that there are several different business models that can be used, individually or in combination, in the ATM service domain depending on the needs and environmental circumstances of each case. This has been included to enrich the input into the debates around what approach to take in payments systems improvement, and to contra the singular proprietary solutions sometimes promoted by the vendor lobby.
- **Reference topics** contain the main governance, regulation and operations reference material. The information contained within this section is obviously generic guideline material and will not be suitable in its specific form in every case. It is drawn from best practice implementations and is intended to be used as input to enrich the development of structures and procedures that need to be created individually in every case.
- **How-To-Do-It topics** contain some information on how to best approach the implementation, once a decision has been made on what to do. It is generalized but is intended to illustrate a systematic approach that could be used to implement an ATM programme. The approach will not necessarily be suitable in every case, and is no more than most competent implementation service organizations would use, but it is believed to be useful as input to a control process.

1.8. Definitions

Acronym/Term	Description
ATM	Automated Teller Machine (commonly called a Cash Machine)
B2B	Business to Business. Usually referring to a system that processes transactions between businesses – as opposed to B2C, a normal retail-level system that processes transactions between businesses and consumers
BIN	Bank Identification Number. Used on payment cards to identify the Issuer
BIS	Bank of International Settlement
CECS	Consumer Electronic Clearing System (of Australia)
CPSS	Committee on Payment and Settlement Systems (at BIS)
EFT	Electronic Funds Transfer. Usually payment of third party accounts or transfer of funds between bank accounts
EMV	Europay MasterCard Visa (smart card standards)

Acronym/Term	Description
EXCO	Executive Committee. Usually reporting to a board of directors, in a company, or to a steering committee, in a cooperative venture.
FEP	Front-End Processor. Usually a networking device operating between a main processor and a network of terminals. Switches transactions and manages devices "down stream" of the main processor.
ICPACE	International Committee of Payment Association CEOs
ISO	International Standards Association
ISO	Independent Sales Organisation (or MSP – Member Service Provider) is an outside company (not a MasterCard or Visa member) that is contracted by a member bank to procure new merchant relationships. In the ATM domain an ISO is an independent company deploying ATMs usually contracted to a bank for the purposes of passing the transactions into the local Clearing system.
NPS	National Payment System. Usually refers to the total set of all participants in a country's payment system as governed by the central bank and related legislation.
PIN	Personal Identification Number. Used to identify the person using a debit card in a payment system (ATM, POS, etc)
POS	Point of Sale. The point at which a purchase takes place. Usually refers to a terminal or terminal system used for payment with a bank card.
SLA	Service Level Agreement. Governs the agreement between business and operations relating to the quality of service provided with accompanying metrics, escalation processes and penalties
STIP	Stand-In Processing. A system providing limited authorisation ability in the event that an Issuer's system is unavailable.
ToolKit	Provides a Structure, a Process and the relevant Tools to address issues critical to the successful implementation of a Product or System
socio-political	The combination of Social and Political factors in a country; defines the population and their desires
socio-geographic	The social, cultural and ethnic distribution of a population across the geography of a country
econo-geographic	The economic distribution of a population across the geography of a country
Issuer	The commercial entity issuing a payment card to consumers. It may be a bank, retailer or other large organisation. The card may be internationally branded or not, and may be account based or prepaid.
Acquirer	Usually but not always a bank that accepts or acquires transactions performed using a payment card issued by other organisations, and passes these transactions into a clearing system for ultimate processing by the card issuer.

Acronym/Term	Description
Credit Card	A payment card, normally bank issued, usually internationally branded, used to make an electronic withdrawal from funds on deposit as in purchasing goods or obtaining cash.
Debit Card	A bankcard, often internationally branded, used to make an electronic withdrawal from a line of credit in a bank, as in purchasing goods or obtaining cash.
Gift Card	A prepaid payment card, often anonymous, usually not account based, intended to be given as a gift
Loyalty Card	A payment or accompanying card that accumulates benefits, related to purchases, that can be redeemed later for value or discounts
Corporate Card	A payment card used primarily for B2B purchases
Smart Card	A payment card incorporating a microprocessor for additional security and data storage
Medical Card	A plastic card used for patient identification that may be used for payment and may contain patient record data
Wage Card	A payment card issued in lieu of cash wages. It may be an account based card that is credited periodically, or a prepaid card that is reloaded periodically, or a disposable prepaid card that is issued each time
Front-End	(Processor) See FEP above
Back-End	(Processor) The networking device operating between a main processor and other organisations' systems. Switches transactions "up stream" of the main processor.

1.9. References

NOTE: If any reader of this document believes they have not been acknowledged as a source please contact the author who will correct this in the next edition.

Although the majority of this document is original work there have been several sources of information in the public domain. The following are specifically referenced for further study:

- "*Core Principles for Systemically Important Payment Systems*" and "*General Guidance for National Payment System Development*" produced by the Committee on Payment and Settlement Systems www.BIS.org.
- "*Guide to Developing a Strategic Framework for Payment System Modernisation*" www.SADCBankers.org.
- "*Principles of Payments Industry Self-Governance*" produced by the International Council of Payment Association Chief Executives

- "*The National Payment System Framework and Strategy*" www.resbank.co.za.
- "*Regulations for Consumer Electronic Clearing System*" produced by the Australian Payments Clearing Association Limited.
- The author also acknowledges the valuable contributions of the Payments Association of South Africa.

Chapter 1. Introduction

There is a dichotomy in retail payment systems that manifests itself in the form of an ATM and the product it most commonly services, cash. Is an ATM (an Automated Teller Device) a Self Service device that helps to promote and service the electronic cash replacement products? Or is it a Cash Machine that extends the utility of cash?

The use of cash is still increasing worldwide, thanks to its unique value proposition. Cash remains the world's most popular payment method.

Projects to modernize the payment systems of countries normally promote mechanisms to replace cash (EFT, prepaid cards, mobile payments, etc) many of which initially rely on the convenient availability of ATMs.

As for the ATM as a Self-service Device, analysing the range of money types in the following picture it is interesting to note how many of the non-cash, or cash-substitute, payment instruments often utilize ATMs in their servicing.

Payment Media	Cash Based	Account Based
Cash	Notes & Coins	
Paper	Draft Money Orders Travellers Cheques Bills of Exchange Promissory Notes	Cheques Paper Giro
Card	Prepaid Cards Stored Value Cards	Debit Cards Credit Cards Charge Cards Retail Cards Corporate Cards
Electronic	Digital Cash	Account Transfers EFT Debit EFT Credit Wire Transfers Bill Payment P-P Payments

Figure 2. ATM Self-service device range of money types

Some are, perhaps, more obvious than others (for example EFT transfers and loading stored value cards) but it doesn't take much imagination to visualize the potential for, say, ordering traveler's cheques or chequebooks.

Location, usage and strategy will dictate the extent to which (time consuming) non-cash transactions can be allowed to dominate ATM usage. Nonetheless, in a cash dominated society where ATM implementation and expansion is critical to modernising the payments industry, by helping to make the infrastructure more citizen centric, the extended utility of non-cash functions is a convenient way to justify the not insignificant operational costs.

Obviously, a country's position on the Cash-to-Electronic Timeline depends on its socio-political and econo-geographic environment. Wherever the national payment system of a country is along this Timeline, the existence of an efficient, effective, well governed and well managed ATM infrastructure is of benefit. This not only applies to the country and its economically active people, but also to the economic union of the region as a whole.

A standardized, controlled approach, utilizing business models that best suit existing commercial abilities and regional interoperability, must benefit funds flows and local and international confidence levels alike.

Where countries exist that, for various historical, economic or political circumstances, do not have a developed and stable retail payment infrastructure (of which ATMs form an important part) it is in the longer term interest of their better equipped neighbours and trading partners to assist with this task.

Creating this ATM ToolKit is undertaken in that spirit of cooperation; in order to find a way of passing on knowledge, expertise and best practices to ease the path to success.

1.1. Business Balance

The global credit crisis of 2007-2009 illustrates the need for good governance of financial systems.

The less regulated institutions, allowed free reign to innovate, did just that, to excess (as is the human want, especially where the potential for unlimited reward exists). Obviously, however, if we want to expand, modernize and innovate, the "pendulum of rigidity" should not swing the other way towards over-regulation and stifle opportunity.

It is all about managing the balance, and sometimes it is easier to implement complex solutions and manage complex environments if a simple model is kept in mind.

To this end, two mature business models are offered below, having been adapted for the subject of this guide: the first illustrates a principle; the second provides a rule.

The original Business Balance model adopted 'Zen' management principles (and was probably eventually a seed for the development of the Balanced Scorecard model). This postulates that there are fundamentally three generic participants to satisfy in a business: ***customers***; ***staff*** and ***shareholders***.

They need to be kept in balance (maintaining an Equilateral triangle) for successful, sustainable, business, and their desires are always at odds (for example, low prices, high salaries, high profits).

In this specific case, for ATMs in a country, the participants could be: ***citizens*** (who need the broadest access at the lowest price); ***stakeholders*** (the providers of infrastructure and product who want freedom and profit); and ***government*** (who want to regulate, and be popular).

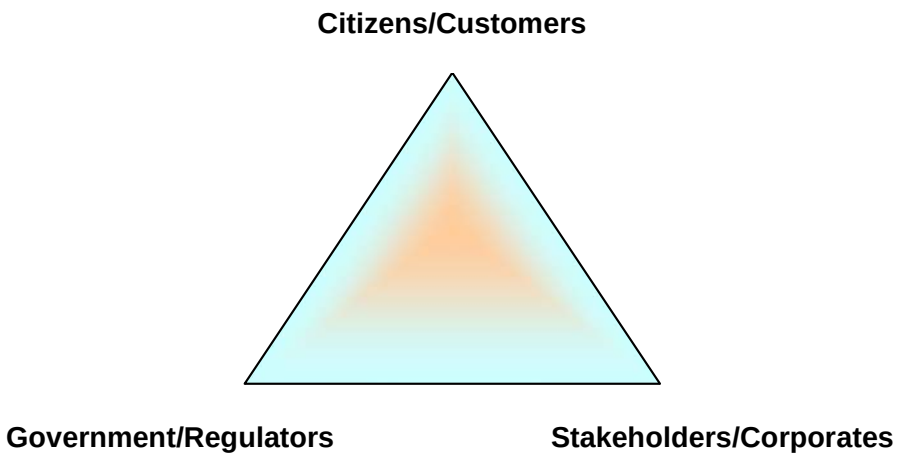

Figure 3. Original "Zen" Business Balance model

1.2. Five-Forces Model

The Porter Five-Forces Model can be adapted to provide a Basic Rule for the ATM market: Innovate Vertically and Regulate Horizontally. This will allow innovation in a controlled space.

Of course, the devil is in the details (as always) but this does give an image for a memory peg. This could be stated as "regulate the payment instruments and the domain within which they operate, but allow freedom in terms of the participants."

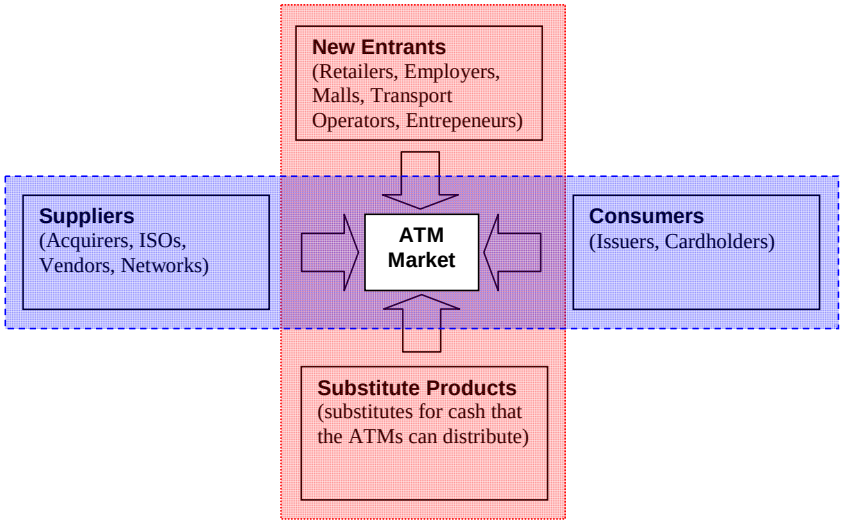

Figure 4. Porter Five-Forces Model

Perhaps a simple example to illustrate this model is to allow non-banks to own ATMs but to regulate the way they are used and managed; or to allow electronic cash products but to regulate the way they are issued and used.

These two models, the Business Balance Model and the Porter Five Forces Model, show the need for balancing governance and competition, regulation and innovation.

Chapter 2. ATM Payment Service

An Automated Teller Machine (ATM) is usually defined as an unattended device which a cardholder may use to issue PIN verified electronic payment instructions for the purpose of drawing cash, making payments to third parties and obtaining account information. "Cash" can also be interpreted as a cash substitute for this purpose; cash substitutes include value drawn down onto a pre-paid card, scrip of some form, or electronic money loaded into an integrated circuit purse or token.

Cards used for this purpose are usually some form of Credit Card or Debit Card, but may also include other types of product such as, for example, Loyalty Cards, Gift Cards, or Corporate Cards. The cards used are normally produced to ISO standard specifications and can be based on Magnetic Stripe or Integrated Circuit (Smart Card) technology, or both.

ATMs are typically installed in geographically diverse networks of devices owned and operated by Terminal Owners, who may be Acquiring banks themselves, bank-owned Cooperative System Operators, Independent Sales Organisations or even private commercial entities who contract the management and networking to ISOs. Whatever the business and infrastructural terminal owning arrangement is, the transactions generated by the ATMs ultimately find their way to an Acquirer (traditionally, but not always, a bank) and via the Acquirer into the payment clearing mechanism of a country.

ATM generated transactions can be either financial (payment related) or non-financial (information related). In general, the Financial transactions are either:

- Debit Pull (for example, Cash Withdrawals and Value Purchases).
- Or, Credit Push (for example, EFT Account Payments).

The Non-Financial transactions can be varied depending on the device and the terminal owner but usually include at least balance enquiries.

ATM networks, whether bank or non-bank owned, are frequently (and should be) interoperable with devices accepting cards from multiple issuers. Interoperability is an economic and efficiency issue and requires both a business agreement and a technical solution. Its extent varies from simple bilateral arrangements to full multiparty, regional and international cooperation. The range of transaction types supported in an interoperable

mode is usually limited to a standardised subset of the full transaction set that can be performed by the device when the Issuer and Acquirer are the same organisation.

Although an ATM Payment Service (comprising the set of all devices and the transactions that can be performed through those devices, in concert with technical specifications, legal and business agreements, and the related risk mitigation procedures) can be implemented in many different architectural solutions, it always forms part of the **National Payment System** in a country. It must therefore fall within the governed and regulated jurisdiction of a NPS.

An ATM Payment Service itself is usually regulated by a payments entity which is part of, or mandated by, the Central Bank and operates through a regulated Clearing House.

It uses one or more approved System Operators to facilitate the exchange of transactions and payment instructions between participants, normally by the use of one or more switching facilities. This generic model is represented in the following diagram.

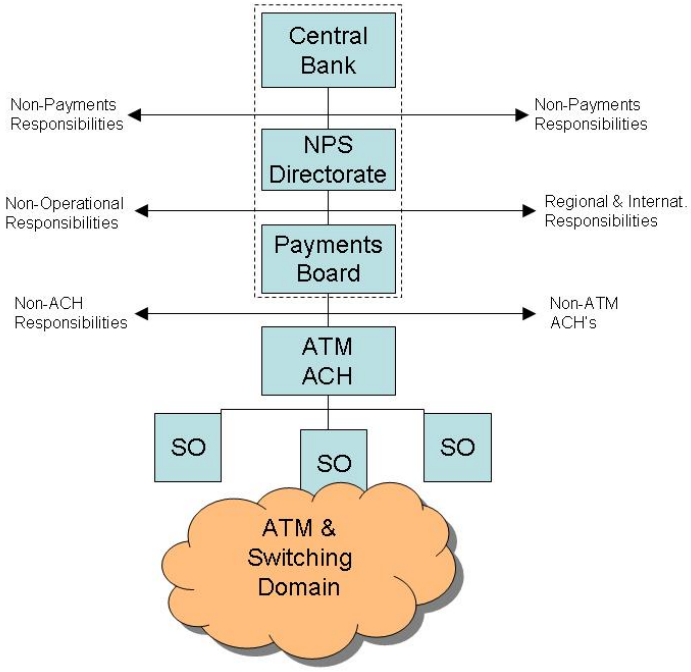

Figure 5. ATM Payment Service generic diagram

These systemic elements can be implemented in various ways (as indicated previously) but should always form part of a regulated and standardised environment for good governance, effectiveness and to assist current or future plans for interoperability. This managed operating approach provides a stable environment for all willing participants, and applies standards to

ensure that all the ATMs are installed with similar levels of client protection. It is generally a good governance requirement to separate the ***business*** relationship between the participants from the ***infrastructure*** operation. In the framework used in this document, that means ensuring that the business scheme owned and managed through the clearing houses and their payment streams are separate legal entities from the system operators, with separate management, plans and visions. This introduces commercial checks and balances as the two types of entities have very different business focuses, and with a non-monopolistic strategy below the governance level will encourage competition and efficiency.

System operators should ensure that availability is to the highest possible standard to establish customer confidence levels for both local and international cardholders, in turn promoting increased usage and better commercial reasons for infrastructure growth. This rationale applies not only to the transaction switching systems, of course, but also to the device, network and cash management elements of the ATM service architecture.

An ATM Payment Service is also dependant on a Card Issuing infrastructure and existing card products being in a serviced market, and must therefore be viewed in concert with such facilities and products.

Cards are the life blood of an ATM service; in order to promote interoperability and be used internationally, they are normally highly standardised and are operationally regulated.

In terms of central bank and NPS regulations and governance it is the banking products (for example, accounts) and financial transactions (for example, credit push EFT), and their usage, that are controlled; the cards themselves are merely instruments of identification and data carriers. Even stored value cards, although "issued" by many commercial entities, have a controlled bank account at the ultimate end-point of the transaction.

2.1. Generic Models and Processes

In order to position an ATM service within the Payment Card domain it is useful to review the standard 4-box model normally used generically, and then consider how ATMs relate to this. Keep in mind the points that:

- Cards are just one type of access mechanism to accounts, which are the actual financial instruments.
- ATMs are just one type of interface device used by cards.

These comments relate to typical use of ATMs as cash machines operated via traditional bank cards. Pre-paid cards (for example, Gift Cards, Medical Cards, Wage Cards, etc) generally operate with some form of conglomerate account behind the scenes and have a similar flow, at least during the value-

load/reload operation which is the equivalent to a cash withdrawal. Cards come in three basic types (no matter what type of card technology used, that is, whether it is a Magnetic Stripe, Smart Card, and so forth).

- **Pay First** includes the Pre-Paid/Stored-Value family.
- **Pay Now** includes the Debit-Card/Charge-Card/Cash-Card family.
- **Pay Later** is essentially the definition of the Credit-Card family.

Below is the standard simplified model that shows how the transaction moves in one direction and the value in the other:

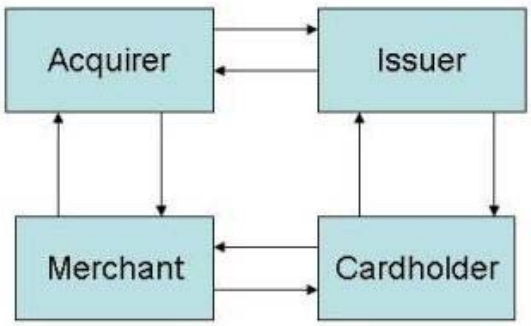

Figure 6. Standard simplified transaction model

There are, of course, other enabling entities involved in the process, such as the networks, switches, and card associations which are not shown. Who these enablers are would differ in most cases depending on prevailing business and other circumstances.

Each solution implemented would have its own set of enabling participants and the impact of these on the basic business model, rules, regulations, and cash flows would need to be specifically determined.

- In some cases the enabler represents or provides a service to one of the main parties (for example, in the case of an ISO managing an ATM infrastructure for an acquiring bank) and then falls within the rules applicable to that party (in this example, the bank).
- In other cases the enabler imposes conditions on one or more of the main parties (for example, an international Card Association such as Visa or MasterCard).

The existence of these enabling entities obviously adds a layer of complication to implementation and operations, although they usually exist for good commercial reasons. They are nonetheless just addenda to the basic model. The ATM equivalent of the generic model is shown in the following diagram.

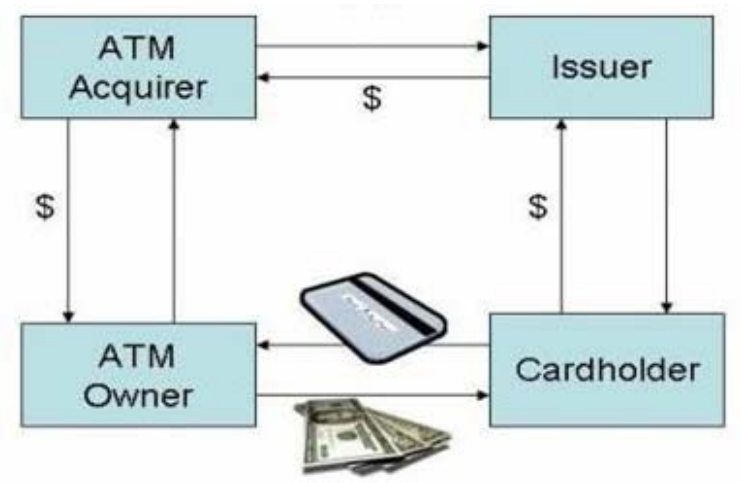

Figure 7. ATM equivalent of the generic model

A Point of Sale or Mobile Commerce or other card based payment model would look similar if drawn up, illustrating how an ATM is just one type of customer interface device in a generic payment stream.

The following diagram represents a generic Card/ATM Business Process Flow.

