

**Process formulation and business model for electronic
payment systems in Zambia**

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EXECUTIVE SUMMARY

In this document the author uses the project to make a comparative investigation between the two payment mechanisms. On the one hand, a comprehensive process analysis was done of cheque payments and this was compared with the vastly simplified process requirements associated with electronic salary payments.

The basis for the investigation is based on available documentation from existing suppliers to the Southern African banking sector, as well as a functional process flow analysis of existing banking solutions implemented at Southern African banks. For this purpose, the author met with supplier representatives and constructed process flows based on best practice, rather than specific implementations. The results were documented to support the hypothesis that electronic systems are not only desirable, but that they are infinitely more customer friendly, efficient, less prone to fraud and ultimately better suited to a post-paper business infrastructure as a sound business model.

The results obtained clearly illustrate that the new generation of electronic payment technologies, based on simplified processing structures and cost effectiveness, will in future dominate and replace traditional payment systems. As a result the observations of the research could in future be used as a model that may be applied to any situation where the unbanked and under-banked populations are drawn into the formal banking network.

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1. INTRODUCTION AND BACKGROUND

Zampay and the Zambian Public Services Union are collaborating to introduce a new payment solution in Zambia, defined as the Transactional Payment Service Solution (TPSS) project. The objective is to entrench low-cost banking services solution for previously unbanked individuals. The first phase of the project (which this document deals with) is aimed at salary payments for the **Zambian Public Service Union (PSU) members** of the Ministry of Education.

Zampay solicited the services of a number of consultants and service providers to realise this objective. The primary consultants are Symelation, an organisation that specialises in the delivery of low-cost financial transactional processing solutions and Mavco, a Johannesburg based consultancy firm. The service providers are Zanaco Bank, which acts as the sponsoring bank for the TPSS, and the underlying technology that will facilitate this solution was obtained from FNDS3000 Corp, a public financial transaction processing company that provides various programs and solutions to financial institutions and businesses on a worldwide basis.

Amongst the services that Zampay will offer include:

- The issuing of a Private Virtual Bank Account Card (“Card”) that is accessible via a card, similar to a normal credit card.
- These Cards may be branded in the name of a community or an employer.
- The Card is accredited by both MasterCard and VISA and may therefore be used at any point of sale outlet where these logos are displayed.
- The Card is also accredited by the South African payment authorities, such as Bankserv, which allows such card owners to transact at most retail outlets, such as Shoprite Checkers and numerous other retailers.
- The Card conforms to secure transaction standards prescribed by local and international conventions.
- Cards may be used for transactions such as payment processing services, card-to-card transactions, credit card transactions and debit order payments.
- Virtual accounts can be managed through Internet banking and mobile user interfaces (Swart, 2010).

2. PROJECT AIM AND RATIONALE

The project aim is defined according to the breakdown below:

2.1 SALARY AND WAGE DISTRIBUTION PAYMENTS

The Zambian authorities require a radically transformed mechanism to distribute salaries and wages to employees and beneficiaries, in particular for the “unbanked” and “under-banked” market segments. The solution has to be based on a delivery method that is affordable, offering convenience and security and incorporating the requirements of the experienced “banked” sector.

The project aims to **eliminate the need for cash or cheque payments** through the introduction of electronic funds transmission, underwritten by a financial institution. It will attempt to remove cheques and cash at the source, normally the place of employment, by allowing wages to be paid electronically, in either offline or online environments, directly onto a ZAMPAY card account, thus **removing the potential for fraud, crime and violence normally associated with cash and cheque payments**. It further removes the responsibility of theft claims against the employer by the employee, as the amount deposited to the card is precisely recorded and saved in a system that tracks financial transactions.

2.2 SOCIAL GRANT BENEFIT PAYMENTS

In addition to the above, a Social Grant Benefit payments solution is required to **enhance the participation of social grant beneficiaries in the economy**.

Social grant fraud often occurs when people receive grants for which they are not eligible. This results in pressure on the Zambian social security system and keeps people who are eligible for grant payments from gaining access to finance.

The aim of the project is to eliminate financial transaction inefficiencies effectively, thus improving the lifestyles of all its beneficiaries. The required solution will create a secure and affordable transactional environment between formal businesses or government and the “unbanked” and “under-banked” populations, who have limited or no access to traditional banking facilities.

3. PROBLEM ANALYSIS AND DELIVERABLES

3.1 PROBLEM OVERVIEW

Payments for the Ministry of Education constitute a large section of the government payments to payees on a regular basis. All of these payments are currently made with paper based instruments, such as cash and cheques, which according to Madhavan (2008) also form the primary payment media of the economy. There are numerous risks and drawbacks associated with this method of delivering wage or salary payments.

Government wage payments are one third in total of the public sector payments in Zambia (Heller & Tait 1983).

In general, the receivers of these payments either have no bank accounts or have very limited access to banking services. This situation occurs when banking fees are too high relative to income, a bank account provides little meaningful benefit or there is insufficient infrastructure to provide banking services economically in the individual's geographical area.

These individuals generally receive wage or salary payments in the form of cash and cheques; they have to use these payments to conduct commercial transactions to fulfil their daily needs. Cash is difficult to track and recipients are faced with various expenses and endure dangers that reduce the options available to them, while cheques have delayed clearance periods and are susceptible to fraud.

An individual's use of cheques or cash, together with lack of access to a bank account can dramatically increase the cost of engaging in basic financial transactions and completely prevent it in some cases. These basic transactions include the routine payment of insurance premiums, the transfer of money to relatives and the use of credit. It is difficult for an individual to obtain a loan on attractive terms without a bank account, since there is no credit history and the individual usually cannot present a reliable means of repayment to the lender.

For the Zambian government, payment processes reliant on the use of cash or cheques face considerable challenges. In addition to the costs and difficulties associated with using these payment mediums, corruption and fraud become even bigger problems, since there is no clear audit trail. The absence of an electronic system for the distribution of goods such as food, medicine and welfare benefits presents a major obstacle to ensuring the fair and reliable implementation of government policies.

Swart (2010) states that the majority of employees are employed on a permanent basis by the government and the payment medium for this type of payment is cheques. This is a huge contributing factor to the problematic payment process that currently exists.

The following sections will focus on the study of the current payment process and the problems created by salary payments using cheques as payment media through modelled AS-IS EPC diagrams, developed to document the state of the current payment processes. Only salary payments will be considered, since a solution mechanism for the payment process will also be applicable to the small percentage of wage payments.

3.2 PAYMENT PROCESS - LEVEL 0

The process under consideration is the payment process within the Zambian Government from the perspective of the employer to the employee. The employer refers to the government and the employee to all the payees within the Ministry of Education in Zambia.

Real IRM Solutions describes this as the highest level in the process model and states that it strategically summarise the business, or in this case the payment process. (ARIS Easy Design and Customised Methodology Training 2003).

To pay an employee; the prerequisite is that all the necessary information required to issue a payment needs to be captured in the government payroll system. Only once the employee is added, the selected employee can be paid.

The LEVEL 0 payment process:



Figure 1 – Highest level payment process.

The LEVEL 1 payment process is further decomposed out of the LEVEL 0 payment process.

3.3 PAYMENT PROCESS – LEVEL 1

The LEVEL 1 process flow model is decomposed out of the ‘Add Employee’ activity in the LEVEL 0 process flow model and is contained in Appendix B. This model consists of the process flow which a payment goes through, depending on the type of employee for whom the payment is generated.

There are two payment cycles present in the current payment process, viz salary and wage payment cycles. The cycle is dependent on the type of employee:

- A salary payment is made to an employee who is employed on a permanent basis and receives a fixed monthly salary in the form of a cheque.
- A wage payment is made to an employee who is employed on a temporary basis. These employees receive variable wage payments depending on the number of hours worked, are paid more than once a month and receive payment in the form of cash.

When a salary employee receives payment, the payment can be dealt with in one of the following ways once the payment is in the employee's possession:

- The salary employee could go to the bank to encash the cheque and receive the cash.
- The salary employee could go to the bank to deposit the cheque in their bank account.

When a wage employee receives payment the following possibilities exist for the handling of the payment once it is in the employees' possession:

- A wage employee could decide against depositing the cash into their bank account, thus has their cash available on-hand to engage in financial transactions.
- A wage employee could go to the bank to deposit the cash into their bank account.

The complication that exists at LEVEL 1 when using either of the above mentioned methods is that all employees cannot deposit payments into bank accounts as the majority of the population is unbanked. Mfuwe (2007) recently addressed this fact, which is also illustrated by Adongo (2007) in the following figure:

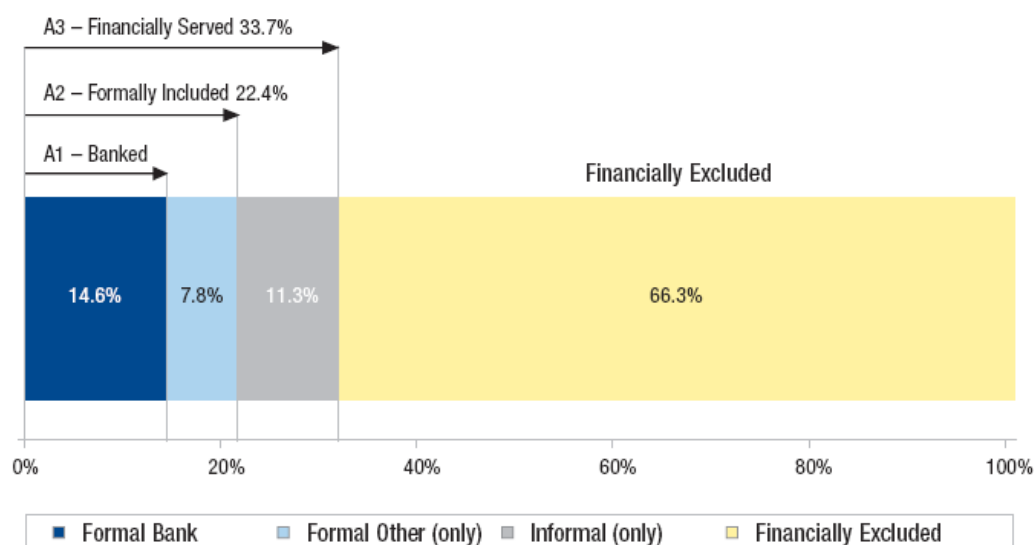


Figure 2 – Unbanked population in Zambia (Adongo, 2007).

3.4 PAYMENT GENERATION AND PRESENTATION PROCESS – LEVEL 2

The LEVEL 2 process flow model is decomposed out of the ‘Generate payment’ activity in the LEVEL 1 process flow model and is contained in Appendix C. This model depicts the method of generating a payment for both a salary - and wage employee, the distribution of the payments to the various pay points of the Zambian Government and the presentation of the payment to the employees. The various problems/risks associated with each activity in the payment generating and presentation process are illustrated in the Event-driven Process Chain (EPC) models.

The event of an ‘Additional employee added’ initiates this process and the ‘Generate payment’ activity. The payment generation could be for wage and salary employees, since the process for these two types of employees is different, the analyses of these two process flows will be done separately. It is worth noting that the focus will be on **analysing the problems associated with certain activities** within these processes and that only the problems that are assigned the highest priorities form part of this study.

Analysis for the salary employee process chain:

- The government payroll department issues an order to the bank for blank cheques, which the government will use to print cheques for salary employees. A problem concerning this activity is that the cheques could easily be stolen by any person who handles these cheques, from the time of order to delivery to the government payroll department. Stolen cheques automatically create an opportunity for fraud. Another problem with this activity is the delays that could be caused by the bank’s inability to provide sufficient cheques.
- The ‘Cheque print run’ activity initiates the printing on the cheques with Magnetic Ink Character Recognition (MICR) printers. Problems affecting this activity are also the possibility of fraud being committed, operational breakdown of these printers and other delays caused by insufficient ink or printing problems.
- The subsequent activities, which are both essential for this process to continue, are to deliver the cheques to all signatories and to have the designated signatories to sign or stamp these cheques with their valid signatures.

Delivering the cheques to the signatories could prove to be a big obstacle due to the current road infrastructure and long distances transit vehicles have to cover while these cheques are in the possession of outsourced logistical companies. The cost of transportation of high-value items such as cheques could prove to be very costly, as described by Swart (2010), since the distances to be covered in short time frames would regularly necessitate air transport.

Another possible problem is the possibility that a person who is not a valid signatory, could act as a signatory by signing the cheque or using the stamp of the signatory. Swart (2010) explains that Zambia has a signature mandate, which specifies which signatures are necessary in the government framework for a signed cheque to be valid; this could create massive delays in this process when a designated signatory unable to sign a cheque.

- The activity of matching a cheque with a given payslip is a manual process, carried out by individuals. Problems associated with this activity are the high operational cost of matching each employee's payslip and cheque and inserting both into an envelope. The operational overhead cost could rise dramatically if this activity is not completed within the allowed time frame and delays within the process would arise. Operational mistakes, such as mismatching of cheques and payslips, cause critical delays in this process, since a cheque or payslip would have to be re-generated for the process to continue.
- The next two activities of sorting envelopes according to pay point and distribution to the pay points is a requirement for payment, since the physical payment documents have to be present at a pay point for the government to pay an employee.

Incorrect sorting of the envelopes according to the relevant government pay points could occur, since this is a manual process, carried out by individuals.

Distribution to the relevant government pay points could be delayed because of the long distances covered by transit vehicles and transit vehicle failure due to the condition mentioned by Bank for International Settlements (1999), that most road surfaces in Zambia are gravel and becomes impassable during the rainy season each year.

Incorrect distribution of payments to the wrong government pay points could be very costly; it could double the logistical cost involved in delivering the cheques and delays may occur as a result of this.

These payments are very high-value items because they are paper based payment instruments; this increases the risk of theft from or hijacking of transit vehicles and the higher the value of the items, the higher the logistical cost involved in the transportation of these items.

- Serious risks and problems may be associated with the activity of the employee collecting the payment at the pay point. The risks named here pose a totally different problem, since the fraud and theft committed at this activity could have very serious implications. If employees pretend to be someone else, they commit identity theft.

Anderson, Durbin and Salinger (2008) state that identity theft involves compiling enough relevant data about someone else to counterfeit the link between two persons, enabling the person to act on behalf of the other person to receive benefits he/she is not entitled to.

Another problem faced by the employee is the issue of collecting the payment; it could be very difficult for some employees if the pay points are not on their route of travel or their transportation method does not allow them to reach it. Uncollected payments are a further problem the government has to deal with. At present there is no mechanism to determine the reason for non-collection. It could be that a person has passed away and the authorities have no means of determining it until they realise that the payments are not being collected anymore, an additional opportunity for fraud arises from this.

If an incorrect cheque or payslip is in the envelope presented to the employee, the process has to be repeated right from the start by processing the payroll and creating a new envelope; this results in huge delays.

- In the process of the employee signing the pay acceptance schedule, some of the problems described above may lead to fraud.
- The activity of the employee depositing his cheque at the bank is the last of the LEVEL 2 salary payment process chain activities to have a risk associated with it. The risk is not inherent to the payment process, but there is a risk to the employee while handling the cheque. Cheque loss is a possibility and carrying a cheque exposes the employee to criminal activities.

Analysis of the wage employee process chain:

- The government payroll system captures the data of the hours worked by all wage employees employed by the government. This data are essential for wage payments, because wage payments could vary depending on the hours worked. The loss of wage payment data creates massive problems; it is a very difficult process to determine the hours worked if the only data that verify this are lost – it is worth mentioning this, although this is an activity that forms part of the tasks of the payroll department and falls outside the scope of this analysis. The payment process is directly influenced if no data are available to create the wage employee payslip.

When data of the hours worked are captured incorrectly, this leads to unhappy employees when their incorrect payment is less than their rightful wage payment or in contrast to this, an employee will tend not to mention any additional wage payment.

- There could be delays in the government activity of requesting the total cash amount to be withdrawn from its account for wage payments, if the amount in bank notes requested is not readily available. This is very often the case and leads to the kind of problem that can be illustrated by using Greenwich Mean Time, showing that the exchange rate of 1 South African Rand is equal to 687.78 Zambian Kwacha, this could be viewed at <http://www.greenwichmeantime.com/time-zone/africa/zambia/currency.htm>.
- Many of the same problems as those associated with the activity of delivering cheques to the government arise when delivering cash to the government. The current road infrastructure remains a huge obstacle to with each delivery, so are the long distances to be covered by transit vehicles while the cash is in the possession of outsourced logistical companies. The transportation of high-value items such as bank notes is a very costly process and the transit vehicle is exposed to opportunities for theft and hijacking during the transportation of bank notes.

The activity of matching the correct amount of cash with a given payslip is a manual process, carried out by individuals. Problems associated with this activity are the high operational cost of matching each employee's payslip with the correct amount of cash and inserting both into an envelope; the operational overhead cost could rise dramatically if this activity is not completed within the allowed time frame and delays within the process would arise. Operational mistakes are a very relevant problem concerning this activity and include the mismatching of the cash amounts and payslips or theft of the cash for the payment, which could cause massive problems later in the process. This result in unhappy employees when their incorrect payment is less than their rightful wage payment or in contrast to this, an employee will tend not to mention any additional wage payment.

- Serious risks and problems are associated with the activity of the employee collecting the payment at the pay point, as described in detail for the cheque payment process chain. Time delays still account for the most of the dissatisfaction experienced by the employees.
- The activity of signing the pay acceptance schedule is described in detail for the cheque payment process chain. It is worth noting that if payments are not collected, the problem arises that the government loses interest on the cash that has been withdrawn.
- Once employees receive the cash payment, it is their decision how they want to use their cash payment. The activity of depositing the cash into their bank accounts will not occur very often, because of the high percentage of unbanked individuals in

Zambia. If employees are banked and decide to deposit their wage payments into their bank accounts, the time frame until the deposit is cleared and available for use in their accounts is unacceptable, since the employees need the cash to take part in financial transactions. If the employees decide against depositing their wage payments into their bank accounts, they run the risk of losing the payments, damaging the cash and being exposed to criminal activities.

3.5 PAYMENT DEPOSITING PROCESS – LEVEL 3

The LEVEL 3 process flow model is decomposed out of the ‘Deposit Cheque at bank’ activity in the LEVEL 2 process flow model. The salary payment depositing process is considered to be defined on LEVEL 3, because the majority of the PSU employees are employed on a permanent basis by the government and are thus receive their payments by cheque on a monthly basis.

This model depicts the different ways for banked and unbanked employees to deposit or encash different types of cheques. Currently employees experience problems with delayed availability of funds due to cheque clearance periods (Anonymous, 2010). The problems created by the cheque clearance process with the highest priority will form part of this in-depth analysis and some activities that have no related problems may also need to be explained to increase the readers’ understanding of all concepts.

A LEVEL 3 scenario framework is contained in Appendix D to show which scenario is relevant to which type of cheque, employee and payout.

Appendix E contains scenario 1 of the LEVEL 3 process flow model.

Appendix F contains scenario 2 of the LEVEL 3 process flow model.

Appendix G contains scenario 3 of the LEVEL 3 process flow model.

Appendix H contains scenario 4 of the LEVEL 3 process flow model.

3.5.1 SCENARIO FRAMEWORK

Description of LEVEL 3 process flow model framework:

- This process is initiated by the event that the salary employee has been paid with a cheque and has to go to the bank and receive the monetary value in return for the deposit or encashment.
- When an employee arrives at the bank, the activity of ‘Complete deposit slip’, which is necessary for any bank deposit, needs to be undertaken by the employee.

- The activity of 'Present documents to teller' is triggered by the possession of the cheque and deposit slip. Problems associated with this activity are fraud and identity theft if the depositors falsely present themselves as government employees.
- In the next activity the teller should 'Match the cheque value with deposit slip value' to ensure that both documents are completed according to regulatory standards and that both values match. If the cheque values do not match, another deposit slip needs to be completed, but if the cheque does not conform to the necessary standard for validation it cannot be processed and long delays are the result. A brief description of the refusal of validation of cheques is provided by Botha (2005) in the chapter 'Verhandelbare dokumente'.
- The activities that follow lead to one of four scenarios that are determined by the type of cheque used for payment (normal or salary), the type of depositor (banked or unbanked) and the type of payout requested by the employee (cash or account).
- The teller then credits the employee's account on the bank system to record the deposit by the employee if the employee has a bank account, or if the employee is unbanked, a cash pay-out is made and the government bank account on the bank system is debited.

The problems associated with each cheque clearing process will be described in the scenarios that follow. The type of clearing depends on the conditions stated in the scenario boxes on the framework diagram.

3.5.2 LEVEL 3 - SCENARIO 1

- If the government's bank branch and the employee's bank branch are different, the employee's branch will contact the government's branch to verify if the cheque conforms to the standard government cheque format. The problems that could arise during this activity are that a person could falsely present them self as a government employee. A related problem is fraudulent cheques that people create.
- The next activity is to 'Verify cheque against government account'. The first shortcoming at this stage is that it might not be possible to verify the signature on the cheque against the authorised government signature. The verification procedures to determine whether someone else than the designated signatory, who forms part of the government's signature mandate signed the cheque, are difficult. Another reason for these difficulties, explained by Bank for International Settlements (1999), is that the unreliability of the telephone infrastructure has led to

communication difficulties for banks between their head offices and branches. This has an adverse effect on fund clearing.

The second shortcoming is the possibility that the government could have insufficient funds to pay the employee.

The biggest effect these problems have on the entire clearing process is time delays, which is a critical factor for banked employees.

The cheque verification activity has two possible events as outcomes; a cheque could be verified or not verified. Since the activities initiated by these two events are different, the analyses for these two process flows will be done separately.

Analysis of problematic activities for a cheque that is not verified:

- When storing the cheques in a bulk file, it is possible that the cheques could be:
 - Damaged due to all the handling of the documents.
 - Misfiled during the filing of the cheques into the bulk file. This could result in cheque loss.
 - Stolen or hijacked, since individuals still handle the cheques during certain stages of this activity and this creates opportunities for fraud.
- The activity of not paying an employee is the most critical outcome of this entire scenario process and the main reason for developing the LEVEL 3 process model. This creates enormous frustration for employees and leaves them without any resources to conduct financial transactions to satisfy daily needs. Delays to create replacement payments are extremely long.
- When sorting cheques according to the government's bank statement sending date, the following problems occur:
 - The processing window (time) available for sorting these cheques is very limited, since a huge number of cheques need to be sorted.
 - The operational overhead cost is very high due to cheques that are not sorted in the given time frame.
 - If the sorting equipment fails, there are massive delays in this process and this not only causes delays, but also increases costs throughout the processes that follow.

Analysis of problematic activities for a cheque that is verified:

- The activity of capturing the payment contains the parallel process illustrated in Appendix E. If there is an infrastructural failure in the government bank's system or it is off-line, no transactions can be captured on the system and this results in huge delays.
- Once the cheque is cleared and the payment is made to the employee, an incorrect amount could be paid to the employee in cash if the teller makes a counting error. The availability of cash could prove troublesome because of the monetary value of the Zambian Kwacha. During certain intervals the bank infrastructure would need to handle many payments and this could lead to overloading and failure.