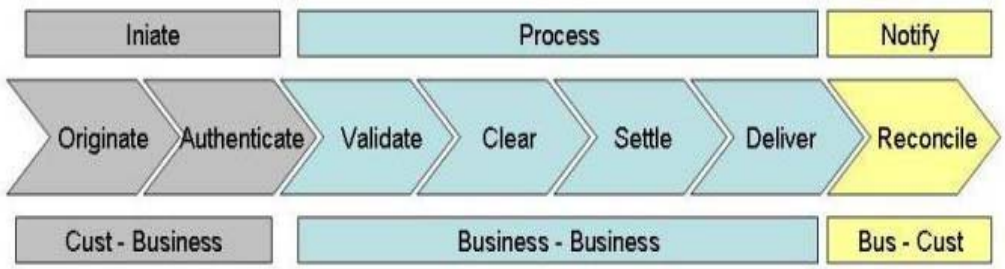

Figure 8. Generic Card/ATM Business Process flow example

This Process Flow can be superimposed onto the generic business model to relate them; the addition of the basic regulatory elements produces a simple model as a memory map:

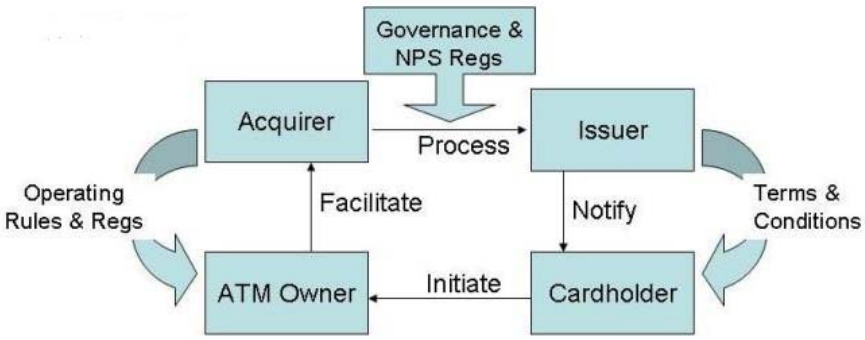

Figure 9. Generic Card/ATM Business Process flow example

A variation of the Process Flow model can also be used, in a simple way, to show the related processing elements that have to be considered, as follows:

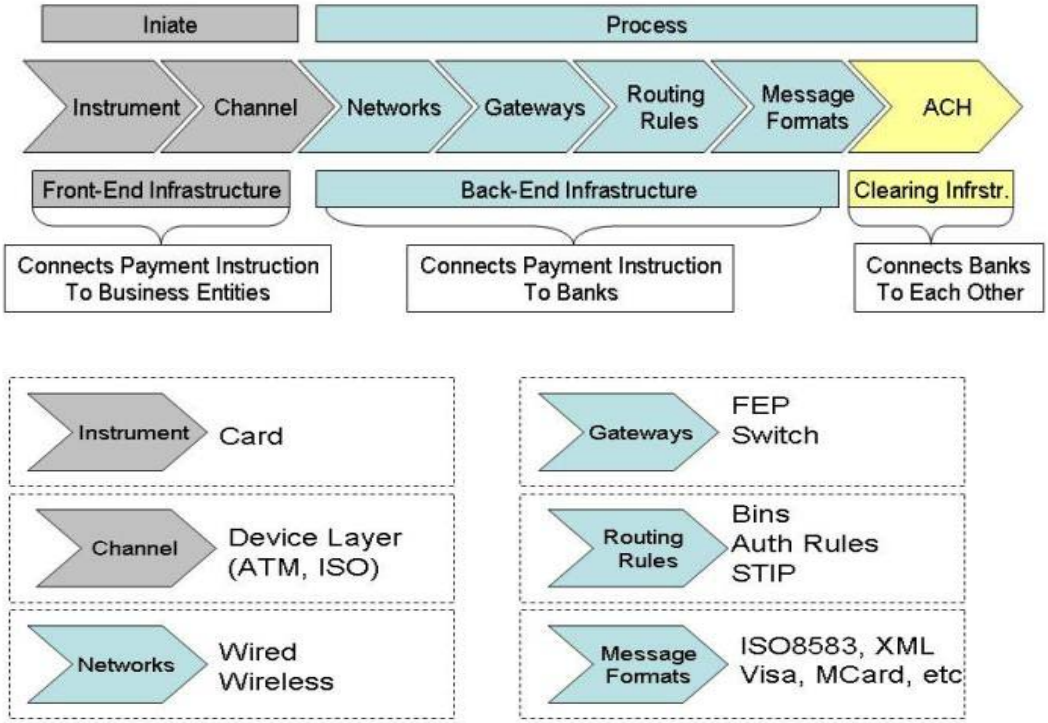

Figure 10. Variation of Process Flow model related processing elements

2.2. Business Domains

We can also review the processing elements and participants in the paragraphs above as Business Domains – a convenient way (using the simple model approach again) of breaking down the complex set of business and technical items that make up an ATM payment service.

It contextualizes subjects such as Security, Contractual Agreements, Costs and Cash Flow, Accountability, international regulation, and so forth. The idea is to ring-fence each set of items in a logical way so that they can be controlled as a whole, and so that failure in one domain does not become systemic.

How this is done in practice depends on the business model adopted (which depends on local conditions, needs and desires), some examples of which are contained further on in this guide.

The following diagram is offered as one possibility, as input to debate on the subject:

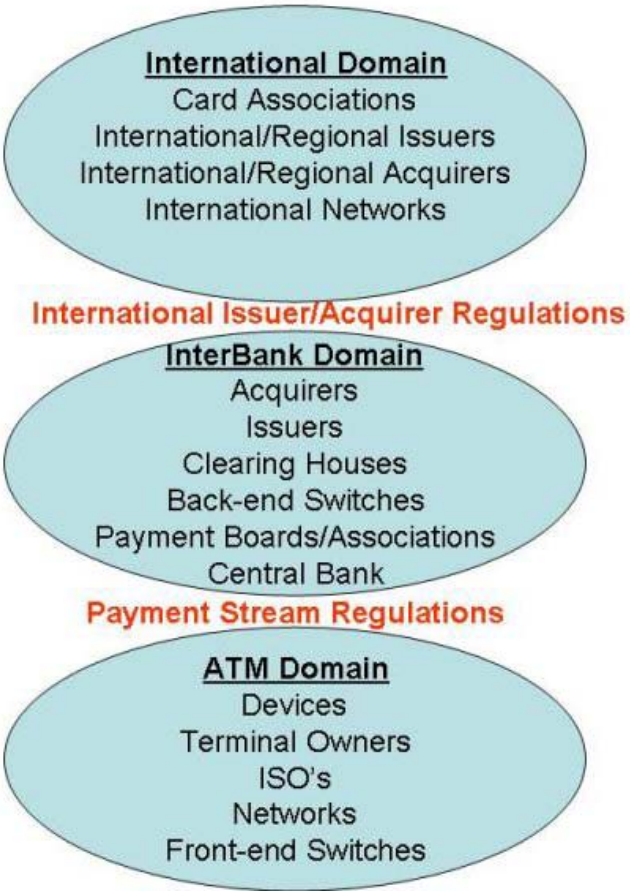

Figure 11. Business Domains

Chapter 3. Business Models

There are a multitude of business and technical architectures that can theoretically be created to implement and operate an ATM Payment Service in a country.

There are many variations currently operating across the developed and developing nations of the world.

The "best" solution is usually a matter of opinion, of compromise and of current circumstances, and (if left fully to the commercial market to determine) could be the one desired by the strongest stakeholder, not necessarily the one in the best interest of either the country or its citizens.

It may be useful at this point to keep in mind a quote from the well known Cruickshank report to the UK Chancellor of the Exchequer on 2002, "Money transmission services are supplied through a series of unregulated networks, mostly controlled by the same few banks who in turn dominate the markets for services to ….. personal customers. This market structure results in the creation of artificial barriers to entry, high costs ….. (to participants), charges for cash withdrawals up to six times their costs, and a cumbersome and inflexible payment system…."

As each set of circumstances is unique, it is not possible to define or even recommend a generic best practice for an ATM business model.

However, there is a set of issues that should be considered, researched and/or debated in order to arrive at a suitable solution. The following are offered, together with some ideas of alternative possible business concepts, as input to the design process for a "best" solution.

3.1. Government Appetite and Political Needs

The strength of the central bank and the desire of government agencies to provide improved banking infrastructure for the general population, despite possible lack of affordability, may be an overriding business strategy in developing countries; as might political commitments to regional powers and economic supporters.

Nonetheless, the issues following in this chapter should all be reviewed, preferably in an open consultative forum, so that business model decisions (and any resulting government vs. private enterprise balance) are taken with knowledge of the consequences, and with the view to providing an easier path to growth.

In many cases, especially where there is little or no existing ATM infrastructure, a PPP (public-private partnership) approach may be the best solution, creating a balance between central bank control and rapid implementation by experienced corporates.

All central banks provide settlement facilities, although payment cards usually settle in the books of a financial institution.

- Some central banks offer clearing facilities of their own as an alternative to private clearing houses.
- Other central banks restrict their activities, besides settlement, to cooperating with private payment system providers to promote safety, efficiency and interoperability via standardisation.

Furthermore, most central banks have explicit legal authority with respect to payment and settlement systems including the oversight of retail payments.

This is reflected in this guide and has become a stronger tendency in the light of a recent shift globally towards greater control over banking in general.

The needs and dictates of central banks may have a significant effect on the resulting ATM solution architectures, in opposition to the desires of strong commercial players – for example with issues such as the implementation of shared, multi-branded, infrastructure as opposed to owned and branded networks with bi-lateral agreements, and so forth.

3.2. Standards

There are several standards, formally defined or de facto, and mainly technical in nature, that have emerged internationally in the card based payments arena.

Many of these are easily available from organisations such as ISO (International Standards Organisation). Others are less easily available from international banking associations and clearing houses, and several are part of the package received in signing up with one of the major card associations on either the issuing or transaction acquiring side.

Some commercial products are almost de facto standards by means of their common usage, and should also be favourably considered for ease of interfacing, wealth of experience and availability of optional functionality – all of which reduces the real total-cost-of-implementation.

The ATM business and the international payment card business have both been around for a long time and, in particular on the ATM side, are well established.

Use of common, standard, methodologies and internationally standard interfaces should be a non-negotiable in designing and implementing an ATM architecture (and any other payment card based business).

There are also many proprietary, non-standard, products available that may look enticing in the short term, but these should be treated with caution due to the usually inevitable challenges in longer term interconnection and interoperability of systems and networks. This is not only a local or regional consideration, but acceptance of internationally issued cards is a norm and will require use of these standards.

3.3. Risk

From the moment of initiation until its settlement with finality all the participants in a transaction (payer, payee, facilitating agents and one or more financial institutions) may be exposed to certain risks.

- **Risk of Fraud** can be defined as the risk that a wrongful or criminal deception will lead to a financial loss for one of the parties involved. The most obvious risk, on first thought, for an ATM solution is card fraud because of the publicity given to its various forms, but there are many other types of fraud.
- **Operational Risk** could be described as the risk of incurring a financial loss because of human or technical error. It includes risks

associated with the failure of communications, transportation, hardware and software components or deficiencies in the internal control systems, human errors or management failure.

- **Legal Risk** arises if the rights and obligations of parties are subject to uncertainty. In the event of a participant's bankruptcy, there is legal risk that the multilateral arrangements between members and the clearing organisation would not be upheld. These legal disputes that delay or prevent settlement can give rise to credit or liquidity risks. And, finally, new payment cards or transactions may be subject to legal risks if appropriate legal foundations have not been put in place.
- **Settlement Risk** is a general term used to define the risk that settlement will not take place as expected. Liquidity problems can result in transaction costs associated with obtaining funds from some other source, opportunity costs and, potentially, defaults on other obligations.
- **Systemic Risk** is the risk that the failure of one participant in a payment system to meet its obligations will cause other participants to be unable to meet their obligations when due.

While these are all general risk statements, each and every one is applicable to the ATM environment and are included here to create pause for thought, that consideration of a particular business model should also include consideration of the participants and the consequences of entering into such business relationships with them.

For completeness we should consider Risk Management as an operational responsibility which, in payment card transactions, involves the introduction of technical, procedural and legal measures. These attempt to ensure that the transactions are valid and to reduce errors by minimising fraud and operational risks, or alternatively, to allocate responsibility among the parties involved. A variety of laws and regulations are required to allocate responsibilities. Contracts may further define responsibilities at a granular level within the legal framework and define risk-sharing responsibilities applicable to a specific switching, clearing or settlement arrangement.

3.4. Participants

The existing banks and infrastructure owners in a country establish the status quo going into any attempt to change and/or improve the ATM payment solution in a country or region.

A small number of strong participants (for example, a few big banks) tend towards "owned" infrastructure with little or no interoperability; compared to a higher number of more evenly matched stakeholders which is more likely to result in a shared infrastructure or multilateral interoperability.

Similarly, a higher number of local cardholders creates more of a demand-pull market for infrastructure, with consequent higher levels of interoperability, as opposed to a lower base of mainly international customers who are easily satisfied with fewer points of service in strategic locations provided by select organisations.

An "owned" infrastructure is often a natural starting point for competitive reasons but care should be taken that the country's ATM service does not get "stuck" in this mode as this benefits the few (often foreign) corporates at the cost of consumer inclusiveness. This can of course be influenced by a central bank with vision and planning (and the necessary funding) – who should also avoid the traps of over-regulation and proprietary solutions.

The boundaries of the ATM domain need to be controlled. These include capabilities of participants, risks and liabilities, standardisation, and so forth, as do the financial entities utilised within the domain such as accounts, transactions, clearing, settlement, and so forth.

This should be balanced without unnecessarily restraining the mechanisms and innovations used to execute the service and deliver utility to consumers.

The aim is to create a framework based on valid legislative, governance, regulatory, risk management and standardisation principles and practices, resulting in an efficient and systemically resilient ATM payment service that is easily interoperable on a regional and international basis.

If this is achieved, then the participants and infrastructures can be allowed freedom to grow, develop and mature within that framework.

In any case, over time, the natural progression of ATM services has been shown to be as contained in the following diagram. Reasons for moving along this timeline are: legislation and regulation; business strategies; and capital or technical restraints.

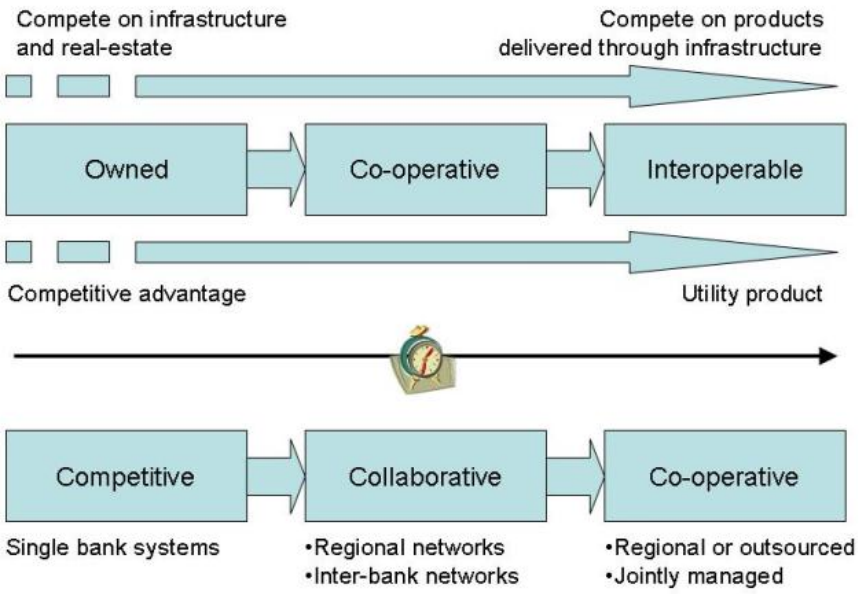

Figure 12. Natural progression of ATM services timeline

3.5. Interbank Insourcing & Outsourcing

Apart from the traditional arrangements for outsourcing systems and operational processes, outsourcing payments processes can be a win-win situation for large and small banks who partner for greater efficiency.

Large banks generally cannot afford to outsource their payments processes; a single provider can neither support the complexity of their payments processes, through all channels and instruments, nor guarantee minimum processing times. However, they can position themselves as a payment service provider, increasing the leverage on their expensive payment platforms, by insourcing parts of the payments process for smaller banks.

The insourcing operation should not be a complex one and there may also be other interesting benefits:

- Insourcing improves the bank's on-us clearing and settlement percentage, resulting in lower costs of clearing houses.
- Preparing the systems and operations for a commercial insourcing operation improves the quality of the internal processes because of the service level agreements (SLAs) with the outsourcing banks.
- The business model develops in the direction of improving the large bank's own payments processes while being financially supported by outsourcing smaller banks.

Smaller banks, on the other hand, have low volumes of payments requiring several expensive systems to maintain and changing regulatory requirements that have to be complied with. Using a total-cost-of-ownership calculation

outsourcing is an interesting and cost effective alternative. If only standardised and well known technical formats are used for interfacing payments then the complexity of the architecture of the small bank can be reduced considerably. However, there are also issues that need to be addressed, such as:

- Long term contracts, the future costs of which cannot always be regained and are not always absolute.
- Limited usable information on which the decision has to be made. In particular when there are several different locations or countries involved with different ways of presenting management information some of 'educated guessing' is inevitable.
- Most insourcing parties do not offer a solution that is a total fit for the outsourcing bank and the large insourcing bank is often unwilling to make changes because of one small client.
- Which part of the payments value chain is suitable to be outsourced? For many smaller banks there are too many scenarios to be able to work out a sound business case.

3.6. General Factors

In addition to the above, it is useful to repeat the four general factors influencing payment systems development that are highlighted in the BIS/CPSS 2006 report, as knowledge of these form the platform upon which all else stands. They are:

- **Environmental factors** include: (i) demographic factors such as population size and urbanisation; (ii) geographic factors, including the level and distribution of resource endowments; and (iii) social and cultural values and norms. These factors can determine the likely acceptance of particular development initiatives.
- **Economic factors** include: (i) the level and stability of overall economic growth; (ii) wealth distribution; (iii) the education and skill levels of, and availability of training facilities to, the labour force; (iv) the development of industrial infrastructure such as telecommunications and transportation systems; and (v) the pace of innovation and technological change. The core economic factors, and their influence on development in the commercial, industrial and financial sectors, are particularly relevant to the payment service needs and capabilities of the country.
- **Financial factors** refer to the financial costs, risks and benefits of payment service, institutional and infrastructure development initiatives to payment service users and providers. Improvements that reduce the user costs in payments for commercial and financial transactions and increase the opportunities for making these

transactions can motivate the demand for and supply of new payment instruments and services. But the payment process also involves direct and indirect credit and liquidity risks that are shared, to varying degrees, between service providers and users. To be successful, payment system development initiatives need to identify these costs, risks and benefits and try to balance their allocation between providers and users. Note that one of the biggest risks to business success is a perceived financial inequality between participants in any shared system/service.

- **Public policy factors** include, inter alia, laws and policies affecting the conduct and performance of financial institutions, as well as the government's education, industry, trade, consumer protection and macroeconomic policies. The involvement of the country's authorities is a fundamental factor in system development, as this directly affects the institutional arrangements. These public policy factors interact with the environmental, economic and financial factors to condition and shape overall system development.

3.7. Clearing Arrangements

In terms of clearing there are, in general, four types of arrangements for the clearing of payment instructions. Combinations of these different arrangements are also possible.

The first arrangement takes place within one and the same financial institution; the other three types require interbank arrangements. Where there are non-bank participants in the clearing process the legislation and regulation of a country would determine whether direct participation or sponsored participation is permitted.

- When the accounts to be debited and credited are held in the same financial institution, termed on-us transactions, the exchange of information and the calculation of balances that characterises the clearing process can be performed within the same financial institution.
- In a bilateral arrangement, the sorting, transmission and processing of payments flowing between two financial institutions is handled via agreement between the institutions themselves.
- Alternatively, financial institutions may employ a common third party, a separate financial Institution, or a sponsor for clearing, with one or more institutions forwarding payment instructions to the sponsor for sorting, transmission and processing. In effect, this is outsourcing/insourcing the clearing function. Sponsors generally provide services according to contracts that are negotiated bilaterally; these contracts must also define risk and liability terms.

- Multilateral clearing arrangements are based on a set of procedures whereby participants present and exchange data, and/or documents, relating to funds transfers to other financial institutions under a common set of rules. A Clearing House is one such arrangement; it is an organisation that operates central switching facilities. It may also act as a central counterparty in the settlement of the payment obligations under a multilateral arrangement. Alternatively, multilateral arrangements may be based on a Clearing Association that is a coordinating body organising and facilitating clearing among institutions but which does not operate central processing facilities or act as a principal for settlement.

3.8. Commercial Relationships

In the framework adopted here there are several business and operational entities defined throughout the body of this document, together with a strongly expressed preference for a governed payments environment.

For the sake of clarity it should be emphasised that these business entities should be established on a strong commercial footing and competition encouraged. The purpose of a strong governance framework is to define boundaries to allow competition to bloom, not to stifle it.

In this document, the clearing houses form the business schemes that define and manage the commercial and legal relationships between participants (issuers and acquirers) in the ATM service (and other payment services).

The system operators that own and run the switching infrastructures that operate in the space between these participants (connecting to issuers, acquirers, international networks, devices and third-party service providers) are separate business entities with vastly different business objectives.

Whilst it may appear that they are owned by the same organisations (and that may often be the case) they require different skill sets and would not be managed by the same executives.

Even within the same corporate organisation, the roles should be financially, tactically, and operationally ring-fenced.

In any case, the clearing house/system operator relationship is potentially a many-to-many relationship including independent outsourcers.

Commercial relationships that exist are never on an equal footing; there could be vast differences in size (and thus financial muscle) between the players. Also, some may be shareholders and others just users or sponsored participants, with obviously differing objectives and unequal voices. Thus, the agreements, rules and regulations need to be carefully drawn, keeping a close eye on the objectives of the consumer, of sustainability, of regional

aspirations, and of international interoperability. Thus, also, why a top-down, governance-centric, framework approach has merit.

After considering all of the above, it is useful to look at a sample range of ***possible business models*** in the ATM payment service domain, as covered in conceptual form over the next few pages.

3.8.1. Scenario A

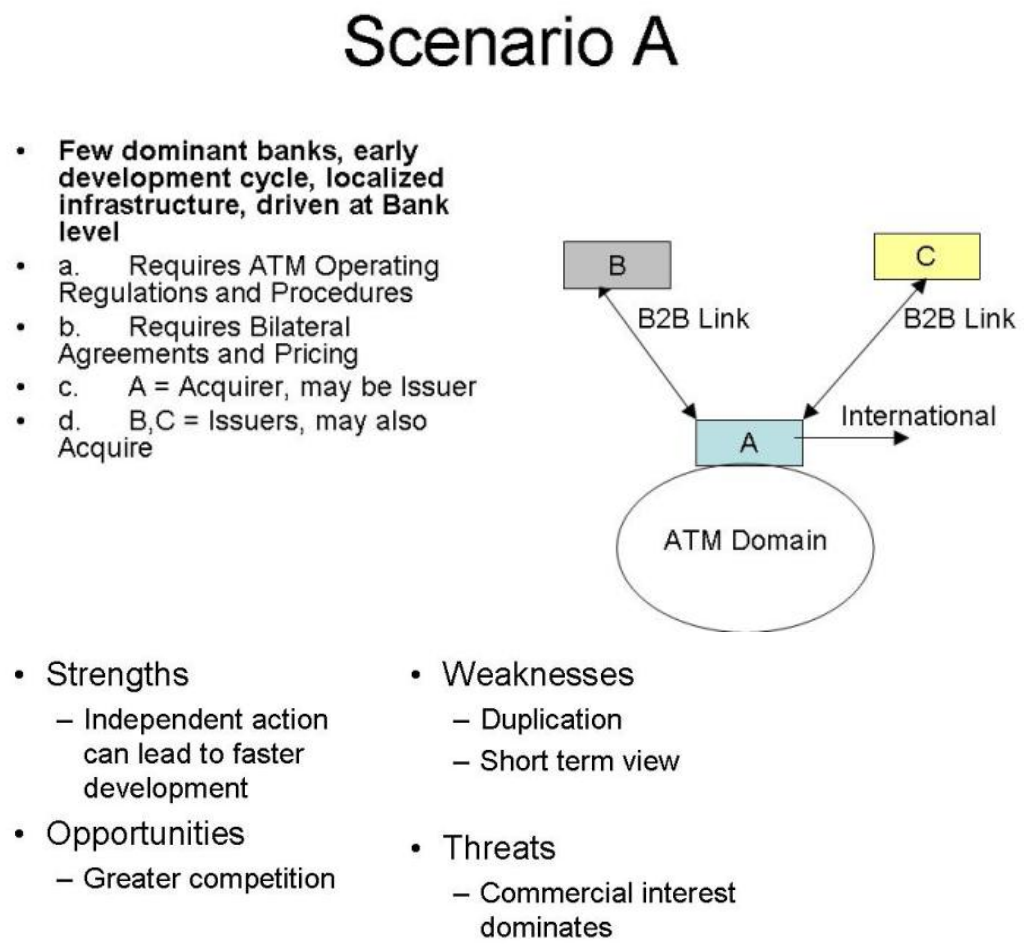

Figure 13. Scenario A business model example

3.8.2. Scenario B

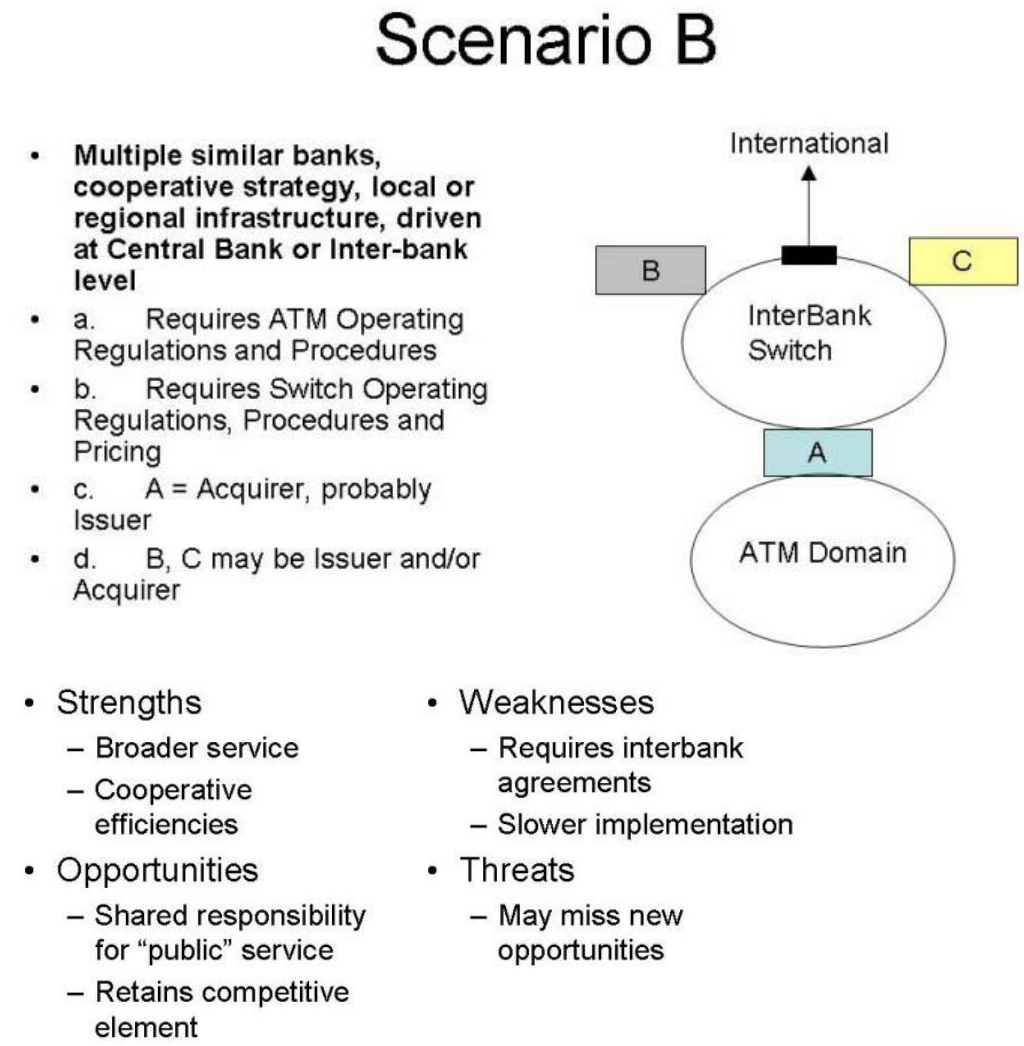

Figure 14. Scenario B business model example

3.8.3. Scenario C

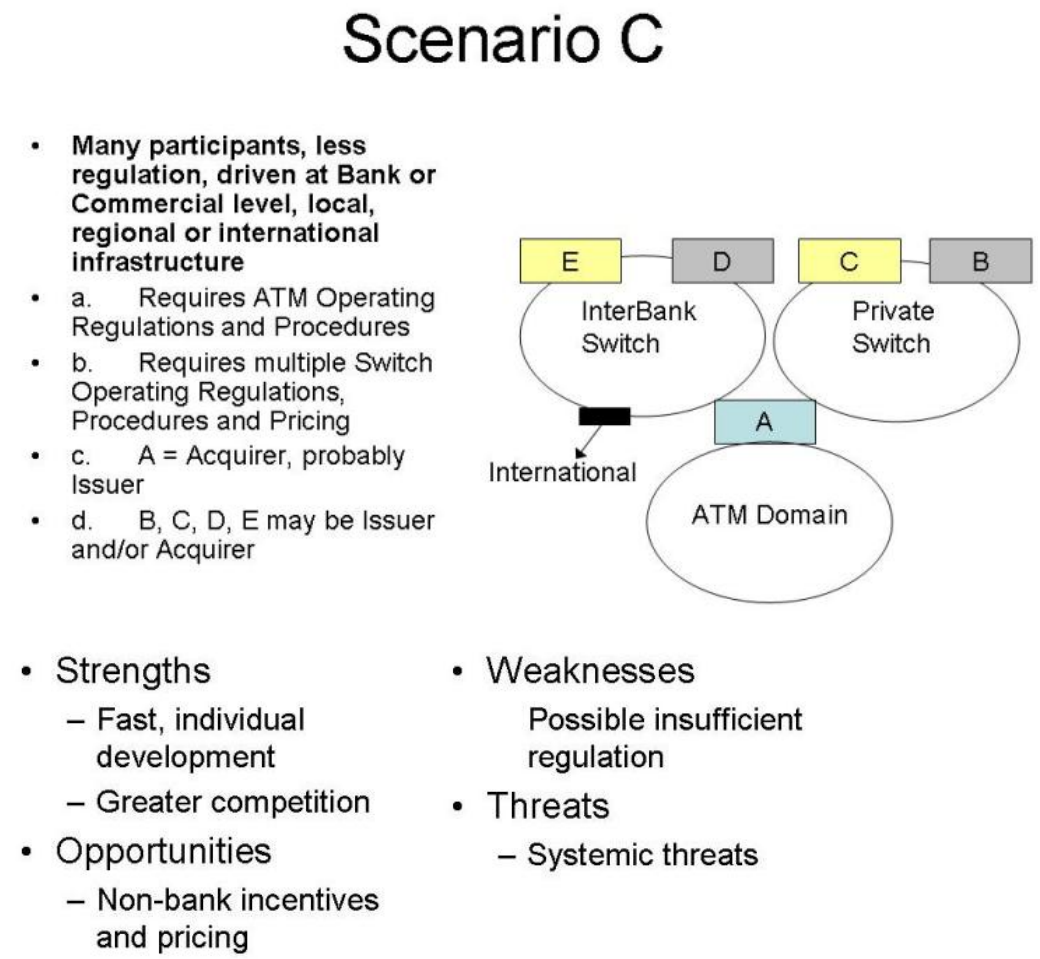

Figure 15. Scenario C business model example

3.8.4. Scenario D

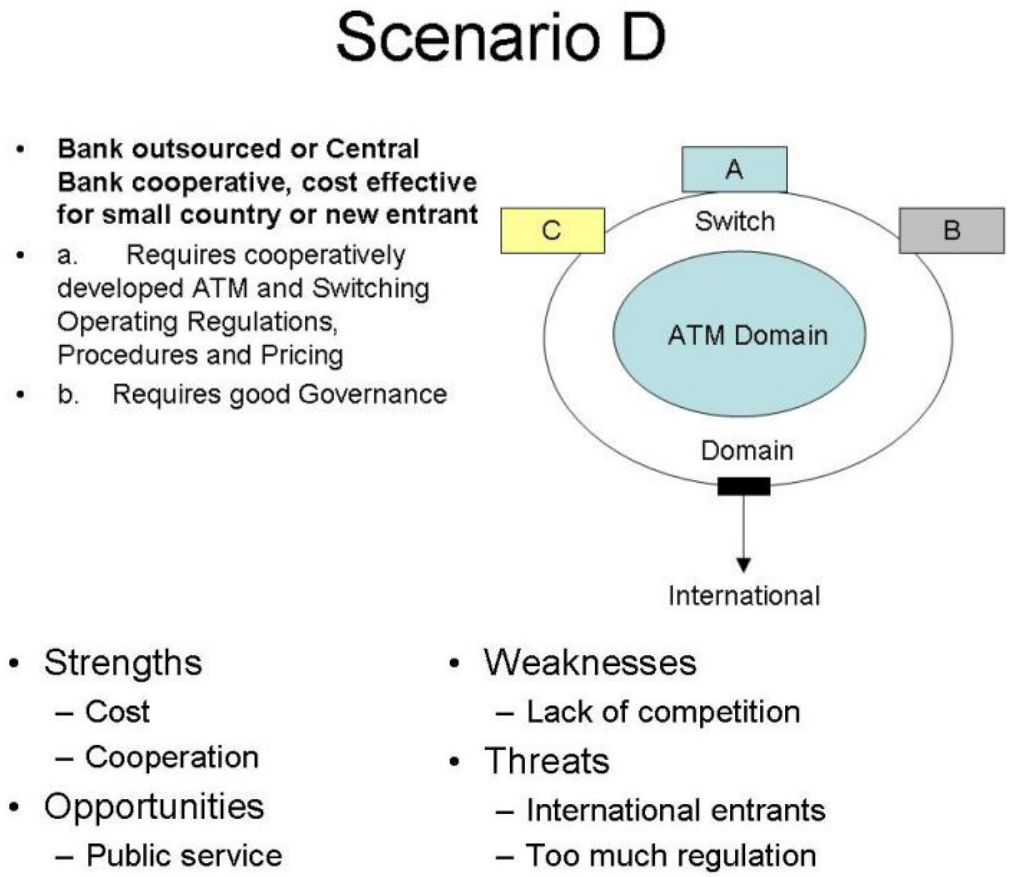

Figure 16. Scenario D business model example

3.8.5. Scenario E

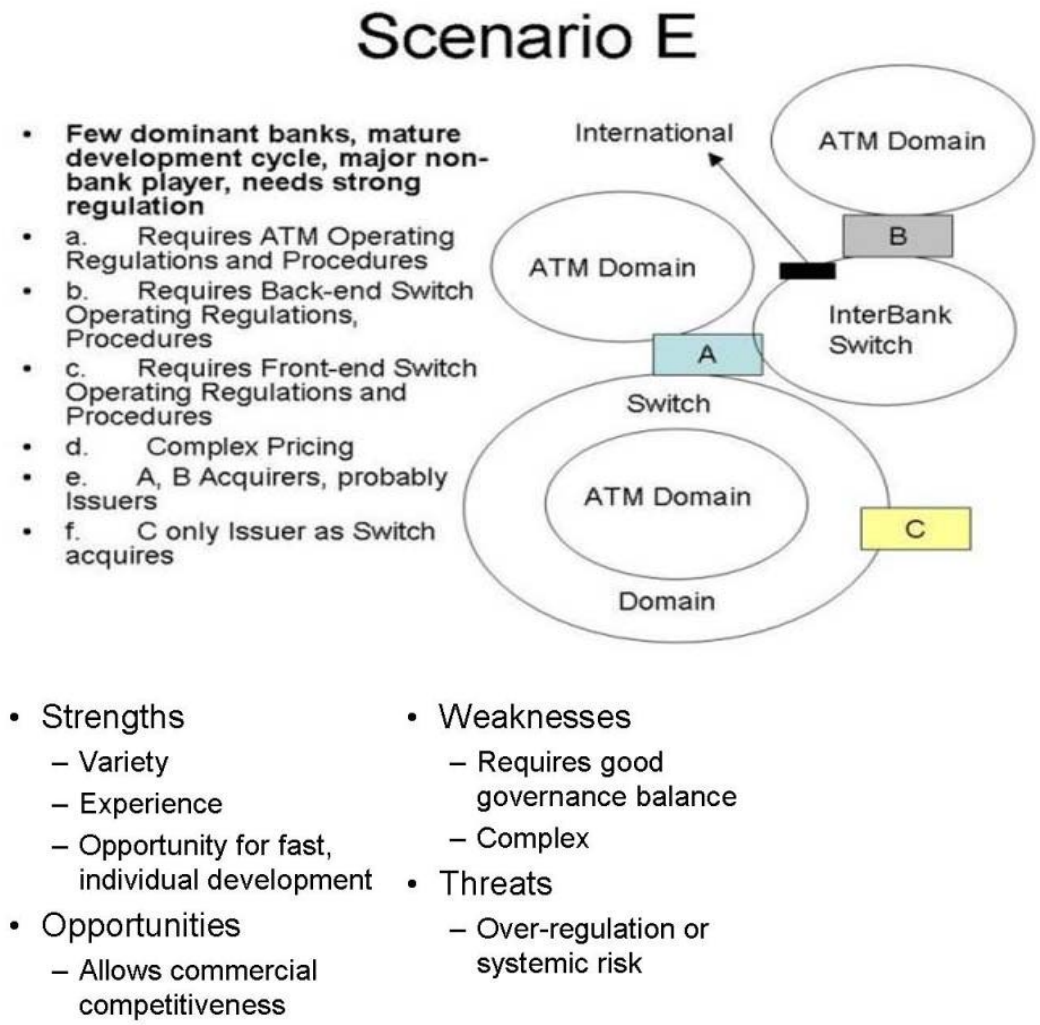

Figure 17. Scenario E business model example

Chapter 4. Governance Introduction

Modern activities relating to the development, implementation and/or improvement of payment systems are usually undertaken within the Fourteen General Guidelines defined by the Bank of International Settlement in the CPSS 2006 report.

Although an ATM Payment Service is only a vertical slice of a National Payment System it should nonetheless be guided by the same concepts, which are therefore mentioned below.

1. **Keep the central bank at the centre.**
2. **Promote the role of a sound banking system.**
3. **Recognise complexity.**
4. **Focus on needs.**
5. **Set clear priorities.**
6. **Implementation is key.**
7. **Promote market development.**
8. **Involve relevant stakeholders.**
9. **Collaborate for effective oversight.**
10. **Promote legal certainty.**
11. **Expand availability of retail payment services.**
12. **Let the business case be the guide.**
13. **Align development of payment and securities systems.**
14. **Coordinate settlement of retail, large-value and securities systems.**

These are derived from the BIS "*Core Principles for Systemically Important Payment Systems*" which should also be reviewed. It is not the place of this guide to discuss these in detail; this is meant only as a reminder to study the BIS documents.

This section of the guide covers (broadly speaking) governance and its structures and rules, and should be read with the applicability of the above BIS guidelines in mind.

In addition to the above, the following Seven Principles have been implemented successfully in payment systems operated elsewhere and form a good basis for open debate on the principles that should be adopted in a particular country. Again, they are general but are as applicable to an ATM payment service as to any other part of a national payment system:

1. The provision of payment system services should not be the exclusive domain of banks.
2. The evolution of payment infrastructures is a cooperative responsibility.
3. Risks and exposures must be visible.
4. Participants are liable for the risks that they introduce into the payment system.
5. A balance must be maintained between risk reduction and cost.
6. The central bank response to a problem in the payment system must be in the interest of the system, not individual participants
7. Broad oversight is necessary to ensure the safety and soundness of the payment system as a whole.

And, as the final focus item in this preface to governance, the five principles of payments industry self-governance as agreed by ICPACE (the International Council of Payment Association Chief Executives) are repeated below:

- **Certainty**—There must be absolute clarity of:
  - Objectives of the self-governance framework.
  - The details and scope of any self-governance processes or structural arrangements.
  - Powers and responsibilities of industry participants, any self regulating organisations, the government regulatory agency and the scope of their respective applications.
  - Rules and actions taken at an industry level.
- **Legitimacy**—The self-governance framework must be:
  - Agreed and adhered to by all relevant stakeholders, including all industry participants.
  - Endorsed by government, through the facilitation of the regulatory authority.
  - Substantively and procedurally fair.
  - Backed by effective enforcement measures.
  - Accountable not only to the industry but to the government.
  - Able to sustain the above over time.
- **Transparency**—The objectives and processes must be publicly visible and accessible, as must the governance instruments and

actions which emanate from those processes, subject to the commercial confidentiality required to maintain the integrity of the framework.

- **Flexibility**—The governance framework must respond promptly to changes in the relevant markets as they evolve if it is to remain efficient and optimal over time.
- **Efficiency**—The governance framework should represent the least burdensome means of achieving the governance objectives by minimising cost and risk.

4.1. Governance Structures

All central banks operate under a variety of constraints, resulting from a mix of legal, social, political, international, competitive and other factors. These (sometimes very) different mix of environmental factors that apply to each central bank are reflected in the fact that each central bank has a unique set of services, operations and customers, and has to create unique infrastructures and rules to suit them.

Governance is about the hierarchy of authority and the jurisdictional mechanisms under which a payments management body (referred to generically as a Payments Board in this guide) will exercise its objectives.

A Payments Board can be either an entity within the Central Bank or an independently run entity (a self regulating organisation as discussed in the previous section) mandated by the Central Bank to manage the regulation of the various payment streams within a country. Payment streams are discussed later but, briefly, a Payment Stream is defined as consisting of the processes, systems and rules that enable banks (and other participants) to exchange and execute payment instructions.

A number of different payment streams usually exist, each of which have principles defined in Clearing House Agreements and have associated Clearing Rules.

Whether a Payments Board is incorporated within the Central Bank or is run independently as a mandated, self-regulated, body is largely a function of the size of the payments industry. In either case it would incorporate or make use of a number of operational and advisory bodies, management functions and various sets of regulations; this guide contains one suggested approach – as a starting point for open debate and in the hope that it may help to shorten the discovery process, and to inject some practical experience into the process.

Some background to the suggested structures is most easily given via the following diagram and its commentaries.

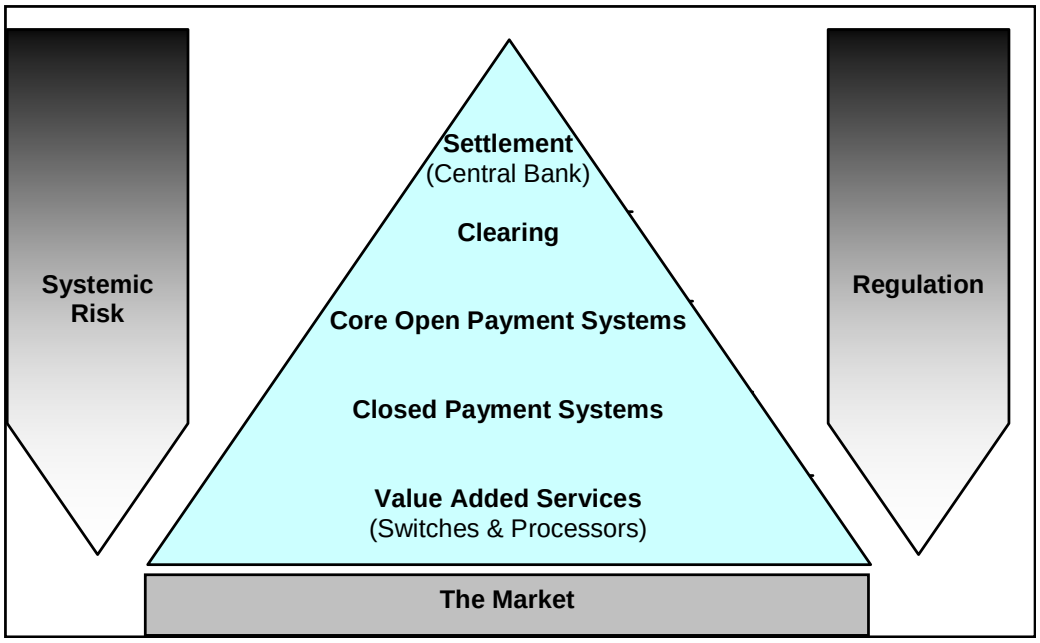

Figure 18. Governance domain diagram

For the purpose of clarity, an Open Payment System is where the Issuer (of cards) and the Acquirer (of the ATM transaction), that is, the Payer and Payee, are different business entities. This is represented by the four-box payment model described elsewhere in this guide. A Closed Payment System has both Issuer and Acquirer within the same business entity is often not a bank.