3.5.3 LEVEL 3 – SCENARIO 2 AND SCENARIO 3

Due to the similarity of the process in scenario 2 and scenario 3, both scenarios will be analysed together in this section to avoid duplication.

The following is important to address:

- Scenario 2 is for a banked employee who deposits a cheque at his own bank, not at a government bank.
- Scenario 3 is for a banked employee who deposits a salary cheque at his own bank, not at the government's bank.

Analysis of the cheque clearing process:

- The cheque must be encoded at the bank with a MICR encoder. The encoder could produce a hardware failure or the magnetic ink could be depleted. An electronic image must be created, which could be damaged or lost. In this case De Villiers (2010) explains that the bank keeps a derogatory file, which will be used to send only the cheque data to the regional processing centre.
- The activity of sending the cheque data electronically to the regional processing centre of the bank is intended to save time by processing the data before the cheques have arrived. The problem associated with this activity is the possibility of network failure. Very expensive network infrastructure is needed to carry the capacity of this valuable data. This is illustrated and simulated in the document 'Aperta Capacity Model and Network Sizing Models', provided by De Villiers (2010). Held over items are the items which the bank did not manage to deliver to the regional processing centre on the same day – this amounts to losses for the banks, since they

have already credited the employee accounts but their account will not be settled on the same day and they lose interest on those amounts.

- The next activity unique to scenario 2 and 3 is the batch processing of all deposits by the cheque processing machine at the regional cheque processing centre. The main problems in this activity are caused by document loss after the transportation of the cheques and deposit slips.

The remaining problems associated with these scenarios will not be described again in this section, since they have already been described in the previous section and the reader could refer back to section 3.5.2 if a description of the problems is necessary.

3.5.4 LEVEL 3 – SCENARIO 4

The important difference between scenario 4 and all the other scenarios is that scenario 4 is only for *cash payouts*, irrelevant of whether these involve:

- A normal cheque or salary cheque.
- A banked or unbanked employee.

Any employee, who does not have a bank account at the same bank as the government, will have to follow the scenario 4 process to receive a cash payout.

Analysis of problematic activities in the cheque clearing process:

- The biggest problem associated with this activity is capacity issues, since the probability is high that banked and unbanked employees will encash their cheques during the same period. This is a direct result of payments being made on the same days; employees prefer cash payouts because of the delays associated with cheque clearing periods, which could result in depleted cash availability.

This could cause overloads on the bank system infrastructure and system failures become hard to avoid and repair.

- The next activity verifying whether the employee is a valid employee poses problems, since the government are not familiar with every employee and the process to verify whether a person is valid employee could be very difficult and result in delays. Fraud through fraudulent documentation is also a big concern at this early stage in the cheque clearing processes.
- The next problematic activity; verifying the cheque against the government account could pose the problem that the signature cannot be verified against the government

signatures available on the bank's system. Insufficient funds in the government account could also cause delays.

- The remaining problems associated with the activities, occurring after the event that a cheque has been verified or verification has been refused will not be described again in this section, since these have already been described in the previous section and the reader could refer back to section 3.5.2 if a description of the problems is necessary.

3.6 DELIVERABLES

The project deliverables specifically excludes the following:

1. The actual implementation and project management of the Zambian payment system project.
2. The development of technical infrastructure for the proposed solution.
3. The development of acceptance criteria and performance monitoring after implementation of the project.
4. The development of legal compliance documentation for the proposed solution.

The project deliverables include:

1. A literature study that includes an overview of the Zambian economy, current payment operations, alternative solutions and the methodologies used.
2. A benefits analysis to illustrate the value of the solution to the parties involved.
3. The current payment process model.
4. A future transactional business process model that will describe the manner in which an electronic payment will be made through the payment system.
5. A business overview that will communicate how Zampay will function during the operational working of the proposed solution.
6. A logistical business process model that will describe the creation of a new card holder, as well as the activation of a new account.
7. A logistical business process model that will describe the card manufacturing process.
8. Qualitative requirement criteria against which the proposed solution will be measured.
9. Operational user manuals that will be produced as a guide for the Zambian PSU employees to follow.
10. A card acceptance declaration document for the Zambian PSU employees, accompanied by the Terms and Conditions for the use of the card.
11. Financial calculations to demonstrate the value of the proposed solution.

4. LITERATURE STUDY

4.1 INTRODUCTION

This section places the current problem in perspective and also provides a viable solution, supported by literature relevant to the current situation in Zambia. Both the current problem and the recommended solution are supported by case studies.

The two methodologies necessary for the formulation of the problem and solution are also compared to alternatives and described according to literature in this section.

4.2 ZAMBIAN ECONOMY AND PAYMENT OPERATION

Very little was done to modernise the payment system in Zambia after the introduction of a liberalised market economy in 1991. Only recently has a Financial Service Development Plan been implemented according to Martinez (2006), this policy is aimed at modernising the Zambian payment system at all levels to ensure a stable, economical and secure payment system for sustainable growth of the economy.

Bank for International Settlements (1999) indicated that a phase of the development plan would be to improve on the shortcomings of the cheque clearing system and provide adequate provision for electronic payments. It is documented by Johnson (1998) that the cheque clearing process could range anything between 4 and 21 days, depending on the level of clearing necessary.

Section 4 of the report (Bank of Zambia 2008) outlines that the Zambian Electronic Clearing House is working in conjunction with the Zambian banking sector; this is a direct result of the improvement policies of the Financial Service Development Plan and is a big building block in the Zambian payment infrastructure.

Johnson (1998) documented that all government ministries in Zambia use mostly cheques. Johnson (2008) indicated that eight in ten banks in the USA reported cheque fraud losses in 2008; cheque fraud still poses a serious risk to the business community and individuals alike. If the USA is at such risk of cheque fraud, one can assume that the figures for Zambia will be at least the same.

Carlsson and Saasa (2002) document that one of the aims of the Basic Education Sub-Sector Investment Programme (BESSIP) for the education sector is to 'create accountable and transportable systems for financial management and procurement'. This forms part of transforming the Ministry of Education's current payment infrastructure to an electronic payment infrastructure.

Martinez (2006) provides the information that only 405 888 electronic bank deposits were recorded during 2005 in Zambia, which has a population of 10.5 million, out of which only 6.2% of adults have bank accounts. A table included in the United Nations Children Fund statistics, (UNICEF, 2007), indicates that 64% of the population lives below the poverty line, which is US \$1.25 per day. With these statistics it is admirable that the percentage of the population which is unbanked is not higher.

This poses a big obstacle in providing an electronic payment solution to the Zambian PSU for the Ministry of Education employees, when such large percentages are currently unbanked.

4.3 ELECTRONIC PAYMENT METHOD AND RELEVANT CASE STUDY

The preferred and most frequently used method of payment is electronic fund transfer (Rahman & Raisinghani 2000). Different ways of electronic fund transfer make use of an ATM, internet or a POS device.

4.3.1 CASE STUDY

The only other case relevant to the current problem in Zambia is documented in a Kenyan report (Kenyan TSC 2001) on the payment of salaries through an electronic fund transfer system.

The report states that the Teacher Service Commission is responsible for distributing payments to 235 000 employees within Kenya's Ministry of Education per month. The greatest challenge the commission faced is similar to the situation regarding delays of wage and salary payments in Zambia. The initiative to find a solution was drastically required when the travelling time of employees started having disastrous effects on the Kenyan education system, since only a limited number of teachers were present at educational institutions.

Prior to 2001 the Commission issued payments through bank accounts for banked employees and District Education offices were used for payments to unbanked employees. Most of the problems stipulated in the Kenya are exactly the same as those in Zambia at present, causing the crisis the Zambian government finds itself in at this stage.

After salary payments were converted to electronic transfer payments, all payments were transmitted electronically to employees' bank accounts and wage payments were able to be collected at branches of the Postal Corporation of Kenya.

The benefits achieved through this solution were:

- The average number of cheques issued per month reduced by 97% on average.
- Lost cheque and cash payments were non-existent.
- Fraud and issuing cost were significantly reduced.

4.3.2 ELECTRONIC PAYMENT METHOD

Sumanjeet (2009) points out that an electronic fund transfer (EFT) is an application of electronic data interchange (EDI) in the financial industry, which sends card numbers via secured private networks between **banks**. Thus, accounts must be held at both banks for the payment to be transferred. Martinez (2006) provides statistics in the figure below of the percentage of the population in African countries with bank deposit accounts:

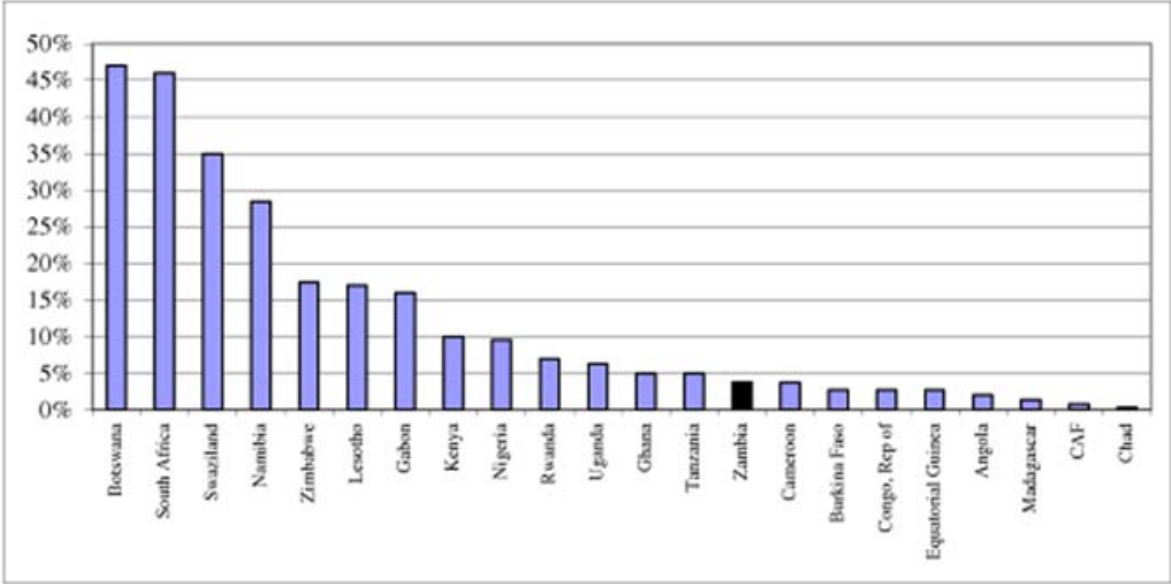


Figure 3 - Percentage of bank deposit accounts in African countries (Martinez, 2006).

In the Kenyan environment it was possible to convert the wage and salary payments of employees of the Ministry of Education to electronic payments via EFT. A higher percentage of the population is banked and access to bank services is much more evenly distributed in Kenya.

Seeing that the majority of the Zambian population is unbanked, EFT will not improve the current problem. A viable alternative could be prepaid salary cards, which offer an electronic payment method for the unbanked section of the population.

4.4 PREPAID SALARY CARDS

4.4.1 BACKGROUND

Beatty (2009) mentions that well known prepaid products have been available for a considerable time; there is a vast range of options available ranging from gift vouchers to phone and travel cards. A new model of the prepaid concept consists out of prepaid salary cards.

Prepaid phone cards were, according to Schneider (2009) first introduced into the market during the 1970's. It has been confirmed by many in the prepaid sector, amongst others, Chakravorti and Lubasi (2006), that the growth in the use of these cards since their inception has never declined and that the cards are replacing paper-based instruments rapidly.