The three pinnacle activities (settlement, clearing and open payment systems) are usually restricted to being performed by registered banks. However, in many places non-banks are becoming strong players in the payments game and steps often need to be taken to formalise their entry into the clearing system, although settlement will remain the exclusive domain of banks.

The lower two segments, where providers of value-added services, front-end switches, processors and private label cards, for example, exist are less regulated. In some cases very little regulation exists in these areas as they are seen to be the source of innovation and are assumed to have little potential impact on systemic risk. This view changes as markets mature, and broader regulation is found to be required to protect consumers. As the market grows, and new commercial opportunities are sought:

- Values processed and value retained by value added processors become significant.
- Closed payment systems increase their reach and, by separating the roles of issuers and acquirers, become open, but with little protection of one party from the transgressions of the other.

- ATM switches & ISO's introduce more complex transactions for their commercial partners, possibly taking deposits and initiating EFT payments, and thus introduce risks into a system where these functions would normally be restricted to registered banks.
- Operational partners who rushed into providing services for one another, because new opportunies existed, find that no structured means of resolving disputes and apportioning risk exists when reality strikes.

Commercially, as with any other practice where the law lags reality, it is quite common for payment arrangements to move beyond the non-regulated area and encroach upon the core payments area without the necessary regulatory oversight or standards being in place. It is therefore important that clear frameworks and boundaries are in place to ensure that payment arrangements that should be regulated are in fact being regulated.

Developing a payment system which enables access to its infrastructure on a fair, equitable and transparent basis is an ongoing and dynamic process. In particular, technological developments and innovation in different payment instruments will inevitably mean that access is a complex and evolving issue. Legislative changes may be required to improve access to the system in the future, or to protect participants and consumers. Furthermore, as payment systems develop, the regional and international interoperability of payment systems becomes of greater importance. It is important not to take any action that would jeopardise future developments in this area, nor to harm the potential for additional competition to arise from greater integration across boundaries.

The governance and regulation structure needs to be a constantly evolving one in order to keep pace with commercial developments, finding a balance between protecting the market without stifling innovation.

Starting with a framework and an understanding of how this growth process is going to be managed strategically is a good approach. The structure illustrated in this guide is defined broadly, as a foundation only; some of the areas relevant to ATMs are discussed in a little more detail, although all of the items are as applicable to ATMs as to any other payment service.

The following diagram, similar to the one illustrated earlier in this guide, is a useful starting point.

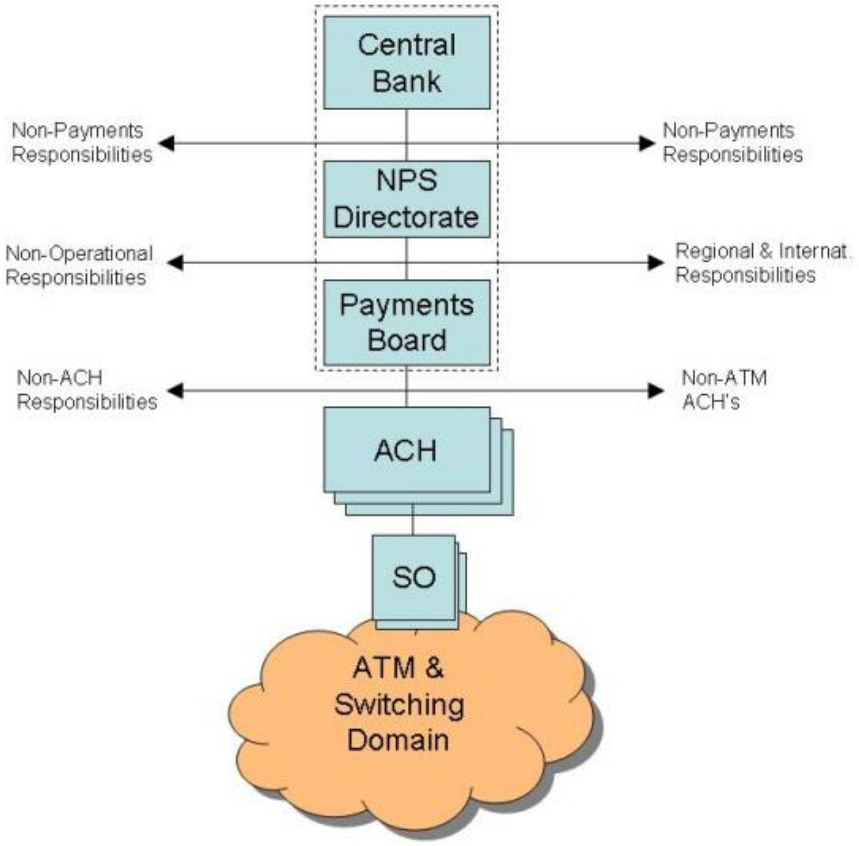

Figure 19. Payment service diagram

Chapter 5. The Payments Board

A Payments Board may be either an entity within the central bank (or more accurately, within the central bank's national payment system directorate) or a separate, independent, self-governing body, depending on the size and complexity of a country's national payment system.

5.1. Background

It is necessary to understand the overall composition and functioning of the Payments Board because an ATM payment service and its infrastructure is an entry point for several payment instruments that would come under the control of the board, and the original *raison d'être* for several commercial entities in the national payment system domain.

The Payments Board would have ***accountability and responsibility*** for several functions:

- The management oversight of the country's National Payment System through authority delegated by the central bank and applicable supporting legislation.
- To manage risk in the National Payment System through co-regulation of its member banks.
- To facilitate the introduction and administration of, and adherence to, clearing house agreements.
- To ensure the ongoing operation of an efficient, reliable and stable payments environment.
- To effectively manage the payment clearing operations between banks and the various licensed networks and operators.

The regulatory and management ***jurisdiction*** of the Payments Board, as mandated by the Central Bank, should include the following, where relevant and appropriate:

- The national payments system as a whole.
- The entire value chain, from sender/payer to receiver/beneficiary, including any instrument, infra-structure or other mechanism involved in a payments system.

- All rules, standards, processes, policies and agreements relating to a payment system.
- All participants in the value chain, including:
  - The banks.
  - All clearing system participants.
  - Other key participants including but not limited to:
    - Clearing House operators.
    - Payment system operators.
    - Providers of payments to third parties.
    - Non-banks issuing payment instruments, even if not specifically designated as such.
- All other stakeholders involved in payments.
- Cross-border payments and their currency aspects.

This is, of necessity, wide ranging and **clearly includes all aspects of the ATM payment service value chain and all of its components**.

In order to undertake these responsibilities within the defined jurisdiction, serving the broad requirements of the government and citizens of a country, several ***key performance areas*** exist for the Payments Board and its constituent parts.

1. Transparent and fair *entry* criteria.
2. Transparent and fair *participation* criteria.
3. Independent and objective governance.
4. Risk management: operational and systemic.
5. Compliance with international standards.
6. Broad accessibility to the system.
7. Enhancement and growth of the system.
8. Facilitated local, regional and international interoperability.
9. Product and service innovation.
10. Comprehensive and sound legal basis.
11. Management Integrity.

To illustrate the ***practical implementation*** required following all the focus areas above in establishing and operating a payments board, the guidelines below are offered for consideration.

For clarity in understanding these guidelines, it should be remembered at this point that the payments board regulates clearing houses which exist to operate payment streams made up of transactions initiated by payment instruments.

- For the purposes of clearing, the basic four-party model (as described elsewhere in this guide) should be followed. Closed-loop payment systems (permutations of three-party systems) should be discouraged.
- The systems of the various participants must be interoperable.
- Common standards must be supported and adhered to. Global standards must be supported at the level of the International Standards Organisation or, alternatively, as determined by international payment schemes such as SWIFT/Visa/MasterCard. The use of proprietary standards should be discouraged.
- The use of common, shared, infrastructure should be encouraged, especially infrastructure with high fixed capital costs.
- A payment instruction must be cleared and settled in the same payment system as it was originally presented. For example, a purchase transaction should not be cleared and settled within an ATM payment system in order to reduce fees.
- Clearing should not be permitted outside of the agreed clearing house structure. This would create a means of bypassing intended legislation, effective governance, clearing rules, and would result in regulatory arbitrage and legal uncertainty.
- System Operators participating the clearing process must be authorized, registered and may require certification.
- Competition within all categories, and between all participants, should be encouraged.
- The entrance of new participants in all categories should be encouraged, within the regulatory and risk management structures.
- Mechanisms must be in place to allow for appropriate reward for investments made, or risks taken, by payment system participants. This is usually achieved via fee structures.
- Innovation should be encouraged, while taking cognisance of the risks of such innovation. Regulation should be at a level which is enabling rather than stifling.
- An emerging payment stream, resulting from innovation or new technology, should create a clearing house as soon as two participants are ready. However, other parties should not be compelled to accept those transactions.
- The implementation and acceptance of new systems, technology, enhancements or transactions should be driven through normal market and competitive forces.

- All participants within a payment stream should be treated equally and according to clear principles and rules, irrespective of size.
- Clear and fair categories of participants must be created through an inclusive, transparent, process, based on their roles in the payments value chain. The risk profile within each category will be different and therefore criteria for entry into and participation within payment streams and clearing houses will differ for the various categories.
- Risk management should be aligned to real, practical, risk exposure.
- A participant that introduces risk must be responsible for that risk ("participant" in this example extends beyond the banks and includes system operators and non-banks that issue payment instruments).
- Payment Board management must commit to act in the best interests of the payments system as a whole, in terms of their fiduciary duties.
- The Payments Board must align their activities with all relevant legislation and central bank directives and policies. This obviously applies mainly in the case where the Payments Board is a separately constituted body rather than an organ of the central bank.
- The Payments Board should have recourse to specialist advisory groups. Participants in these groups should be at an appropriate level of skill, authority and status, and receive recognition and be rewarded for their contribution to the industry.
- At all levels, decision-making should preferably be by means of reaching consensus but a final voting process should exist to break deadlocks.

5.2. Clearing Houses

Clearing Houses are all founded on a principle of centralised operators providing connectivity and switching of transactions between all participants in a particular payment stream, for example, all the transactions generated by a defined set of payment instruments.

This is a highly efficient model which is managed in terms of a legal framework based on a clearing house Agreement signed once by each participating party but should be drafted in such a way that it creates a bi-lateral legal relationship between all the individual parties in the clearing house.

The Agreement is supported on a more detailed level by Clearing Rules that regulate the operational participation. A clearing house and its operations is managed by representatives of the participating banks via a Committee that bears responsibility for the effective functioning and risk management of the payment stream for which it is responsible. Participation and decision taking should happen on an equal basis with every committee member having one vote.

A Payment Stream itself is the functional set comprising of: payment instrument, processes, systems and rules, which enable participants to exchange and execute payment instructions. In order for a payment stream to work it requires access by a customer via a device and a channel (for example, card, ATM, network). It ultimately enables the end-to-end transfer of funds between participants.

Examples of payment streams, and therefore required clearing houses and committees that would be required to govern an ATM payment service are:

- The ATM payment stream itself, focused mainly on the cash functionality.
- An EFT payment stream to manage the payments and transfers that make up the non-cash financial functionality of an ATM.
- A Card payment stream to govern the types and usage of cards initiating ATM transactions.

There could be others depending on the full product functionality supported by the ATM network.

Interchange fees (the costs banks recover from one another for switched transactions) should be set on a multi-lateral basis at the payment stream level as different elements have to be considered in each case and different regional or international fees and factors are involved.

These fees would be defined (together with the process undertaken to derive them) within the Clearing House Agreement.

Interchange is a complex and sometimes emotive issue and needs to be considered with care, especially with financial inclusion becoming a more important and visible policy in most countries.

Fees are a sensitive issue in terms of access to cash, especially as cash is the "payment system of last resort", and are generally becoming more visible to the consumer.

The original concept of a general not-on-us transaction fee is rapidly being replaced by direct charging of issuer and acquirer fees, with surcharges applied by ISO operators.

The following diagram shows a sample ***payment value chain*** and may help to illustrate the contextual relationship of components.

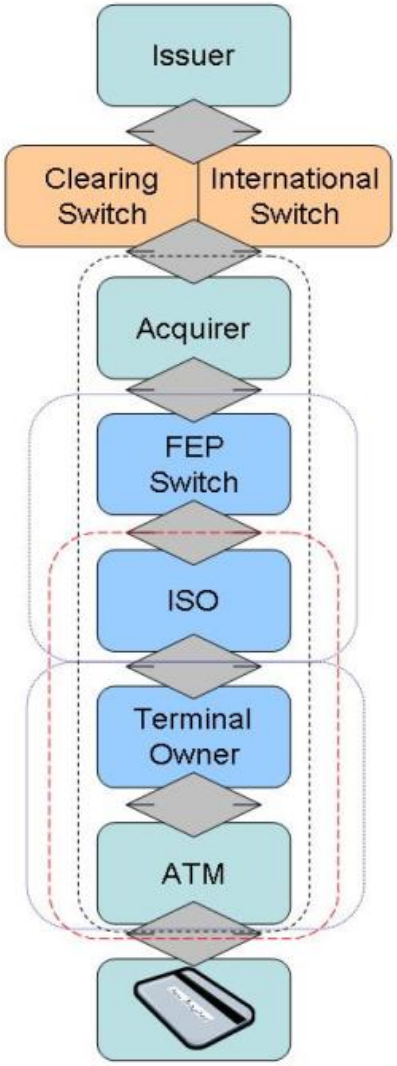

Figure 20. Sample payment value chain

It is only one fairly generic example but even this can be structured in different ways as illustrated by the entity groupings. Some of the intermediate entities between ATM and Acquirer may not exist or may just be functions within a single entity.

In terms of regulation, depending on who owns and operates the various parts of this value chain model, the Payments Board may directly regulate the entire process (if it all falls within an "open system" operated by banks) or only part of the process below the level of Acquirer (when outsourced or independent operators own and manage the lower part of the value chain). In the latter case, the Acquirers (broadly speaking) hold the accountability of their non-bank operating partners.

5.3. System Operators

Clearing House System Operators can be local or international organisations and perform the role of switching payment transactions between banks, that is, they are responsible for transaction clearing and for the calculation of payment obligations between different providers of payment services, including fees, and so forth. In doing this they must adhere to standards set by the central bank, the payments board and the clearing houses controlling the transaction types (payment streams) they are switching.

There can be a number of different System Operators that are active in different clearing houses; potentially even separately for different payment streams.

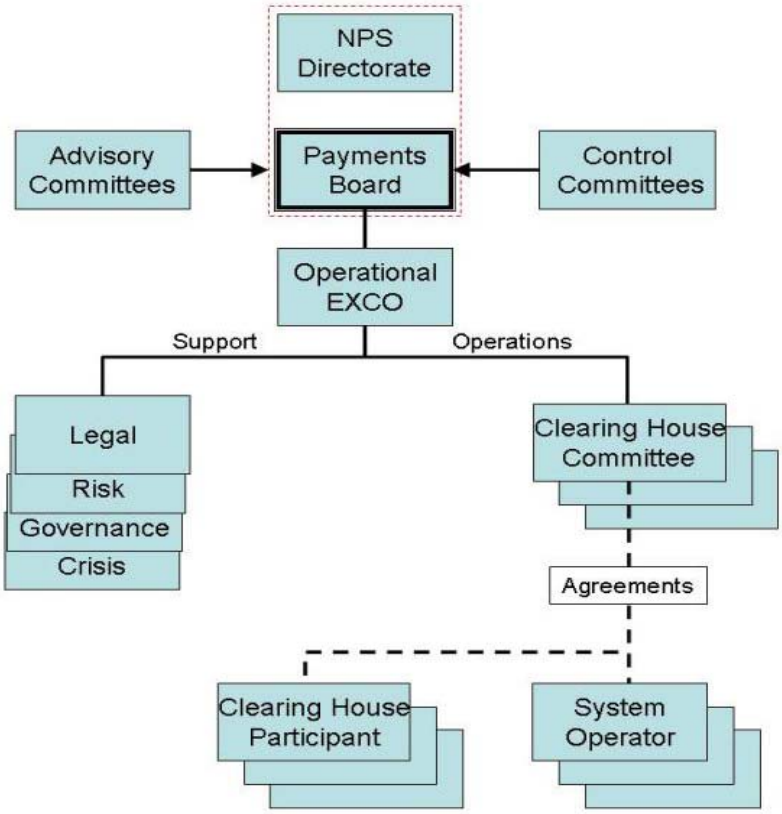

Figure 21. Clearing house architecture and System Operation relationship

Depending on their position in the overall payments architecture they may, or may not, calculate the settlement positions for the clearing banks. In the case where non-banks are included directly in the clearing system, and therefore interface directly to the system operator, settlement would usually be done by the clearing banks via a sponsorship (or client, or outsourcing) agreement. It is not usual for non-banks to participate directly in the settlement process.

The System Operator is also a business, not just a data centre, and therefore has shareholders, directors, users and a management structure, whether or not they are a private corporation, a public utility or a public-private partnership; the accountabilities are just different. As it (or one of many) may also be an international processing outsourcer, international commercial and regulatory considerations apply. It can, therefore, be a complex business to manage. It requires strong leadership, adherence to good corporate governance standards, and whilst its directors may be drawn from the same organisations as its customers their fiduciary responsibilities are different, and will probably be in occasional conflict. They will want to maximise profit and efficiency, their customers will want lowest cost; they will want to broaden their customer base, their customers will want to maintain control.

It becomes essential, therefore, that not only are the shareholder and user agreements comprehensive and enforceable (despite the possible common corporate parents) but that effective methods of conflict resolution are in place.

There will, no doubt, be users/customers who are shareholders; there may also be users/customers that are not – this will add further fuel to the likelihood of conflict. These mechanisms must be created up-front, at the time of corporate creation, and solidly incorporated into the relevant agreements.

5.4. Agreements

Each clearing house, the payment stream it manages and its participants should be regulated through an **Agreement** and a set of **Rules** (incorporating the principles in the Agreement) that govern the practical operation, as the foundation of an unambiguous process.

The agreement covers the legal relationship between the participants in the clearing house, and the rules govern the operational processes and standards to be complied with by the participants. A natural requirement is that issues of non-compliance and dispute resolution must be covered.

There are several clearing houses that affect, or are involved in some way, with an ATM payment service. Although the specifics of each clearly differ (and will differ in each country depending on the prevailing markets, legislation and conditions in each country), there is a general framework that can be adopted as a starting point for inclusive debate amongst participants.

5.4.1. The Clearing House Agreement

The Agreement should include the following subjects:

1. **Participants** and the definition of who the participants are, and the qualifying criteria for potential new participants. Do they have to be a Clearing Bank, or some other form of Bank, or a Bank at all? Are non-Bank acquirers allowed to join a Clearing House? If so, under what conditions? Are they limited in functionality? Do they require sponsorship and guarantees? Participants are all signatories to the **Agreement** and must comply with the **Rules** applicable to the specific clearing house.
2. **Obligation** is a formal, comprehensive, statement of compliance to clearing house rules and regulations – to include acceptance of the actions that could be taken against the signatory in the event of non-compliance, as a result of the increased risk that such non-compliance may introduce.
3. **Transactions** is a precise definition of the types of transactions that may be initiated or processed under the auspices of the particular clearing house, to include definitions of currency and limits on value.
4. **Risk** involves all participants who must adhere to all reasonable auditing, risk management and risk containment measures as requested by the relevant clearing house and the Payments Board; this should specifically include an agreement against colluding with customers to bypass risk prevention criteria.
5. **Information** includes the requirements for information security and privacy, and the retention of data for legal purposes.
6. **Fees** details common, bi-party and/or multi-party fees and charges that would be negotiated between the participants.
7. **Management** includes statements about the management of the operation of the clearing house. These should reflect that it is a self-governing entity that exists with the support of the central bank, and via a mandate from the payments board; and a formal recognition that such support and mandate could be withdrawn.
8. **System Operators** covers: a mutual agreement to utilise the system operator(s) approved by, and potentially contracted to, the clearing house. This commitment is fundamental to the commercial viability of the clearing house concept as a whole.
9. **Clearing Rules** is: a statement of the clearing rules for the specific clearing house or, if these are contained in a separate document, a reference to that document. Some example rules are described later in this guide and should be used to stimulate discussion in a workshop environment where the participants include at least all the members of the relevant clearing house Committee. This is a complex and

detailed task. For clarity in this section of the guide, some example items related to ATMs are given here:

a. ATM debit payments may only be delivered for clearing on an individual entry by entry item basis in real time.

b. ATM debit payments may only be initiated by a PIN verified payment instrument such as a cash card, debit card, credit card, or smart card.

c. The storage of PIN information is prohibited.

d. All ATM debit payment instructions that are correctly validated by PIN management, authorized and delivered to the Issuer must be accepted.

e. Any payment which has been authorised by the Issuer may be cancelled via an instruction delivered for processing in the same clearing cycle.

f. The Acquirer and terminal owner must include references to themselves in any ATM debit payment instruction.

g. The Acquirer and terminal owner must include reference to the identity of the beneficiary in any ATM debit payment instruction, where the beneficiary is a third party.

h. Where payment has been authorised and made by the Acquirer and terminal owner in accordance with the mandated process, and it is subsequently established that the payment instruction was initiated fraudulently, the Acquirer and terminal owner shall be liable for any loss arising.

i. Any additional items.

5.4.2. The System Operator Agreement

The system operator(s) must conform to a set of defined criteria and be approved by the participants of the clearing house for whom it will providing a service. These criteria should include at least the following:

1. **Financial**, a proven financial standing, an ability in terms of financial reporting and verifying its capacity to operate for at least 12 months from the date of implementation.
2. **Service Level** as defined within comprehensive Service Level Agreements, including its ability to monitor and report on compliance to these.
3. **Management** covers managerial resources and competence, with specific reference to high-volume, time-critical transaction processing.
4. **Technical** defines technical capabilities and capacities, and ability to conform to standards. Planned obsolescence, upgrading and

replacement programmes should be in place. Its ability to meet security standards to correctly connect to participants' systems.

5. **Operational** includes resources able to meet required levels of service, including having in place necessary escalation and business continuity processes.
6. **Legal and Contractual** contains agreements cementing the above criteria into law; also to include definitions and commitments relating to accountabilities, pricing, liability, dispute resolution and information management.
7. **Risk** details adherence to all reasonable auditing, risk management and risk containment measures as requested by the relevant clearing house and the Payments Board. Provision must be made to cater for potential changes in the legal structure or ownership of the system operator, and to enable the central bank to invoke a take-over of a system operator, in need, to ensure the continuity of clearing services.

5.5. Payments Board Operation

At this point, a little more input to the possible makeup and operation of the Payments Board itself may lead to some useful discussion. It has been stated that the Payments Board may be either an entity within the central bank (or more accurately, within the central bank's national payment system directorate) or a separate, independent, self-governing body, depending on the size and complexity of a country's national payment system.

- In the first case, the board and the EXCO (Executive Committee) are likely to be one and the same.
- In the second, the board would essentially operate as a board of directors and the EXCO as a normal management team in a commercial entity.

However, in either case, a broad representative body is required to guide and set policy and principles.

In order to do this a Steering Committee consisting of voting members drawn from all participants in the clearing mechanism of the national payment system should be formed (usually all clearing banks and the central bank, but others may be included depending on legislation).

For the purposes of separation of duties, the payments board is ***not*** a subset of this steering committee, although the payments industry participants represented on the payments board will be a subset of those represented on the steering committee. The following diagram may help to clarify the concept.

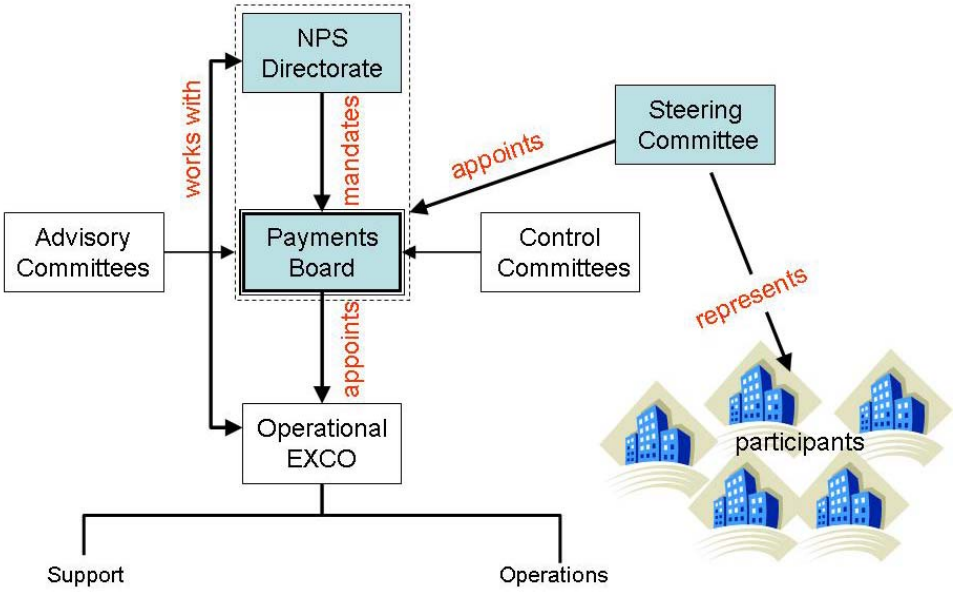

Figure 22. Payments Board operation

As a general guideline for discussion, the following are some examples of the potential duties of the Payments Board and the Steering Committee:

5.5.1. Payments Board

1. Receives policy from the NPS Directorate of the central bank
2. Influences policy and policy changes made by the NPS Directorate
3. Converts Policy into Principles to be followed within clearing houses and their committees
4. Empowers the EXCO to implement rules, derived from these principles, for implementation within clearing houses and system operators
5. Receives guidance from the Steering Committee, influencing the way in which policy, principles and rules are addressed and formulated
6. Works to obtain consensus on all issues under debate relating to payment streams, clearing houses and system operators

5.5.2. Steering Committee

1. Tables and discusses items for decision and implementation by the Payments Board
2. Reviews decisions taken by the Payments Board or EXCO
3. Requests research to be undertaken
4. Requests expert assistance from the Payments Board or EXCO

5. Votes on items tabled and actions to be taken
6. Seconds staff from their respective organisations to assist EXCO
7. Allocates staff from their respective organisations to attend and be responsible for the various clearing house committees
8. Enables the central bank and its NPS Directorate to adequately discharge their responsibilities in terms of the monitoring, regulation and supervision of the payments environment
9. Brings to the attention of the Steering Committee any details concerning members/participants not adhering to the principles and rules agreed to
10. Represents their respective organisations in accepting liability for all settlement risk
11. Represents their respective organisations in accepting liability for all operational risk
12. Provides funding to enable the Payments Board and EXCO (if an independent entity not part of the central bank structure) as well as the various clearing houses and committees to operate

5.6. Role of Non-Banks

There could be many non-regulated players in the ATM payment service that fall outside of the "***payment board/bank/clearing house***" governed structure. Their number, influence and impact will depend on local conditions but, in principle, the regulatory environment needs to recognise their existence, understand their impact (particularly in terms of systemic and reputational risk), and find a way to incorporate them without stifling innovation and competition. These organisations are likely to include (in the ATM domain) some or all of the following:

- Network operators.
- Retailers.
- ATM owners.
- Independent Sales Organisations (ISOs).
- Private, cooperative and front-end Switches.
- Prepaid card issuers.
- Prepaid value sellers.
- Cash distributors.
- ATM technical service operators.
- Bureau and System Operators.

Whilst it is usually the technical infrastructure operators, and infrastructure financiers, that are considered here, other functionaries should not be forgotten. For example, issuers of non-bank payment instruments such as cards that are underpinned by "accounts" funded by pre-payments, discounts, overpayments and lines of credit. These organisations are generally not bound by the same standards, rules and regulatory oversight as banks and therefore don't necessarily take the same steps to provide a safe, efficient, interoperable and cost effective service. An access regime that includes these non-bank providers of payment services must be developed to allow for their participation under suitable regulation and supervision in the formal payments infrastructure. Depending, again, on local conditions, these various organisations and their potential risk impact could be managed via *inclusion, exclusion, negotiation* or *direct regulation*, or a combination of these based on an analysis of individual players. Oversight should be in line with their role and size in the payment chain.

- **Inclusion** would require direct participation of an organisation within the payments structures discussed above. As the Payments Board is established (in the model proposed in this guide) as a central bank mandated (self-)regulating body of the payments industry, significant non-bank participants should, in reality, participate directly in it. It is normally not considered acceptable to allow non banks (specifically non clearing banks) into the clearing mechanism itself; however, there should be a way to accommodate them by excluding them from settlement, limiting their activities, managing their market conduct and regulating their float holding, as has been done in some countries.
- **Exclusion** defines when non-participants, that is, non-banks, could be prevented from participating in the payments industry at all through legislation. This could be applied selectively to avoid breaking the principles of balance stated earlier, based on the category, size, and so on, of each organisation.
- **Negotiation** covers bringing non-banks into the formality of the payments industry which could be done on an arms-length basis by establishing consultative and/or representative associations with direct and formal links to the Payments Board and/or the NPS Directorate.
- **Direct Regulation** acknowledges the roles of the more critical non-bank players and creates specific legislation to define their market participation, conduct, accountability and oversight.

Chapter 6. Business Continuity Planning

The definition of a Business Continuity Plan for an ATM payment service, together with its associated Disaster Recovery and Crisis Management plans is a complex subject, very specific to the business and infrastructure affects, and beyond the scope of this document.

This section is largely a place-holder to remind readers that BCP is a critical element of payment system design, development, management and operation, and is usually (or should be) mandated by a central bank within the national payment system governance regulations.

Figure 23. Business Continuity Planning life cycle

Business recovery operations are no longer aimed only at what is inside the data centre. Recovery is a corporate-wide undertaking. As payment system operations become decentralized, regional operation centres face greater exposure. As operations are outsourced, and less regulated commercial entities enter into the ATM service arena, BCP planning becomes both more complex and more necessary.

The staples of virtually every working environment such as office space, personal computers, telephones, automatic call distribution systems, and other critical office equipment , including those in remote locations, need to be accounted for in a disaster recovery plan.

Business continuity has moved beyond recovering computer systems to restoring and recreating business processes.

A payment System Operator's BCP arrangements must aim to ensure that it meets agreed service levels even if one or more components of its system fails, or if it is affected by an abnormal external event.

Many international standards and regulations exist on this topic, and many consultants and vendors earn a living from aiding in the planning and execution of business recovery.

The following quote, albeit specifically relative to banking, is worth repeating here.

Ms. Susan Schmidt Bies, Governor, Board of Governors of the Federal Reserve System, United States of America:

> "Banks, like businesses everywhere, can be subject to wide-scale disruptions resulting from both natural and man-made disasters. Potential problems include destruction of facilities, missing personnel, power and communications outages, lack of transportation and fuel, interruption of mail and other delivery services, and health and safety crises. In short, services and activities normally taken for granted can be suddenly disrupted – and in some cases for an extended time. When developing business-continuity plans, bankers need to understand that people are the most vital resource. Bankers should plan for ways to track and communicate with personnel through a range of channels, including ways to reach personnel if phone and electrical services are down… Depending on the cause of the disruption, bankers should also expect that some of their personnel may be dealing with family emergencies that will limit their ability to work. Therefore, it is especially important to identify and train backup personnel to handle critical operations and services. Business-impact analysis and planning requires that bankers understand not only their business lines but also the systems and processes that support those business lines. The bank's planning should address how these support systems and processes could be recovered if they are disrupted, including the effect such a disruption would have on the bank's facilities, equipment, and other physical property. The bank may have to operate from backup or some type of recovery facilities for an extended period in order to provide critical services to customers. Employees may also need to be prepared to perform services manually if computer systems become unavailable. Naturally, we cannot expect bankers to prepare for every conceivable event or plan for them with equal intensity. As with any aspect of risk management, bankers should assess the probability of an event and its potential consequences. We certainly understand that planning, preparation, and testing consume time, energy, and money. Accordingly, institutions should determine the most cost-effective way to mitigate risks and continue to assess which possible events deserve greater attention and preparation."

Chapter 7. Payment Stream Rules

The payment streams in operation in a country will be determined by what the clearing banks in that country wish to support. A subset of those payment streams will be supported through the ATM payment service of the country. This is determined by the clearing banks, the capability of the ATM infrastructure, the requirements of the market and the applications offered by the ATM owners, networks, etc, in that country.

Each payment stream will have a set of rules governing how that payment stream must be managed by all the various participants, usually via a purpose-built clearing house and one or more appointed system operators/switches. These rules have to be developed locally and in-situ owing to the variance in legislative, social, political and economic conditions from area to area.

The following checklist of possible items for inclusion in payment stream rules for use in ATM switching is offered as input to the process; whilst sample detail is given in some cases these are intended to be merely examples as an aid to the process of inclusive self-determination which must be undergone in each case.

NOTE: These rules consider only the switched (that is, not-on-us) transactions, typically limited to cash withdrawals, sales of pre-paid value and balance enquiries.

However, this could be extended to functions such as deposits, ticket purchases, etc, as required in each area subject to the existence of agreed and appropriate, rules and processes.

Use of ATMs for the purpose of initiating non-cash transactions such as EFT third party payments, for example, is in terms of an initiator and carrier of a payment instruction. Such a payment instruction would normally require that a Form of Authority, or Mandate, is already in existence. Mandates can be created electronically, through the process of adding a payment recipient online, but this function is not usually recommended as an ATM transaction.

Depending on the transaction, and on the third party receiving the payment, there may be additional rules imposed on the ATM payment service.

7.1. Rule Examples

The rule examples given in this section relate to local acceptance and switching, and need to be read in conjunction with, and expanded by, the

operating regulations issued by all the international card associations whose products are going to be accepted in the ATMs.

The rules are binding upon all participants in the value chain.

Generally, in the event of any inconsistency or contradiction the regulations of the international association would take precedent, unless doing so contradicts local laws. Those operating regulations are extremely detailed and quite onerous, and are available to all of their customers, although not generally obtainable in the public domain. In most cases, these regulations are so widely adopted that they have become de facto international standards.

Product Rules

1. Cards accepted.
2. Cash products.
3. Prepaid products.
4. Scrip products.
5. Non-card products.

Standards Rules

1. Card standards.
2. Messaging standards.
   - Device security standards.
   - PIN security standards.
   - Interface standards.
   - International compliance.
3. Encryption Standards.

Participation Rules

- No clearing between participants without legally binding Clearing house Agreements in place.
- Participants may only use the services of an authorised System Operator.
- A participant may only outsource on the basis that the service provider is operating purely in the capacity of a service provider, and does not undertake any financial obligations or liability.
- A sponsor must assume all the payment obligations created by the clearing process.

- An Issuer must supply a list of the response codes, as a sub-set of all permissible codes, that will be used in their reply messages.
- The introduction of an additional / new response code must be approved in advance by the clearing house.
- Terminal Owners, are not obliged to use all response codes.
- Issuers' systems must be able to act appropriately to all response codes.

Compliance with Standards Rules

- Participants are obliged to conform to all standards adopted by the Clearing House and the System Operator.

Penalising Non-compliance with Standards Rules

1. Financial penalties.
2. Withdrawing participation.

Payment Instructions Eligible for Clearing Rules

1. Cash Withdrawal Limits.
2. Pre-Paid Limits.
3. Products are subject to card and account limits as agreed between the Issuer and the cardholder, as validated by the Issuer during the authorisation process.
4. As a minimum, all terminal owners must process all cash withdrawal and balance enquiry requests.
5. If the terminal owner issues a negative completion, the response code field must indicate whether or not the related transaction, should stay in the clearing process or not.

Device Security Rules

1. Standards: national and international standards.
2. Evaluation: An evaluation facility, approved by the Payments Board should evaluate all Secure Cryptographic Devices.
3. Limitations on Functions: The function set of a Security Control Module should be designed so that no single function, nor any combination of functions, can result in disclosure of secret information.

4. Device Management: Certain devices must be managed in accordance to international standards and requirements laid down by the Payments Board EXCO, for example:
   - PIN Entry Devices.
   - Security Control Modules (Host Security Modules).
   - Key Loading and Transfer Devices.
5. Terminal owners must exchange PIN Working keys with the clearing house System Operator at least once every two weeks.

Processing Standards Support Rules

1. The transaction acquirer must ensure that its systems (or systems used by it throughout the acquiring value chain) force the use of a card and PIN to initiate each payment.
2. PINs may not be stored within the terminal or system.
3. Track 2 data stored on the magstripe, and/or Chip application data, may not be stored or recorded for the purpose of initiating requests for authorisation or payment instructions at a future date.
4. The terminal owner's switch branded terminals must accept the cards of the other clearing house participants.
5. The terminal must initiate a request message to the issuer immediately on receipt of the client's keyboard input.
6. The terminal must encrypt PIN numbers at the moment of input by the client.
7. The issuer must generate reply messages with appropriate response codes that indicate what action is required from the terminal owner with regards to a specific message.
8. The terminal must issue a negative completion message with an appropriate response code upon detecting an error before finalising a transaction.
9. The issuer must accept any negative completion message and should the response code indicate that the transaction is not included in clearing, or included in clearing with a different amount, apply reversing entries to its client's accounts on a real time basis

Payment Exchange Timeframe Rules

1. Online availability of both Terminal owner and Issuer functions. Availability during Core Hours must not be less than XX% of the time measured over any given month.

2. Response times from System Operator to the Issuer, and vice versa, must be less than X seconds for XX% of transactions and less than X seconds for XX% of transactions processed.
3. Response times from Terminal Owner to System Operator, and vice versa, should not exceed X seconds for XX% of transactions and X seconds for XX% of transactions.
4. Timeout parameters set by each participant on its terminals must be not less than X and not more than X seconds.

Processing Time Frames at the System Operator Rules

- Dependant on participant processing.

Settlement and Settlement Timeframe Rules

- Dependant on central bank rules.

Financial Reconciliation and Settlement Adjustment Rules

- Dependant on central bank rules.

Handling Bona Fide Errors (such as duplication) Rules

1. An online real time electronic system must be used to automate the settlement of errors and for participants to transmit queries and query resolutions to each other.
2. Participants must resolve all queries within X business days.
3. Participants (terminal owner through Issuer), including the System Operator, must maintain adequate audit trails of all transactions and associated fees for a minimum of X months. Thereafter the records must be maintained for a period a to comply with local financial regulations.
4. Queries raised by an Issuer, which are older than 6 months may be disregarded by the Terminal owner, and in these cases the Query must be settled by the Issuer with their client.
5. In the event of a dispute, copies of audit trails are to be provided by all participants within X business days from date of request and the matter resolved between the participants concerned.
6. Where an overpayment occurred due to a fault on the Terminal, and which did not result in an unbalanced settlement position, the Issuer, should make every reasonable effort to recover the funds from their customer and reimburse the Terminal owner accordingly.

7. In the case of a transaction involving a Third Party Recipient, the Acquirer is responsible for query and/or dispute resolution in response to matters raised by the Issuer on behalf of the Cardholder. The Acquirer accepts the risk in the event of non-performance of the Third Party Recipient's obligation. This excludes fraudulent transactions.
8. In the instance where swapped cash canisters caused the terminal to over dispense, the Acquirer, ISO or terminal owner (subject to the legal arrangements between them) will carry the risk of loss. The Issuer should, subject to a maximum of X calendar days, make every reasonable effort to recover the funds from their customer and, if successful, reimburse the Acquirer.
9. In the instance where swapped canisters caused the terminal to short dispense, the matter must be resolved according to the rules that deal with disputes.

Handling Fraudulent Payment Instructions Identified After Payment Rules

1. Card swapping.
2. Lost or stolen cards.
3. Robbery.
4. Card reader jamming.
5. Card skimming.

Changes to BIN Table Rules

1. Dates permitted for changes.
2. Advance notice for changes.
3. Obligations to accept.
4. Cost recovery.

Terminal Device Rules

1. ATMs devices utilising the switch network are to conform to the following:
   a. The devices must be self-service and stand-alone dispensing cash and/or services to the general public.
   b. Devices should be located mainly in public places.
   c. Payment instructions through the devices must be Customer activated by the use of a card and PIN.

   d. The PIN number entered on the device must be encrypted on output from the device (for example, a PIN number must never be sent in the clear).

   e. The PIN entry device must be designed and installed so that the customer is able to prevent third parties from observing the PIN value as it is being entered.

   f. In order to protect the unenciphered PIN, the PIN entry device must be a Secure Cryptographic Device. All cryptographic functions must be performed in a secure cryptographic device in which all clear text keys and PINs are physically protected against disclosure and modification.

2. All participants along the value chain must encrypt PINs in either of the following devices:

   a. Physically Secure Device, or.

   b. Device that incorporates Smartcard ATM technology and Tamper Resistant Characteristics; together with a working key, which is used at the ATM/Non-ATM.

3. In order for a terminal to qualify as a "Physically Secure Device", it must ensure that penetration of the device will cause immediate erasure of all PINs, cryptographic keys, and all useful residue of PINs and keys contained within it.

4. All terminals must support a unique key per terminal.

5. Devices must be approved by the System Operator from a technical systems point of view.

6. Devices must be identified with the logo of the Terminal owner.

Transaction Receipt Rules

1. The minimum information printed on a customer's receipt for a successful cash withdrawal must be specified, and should include:

   a. Trace number.

   b. Authoriser Reply Code.

   c. Terminal Identification.

   d. Terminal Sequence number.

   e. Last three digits of the account number.

   f. Date & Time of transaction.

   g. Withdrawal Amount.

2. Balances must not be printed on the receipt when the transaction has been declined.

3. For a successful Third Party Payment transaction, the following information must be printed on the transaction receipt:
   a. Switch Trace Number.
   b. Authoriser Reply Code.
   c. Terminal Identification.
   d. Terminal Sequence Number.
   e. Last four digits of the card number.
   f. Date and time of transaction.
   g. Third Party Service Provider Name.
   h. Reference number of the device receiving recharge value (for example, cell phone number, meter number).
   i. Amount of the transaction or service value.
   j. Help Desk telephone number of Service Provider for payment queries.

Interchange Audit Trail Rules

1. Each Acquirer should ensure that interchange reports are produced containing information which:
   a. Satisfies the internal audit requirements of both parties.
   b. Provides the ability to trace items in the event of discrepancies.
   c. Assists in verifying settlement figures.
   d. Provides statistical information for calculating Interchange Fees.
   e. All transactions, whether approved or declined, that are processed through the ATM network must be reported, to assist with cardholder enquiries and balancing procedures.
2. Each Acquirer should have a daily transaction file containing the following:
   a. Cardholder Number.
   b. Acquirer Sequence/Trace Number.
   c. Issuer Sequence Number.
   d. Local Posting Date.
   e. Real Calendar Date and Timestamp of Transaction.
   f. Acquirer ATM Sequence Number.
   g. Transaction Type Performed.
   h. Amount of Transaction.
   i. Location.

   j. Authorisation response code.
   k. Terminal ID number.
3. Each participant should produce a monthly interchange billing report specifying:
   a. Number of Transactions acquired.
   b. Fees applicable to transactions acquired.
   c. Number of Transactions issued.
   d. Fees applicable to Transactions issued.
   e. Net settlement figure for monthly fees.