4.4.2 CASE FOR PREPAID SALARY CARDS

The primary advantage prepaid salary cards have above other electronic payment systems is the opportunity that it provides to employees with limited access to financial institutions to make use of electronic payments, this is also described by Chakravorti and Lubasi (2006).

It is important to take note of the characteristic mentioned in the document *Unleashing the potential of prepaid* (Anonymous 2006), that functionality of prepaid cards could very closely resemble that of debit cards. This characteristic promotes business opportunities, enabling institutions providing these services to reach a larger section of the potential market.

Chakravorti and Lubasi (2006) note that governments use prepaid cards to replace cheque payments. The implementation of the solution of prepaid salary cards to incorporate the unbanked and under-banked into the Zambian national payment system should improve the current economic environment. Prepaid salary cards should improve the current economic value for the government and the employees, since individual costs of generating, distributing, and depositing cheques are greater than the transactional costs of prepaid salary cards.

South Africa provides a very stable platform and service to the African continent for financial development and plays a huge role in the Southern African Development Community (SADC). This gives reassurance that the implementation of the prepaid salary card in Zambia will be successful, based on several retail specific prepaid cards already implemented in South Africa (Anonymous 2009).

4.4.3 FUNCTIONAL OPERATION

Cook (2010) stipulates very clearly that providing a prepaid salary card solution requires cooperation between multiple stakeholders.

Terminology necessary to be defined and stakeholders relevant to a prepaid salary card solution are provided below. Some of these terms will just be described to clarify the concept and provide insight, while others will be referred to frequently in Section 6 of this document:

- An **acquiring bank** is a financial institution, commonly a bank, which processes a merchant's card authorisations and payments, forwarding the data to a card

association (Visa/MasterCard), which in turn communicates with the issuer. This definition can be viewed at the Qfinance website dictionary through

< <http://www.qfinance.com/dictionary/acquiring-bank>>.

- A **sponsoring bank** is a Chartered Bank that has obtained membership from Visa or MasterCard in order to allow a third party processor access to the Visa and MasterCard networks. This definition is provided by Infomerchant and is can be viewed at <<http://www.infomerchant.net/creditcardprocessing/glossary/sponsoringbank.html>>.
- An **issuing bank** is a financial institution and member of Visa/MasterCard. The bank signs contractual agreements with cardholders and issues cards to them.
- A **Third Party Processor (TPP)** is not a member of Visa/MasterCard. The processor provides authorisation and manage cards and funds in card accounts via a processor's information technology platform. The definition can be view at <https://www.paypalobjects.com/en_US/vhelp/paypalmanager_help/glossary.htm>
- The **Payment Service Provider (PSP)** could be described as any business that is willing to accept a card as an electronic payment method in exchange for goods or services.
- **MasterCard** is an alliance of banks and financial institutions that governs the issuing and acquiring of transactions at any ATM or POS accredited by MasterCard. This definition can be viewed at <http://www.chasepaymentech.com/portal/community/chase_paymentech/public/public_website/glossary#m>.
- A **card holder** is the person who is the legal recipient of an issued card and who is in possession of the card.

The terminology provided above covers all the different stakeholders/entities involved in a prepaid salary card solution and the figure shown below is specifically designed to illustrate graphically how such a solution would be orchestrated within the Zambian environment:

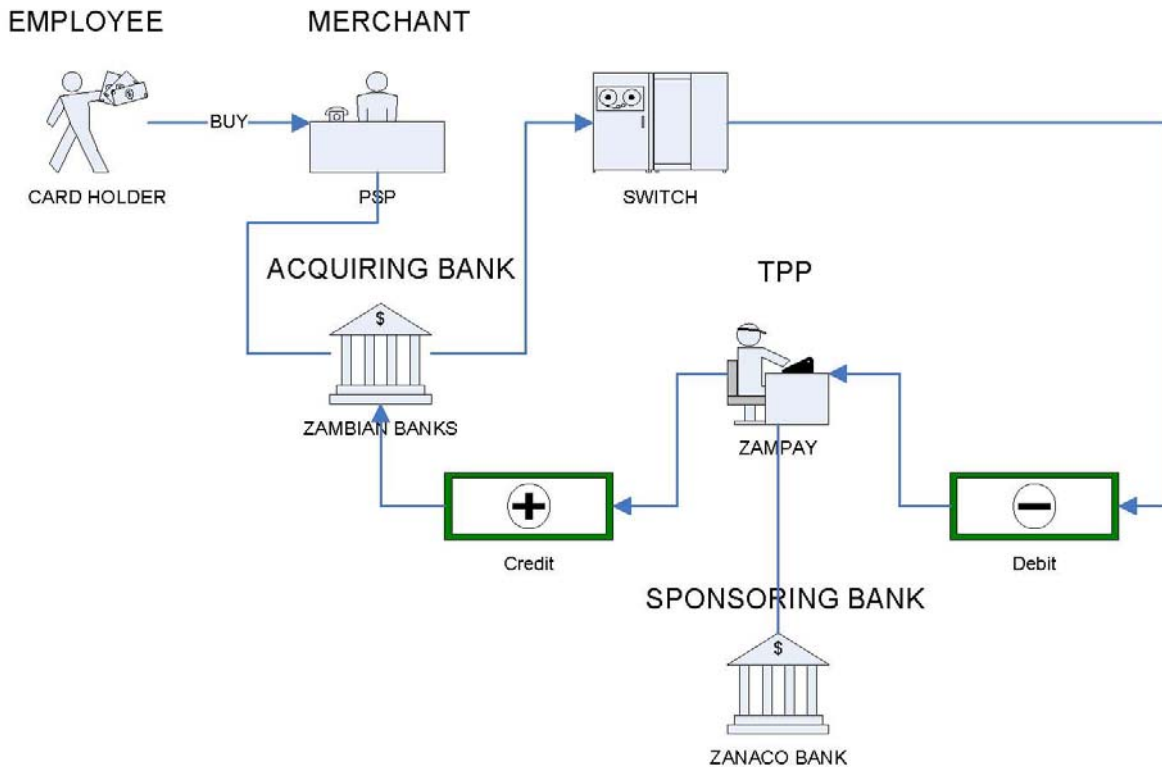


Figure 4 – Prepaid salary card payment solution functional operation / transactional flow.

Although it is an important characteristic that prepaid cards have functionality similar to debit cards, Sienkiewicz (2007) indicates that prepaid cards differ from debit cards because of the third party involvement with the cards. It is the third party's responsibility to manage and process the cards that are linked card accounts at the TPP, while banks are responsible for managing bank accounts on behalf of the card holders of the cards.

A fundamental difference in the design of a prepaid salary card solution is that prepaid cards can be used as two types of cards (Anonymous, 2009), open loop cards and closed loop cards.

- Closed loop cards are very limited in their functionality since transactions are limited to only certain merchants.
- Open loop cards are branded by either Visa or MasterCard, and enable the functionality of the card by allowing it to be used at any ATM or POS where their logos are displayed. This is applicable to the Zambian problem where the employee needs to take part in various transactions across the economy.

Cook (2010) also explained that the majority of prepaid cards are magnetic stripe cards. Magnetic stripe cards are the most cost-effective and are most applicable to the Zambian infrastructure with magnetic stripe card readers present in any ATM or POS device.

4.4.4 BENEFITS

The benefits mentioned below are an overview and were identified in consultation with Cook (2010):

- An additional market segment is provided to financial institutions.
- By providing a prepaid salary card, the employer is able to load the card with the employee's salary in a fast, cost-effective and efficient manner, thus reducing the overheads on cash or cheque processing.
- Employees are provided with a prepaid payment card, rather than having to pay high fees for cashing a cheque or carrying their entire weekly wages in cash.
- The card will be accepted worldwide at numerous locations in an open loop environment.
- Employees may also add an additional card to their account and it would be possible to send the additional card to another location. This would enable a family member to use the additional card at an ATM to withdraw funds in a local currency and use the card to make purchases at local retailers
- The user can only spend what has been paid into their card accounts, and can look at their transaction history.
- Prepaid salary cards create a credit record for employees who were previously unbanked.
- The use of prepaid salary cards can be a much cheaper way of accomplishing international payment.

4.4.5 CASE STUDY

The case study discussed in this section was performed on an American organisation, since prepaid salary cards have been developed and are implemented on a much broader scale in the USA. The situation described was documented by Chakravorti and Lubasi (2006).

4.4.5.1 ORGANISATIONAL CONTEXT

U-Haul International is an organisation with the aim of renting and/or leasing reliable trucks and trailers for the movement of goods, which has 18 000 employees located in 16 states across the USA. The similarity between U-Haul and the Zambian government is that a large percentage of employees is unbanked in both cases.

4.4.5.2 IMPLEMENTATION

The implementation process was initialised in 2001 to only 57% percent of the total workforce of U-Haul.

4.4.5.3 RESULTS

The most substantial result in the migration from paper based salary payments to prepaid salary cards was a saving of \$ 500 000 during the first year, because of reduced payroll cheque costs.

In addition to the above mentioned savings, U-Haul reduced:

- Transactional cost per payroll transaction by \$0.03.
- Distribution savings cost to the various pay points by \$ 60 000.
- Payroll administration by four fewer employees.

This provides sufficient evidence that prepaid salary cards are superior to the current modus operandi of the Zambian government.

It could also be assumed with a relative amount of certainty that savings in the Zambian environment would amount to much more than the figures provided by Chakravorti and Lubasi (2006) for U-Haul.

The reasons for this assumption are that:

- The number of unbanked employees within the Zambian government is much higher than was the case at U-Haul;
- The improvement in time to make funds available is much higher due to the long clearing periods in Zambia and thus more employees will opt for the prepaid salary cards;
- Frustration arising from lost or delayed payments from the government is eliminated.

4.5 RELEVANT METHODOLOGIES

4.5.1 BUSINESS PROCESS RE-ENGINEERING

Muthu, Whitman and Cheraghi (1999, p. 1) state that 'reengineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance such as cost, quality, service and speed' and 'a business process is a series of steps designed to produce a product or a service. It includes all the activities that deliver particular results for a given customer'.

The combination of these two definitions results in the understanding that Business Process Re-engineering (BPR) is to redesigning the existing processes used in an organisation to deliver goods or services to a customer.

Real IRM Solutions state that the process model flow of the current business processes create the AS-IS state of the model and a TO-BE state will be modelled out of the problematic, re-engineered processes (ARIS Easy Design and Customised Methodology Training).

4.5.2 BUSINESS PROCESS RE-ENGINEERING METHODOLOGY

Important factors to consider when selecting a process modelling notation is the notation's applicability to the processes that must be modelled and the industry to which it will be applied.

Event-driven Process Chains (EPC) and Business Process Modelling Notation (BPMN) are both synonymous with the improvement and re-engineering of process flows with the focus on overall improvement of the processes within a business environment or outside it.

The EPC modelling language is well documented by IDS Scheer and in various scholarly articles worldwide. Its age as a modelling notation enabled it to correct any misinterpretations or shortcomings it might have had. This is in contrast with BPMN, which certainly has more functionality, but according to Indulska and Muehlen (2010) in a study they conducted it has shown that BPMN has to be supplemented with textual annotations and business rules from other languages. This creates confusion, misinterpretations and lack of consistency that is acknowledged by some organisations.

Dehnert and van der Aalst (2004) point out that EPC as a business modelling notation is widely accepted in practice. This confirms that EPC is recognised by key stakeholders across various global industries. While the focus in global industries constantly shifts between trends such as productivity and management improvement on all levels of a business, the processes should always be re-engineered. Thus this provides a logical reason why EPC is still functional 18 years after its development in 1992 by Keller, Nutgens and Scheer as described by van der Aalst (1999).