Retention of Cards Rules

1. Days retained.
2. Destruction rules.
3. Issuer advice after retention or destruction.

ATM Branding Rules

- As determined by joint marketing committees.

Cash Dispensing Rules

- To be agreed based on currency type and denomination, location of devices, cash distribution facilities, security issues, and so forth.

Penalising Non-conformance to the Clearing Rules

1. Definitions.
2. Resolution procedures.
3. Fees and costs.
4. Loss apportionment.
5. Serving of notices.

Escalation Procedure Rules

1. All problems should be managed in accordance with an agreed production problem process between the parties.
2. ATM interchange escalation procedures should be defined based on three severity levels and three levels of escalation, and the process should be applied 24x7.

3. Severity level examples:
   a. **Critical**—The service is unusable or unavailable.
      - System/online/network component down.
      - Product/service unavailable.
      - No bypass available.
   b. **Medium**—The product service is useable, operations are restricted, a level of risk exists.
      - Limited/no access by network devices.
      - Product/service degraded or restricted.
   c. **Low**—The product service is useable, operations are restricted, risk is low.
      - Day to day issue.
      - Problem Identified.
      - No customer impact.
      - Resolution is available.
4. Only the first two levels need be advised by the switch operator to the issuer/acquirer participant after normal business hours.
5. The escalation levels should be defined on the basis of time-to-escalate (which may differ for each severity level), seniority level of management involved, and a defined process to be adopted for each level.

Regional Cross-border Payment Rules

- To be determined according to regional rules.

Service Level Agreement (SLA) Rules

1. Every operational participant in processing the payment stream must commit to a Service Level Agreement to ensure against systemic failure.
2. SLAs need to be coordinated to avoid a “weakest link” or “serial points of failure” situation.
3. SLAs need to be formally reported on, on a regular basis, to both the payments board (as the ultimate accountable body) and to the next participant up the ATM value chain.

Fees, Transfer Charges, and Interchange Rules

The various fees require to be unambiguously stated, transparently established, and calculated via an enforceable charging mechanism as this can be the most contentious of topics. The amount of time and effort necessary to establish this mechanism should not be underestimated.

Chapter 8. Development of Switching Infrastructures

What is the best approach to setting up a centralised switching infrastructure?

Some of the more detailed aspects of the technology and some input into how to manage the business/technical process as a programme are covered later in the guide. At this point, it is only necessary to establish a concept; the concept of a top-down approach.

8.1. Governance Versus Switch Centricity

It is possible, and has been done many times, to use a "switch centric" approach. However, it is recommended here that a "governance centric" approach should be used.

- **Switch Centric** means starting with a commercial or political decision to form a switch and then launching a business/technology driven programme to achieve that, usually as a joint venture between banks and a major vendor, network or services outsourcer. Whilst this would no doubt be effective, and would probably be faster to market, it may not be well grounded from a legislative point of view and may not satisfy the requirements for a sustainable solution in terms of addressing socio-political and longer term interoperable requirements.
- **Governance Centric** means first ensuring a valid legislative and governance structure exists, and deciding on the socio-economic requirements, before commencing with a switch. It does not necessarily mean dispensing with the joint venture business/technical programme (which may end up being identical) but introduces two additional considerations.
  - Firstly, in many countries, because of the political and economic environment, a central clearing and ATM (and other payment) enabling infrastructure could be an ideal PPP (public private partnership) opportunity.
  - Secondly, it would usually be beneficial to either start with, or at least review, the governance, legislative and regulatory environment, as it relates to payments in general and ATMs in particular. In other words, if they do not already exist, the creation

of a Payments Board, Steering Committee and Payment Stream Committees, together with the basis of their respective Agreements and Rules, in advance of planning for the creation of processes and infrastructure.

The implementation of modern retail payment systems is a complex undertaking. Given the size and diversity of the network of direct and indirect participants the success or failure of the programme will rest on the strength and capabilities of the managing body. In the example given in this guide, it would fall to the structures established by the central bank, national payments directorate, payments board and the various committees. The following sections cover the two most important pre-implementation tasks, situation assessment and strategic plan and vision.

8.2. Situation Assessment

It is essential to take stock of the environment, current resources (their strengths and weaknesses and the current levels of resource utilization), national economic strategies and socio-political circumstances. A complete and up-to-date quantitative and qualitative analysis of the current retail payment systems is required – often referred to as a Country Audit. Various models of such evaluations are available in the public domain for reference. This topic is referred to again, in more detail, later in this guide.

8.3. Strategic Plan and Vision

The formulation of a strategic vision of where the country wishes to be in terms of an ATM payment service is critical in order to know how to progress along the implementation path. And to be able to create conceptual business architectures and designs that will define the development approach. This includes: knowing what the country wants to do in terms of other related services, including the issuing of cards and substitute products; what public/private relationships may be desired; what and how the infrastructure should evolve; what regional interoperability may be required; and so forth.

A comprehensive retail payment switch comprises not just the money movement mechanisms – banks, payment processing organizations, communications networks and computer systems – but also includes some or all of the following:

- Institutions providing financial intermediation.
- Explicit legal and statutory frameworks.
- Applicable rules, regulations and agreements.
- Requirements for domestic payment standards and the relationships with international standards.
- Minimum compliance definitions.

- Public education programs to build understanding and confidence in the use of the services.
- An ombudsman function to research and resolve disputes between consumers and service providers.
- Scope of appropriate payment instruments to be utilised.
- Functional requirements and standards for processing systems, interfaces and operating procedures.
- Business models and applicable architectures to achieve the most cost-effective technological infrastructure.
- Requirements for clearing and settlement mechanisms that balance risk and efficiency requirements.
- Roles of participants in the value chain that help to satisfy market needs at acceptable costs.

Chapter 9. Switch Architectures

What is a switch (in the context of this business-level ToolKit)? Referring back to previous illustrations and information in this guide, a "switch" can play varying roles within an ATM (or other generic) payment solution, depending on where it is positioned in the value chain, what business model has been adopted, and who owns and operates it. There is traditionally a basic operational divide at the Acquirer function in the 4-box payment system model between:

9.1. A Front-End Switch

- Operating in the ATM domain.
- Interfacing to terminal devices.
- Managing terminal devices.
- Interfacing to a variety of delivery channels.
- Managing the ATM domain security.
- Performing stand-in authorisation services.
- As a front-end-processor.
- As a router.
- As a cash and consumables monitor.

9.2. A Back-End Switch

- Operating in the Interbank domain.
- Managing the clearing system.
- Interfacing to inter-regional and international networks.
- Interfacing with settlement systems.

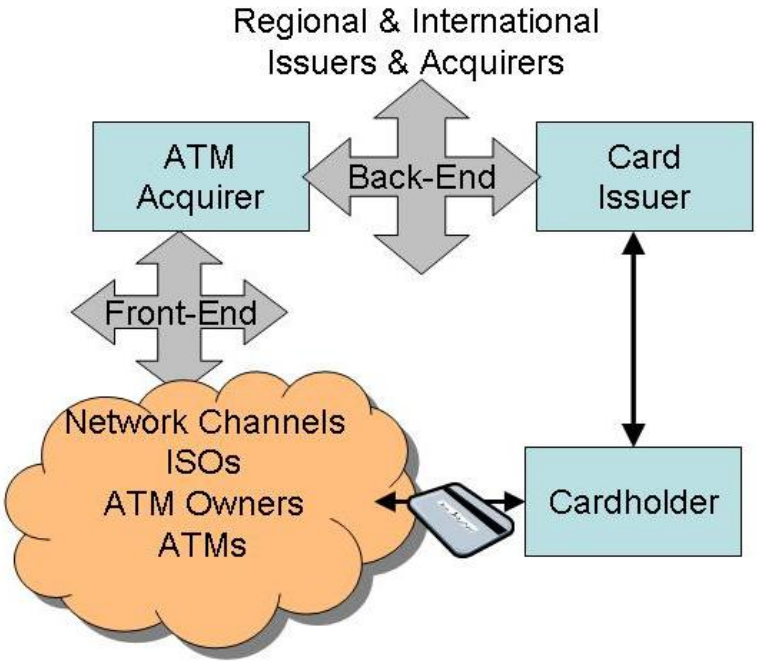

Figure 24. Back-end and front-end switches

Depending on the business model and participants there are a variety of additional potential functions ranging from fee management in interoperable and shared networks, to GPS services and biometrics for mobile payment facilities.

It is also possible that the above two logically separate operational sets could be physically combined in a single "switch", where ATM services are relatively limited, or where a group of banks out-sources all their networking.

Switches can be relatively small, SQL Server based, clusters of processors, or gigantic fail-safe processors of huge volumes of real-time transactions. Switches can manage their own physical networks, or rely on virtual, mobile or internet channels. Switches can be local, linked to international servers for international traffic – or international, linked to local servers for local traffic. Switches can be locally owned and managed, or internationally owned and managed. Virtual switches can be physically split between local and international locations. Physical location is less important than standardisation, reliability, throughput, support and interoperability.

A brief review of the diagrams of the business model examples given earlier in this guide (repeated here for convenience), and the differing positions that "the switch" or switches could occupy in them, should help to illustrate the variety.

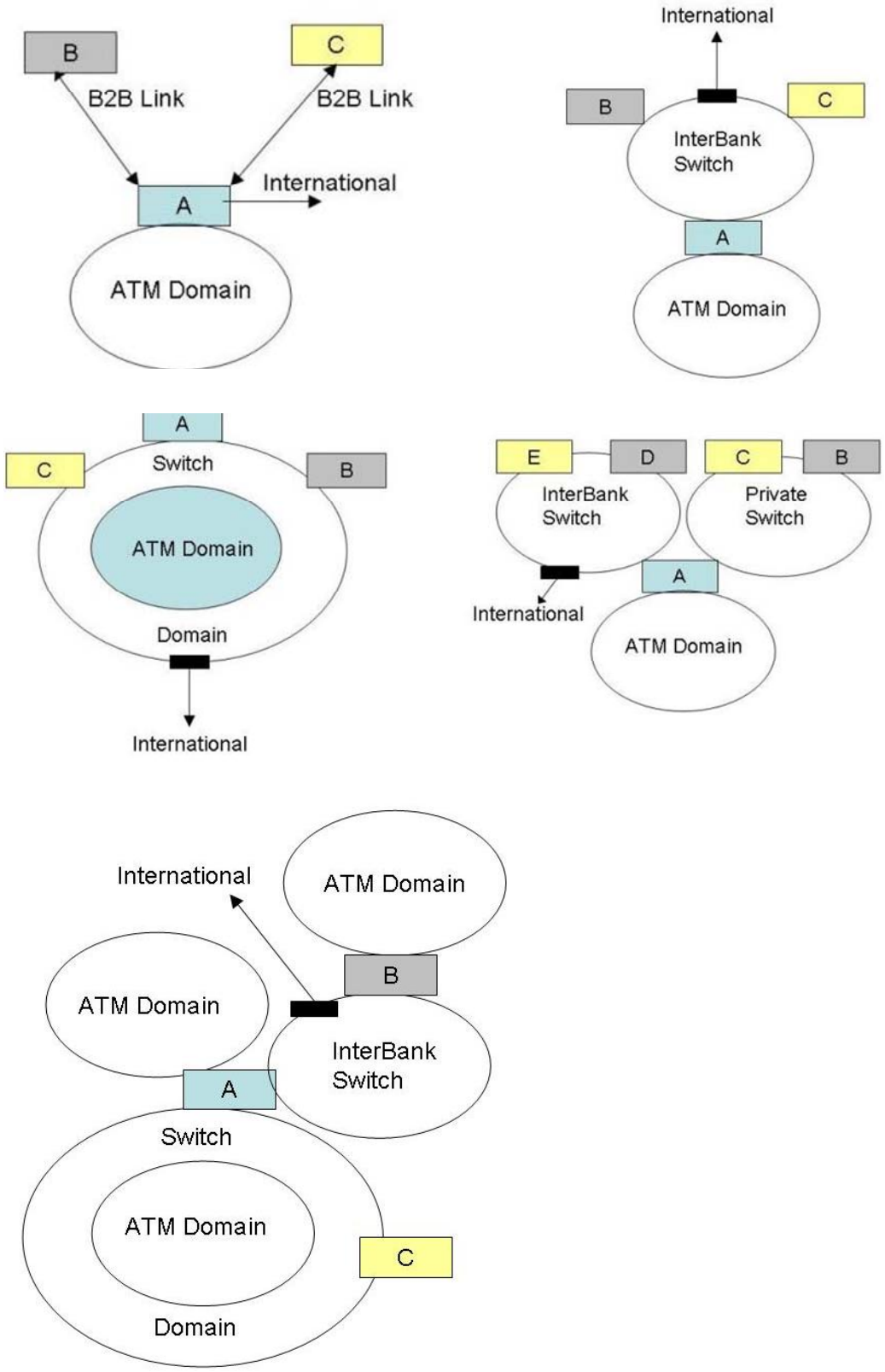

Figure 25. Business model diagrams

A review of the ATM payment Value Chain diagram (given here for convenience) also illustrates the various positions within the value chain that a switch could be located to play one of its diverse roles.

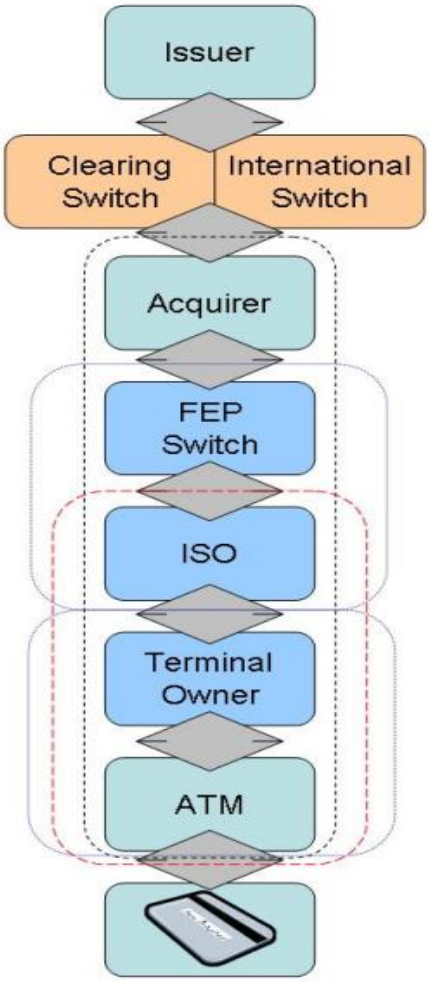

Figure 26. Value Chain diagram

Once again, the point is made that each environment requires detailed assessment and analysis before any decision about switching solutions can be made (ATM or otherwise).

A typical "switch" technical solution is a modular EFT processing and switching system that provides ATM terminal driving, transaction authorisation, flexible routing, security management (including EMV requirements) and network control functionality. It should also support multiple currencies, and multiple host and interchange interfaces. The business functionality should include settlement preparation, reporting, cash management and fee management. In some cases a stand-in authorisation function is provided.

From an architectural point of view, the routing and processing functionality is often separated for performance reasons, and the "switch" may be a logical entity made up of multiple physical entities remotely located from each other in a processing web.

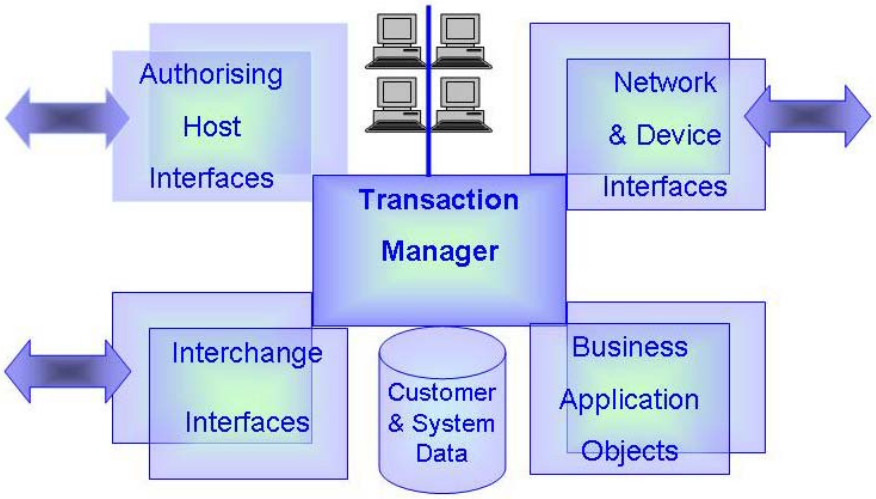

Figure 27. Routing and processing functionality architecture

The system overall should be a scaleable, robust, high-performance, fail-safe solution for delivering an ATM payment service for organisations of all sizes. ATM owners and service organisations should be able to offer their customers a range of services through their own proprietary networks, and an agreed subset of services to other organisations through regional, national and international interchange networks.

The variety of needs, and of solutions available, is so disparate that further technical discussion is not practicable without detailed knowledge of the requirements. Suffice to say that there are such a wide variety of solutions available that finding a technical solution to the defined business requirements will not be a limiting factor.

Chapter 10. ATM Development Programme Background

A Programme **is defined here as the total body of work that has to be managed to achieve the desired business or strategic result.**

An ATM development programme includes both business and technical aspects and normally consists of a number of defined projects, each of which are focused on achieving a specific task contributing to the overall goal. To understand the scope of the programme contemplated here (in terms of developing or improving an ATM payment service) some information items are offered for consideration first, and then the guide moves on to establishing a formal programme and its constituent projects.

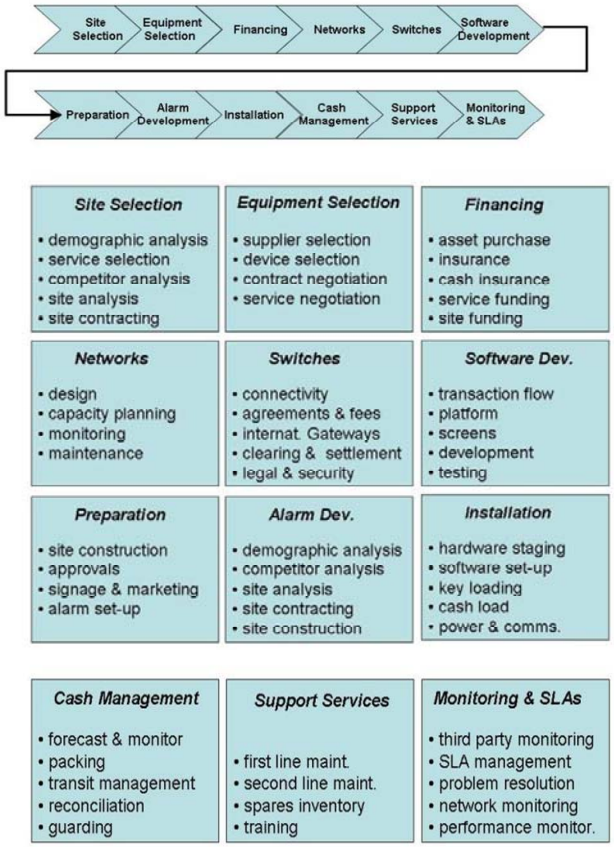

Figure 28. Value chain example

10.1. Definition of a Country Audit

Country auditing involves gathering detailed information about the current state of the country's payment systems; not only ATMs (there may not be an ATM population yet) but all the aspects that may impact a move towards implementing or improving an ATM payment service. Apart from the usual socio-economic data, information is also collected about the country's payment-related infrastructure, potential market, the financial system and the existing payment and clearing systems and is presented in a formal and structured manner to facilitate analysis. It is usually not possible to achieve a fully comprehensive set of data – so the exercise should not be unnecessarily extended. An audit such as this establishes the "going in" position and forms the basis of a Situation Analysis normally done as part of a formal strategic plan. Various techniques can be used to gather information; usually the best way is determined by the particular country's demographics.

Once the information has been collected a SWOT analysis (internal and external strengths, weaknesses, opportunities and threats) should be done to make all the issues and limitations visible to all the stakeholders as part of the ongoing participative, inclusive, exercise of developing an effective ATM payment service. After this has been done it is usually useful to hold a workshop with as many stakeholders as possible in order to:

- Ensure a better understanding of the information gathered.
- Identify differences in the information gathered.
- Identify the constraints and opportunities emerging from the information gathered.
- Identify a common purpose as part of a team building process.
- Obtain proposals from the stakeholders.

The information produced should include some or all of the following:

- The economic, socio-political, socio-geographic and cultural background to the country.
- Institutional aspects; the roles of the financial and non-financial institutions that play roles in the payments business; the roles of other public and private enterprise bodies that could be considered as stakeholders (for example, card associations, bank associations, retailer associations, and so forth).
- Payment systems infrastructure, including proprietary and shared transaction processing systems and networks, and settlement and clearing systems. This should include the key properties of the infrastructures, such as: the participants, transaction types, operating rules, backup solutions, settlement procedures, potential risks including credit and liquidity, and pricing policies.

- Non-financial infrastructure needs to be documented, such as telecoms, transportation and energy, as this will have a material effect on implementation and the business model choices that need to be made.
- The use of payment instruments and media, including: cash, cheques, EFT credits and debits, and credit, debit and prepaid cards.
- Available infrastructure for cross border, multicurrency and international transactions, including the participants, the systems and operations, the instruments used, the settlement procedures, risk management and pricing.
- The general business environment and practices that may impact on payment systems in general and the potential use of various business models in the ATM domain.
- Recent developments, including new governance and/or consultative arrangements in the payments environment, any national or regional initiatives, and any relevant legal or regulative reforms.
- Statistical data, to establish trends in order to guide planning and developments. These are not only payment trends but also economic and socio-geographic trends.
- End-user needs and views, covering aspirations, safety, convenience, and reliability.
- Glossary of Terms lists all the terms that may be unfamiliar to new or less experienced stakeholders and future participants.

10.2. Holistic Positioning View

The following diagrams may help to keep in mind that an ATM payment system, or a part of one, such as a switch, cannot be developed in isolation.

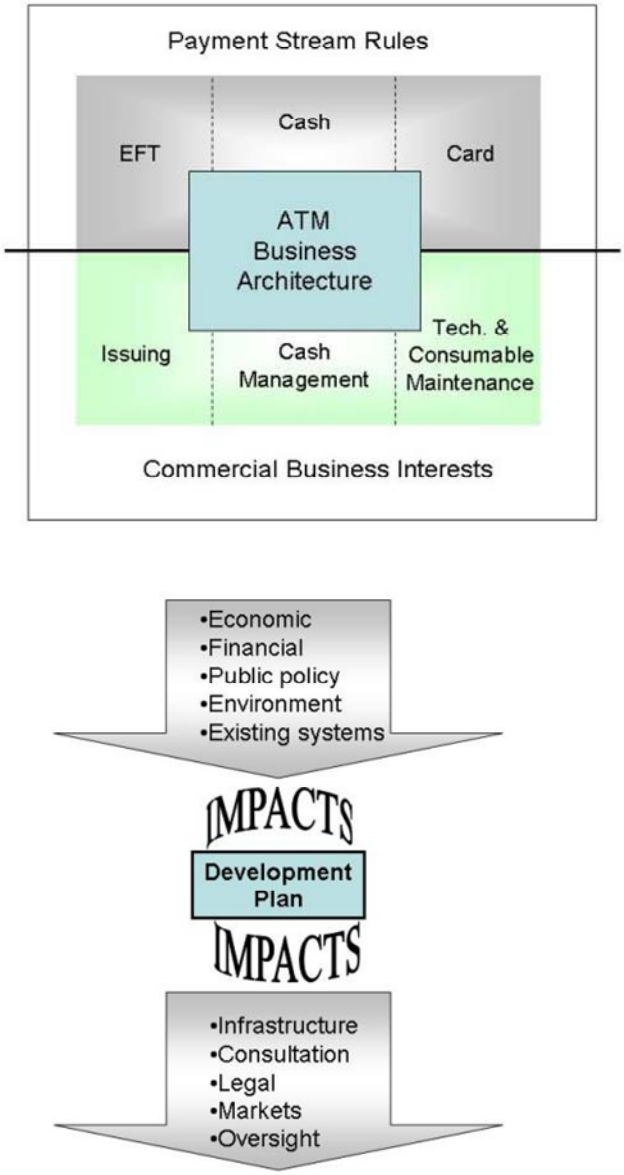

Figure 29. Holistic positioning view of an ATM payment system

10.3. Extended Value Chain Including Governance

This value chain attempts to give an overall visual clue as to how the establishment of an ATM payment service may progress. The NPS tasks (or something similar) may have already have been concluded.

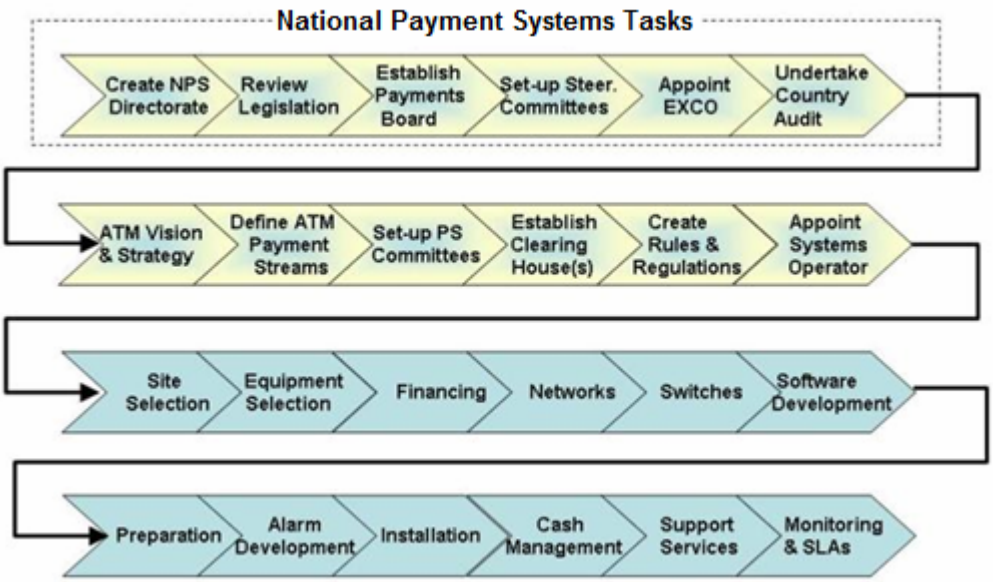

Figure 30. Extended Value Chain diagram

10.4. Business Processes

In addition to the processes necessary for governance, there are several sets of business process that need to be created for the management of the ATM payment service once implemented.

The processes required and their format will depend on the business model and product structure chosen; however, it is useful to remember that the design of the product/service itself and the design of the supporting processes are interrelated and should be done together.

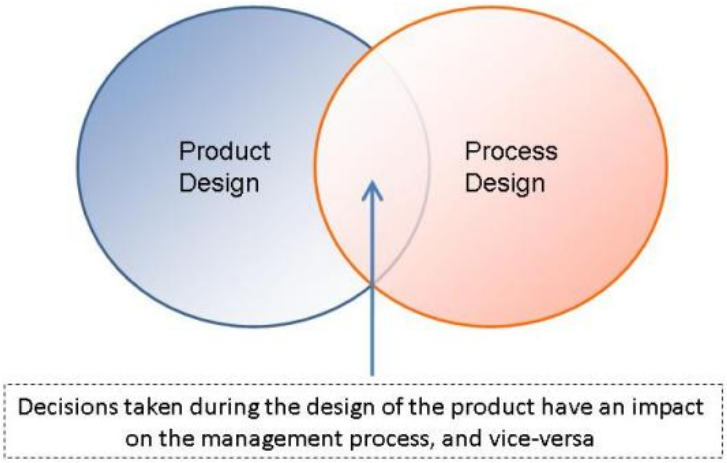

Figure 31. Business processes

The additional diagram below is a simple overall visual clue of the categories of process involved in establishing governance structures.

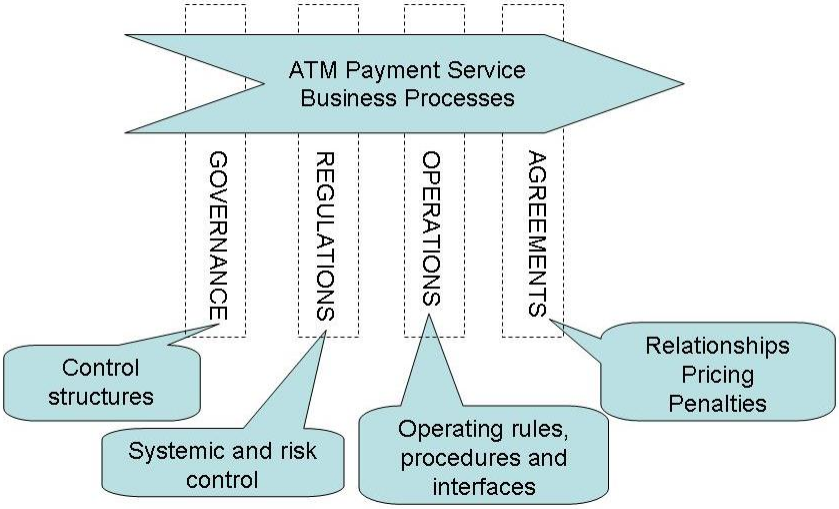

Figure 32. Governance structure categories

And redrawn in terms of the various processing domains:

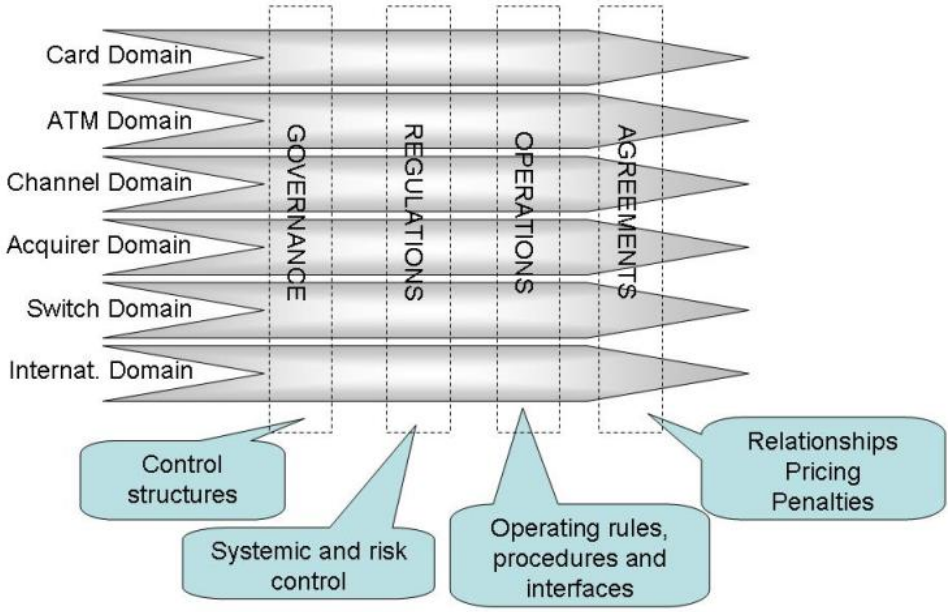

Figure 33. Governance structure categories, Revised

10.5. Programme Management Approach

Different programme management organisations have different approaches to the task. However, the following information may assist to create a checklist of aspects that should be included:

- The role of the Programme Manager is to define, structure and manage all the elements of the programme according to agreed standards. This includes resource management, overall coordination of any workgroups and ensuring the successful delivery of agreed projects. The role could include co-ordination of related activities performed by participating banks and other key stakeholders. In addition to project management resources, a Programme Manager would usually be assisted by additional programme office resources to fulfil administrative and facilitation tasks.
- Participative model and structure: focus on getting the required co-operation from all team members who often have their own regular duties to fulfil and come from diverse backgrounds.
- Reporting structure: the Programme Manager would report progress to the Payments Board, or other appropriate structure that may be established (for example, a steering committee). In addition, regular interaction should take place at NPS Directorate level.
- Sign-off procedures: specific milestones should be agreed with a process in place to have these signed-off at an appropriate level.

- Pro-active variance and exception reporting should be the norm.
- Managing and delegation: the success of the programme will depend largely on the ability to secure and coordinate the relevant resources, frequently via secondment from participants in the ATM development programme.

A key element of the success is often an ability to harness the wealth of expertise amongst the participants. One approach to attempt this includes:

- Pre-meetings, where the Programme Manager conducts a meeting with each of the organisations who will participate. This will lead to an understanding of their past efforts and their current expectations. It is important to treat a programme of this nature with sensitivity and with respect for the different organisations' cultures.
- Sensitisation workshops to gain consensus on commitments, individual role-players, methodologies and risks.

Chapter 11. ATM Payment Service Development Programme

As this guide focuses on ATM aspects, it is assumed at this stage that the processes to establish what has been referred to as the NPS Directorate have been completed, perhaps due to modernisation work undertaken to establish a RTGS (Real Time Gross Settlement) system. The Payments Board (or something equivalent but alternatively named) may have been set up if retail payments products exist, or its establishment may have been planned. If not, it needs to be established to create a focus area, and point of accountability, for the work necessary to create the governance structures for an ATM payment service; also to drive forward the development programme as a whole. Some input can be taken from the discussions earlier in this document but, in any case, it needs to be an inclusive process as the control and advisory committees have to be established simultaneously to guide the process forward.

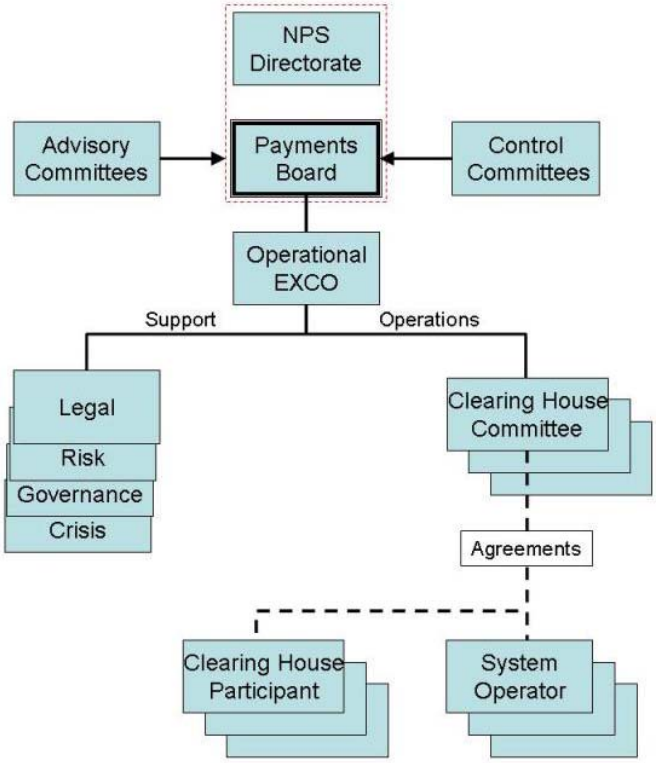

Figure 34. ATM Payment Service model

Once the Payments Board is in place, the EXCO needs to be appointed.

This entity will then take on the responsibility for defining the payment streams and the relevant clearing house committees. This includes who will take on the work of creating the legal relationships and rules for each clearing house/payment stream.

Additionally, the EXCO defines a management structure for all the support functions such as legal, risk and crisis management, finance, governance, staff, and so forth.

The EXCO is referred to as a business entity rather than specific people.

This is because the EXCO, Payments Board, and NPS Directorate may be the same or separate group of people, depending on the size and complexity of the anticipated payments operation.

This point in time is the first major milestone. At this time the responsible functions are in place to guide and manage the process of creating a payment service operational entity.

Three concurrent ***Work Streams*** start at this point (the same logic applies irrespective of whether only an ATM service is being established or multiple payment services are being planned for, for example, POS, Mobile, Internet, etc):

1. The EXCO should implement a business project that undertakes the Country Audit, builds a Vision and creates a Payments Strategy with a Conceptual Solution Design/Architecture and a chosen business model.
2. The Clearing House Committee(s) should commence with the tasks of drafting Agreements, developing Rules and agreeing Fee Structures.
3. A Project Office should be established, reporting to either EXCO or the Payments Board. With its Project Management and Project Administration capabilities it will drive the various projects required to implement the infrastructure. In the case of an ATM service, depending on the size of the market and business model adopted, this may include:
    a. Choosing one or more System Operators to develop and run a Clearing Switch and other systems necessary for the Clearing Houses.
    b. Designing and implementing networks.
    c. Selecting and implementing ATM hardware and software.
    d. Buying or building gateways, interfaces and acquiring systems.

e. Potentially becoming involved with card issuing systems.

f. Developing the business processes necessary for:

- Operating, monitoring and managing the infrastructure.
- Management and distribution of cash.
- Site selection and preparation.
- Management of independent third-party operators and ATM owners.
- Clearing, settlement, reporting and dispute resolution (in concert with the clearing house committees).
- Additional tasks, as defined.

The Project Office may also optionally provide support functions to the EXCO and Clearing House Committees for the tasks they are undertaking.

As it is usually a temporary function and requires specific expertise that may not be easily available when required, and to enhance the independent and non-partisan reputation of the central bank, the project office and its staff are often consultants and contractors.

These three work streams may, in practice, all be part of a single high-level programme, or they may be independently managed. In either case, their deliverables are inter-dependant and the work streams are therefore interlinked, and there must be some level of overall coordination.

- Networks cannot be designed and switches cannot be sized without demographics from the audit and without tactical plans from the strategy.
- Clearing systems cannot be finalised without knowledge of a fee structure.
- Hardware cannot be selected without knowing who the switch/service participants are and what their functional and financial contribution will be.

One possible graphic representation of the above functionality is represented in the following diagram as input to the decision process.

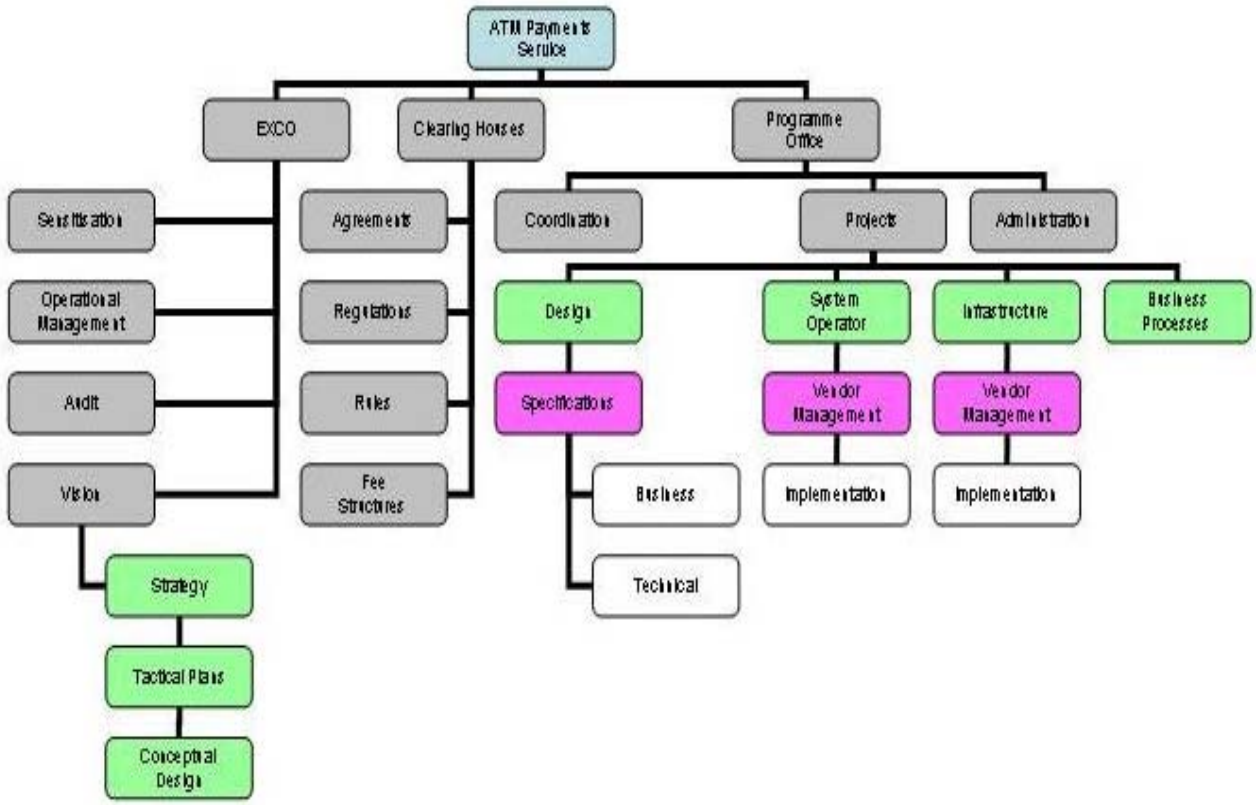

Figure 35. Implementation work streams

Every implementation is unique. However, it may be useful to look at a few of the individual projects in a little more detail.

11.1. Systems Development

Once there is a conceptual solution architecture in place, the result is normally several systems that need to be developed (bought, built or outsourced).

For example:

- Clearing Switch.
- Acquiring System.
- Front-End Switch.
- Cash Management.
- ATM Applications and their Management, and.
- Others depending on the chosen business model and architecture.

Each of those would need to be set up and managed as a Project within the overall ATM payment service Programme.

There are many different project management processes and techniques available, and it is not the function of this guide to define or choose between those. Suffice to say that a formal methodology should be chosen, in particular if sponsorship from an international organisation is desired, or if some or all of the projects are to be developed within a Public Private Partnership. It is recommended, however, that the chosen methodology is based upon one of the two generally approved approaches, for example, Prince2 or PMBOK (project management body of knowledge).

The following diagram illustrates the process.

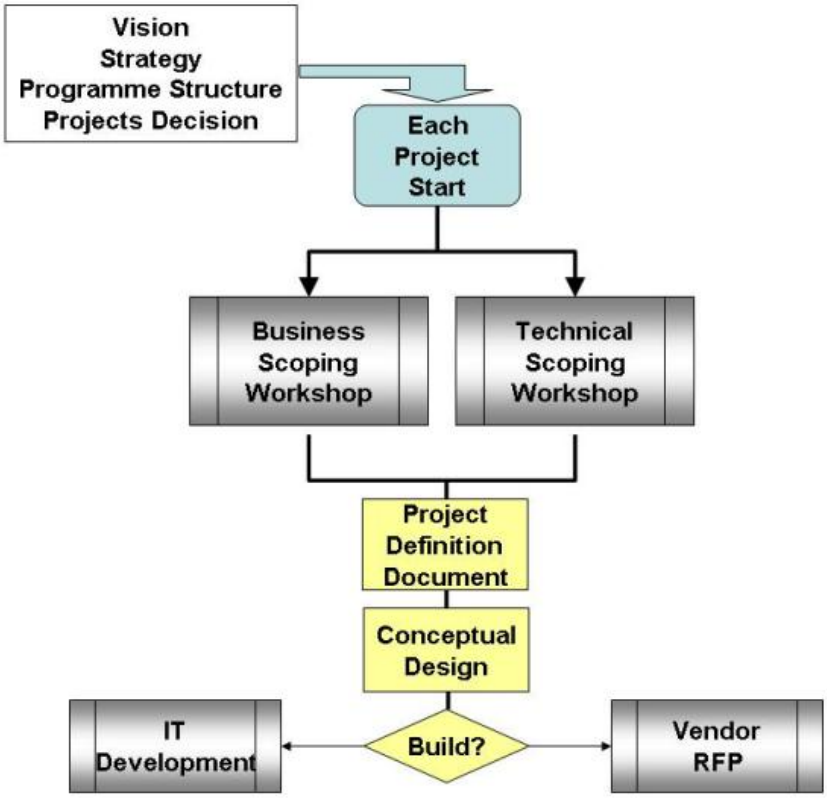

Figure 36. Project management process example diagram

No matter which methodology is adopted, experience has shown that the following elements should be used or incorporated:

- We assume that a **Vision and Strategy** is in place, incorporating the fundamental principles and critical success factors, and that a conceptual design/architecture has been selected, identifying the business model that will be used. There may be some iterative processes involved to get to a chosen model; it may occasionally be necessary to go some way down a development path (for example perhaps an RFI process) to derive potential costs as input to a business model decision.