A characteristic of an EPC which makes the modelling language so appropriate on all levels is the language's ability to illustrate how processes interact with external units, ultimately producing outcomes. This view is supported by van der Aalst (2000) who states that it is possible to extend EPCs with entities, business objects and organisational units.

The modelling language is placed in context when van der Aalst (2000, p. 4) defines the language as 'targeted to describe processes on the level of their business logic, not necessarily of their formal specification level, and to be easy to understand and used by business people'.

This neatly positions EPC among other modelling languages as a language which has extensively documented requirements capable of being satisfied during process modelling.

Looking at the above described in context, the reasons for using EPC diagrams as modelling notation are as follows:

- There are many external systems and detail flow processes that needed to be illustrated during the development of the AS-IS EPC diagrams to describe the problem sufficiently for the reader to understand and gain insight into the problem the Zambian government payment system currently faces.
- A better understanding of the improvements and differences in the cheque payment and electronic payment processes will be formed when a constant language is used.
- Zampay uses EPC as the modelling language for its business processes that fall outside the scope of this project.

As a well documented process modelling language Van der Aalst (2000) states the following set of process modelling notation and rules. The process consists of mainly four types of objects listed as:

- Events
- Activities
- Rules
- Resources

Descriptions of these objects in literature are provided by Brabander and Davis (2007) and IRM SOLUTIONS (ARIS Easy Design and Customised Methodology Training) as follows:

Events are objects which present a certain state of the process or environment. They initiate any activity to start and follows any activity as an outcome. For the description of the event, a noun is always used in combination with a past tense verb. It is important to keep in mind that the final event in a process chain can start another process to form a bigger process model. Certain regulations exist for the use of events to formulate the process, including that:

- A process chain should always start and finish with one or more events.
- The XOR rule should always be followed by two or more events.

Activities always follow an event. The activity is associated with a certain process that must be completed within the bigger process. The name of an activity is always composed from a present tense verb, followed by a descriptive noun.

Rules are composed out of decisions that need to be taken between certain events and activities in the process. The first type of rule is the AND rule, which indicates that all objects leading out of the AND rule must happen for the process to continue. The second type of rule is the OR rule, which indicates that one or more of the objects leading out of the OR rule could happen for a process to continue. The third rule is the XOR rule, which indicates that only one of the objects flowing out of the XOR rule could happen, thus if one path is followed, the rest cannot be followed.

Resources are those extra interfaces necessary for the process to be executed, such as an IT system, personnel and any other external.

4.5.3 TECHNOLOGY

The technology used to model BPR models is in the form of software provided by many different organisations.

Prof. Dr. August Wilhelm Scheer was not only one of the developers of the EPC modeling language, but also the founder of IDS Scheer in 1984 that developed the ARIS software for EPC modeling, which became the software standard for the industry. For more information the details can be viewed at < http://www.ids-scheer.com/en/About_us/3674.html>. The basic ARIS version is available on the internet and provides a good platform for business process modeling. This supports the reason for choosing EPC as the modeling notation for this project.

Any additional reference regarding this platform can be viewed at <http://www.ids-scheer.com/en/ARIS_ARIS_Platform/3730.html>.

4.5.4 BUSINESS MODEL METHODOLOGY

In the selection of a methodology to formulate a business model in the payment industry it is important to consider the way in which the organisation utilise transactional data.

Where organisations generally receive feedback from their clients, organisations in the payment industry use their transactional data for feedback to assist the organisation in aligning its strategy and to continuously improve their processes. This data are particularly useful for an organisation such as Zampay, which is still in the development phase to neatly position the organisation in the market and help direct its growth and development.

Focusing on the above mentioned, the author chose the Qbit Complex Organisational Systems Business Architecture Model (BAMTM) as the guiding methodology for the Zampay business model.

What makes the Qbit Complex Organisational Systems Business Architecture Model methodology so applicable to the payment industry and Zampay in particular is the fact that the transactional data of the prepaid salary cards could be utilised to continuously improve the business processes in each organisational unit within Zampay.

The model recognises that large organisations function as a complex environment and the different departments within an organisation are referred to within the model as business sub systems, while the different functional units within each department are referred to as sub-sub systems. A particular chain of events exists for each sub system to deliver value to a business and any fragmentation along this chain significantly decreases the sub system’s ability to yield value. This allows the system studied to be isolated and enables monitoring of the system’s impact on other systems.

Pretorius (2008, p.14) defines value as ‘the ability to inform, guide and influence decision making operationally and tactically to inform and guide the formulation of business strategy as a support or core function of a business’.

This chain of events forms the foundation of the Qbit Complex Organisational Systems Business Architecture Model and represents a systematic breakdown of each element necessary to accomplish the sub system’s objective and then utilise the transactional data through different layers of complexity to align the business strategy. Pretorius (2008) provides the framework of this chain, as illustrated below:



Figure 5 - Qbit Complex Organisational Systems Business Architecture Model event chain (Pretorius, 2008).

This chain of events is applied to each sub-sub system in an organisation to ensure that the sub-sub system has certain tasks allocated to it. These tasks should be carried out according to the correct procedures, regulations, rules and requirements. The sub-sub system follows defined processes to accomplish the tasks allocated to each sub-sub system, which in turn generates transactional data through transactions automated where possible. This

information is transformed into business knowledge through the Qbit Complex Organisational Systems Business Architecture Model event chain to direct the organisation and re-align its vision consistently.

Pretorius (2008) emphasises the importance of the different sub systems within an organisation not functioning individually, since it is critical for the success of this model to ensure that the different sub systems forms one dynamic system functioning as a whole to provide a solution. This is accomplished by essentially applying the same approach vertically within each sub system and horizontally across the sub systems in accordance with the Qbit Complex Organisational Systems Business Architecture Model.

The Qbit Complex Organisational Business Architecture Model also recognises that complex organisations consist of three core components, namely processes, people and technology. Processes and technology are largely predictable in its response to activity if it is well designed or documented, while people are very unpredictable in their actions and interactions with the other two components.

Fundamentally this model illustrates that an absence of proper formulation and agreement on conformity of the operating model ultimately affects the principles and policies in the business and also the quality of information used in decision making.

The relevancy of this business model methodology in the electronic payment industry cannot be ignored, since it combines technology, processes and people to **accumulate transactional data and information to direct the organisation.**

This methodology was designed and developed by Otto Pretorius, the Principal Thought Leader and Director of Qbit Group, under the guidance of Prof Louis Fourie from the University of the Western Cape. The methodology is widely used in commercial applications in Southern Africa, the Middle East and Malaysia.

5. BENEFIT ANALYSIS

In the light of the problem analyses that highlighted the severity of the problems associated with the current wage and salary payments, literature was provided to support the proposed prepaid salary card solution intended to establish an electronic payment system for the currently unbanked and under-banked majority of employees. A benefit analysis is provided below where the value of the solution for the employer, employee and solution provider are documented:

Direct and immediate value of prepaid salary cards to Zampay and Zambian government	Direct and immediate value of prepaid salary cards to PSU employees
<ul style="list-style-type: none"> ○ Productivity improvements for government; employees gain faster access to funds. ○ Leads to cost reduction and turnover improvement. ○ No commercial bank account is required. ○ No extra processing to create commercial bank account – prepaid salary card provided to people with limited FICA requirements. ○ Broaden Zampay’s client base. ○ Increased Zampay brand awareness in the marketplace and create opportunity for other organisations to enrol their employees on already existing infrastructure. ○ Total flexibility with Zampay prepaid salary card to introduce different employee programmes in short time periods, which allows the government to react to market changes immediately, creating a better ability to retain employees. ○ Full reporting to improve payroll department control over: <ul style="list-style-type: none"> ▪ Uncollected payments. ▪ Financial payment statements. ○ No need to produce cheques. ○ No need for cash payments. ○ Reduction in costs as well as administration related to resolving fraud issues; rejects from bad data and commercial bank account changes. ○ No need for payslips to receive salary/wage payments. ○ Cards can also be used as access cards; reducing likelihood of employee losing access cards, because of payment medium, thus the government could save on expenses. ○ Government has better control over access to the working environment. ○ Employee can be paid daily, weekly, monthly or any other time period at very low cost. ○ Reduced administrative and logistical costs as only one transfer is made to one account – simple and cost-effective. ○ No extra cost for cheques not verified, that has to be re-issued by government. 	<ul style="list-style-type: none"> ○ Employees can access their money at virtually any ATM and POS world-wide (possibility to access virtual cash on cell phone). ○ Security improved as there is no need to withdraw all money from an ATM in a single withdrawal to avoid high bank charges. ○ Immediate availability of funds, as cards are prepaid and time delayed deposits and clearances are eliminated. ○ No need for expensive bank account; employees do not typically have identification or credit requirements that effectively bar them from having traditional bank accounts. ○ FICA requirements greatly reduced: <ul style="list-style-type: none"> ▪ No proof of residence. ▪ Limited proof of identification. ○ Can be used to transfer money cost-effectively. ○ Could be reloaded at locations other than bank branches e.g. retail outlets, ATM’s, etc. ○ Alerts for all transactions available by email, text and voice ○ Bill payments via prepaid salary card ○ Eliminates cheque depositing fees ○ Eliminates cheque clearing fees ○ Eliminates costly money orders for bill payment ○ Eliminates lost or stolen cash ○ Eliminates cost associated with pay cheque collection – time off work and petrol, etc. ○ Eliminates cheque clearing delays ○ Low charges, low initial and ongoing costs ○ Funds safe – no physical security threat or fraud ○ Easy to use ○ Micro loans could be accessed due to bank record ○ Can be used to pay for school fees, books etc. ○ All cards are secured by a unique PIN; if stolen or lost <ul style="list-style-type: none"> ▪ A new card can be issued immediately. ▪ Funds can be transferred to the new card immediately. ○ Can benefit from any of the reward schemes that the PSU purchasing power can negotiate for the card ○ No need for changes for employees as the card will cover their movements between different group companies, during periods of lay-off as well.

Table 1 – Benefit analysis.

Reflecting on the benefits gained by each party involved in this TPSS, it is evident that substantial improvements are introduced on all levels of concern to the PSU employees, namely cost, transactional payment duration, funds accessibility, security and personal safety needs.

For the Zambian government, ease of payment and workforce productivity improve drastically, while the costs associated with payments and the possibility of fraud decrease drastically.

Zampay gains a massive market share over other competitors, especially when considering the vast opportunity to implement the prepaid salary card concept in other Zambian government ministries and the private sector. The company growth will exceed expectations and financially Zampay will receive massive benefit.

6. CONCEPTUAL DESIGN

6.1 INTRODUCTION

This section will communicate and illustrate how a prepaid salary card solution is constructed, in order for the reader to develop a better understanding of the complexity involved in designing such a solution. Section 6.2 will focus on the functional operation of the solution, with specific reference to the current Zambian environment. For illustration purposes, the reader could refer back to Figure 4 on page 26, contained in Section 4.4.3 of the literature study.

The card manufacturing, card issuing and transactional payment processes are also described in this section. It is of critical importance to understand that these processes are modelled to depict the **manner in which Zampay serves the client and engages with external parties necessary to ensure the operational working of the TPSS**. All of these processes and the activities contained in the processes are not necessary internal business processes within Zampay.

An important aspect to understand is how these processes fit together to provide a service / solution to the Zambian PSU. It is a prerequisite for the card first to be manufactured before it can be issued to an employee of the Zambian government. Only after a card has been issued to an employee, a payment can be made onto the card and the employee can then engage in transactional activity. This is illustrated in the figure below:

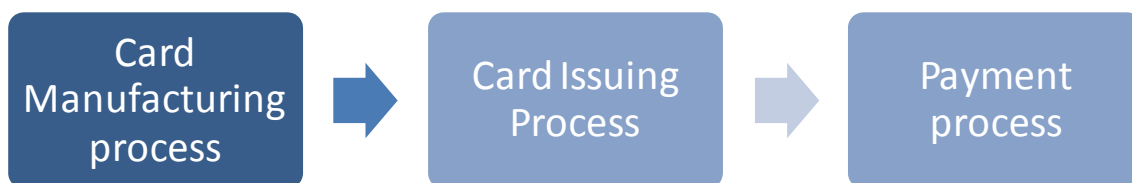


Figure 6 - Order of execution of processes.

In the description and illustration of all these processes, consideration will *not* be given to the analysis and description of problems associated with these processes, since this is a solution recommendation, not a problem analysis.

The description of these process models was done in detail in order to provide reason for carrying out certain activities within the processes, which may otherwise have been unclear without thorough explanations, since this is a new concept in the financial payment industry on the African continent and specifically in the Zambian environment.

These processes are described in detail from Section 6.3 up to Section 6.5 and are contained in Appendix I to Appendix W in this document.

Lastly this section strives to provide an **overview of** and insight into how Zampay functions internally within its different organisational units to sustain the organisation and successfully provide a TPSS to the PSU members employed by the Zambian government. It is important to note that the **model and descriptions provided are not a complete business model / architecture; it only serves to create a better understanding of the total solution from a viewpoint within Zampay** and is **described** with reference to the organisational model contained in Section 6.2.2.

The overview of how Zampay functions as an organisation is accomplished with the methodology described in Section 4.5.4 of the literature study and it is advisable to first form an understanding of the literature before attempting to read through Section 6.6.

The transactional payment, card manufacturing and card issuing processes are integrated into the business model where applicable and the overlapping activities are indicated with corresponding icons in the process models and the organisational model to ensure a more clear understanding and insight for the reader.

6.2 PREPAID SALARY CARD FUNCTIONALITY

6.2.1 OVERVIEW

The functionality of a prepaid salary card solution is dependent on the co-operation of the various stakeholders involved to provide the necessary technology and services, at a cost

which is financially feasible for the card holder. This is a significant aspect of the system in the Zambian environment, where the PSU has to provide unbanked and under-banked government employees with an affordable salary payment solution.

It is important to recognise that all prepaid salary card solutions are achieved by applying the same principles to the overall framework. The terminology of the different stakeholders may be different depending on the requirements and environment in which a prepaid salary card solution is implemented.

6.2.2 DESCRIPTION OF FUNCTIONAL OPERATION

For the effective functioning of a prepaid salary card, it is widely accepted that the following preliminary processes have been completed:

- The manufacturing of the card.
- The issuing and activation of the card, which result in the employee becoming a valid card holder.
- The funding of card account and the loading of the card with the account amount.

This places the card holder in a position to make a purchase at any accredited MasterCard PSP.

Functions of entities and relationships with other entities:

- **Card holder**

The card holder is an employee of the Zambian government and is able to make purchases with his/her prepaid salary card at any PSP which is accredited by MasterCard.

- **Payment Service Provider**

The PSP holds an account at the acquiring bank of his choice. The PSP would have a POS device available, provided to him by his acquiring bank. When the PSP swipes the card holder's card through the card reader, information is automatically sent to the TPP's processing platform for verification and processing.

- **Acquiring bank**

The acquiring bank is a financial institution/bank that provides banking services and a bank account to the PSP. It is this account held at the acquiring bank by the PSP that will be credited with a sale made by the PSP, after the transaction has been processed by the local switch in Zambia.

Since it is a prerequisite to be a financial institution to become a member of Visa/MasterCard, the PSP will automatically be accredited by MasterCard if the PSP has a bank account at such an acquiring bank.

- **Sponsoring bank**

In the context of the Zambian environment the sponsoring bank would “sponsor” the TPP (Zampay) with its bank license to be able to accept deposits onto the cards, as well as a Visa/MasterCard membership. The sponsoring bank is also where the employer (government) would hold its account. This is called a funding account to which the sum of all the employee’s payments would be deposited to. Every time an employee is paid, the amount is loaded onto the employee’s card by the TPP from this account. The sponsoring bank in this particular solution is Zanaco bank and for more information on the bank, the website < <http://www.zanaco.co.zm>> can be visited.

- **Third Party Processor**

Zampay would function as the TPP in the TPSS for the PSU. The TPP primarily provides the card issuing platform, manages the accounts of the various prepaid salary cards and processes the transactions.

When a purchase is made at a PSP or cash is withdrawn at an ATM, the TPP receives the transactional information for verification on its processing platform.

The processing platform technology is provided to Zampay by FNDS3000 Corp. FNDS3000 Corp is a public financial transaction company that provides a wide range of processing platforms to the electronic payment industry outside the USA. For more information on FNDS3000 Corp, its website can be viewed at < <http://fnds3000.com/index.htm>>.

The TPP has a Visa/MasterCard membership “sponsored” to them by the sponsoring bank; this ensures that it is possible for the TPP to access the government’s account at the sponsoring bank and also MasterCard for verification of funds and accreditation.

If verified, the TPP will authorise the transaction and credit the card holder’s card account and the government’s bank account at the sponsoring bank will be debited with the specific amount.

Switch

The switch is an electronic payment system owned by all the largest banks in Zambia. At the end of each day, various transactions between banks have to be settled, regardless of whether the card holder’s bank (sponsoring bank) and the PSP’s bank (acquiring bank)

are the same or different. The PSP's account at the acquiring bank will then be credited and the card holder's account (government account) at the sponsoring bank will be debited.

This is the basic interaction between the various stakeholders involved in the prepaid salary card solution to ensure the operational working of the TPSS.

6.3 CARD MANUFACTURING PROCESS

The process under consideration in this section describes the activities that involve the TPP and the government during the production phase of the prepaid salary cards. Some of the activities and processes that form part of the manufacturing process in the outsourced card manufacturing company are also modelled and described in this section.

An important aspect of the card manufacturing process to recognise is that this process is a prerequisite for any card to be issued.

To manufacture a card, a card design must first be agreed on before the card can be printed. These are the activities on the highest level (LEVEL 0) of the card manufacturing process.

The LEVEL 0 manufacturing process:

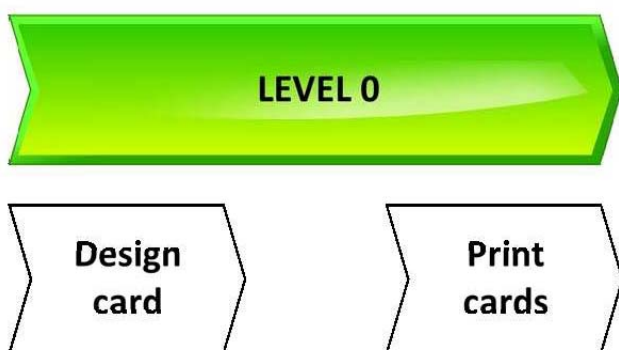


Figure 7 – Highest level manufacturing process

The card manufacturing process will be further decomposed in the LEVEL 1 process.

6.3.1 CARD MANUFACTURING PROCESS - LEVEL 1

The LEVEL 1 process flow model is decomposed out of the 'Design card' activity in the LEVEL 0 process flow model and is contained in Appendix I.

The LEVEL 1 card manufacturing process is initiated by the event that the government has decided on a prepaid salary card as the TPSS for the Ministry of Education employees.

A card must firstly be designed by a graphic design company, in co-operation with the government and the TPP. The card design will be provided to the card manufacturer as soon as all the parties involved are satisfied with the design. Proof cards will be printed by the card manufacturer for the government and the TPP to obtain a prototype of the card, which then needs to be approved by the government. In the case of non-approval, the card design process will be repeated. When a card design has been approved by the government, the card manufacturer will print the final design of the card for the quantity required by the government.

The LEVEL 1 card manufacturing process will now be further decomposed in the LEVEL 2 process flow models.

6.3.2 CARD MANUFACTURING PROCESS – DESIGN CARD ACTIVITY – LEVEL 2

The process flow model for the LEVEL 2 design card activity is decomposed out of the 'Design card' activity in the LEVEL 1 process flow model and is contained in Appendix J. This model illustrates the activities that need to be carried out by all the stakeholders involved in the design of a prepaid salary card, up to the point where the design should be approved by MasterCard.

- During this process the 'Design card' activity should be carried out by the TPP. This activity consists of two activities that must be completed before this process can continue. The first activity is 'Appoint graphic design company'; during this activity the TPP should consult and appoint a graphic design company that would be responsible for designing the prepaid salary card.
- The activity 'Arrange meeting with government' should now be executed by the TPP. The only task within this activity is to schedule a time frame which suits the government, graphic design company and the TPP.
- The activity 'Consult government on card design' can then start. This is executed in the time frame in which the meeting is scheduled and should be undertaken to allow the government, graphic design company and the TPP to consult one another on the requirements of the card design.
- The TPP should now carry out the activity 'Acquire Visa/MasterCard requirements'. During this activity the TPP will acquire the necessary card requirements from MasterCard and provide these to the graphics design company.
- The activity 'Design prototypes', in which different prototypes / designs of the card will be developed, will subsequently be performed by the graphic design company.

- The activity 'Arrange meeting with government' should again be carried out by the TPP. The objective of this meeting is for the TPP to present the prototype designs to the government in the presence of representatives of the graphic design company. This activity could result in one of two events that follows as its outcome:

- I. The card design is found acceptable.
- II. The card design is not found acceptable.

If event I follows the activity, the design should be awaited for approval. The activity that follows in this case is to approve the design.

If event II follows the activity, another meeting should be arranged.

- The activity 'Arrange meeting with government, should again be performed by the TPP. The objective of this meeting is to consult the government on the reasons for the design not proving acceptable.
- The activity 'Consult government regarding design refinements' should subsequently be performed by the TPP and graphic design company. During this consultation the government should inform the graphic design company of the refinements necessary for the card to be acceptable. The process should be repeated from the 'Design prototypes' activity until the status of event I is achieved.
- The activity 'Approve design' should now be carried out by the government and this activity could have one of two events that follows as the outcome:
 - I. The card is designed.
 - II. The design is not approved.

If event II follows the activity, the card design was not approved by senior government officials and the TPP can be informed of the refusal to approve it.

- The activity 'Inform TPP of non-approval' should now be performed by the government.
- The activity 'Arrange meeting with government' should again be performed. The objective of this meeting is to consult the government on the reasons for not approving the card design.
- The activity 'Consult government regarding approval' should now be performed. All the parties involved attend this consultation in the time frame arranged for the meeting. As a result of this, a meeting will again be arranged to consult the government on the

necessary refinements as described earlier in this section and the process will continue until the card design is approved.

If event I follows the activity, the card design was approved by a senior government official and the TPP can be informed of the approval.

- When the TPP has been informed of the approval, the activity 'Consult MasterCard for approval' should be performed by the TPP. This activity could lead to two events as the outcomes:
 - I. MasterCard approves the card design and the card meets their requirements.
 - II. MasterCard does not approve the card design and the card does not meet their requirements.

If event I is the outcome of the activity, this completes the card design process. If event II is the outcome of the activity, prototypes should again be designed and the whole process from there on should be performed until MasterCard approves the card design.

This completes the process flow of the LEVEL 2 design card activity and the 'Provide card design to card manufacturer' activity on the LEVEL 1 card manufacturing process in Appendix I could now be carried out.