- This should be followed by a **Scoping Process**, usually one or more Business and Technical Workshops, which should be inclusive and involve all stakeholders.

11.1.1. The Scoping Process

This may include business consultants and specialists but would normally exclude vendors. Participants in each workshop should have suitable business or technical knowledge, as applicable, and be at the correct level of seniority; commitments and agreements may be required between parties to a switch.

Business Scoping Workshop Agenda

A **Business Scoping Workshop** could have an agenda covering the following topics, at a business level, for example:

- Nature of the Business.
  - Business strategy focus.
  - Market metrics.
  - Risks.
  - Competitors.
- Business Operations.
  - Business model and architecture.
  - Functionality desired.
  - Process requirements and responsibilities.
  - Locations required.
  - Resources needed.
  - Customer profiling and metrics.
  - Customer support requirements.
- System Overview.
  - Existing systems of participants.
  - Planned future systems of participants.
  - Systems of potential partners.
- Processing Environment.
  - IT roles and environments.
  - Human interface designs (screens, buttons, and so forth).
  - Reporting requirements.
  - Suppliers and outsourcers.
- Market Definition.
  - Product focus.

  - Market sectors.
  - Customer requirements.
  - Sector functionality.
  - Future potential or planned functionality.
  - Pricing.
- Timing.
  - Pilot systems.
  - Rollout.
    - By sector?
    - By region?
    - By function?
  - Checkpoints.
  - Targets.
  - Goals.
- Project Roles and Responsibilities.
  - Programme management.
  - User representation.
  - Infrastructure management.
  - Business operations training.
  - User testing (complex across multiple participants).
  - Signoff.
  - Acceptance.

Technical Scoping Workshop Agenda

A Technical Scoping Workshop could have an agenda covering the following topics, at a technical level, for example:

- Business Review would be a review of the business operations as discussed in the business workshop(s) as background to the technical debates. Different people are likely to attend the business and technical workshops
- Existing Systems Review.
  - A review of the systems of participants, in order to understand the systems domain within which an ATM system, switch, etc, would be created.
  - Networks.
    - Wired.
    - Mobile.
  - Processing metrics.
    - Performance.

    - Volumes.
    - Peaks.
    - Capacity.
- New Potential or Anticipated Systems.
    - Interfaces.
    - Functionality.
    - Volumes.
    - Locations.
- Processing Environment.
  - IT structure.
    - Roles and responsibilities.
    - Locations.
  - Suppliers & Outsourcers.
    - Platforms.
    - Applications.
    - Networks.
    - Application development.
    - Locations.
    - Operations.
    - Communication policy for dealing with vendors.
- Planning.
  - Marketing requirements.
  - Environment needs.
  - Locations.
    - Development.
    - Production.
    - Backup.
  - Systems implementation.
  - Business structure installation.
  - Priorities and freezes.
  - Lead times.
  - Resources.
  - Training.
- Timing.
  - Pilots.
  - Rollout.
  - Checkpoints.
  - Targets.
  - Goals.
- Project Roles and Responsibilities.
  - Project management.

- Outsourcers and suppliers.
- IT operations.
- Business infrastructure.
- Integration testing.
- Sign-off and acceptance.

11.1.2. Project Documentation Development

The following documents should be produced as part of the project, for any methodology.

- **Project Definition Document (PDD)** needs to be produced at this stage, documenting the conclusions of the workshop, the scope of the project, any proposed solutions, project milestones and any issues open for discussion, decision or requiring resolution. This document needs to be accepted by all participants as it forms a common basis for understanding.
- **Conceptual System Design Document** is created as the formal definition to carry forward to the next stage, after the project is defined in the PDD.At this point a build-or-buy decision is necessary (it may have been made during the workshops, or even up-front as a strategy decision).
- **Statement of Work (SOW)** is produced if a Build decision is taken, based on the Design and PDD defined above. The project then transforms into an IT development project and will be managed in the usual way, producing plans and specifications. A sample high level plan is included later for reference but each IT/project management facility has their own approach.
- **RFP (Request for Proposal)** is developed if a Buy decision is taken, transforming the project into a Vendor Management project. This type of project is managed through an process, some example detail of which is given later.

11.2. Vendor Management Process

A formal vendor management process (often referred to as an RFP process) should be initiated. In the case of purchasing (or leasing) ATM equipment this process is always required (as building your own ATM is not a practicable option!). The process can also be followed in the case of outsourcing, or selecting any form of third-party partner (for example, . Network, ISO, technical maintenance company, consumables maintenance contractor, cash distribution and management organisation, etc, etc). Obviously, not all process are suitable in every case and the following information should be used as a guideline to adopting a relevant business approach.

The overall approach is shown graphically below, followed by descriptions and an ***example of a document*** for input to the approach chosen.

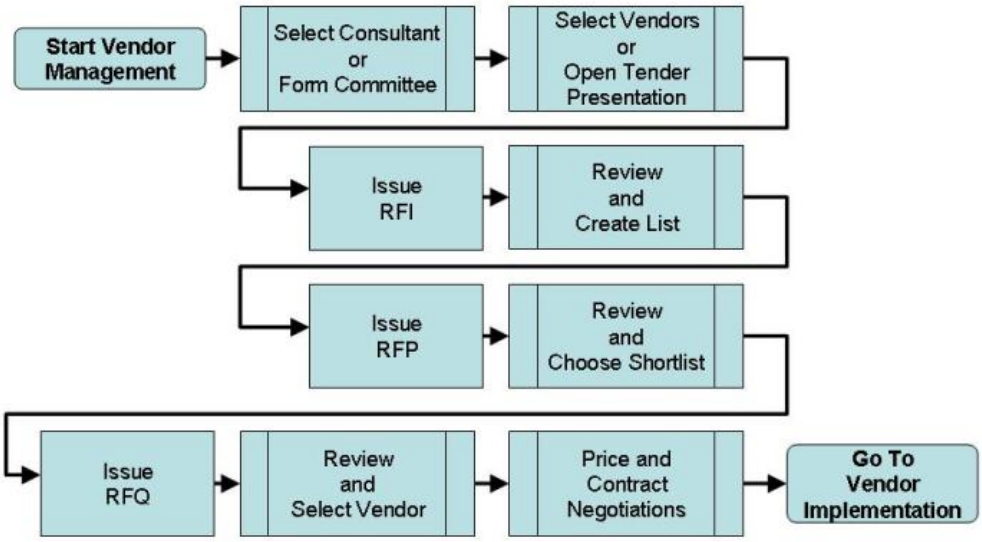

Figure 37. Vendor management process diagram

- **RFI** (**Request for Information**) is an optional step useful for gathering information if there is uncertainty about what products are available, what the current state of technology is, or who the potential vendors may be. The last point is of particular use where new or unknown international vendors may be interested in entering a country – its value is of course directly proportional to how, and how widely, the RFI is issued. The RFI and its responses are generally fairly high level documents but may contain product details or conceptual solution architectures; any pricing information, if any, at this level of documentation can best be described as indicative and should not generally be used for budgeting. There is sometimes vendor resistance to this step as it may be regarded as a "fishing" exercise.
- **RFP** (**Request for Proposal)** is a document issued, usually to a defined set of potential vendors, once the solution has been more clearly defined in terms of concepts and requirements. The response should contain a high level of detail, including information on support services and the approach proposed for implementation. The financial/pricing information in the response is subject to negotiation but should give a good indication for budgeting purposes, and should be detailed enough to use as a basis for evaluation against other responses. This is sometimes the only proposal document used; there may not be a need to issue an RFI if the possible solutions are clear

enough, and there may not be a need to continue with an RFQ if the pricing details are sufficient.

- **RFQ** (**Request for Quotation**) is an optional document issued in one of the following cases:
  - If there is a small short list of finalists after a selection process who have similar proposals and a final, more detailed, price quotation is required to make a decision.
  - If significant changes have been made, either during negotiations and a new quotation is required, or during a review of the RFP responses with consequent major price implications.
  - If this is essentially only a pricing request because all the details of the product or solution are known, or are very limited.

  An RFQ response should contain accurate and detailed pricing but usually contains little product or technical detail.

The evaluation of RFI/P/Q responses should be done objectively, by representatives of all affected areas of the business, or all participants in the case of a shared infrastructure. It is usually recommended that a formal and transparent process is undertaken to avoid future conflict and legal challenges. There are many approaches suggested by those with experience in vendor management; one example that has been found to be successful in the banking and payments business is described, conceptually below.

Information contained in responses contains three categories of data:

- **Tangible Data**; consisting of measurable non-financial data and direct responses to questions in the Request document.
- **Intangible Data**; consisting of information that cannot be directly and objectively evaluated. This may relate to business relationships, breadth of experience, political positioning, and so on.
- **Financial Data**; largely consisting of pricing data, but may include some long term cost implications of adopting particular approaches or indirect impacts on costs and liquidity.

These categories of data need to be used and evaluated separately and in different ways:

- **Tangible Data** needs to be evaluated in a "semi-blind" manner based on numerical rating of criteria. The criteria and the weightings for the criteria must be chosen in advance of reviewing the responses, must be chosen by knowledgeable business management and should not be chosen by the same people that are evaluating the responses. In the case of a consultancy undertaking the RFP process, they will facilitate the gathering of criteria from business participants in the ATM solution, switch, or whatever, rather than select the criteria themselves. An example of generic criteria is given below but, in reality, criteria must be carefully chosen to be specific to the solution

desired. This part of the evaluation will provide a short list (perhaps one) of potential vendors who come closest to satisfying the functional requirements.

- **Intangible Data** is normally not evaluated but is rather documented and commented upon on a SWOT or Pro/Con basis. These notes may be used later in the decision process to arrive at a final result.
- **Financial Data** must be evaluated in a separate exercise to the tangible (largely functional) data. It is often evaluated by a different set of people, who may be financial experts. The tangible data evaluation is normally done first and this step frequently eliminates some proposals that do not meet the "must have" functional criteria. In those cases, the financial data is not considered and the eliminated proposals are not financially evaluated. The financial data can often not be directly compared, due to different methods of structuring costs, income streams, etc; it is normally the derivative net impact of all the financial data that is, somewhat subjectively in many cases, considered in reducing the previously chosen short list down to one or two finalists. In other words, it is the overall impact on capital budgets, long term P&L, financial risk and liquidity, and similar issues that are compared.

Whilst, ideally, a fully objective process is desired, in practice a largely objective but fully transparent process is the best that can be achieved. This usually follows the sequence of: reduce proposals by at least half through the tangible data evaluation; then choose two finalists via the financial data; and finally use the intangible data as a tie-breaker.

The following table provides a real-world example of a tangible data ***Criteria Matrix***. This particular example has been simplified and obviously cannot be used in its current form, but serves to illustrate the concept and process. As described above there is no financial data included here.

Each item would normally be initially judged on a strengths/weaknesses basis to assist with rating, and "must have" features are checked for compliance.

These criteria are similar to those used in the evaluation of an ATM switch; in the case of ATM equipment vendor evaluations there would be more detailed technical features to evaluate.

Following this table below, there is an list of ATM features that could be included.

Criteria	Weighting (%)	Rating (0-9)	Total (WxR)
Suitability of Proposal per Customer Requirements			
Functional Fit	15		
New Implementation			
Modular/Entry-level Solution			
Total Solution			
Integration to Banking System			
Rapid Implementation			
End-to-End Business Support Expertise			
Functional Completeness	20		
Issuing (incl. Card Personalisation)			
Acquiring (incl. device support)			
Switching (incl. Association links)			
Processing (incl. Account Management)			
Vendor History & Stature			
Industry Experience	5		
Company endurance			
Company reputation			
International exposure			
Card Association experience			
Solution Experience	5		
Switching			
ATM			
POS			
Cards			
Account Management			
Knowledge of local environment			

Criteria	Weighting (%)	Rating (0-9)	Total (WxR)
Commercial Agreement			
Terms & Conditions	10		
Timing			
Payment Schedules			
Comprehensiveness (inclusiveness)			
Guarantees & Penalties			
Timing/delivery	5		
Performance			
Implementation Methodology			
Participants	10		
Experience			
Comprehensiveness			
Resourcing			
Project Management	10		
Experience			
Methodology			
Vendor Support			
Experience	10		
Past History			
Resources			
Locality	10		
Implementation			
1st Level			
2nd Level Backup			
Totals	100		

11.2.1. Possible ATM Feature Evaluation List

- Bulk Note Acceptor.
- Card Readers.
- Cash Cassettes.
- Coin Dispensers.
- Communications.
- Consumer Displays.
- Envelope Depositors.
- Scrip Dispensers.
- Multi-media Functions.
- Fascia Options.
- Function Keys.
- Guidance Features.
- Heater.
- Scrip & Envelope Depositors.
- Keypads.
- Lock Options.
- Printers.
- Processors.
- Safes.
- Security Features.

11.2.2. Cost Considerations

The list below gives some input as to the types of ***costs*** that may be included in a proposal for an ATM solution; equipment and front end switch included (assuming a leased/licensed rather than purchased funding approach).

There are, of course, no actual costs listed but it is believed that understanding the range of different types of costs that could be quoted would help to create and evaluate an RFI/P/Q type document.

- Switch Application Software License Cost (what period?).
- Switch Application Software Maintenance Fee (monthly/annually?).
- Switch Hardware License Cost (what period?).
- Switch Hardware Maintenance Fee (monthly/annually?).

- Switch Hardware Operating Software License Cost (what period?).
- Switch Hardware Operating Software Maintenance Fee (monthly/annually?).
- ATM Application Software License Cost (what period?).
- ATM Application Software Maintenance Fee (monthly/annually?).
- ATM Hardware License Cost (what period?).
- ATM Hardware Maintenance Fee (monthly/annually?).
- ATM Hardware Operating Software License Cost (what period?).
- ATM Hardware Operating Software Maintenance Fee (monthly/annually?).
- Switch Database License Cost (what period?).
- Switch Hardware Implementation Services Charge.
- Switch Application Software Implementation Service Charge.
- ATM Hardware Implementation Service Fee.
- ATM Software Implementation Service Fee.
- Switch Application Software Custom Development Fees.
- Switch Software Maintenance Support Fees.
- Switch Hardware Preventative Maintenance Fees.
- ATM Hardware Preventative Maintenance Fees.
- ATM Software Maintenance Support Fees.
- ATM Software Customisation Fees.
- Switch Security Module Hardware Costs.
- Switch Security Module Software License.
- Customer Support Fees.
- Project Management Fee.
- Training Costs.
- Consultancy Fees.
- Documentation Costs.

Notes

1. Pricing is usually quoted in US$ or Euro and should be quoted CIP rather than FOB; transport costs, especially for heavy items such as ATM safes, can add considerably to costs and lead to unequal comparisons.

2. Pricing may be tiered based on volumes, number of users, number of eligible cards in the market, or any other suitable market variable that is acceptable to both customer and vendor.
3. Tiered pricing usually requires some form of volume distribution guarantee over the licensing period, perhaps with penalties or rebates for variations from the expected distribution.
4. Pricing usually excludes any travel and accommodation costs incurred during the implementation, commissioning and education processes.
5. Payment Terms for application software licenses vary but vendors generally require a guaranteed license period (for example, 5 years) and a portion of the total license fee paid on signature.
6. Payment Terms for custom software development, education, project management and other similar services usually require a significant portion on signature (for example, 35% – 50%) and the remainder staged according to delivery (for example, per month, per course, per software module, and so on).

Chapter 12. Commercial Operation

The day to day operation of the Switch, Networks and ATMs is wholly dependant on the solutions adopted, the business strategy implemented, the participants in the venture, and the economic and geographic environment.

Therefore, its definition is beyond the scope of this particular guide. Chronologically, the creation/definition of these tasks follows the governance and implementation topics considered in this guide.

It is a considerable subject, and the major ***ongoing*** task set of an ATM payment solution. In terms of the implementation structures defined in ***this*** guide, establishing these operations could be seen as an additional leg to the EXCO/Clearing House/Programme Office structure, reporting into the Payments Board as presented previously.

Certainly this should probably be the approach adopted for an early implementation phase, to ensure that all operational aspects are considered during the design and implementation activities. As a checklist, the following items are typical of the activities that need to be considered.

- Cash replenishment.
- Armed Cash Courier.
- Armoured Guards.
- Safes.
- ATM Surcharge & Ownership arrangements.
- ISOs (Independent Service Organisations).
- Franchises.
- ATM Crime.
- ATM insurance.
- ATM Kiosks.
- ATM Maintenance.
- ATM Supplies.
- Mobile ATMs.
- Transaction Monitoring.

- Customer Complaints.
- Record Keeping.
- Business Licenses.
- Fee Disclosures.
- Reliability.
- Increasing ATM volumes.
- Marketing.
- Outdoor location challenges.

From a business standpoint, these operational issues are all practically conducted by private enterprise concerns (banks, vendors, service organisations, ATM owners, etc) and how they are performed will be driven by commercial interests. Which links back to:

The original theme of this guide: *balance with innovation under governance for the ATM payment service***.**

Appendix A. RFP Document Example

The following section lays out an example RFP document content as issued to potential vendors. The content will clearly vary depending on what product, system or solution is required, but this framework may be useful as a basic starting point.

1. **Introduction**
   - An brief introduction to the customer organisation and what solution they are seeking to acquire.
   - The rules for the submission of the proposal.
   - Structure of required response, such as:
     - Management Overview.
     - Introduction.
     - Vendor Overview.
     - Proposed Solution.
     - Functional Specifications.
     - Technical Specifications.
     - Future Products to be taken into account.
     - Project Management Services.
     - Custom Development Services.
     - Implementation Services.
     - Support Services.
     - Costs.
     - Answers to specific questions asked throughout the RFP.
   - Standards to be adopted.
   - Contact details.

2. **Organisation Profile**

   Of the customer or participants in a shared scheme.

3. **Planned Management and Implementation Methodology**

4. **System/Solution Requirements**
   - High level description of required solution.
   - Geographic and demographic environment.
   - Solution architecture diagram.
   - Description of any existing products or systems to be replaced.
   - Functional requirements.
   - User interfaces.
   - Technical requirements.
   - Preferred hardware platforms.
   - Networking requirements.
   - Training requirements.
   - Support requirements.
   - Software release policy.
   - Compliance requirements.
   - Monitoring requirements.
   - Hours of operation.
   - List and quantity of devices to be supported.
   - Transaction set to be supported.
   - Card scheme interfaces to be supported (national, regional and international) interfaces to host systems or applications.
   - Authorisation functions required.
   - Hardware security modules to be supported.
   - Card base and transaction volumes (peak transactions per second and average number of transactions per month) for initial configuration and anticipated growth over the next five years.

5. **Existing Systems**

   Descriptions and diagrams of any existing systems, products, architectures that are to be replaced or interfaced to.

6. **Timescales**
   - The date by which the proposed solution needs to be implemented.
   - Important events that enforce the timescales.
   - Timeframe for the evaluation of the proposal.

Appendix B. Vendor Solution Implementation Plan Example

This section provides an example of the contents of an ATM system implementation plan for a front-end switch follows. The items will vary depending on the requirements but this should provide a starting framework for development.

This plan assumes a standard, custom configured, but not custom developed, product.

The activities here start after the vendor has been selected.

Keep in mind here that previous processes under the control of the Payments Board and Programme Office held scoping workshops and created conceptual designs.

- **Contract.**
  - Drafted.
  - Negotiated.
  - Signed.
- **Project Workshops.**
  - For the vendor to define the scope of his tasks.
  - Business & Technical workshops defined above will provide most of the input, but this is at lower functional and operational level.
- **Statement of Work.**
  - As for any other development project, the vendor will create a SOW document defining the contractual task to be undertaken. This must be signed and will be the legal point-of-reference for any disputes on system scope and functionality during the course of the project.
  - There are usually multiple versions of this document because of its importance.
  - No work that consumes resources or requires funding will be undertaken until this document is signed.

  - Vendors may have different names for this document, but some form must exist. Without it neither party can be totally sure of their legal and financial commitments, and it is essential to avoid scope creep and resolve inevitable conflict in an objective manner.
- **Licensing.**
  - Software.
  - Maintenance.
  - Release schedule.
- **Support Contracts.**
  - SLAs.
  - First & Second level query resolution.
- **Escrow.**
  - Escrow agreements for any mutually developed applications.
- **Environment Preparation.**
  - Hardware implementation.
  - Network specify & test.
  - Software basic installation.
  - Base software testing.
  - Base software acceptance.
- **System Configuration.**
  - ATM device type support.
  - Security configuration.
  - Transaction routing.
- **User Acceptance Testing.**
  - Test criteria.
  - Test scripts.
  - Testing.
  - Documentation acceptance.
- **Interface Certification.**
  - VISA.
  - MasterCard.
  - Other international.
  - Host systems.
  - Interbank systems.

- **Training & Education.**
  - Front End Processor/Switch hardware operations.
  - ATM switch software operations.
    - Overview.
    - Database.
    - Transaction processing.
    - Balancing.
    - Security.
    - Reporting.
- **Go Live.**
- **Post Go Live Support.**
- **Handover.**

Appendix C. Statement of Work Framework Example

As the Statement of Work (SOW) is a critical document, a framework of a typical SOW is given below for reference. Additional standard legal clauses would be required:

1. **Introduction**
2. **Contact Information**
3. **Customer Information**
   - 3.1 Nature Of Business
   - 3.2 System Overview
   - 3.3 Business Environment
   - 3.4 Customer Processing Environment
4. **Vendor Deliverables**
   - 4.1 Project Management
   - 4.2 Project Documentation
   - 4.3 Hardware Configuration
   - 4.4 Software Configuration
   - 4.5 Communications Configuration
   - 4.6 Custom Development
     (to include all design and specification documentation)
   - 4.7 Training
   - 4.8 Documentation
   - 4.9 Service Level Agreement
5. **Delivery Plans**
   - 5.1 Customer
   - 5.2 Vendor

6. Customer Responsibilities

6.1 Hardware

6.2 Software

6.3 Communications

6.4 Site Preparation

6.5 Training

6.6 Documentation