6.3.3 PROVIDE CARD DESIGN TO CARD MANUFACTURER ACTIIVITY - LEVEL 2

The process flow model for the LEVEL 2 provide card design to card manufacturer activity is decomposed out of the 'Provide card design to card manufacturer' activity in the LEVEL 1 process flow model and is contained in Appendix K. This model illustrates the activities that need to be undertaken by the TPP to provide the card manufacturer with the card design and all the necessary information and resources to place an order.

- The activity that is initiated by this process is 'Provide card design to card manufacturer'. During this activity the TPP should provide the necessary information to the card manufacturer by executing two activities:

The first activity also consists of two activities. The first activity is 'Provide graphical image / design'. The design that is provided during this activity contains the layout and the graphical image. The second activity is 'Provide colour separations', which includes providing information to the card manufacturer on all the specific colours that should be used on the card and in which sequence these colours should be printed. The event that follows these two activities is that the card design has been provided to the card manufacturer.

The second activity is 'Provide order quantity'. During this activity the TPP should inform the card manufacturer of the total number of cards the government wants to produce. The event that follows this activity is that the order quantity has been provided.

The events of the two activities described above, together initiates the activity to provide a quotation.

- The activity 'Provide quotation' should now be performed by the card manufacturer, once he has received all the relevant information. This activity includes providing the TPP with a quotation for all the costs to manufacture and ultimately emboss the cards during the issuing process.
- The activity 'Obtain funding approval' should now be carried out by the TPP. This includes obtaining approval from the government for the quotations the card manufacturer has provided to ensure that the government has sufficient funds for the manufacturing of the card.
- The activity 'Place order' should now be performed by the TPP. The event that follows is that an order has been placed and this initiates the activity for the card manufacturer to plan the production.
- The activity 'Plan production' should be performed by the card manufacturer. This activity includes two activities that need to be executed. The first activity is 'Financial planning'; this is an activity undertaken within the card manufacturing company and not of real importance to the TPP. The second activity is 'Manufacturing cycle planning', which is also an activity undertaken within the card manufacturing company, but is important to the TPP. This allows the TPP to make a calculation of when the cards could be manufactured and estimation of the start of the card issuing process can be done. The process flow concludes where the card manufacturer has finished the production planning.

This completes the process flow of the LEVEL 2 provide card design to card manufacturer activity and the 'Print proof cards' activity on the LEVEL 1 card manufacturing process in Appendix I could now be executed.

6.3.4 CARD MANUFACTURING PROCESS - PRINT PROOF CARD ACTIVITY - LEVEL 2

The process flow model for the LEVEL 2 print proof card activity is decomposed out of the 'Print proof card' activity in the LEVEL 1 process flow model and is contained in Appendix L. This model depicts a framework of all the fundamental manufacturing steps to produce a

transactional card. This model also includes the approval of the manufactured card by the government.

- The activity 'Print proof card' initiates this process and is performed by the card manufacturer. This activity consists of three activities that need to be performed by the production manager in order for the process to continue.

The first activity is 'Receive discrete job pick list'. This list enables him to collect all material necessary from the store room. The second activity is 'Receive Work order', which describes the manufacturing task that must be completed. The third activity, 'Receive Production Planning sheet', indicates the schedule for the manufacturing of the required cards. After all three of these documents have been received, the printing of the proof cards can continue.

- The activity 'Retrieve PVC sheets according to pick list' should then be carried out. This activity consists of obtaining the number of PVC sheets necessary according to the number stipulated on the list.
- The activity 'Print sheet/s' should now be carried out. During this activity the sheets for the front and back of the cards are printed. For printing onto PVC cards, silk screen processes are commonly used with variants of various colours. For this printing process the card manufacturer would make use of the colour separations provided by the TPP, as described by Jansen (2010).
- The activity 'Audit printed sheet/s' should be carried out by the card manufacturer. The sheets are all assessed to ensure the printing requirements are within the required quality parameters. The outcome of this activity could be any of two events:
 - I. The printed sheet/s is / are approved.
 - II. The printed sheet/s is / are not approved.

If the outcome of this activity is event I, the process will continue. If the outcome of this activity is event II, the process has to be repeated for the printing of the sheets until the status of event I is achieved.

- The activity 'Add magnetic strip' should now be carried out to continue the process. This is accomplished by adding the magnetic strip onto the lamination material, using a hot stamping method. A more detailed description can be viewed at < <http://www.madehow.com/Volume-4/Credit-Card.html>>.
- The activity 'Laminate sheet/s' can now be carried out. During this activity the front and back sheets required to create a card are collated by laminating the sheets together.

Hanghiri and Tarantino (2002) describes that the laminating process is based on the attribute of thermoplastic materials to pass through different phases when exposed to heat.

- The activity 'Cut sheet/s' should now be carried out and is accomplished by using a punching tool integrated within an automated punching machine. Hanghiri and Tarantino (2002) indicate that the precise alignment of the sheets for punching are of critical importance and the number of cards cut out of a sheet range from 12 up to 48 cards.
- The activity 'Inspect cards' consists of a visual or automated test where the cards are randomly inspected on all critical areas, such as printing, laminating and the cutting of the card. Jansen (2010) explained that an important aspect to take note of during this activity is that if a card fails the test, another card will not be manufactured to replace it. The client or in this case Zampay will accept in the contractual agreement with the card manufacturer that the number of cards ordered may differ with a variance of ± 0.02 on the total number of cards.

Two activities now need to be completed for the process to continue:

- The first activity, 'Add hologram', is performed on front on the card, again using a hot stamping method.
- The second activity, 'Add signature panel', takes place on the back of the card, also using a hot stamping method.

Both these measures are added for security and verification purposes and are requirements specified by MasterCard. For more information on both of these features, <http://www.madehow.com/Volume-4/Credit-Card.html> can be visited.

- The activity 'Assess quality' is now performed visually on a sample of randomly drawn cards. If the card passes the quality assessment, it will be ready to be packed. If the card fails the quality assessment, it is shredded.
- The activity 'Pack proof card/s' is now carried out and consists packing the card/s in secure packaging for transport to the TPP.
- The activity 'Present card to government' will now be carried out by the TPP after the logistical company has delivered the card/s.
- The activity 'Final approval' serves as the last approval step of the card. This activity could have two outcomes:

- I. Card design approved.
- II. Card design not approved.

If the outcome is event I, the card is approved and full scale manufacturing can start. If the outcome is event II, the process to design the card up to the printing of proof cards should be repeated as indicated on the LEVEL1 card manufacturing process in Appendix I.

This completes the process flow of the LEVEL 2 print proof card activity and the 'Print bulk cards' activity on the LEVEL 1 card manufacturing process in Appendix I can now commence.

6.3.5 CARD MANUFACTURING PROCESS – PRINT BULK CARDS ACTIVITY - LEVEL 2

The process flow model for the LEVEL 2 print bulk cards activity is decomposed out of the 'Print bulk cards' activity in the LEVEL 1 process flow model and is contained in Appendix M. This model depicts a framework of all the fundamental manufacturing steps to produce a transactional card. This model is exactly the same as the 'Print proof card' activity model contained in Appendix L, except for the last two activities. The reader could refer back to Section 6.3.4 above for a detailed description if required. A description of the last two activities follows below:

- The activity 'Pack cards' is carried out after the manufacturing cycle has been completed. During this activity the total number of cards ordered by the government will be packed in secure packaging.
- The last activity, 'Store packed card/s in vault' completes this process. The vault is a secure facility situated at the premises of the card manufacturer. According to Jansen (2010) the vault has to conform to requirements specified by MasterCard. All the manufactured cards will be stored in the vault until Zampay requests the embossing of cards.

After all the activities necessary for the card manufacturing process, described in this section, have been completed, the card issuing process can start.

6.4 CARD ISSUING PROCESS

The card issuing process takes all the steps and activities into consideration that need to be undertaken from the addition of an employee as a new card holder up to the activation of a new card.

Two important aspects to take notice of and understand are:

- It is a prerequisite for a card to be issued before an electronic payment can be made.
- To pay an employee as a card holder, additional information is necessary over and above information that was needed previously to issue a paper based payment.

The highest level (LEVEL 0) of the card issuing process constitutes adding a card holder onto the system and then ultimately activating the card.

The LEVEL 0 card issuing process:



Figure 8 –Highest level card issuing process.

The card issuing process will be further decomposed in the LEVEL 1 process.

6.4.1 CARD ISSUING PROCESS - LEVEL 1

The LEVEL 1 process flow model is decomposed out of the 'Populate System' activity in the LEVEL 0 process flow model and is depicted in Appendix N.

The LEVEL 1 card issuing process is initiated by the event that all the government employees in the Ministry of Education who are already on the government payroll system must be added as card holders. Whether it is a new employee or an existing employee, every card holder must be added through this process.

The system must then be populated with the relevant employee information and data. After the information has been captured, this information should be provided to the TPP to create card accounts for the employees who should become card holders. The account information is then provided to the relevant card manufacturer to finalise the card for each individual. As soon as the physical card has been embossed, the card's functionality must be validated and the card should be presented to the employee who is the legal recipient of the card.

The LEVEL 1 card issuing process will now be further decomposed on LEVEL 2 process flow models.

6.4.2 CARD ISSUING PROCESS – POPULATE SYSTEM ACTIVITY - LEVEL 2

The process flow model for the LEVEL 2 populate system activity is decomposed out of the 'Populate system' activity in the LEVEL 1 process flow model and is depicted in Appendix O. This model illustrates the activities that should be carried out by the government payroll department in order to ultimately add an employee as a card holder.

The event that a card holder must be added onto the government payroll system initiates the populate system activity to start this process flow.

- The 'Populate system' activity consists out of two activities that need to be executed in order for the system to be populated with the relevant information.

The first activity is to populate the system with 'Employee details' – the details necessary for an electronic payment is more than the details necessary for a paper based payment. An employee's address and ID number is necessary, since these will be linked to the card that will be issued and the government will provide this information to the TPP. A person's ID number is not necessarily needed when printing a cheque, etc.

The second activity is to populate the system with 'Payment information' – this information includes details on the number of recurring payments that should be made annually and also on the value of an employee's salary or wage payments. This information is required by the TPP for internal calculation purposes.

After these two activities have been carried out the populated system data should be executed and approved:

- The activity 'Audit employee card holder's data' should then be undertaken to ensure that every employee's data are entered into the system and the data are audited for correctness.
- Carrying out the activity to 'Approve the audited data' is strictly limited to the head of the government payroll department. All the employees who form part of the approved data will be accepted as card holders on the government payroll system. The event that originates and ends this process is that the employee is added as a card holder.

This completes the process flow of the LEVEL 2 populate system activity and the 'Provide information to TPP' activity on the LEVEL 1 card issuing process in Appendix N can now be carried out.

6.4.3 CARD ISSUING PROCESS – PROVIDE INFORMATION TO TPP ACTIVITY - LEVEL 2

The process flow model for the LEVEL 2 provide information to TPP activity is decomposed out of the 'Provide information to TPP' activity in the LEVEL 1 process flow model and is contained in Appendix P. This model illustrates the activities that should be carried out by the government payroll department to provide the card holder information to the TPP.

- During the 'Provide information to TPP' activity two activities need to be carried out for the information to be provided:

The first activity that should be undertaken on by the government's payroll department is 'Create card holder information file'. This is a very simplex and automated activity where the government's payroll system creates a file with all the card holder information.

The second activity to be undertaken by the government's payroll department is 'Test FTP link'. File Transfer Protocol (FTP) allows one to transfer files securely between two computers via the internet, for a more descriptive definition the website http://compnetworking.about.com/od/networkprotocols/g/bldef_ftp.htm can be visited. The information file needs to be sent via a secure link, since it contains personal information on the government's employees that is not meant to reach the public domain. There could be two events that feature as outcomes of this activity:

- I. The first outcome could be that the FTP link is secure / active.
- II. The second outcome could be that the FTP link is not secure / active.

If the outcome of event I follows the activity, then the link is secured, the file is created and the activity to send the file to the TPP could be undertaken. If the outcome is event II, the link is not secured and the activity to repair the link should be repeated until the status of event I is reached.

- The activity 'Repair the link' procedures for testing the link for technical problems up to infrastructure problems and the test and repair process should continue until the link is secure and active.

When the link is secure and active, and the file has been created, the activity of sending the file to the TPP could be initiated.

- The activity 'Send card holder information' file should now be performed by the government's payroll department to send the file to the TPP.

This completes the process flow of the LEVEL 2 provide information to TPP activity and the 'Create employee account' activity on the LEVEL 1 card issuing process in Appendix N can now be carried out.

6.4.4 CARD ISSUING PROCESS – CREATE EMPLOYEE ACCOUNT ACTIVITY - LEVEL 2

The process flow model for the LEVEL 2 create employee account activity is decomposed out of the 'Create employee account' activity in the LEVEL 1 process flow model and is contained in Appendix Q. This model illustrates the activities that should be undertaken by the TPP to create an account number for each employee on the TPP electronic payment processing platform.

The activity that needs to be completed to continue the card issuing process is the creation of an employee account. The 'Create employee account' activity consists out of two activities:

- I. The activity 'Create employee account on system' is an automated process where the information file is entered into the TPP payment system and the system automatically issues a number for each card holder. This number will act as the account number. The number in the electronic processing platform identifies the card holder and the type of financial transaction card the account is created for.
- II. The activity 'Create embossing file' is also an automated activity which the TPP payment system automatically initiates when the account number is created. The embossing file contains all the card encryption data, employee card number and name data. An important aspect to understand is that the account number created for each card holder when the account is created is different from the card number created when the embossing file is created.

This completes the process flow of the LEVEL 2 create employee account activity and the 'Provide information to card manufacturer' activity on the LEVEL 1 card issuing process in Appendix N can now be performed.

6.4.5 CARD ISSUING PROCESS – PROVIDE INFORMATION TO CARD MANUFACTURER ACTIVITY - LEVEL 2

The process flow model for the LEVEL 2 provide information to card manufacturer activity is decomposed out of the 'Provide information to card manufacturer' activity in the LEVEL 1 process flow model and is contained in Appendix R. This model illustrates the activities that should be undertaken by the TPP to provide the card manufacturer with correct information to emboss the already manufactured cards and finish the card manufacturing process.

- During the 'Provide information to card manufacturer' activity two activities need to be executed for the information to be provided to the card manufacturer:

The first activity that should be carried out by the TPP is 'Retrieve embossing file' from the TPP payment system. The event that follows this activity is that the embossing file has been retrieved from the system.

The second activity that should be carried out by the TPP is 'Test FTP link'. This activity is described in detail in section 6.4.3 and one could refer back to this section if necessary. The event that follows this activity is that the link is secure and active.

When both the above described events are reached within the process it initiates the activity to send the embossing file.

- The activity 'Send embossing file' should now be carried out by the TPP. The event that features as the outcome of this activity is that the card manufacturer received the embossing file.
- The activity 'Retrieve card(s) from vault' should now be carried out by the card manufacturer to remove the cards that have already been manufactured by the card manufacturer for the government to emboss them with the relevant information in the file.
- The activity 'Emboss Card(s)' should now be carried out by the card manufacturer to emboss the card with the embossing file information. This information will typically contain card encryption data, employee card number and name data. The product that is produced through this activity is a prepaid salary card.
- The activity 'Notify of card delivery' should now be undertaken by the card manufacturer. During this activity the card manufacturer should notify the TPP that the card(s) is in the process of being delivered. The notification should be given on the day the card(s) is collected by the logistical company.
- The activity 'Deliver card(s) to TPP' should now be undertaken by an outsourced logistical company. This includes collecting the card(s) from the card manufacturer, transporting the card(s) to the TPP and delivering the card(s). This activity could have one of two outcomes:
 - I. Card(s) delivered to TPP.
 - II. Card(s) not delivered to TPP. There could be various reasons for this and a missing card(s) holds a potential risk in terms of fraud if it comes into the wrong person's possession.

If event I is the outcome of this activity, it initiates the activity to acknowledge that the card(s) were received. If event II is the outcome of the activity, it initiates a combination of two activities:

- The first activity 'Cancel undelivered card(s)' should be executed by the TPP. The TPP cancels the account(s) of the missing card(s) to ensure that the card(s) will not be recognised by any member of MasterCard for transactions.
- The second activity, 'Create embossing file for missing card(s)' should also be carried out by the TPP to create new account numbers and a new embossing file for the missing cards. The entire process for providing the embossing file information to the card manufacturer is repeated until the card(s) are delivered.
- The activity 'Acknowledge receipt of card(s)' will now be carried out to complete the process as soon as the card(s) are delivered. The moment the TPP informs the card manufacturer of the delivery of the card(s), the event that card is created follows the activity and completes this process.

This completes the process flow of the LEVEL 2 provide information to card manufacturer activity and the 'Test card' activity on the LEVEL 1 card issuing process in Appendix N can now be carried out.

6.4.6 CARD ISSUING PROCESS – TEST CARD ACTIVITY - LEVEL 2

The process flow model for the LEVEL 2 test card activity is decomposed out of the 'Test card' activity in the LEVEL 1 process flow model and is depicted in Appendix S. This model illustrates the activities that should be undertaken by the TPP to validate that each card is functioning in the correct manner.

- The activity contained in this process to continue the card issuing process is 'Test card'. The 'Test card' activity consists out of two activities which should be executed. The first activity is 'Verify card encryption'. Card encryption includes encrypting the card holder information on the magnetic strip on the back of the card. The second activity is 'Access correct account'.

To verify both these activities, the TPP will swipe each card through a card reader to ensure that the card is readable and that the card accesses the correct account. This is a re-iterative process that is executed in batches of a 1000 cards each.

This activity could have one of four events as a consequence:

- I. Card encryption verified and account verified.

- II. Card encryption verified and account not verified.
- III. Card encryption not verified and account verified.
- IV. Card encryption not verified and account not verified.

If event I is the outcome of the activity, the process is complete. If event II, III or IV is the outcome of the activity, the cards with incorrect functionality are removed from the system.

From there on exactly the same process is followed to provide the card manufacturer with the embossing file to create a new card. For a detailed description of this process, refer back to section 6.4.5. This process should be followed until the card encryption is verified and the correct account is accessed by each card.

This completes the process flow of the LEVEL 2 test card activity and the 'Present card to employee' activity on the LEVEL 1 card issuing process in Appendix N can now be carried out.

6.4.7 CARD ISSUING PROCESS – PRESENT CARD TO EMPLOYEE ACTIVITY - LEVEL 2

The process flow model for the LEVEL 2 present card to employee activity is decomposed out of the 'Present card to employee' activity in the LEVEL 1 process flow model and is contained in Appendix T. This model illustrates the distribution of the cards by the government to the various issuing points within Zambia, as well as the physical issuing of the cards to Zambian PSU members employed by the Zambian government. The activation of the card completes the process and enables the card to be used in transactional activities.

The 'Present card to employee' activity is composed of a process chain that firstly needs the following two activities to be completed in order to continue:

- The first activity, 'Notify of card delivery' should be carried out by the TPP. During this activity the TPP should notify the government that the card(s) is in the process of being delivered. The notification should be given on the day the card(s) is collected by the logistical company.
- The second activity, 'Deliver card/s to government' is the responsibility of an outsourced logistical company to provide the government with the cards it ordered, in the expected state.
- The next activity, 'Acknowledge receipt of card/s' is an indication by the government to the TPP that it is in possession of the cards.

- The activity 'Sort card/s according to pay point/s' should now be carried out by the government. This is accomplished by sorting the card(s) according to the pay point(s) where the employee previously collected his/her salary or wage payment.
- The activity 'Distribute card/s to pay point/s' is the next activity to be carried out by the government. This forms part of distributing the cards to the various pay points within the government. An important factor to note, compared to the cheque payment process, is that the distribution of the card is a once-off distribution, while the distribution of cheque or cash payments is an ongoing process which happens at least once a month.

Two activities need to be carried out next in order for the process to continue:

- The activity 'Notify employee/s of card collection date/s' involves the government informing the employee of given dates for card collection and the activity 'Notify employee/s of necessary documentation', includes notifying the employee of relevant documentation for identity verification and employment confirmation.
- The activity 'Arrive at pay point' should be carried out by the employee on the date indicated, since it is a requirement for the employee to be present at a pay point in person to receive the card.
- The activities to 'Verify employee validity' and 'Verify employee identity' should now be carried out and the documentation needs to be approved by the government after the employee has presented the relevant documentation.
- The activity 'Complete employee validity form' should subsequently be completed by the government and the employee. This document serves as proof that the employee is employed by the Zambian government and that there is an agreement between the parties.
- The activities 'Give card to employee' and 'Provide user manual to employee' should now be carried out by the government. The card issued is the Zampay prepaid salary card and the user manual issued, provides instructions for using the card to take part in transactional activities, as well as information on transactional fees. The user manual is contained in Section 9.1.3.
- The penultimate activity that should be undertaken in the card issuing process is 'Sign card declaration document'. This document needs to be signed by the employee and the government and it is a declaration on behalf of the employee's acceptance of the terms and conditions associated with the use of the card. The declaration document and the terms and conditions is contained in Section 9.2.

- The activity 'Activate card' should now be carried out by the employee to finalise the issuing process and this will enable the employee to take part in transactional activities. Instructions for activation are contained in the user manual.

This concludes the card issuing process and after the final activation of the card as described above, the process of loading a card with a wage or salary amount is described in the next section.

6.5 ELECTRONIC PAYMENT PROCESS

The process under consideration is focused on providing a detailed flow of the electronic payment process solution in the Zambian government environment from the perspective of the employer to the employee and contains all the activities necessary for an electronic payment to be successfully made onto a prepaid salary card.

It is important to note that the prerequisites to pay an employee are exactly the same in salary payments made with paper based instruments as in electronic payments made via a card. The modelling of the electronic payment process of the prepaid salary card has exactly the same objective as with paper based instruments – to provide the employees with their salary or wage payments as fast as possible to enable the employee to engage in electronic transactions to fulfil their everyday needs.

To pay an employee the prerequisite is that all the necessary information required to issue a payment needs to be captured in the government payroll system. It is important to take note that the information needed to make an electronic payment is different from the information needed to make a cheque payment. The information necessary to issue an electronic payment will form part of the issuing process reflected in Appendix N and is broadly described in Section 6.4.2.

Only once the employee is added, the selected employee can be paid. These are the activities on the highest level (LEVEL 0) of the electronic payment process.

The LEVEL 0 payment process:



Figure 9 – Highest level payment process

The payment process will be further decomposed in the LEVEL 1 process.

6.5.1 ELECTRONIC PAYMENT PROCESS - LEVEL 1

The LEVEL 1 process flow model is decomposed out of the 'Add Employee' activity in the LEVEL 0 process flow model and is contained in Appendix U.

This model consists of the process flow which a payment follows after an employee and the employee's accompanying payment details have been added to the government payroll system. It illustrates that a payment should first be generated by the government payroll system before the payment can be processed and the payment can be made by the TPP (Zampay).

The difference to note between the paper based salary payment process and the electronic payment process on LEVEL 1 is that an electronic payment is not a physical payment involving handing over a physical currency format into the employee's possession. Electronic payments first have to be generated electronically before the actual payment processing and payment can take place – this will become more apparent on the LEVEL 2 process flow models.

6.5.2 ELECTRONIC PAYMENT PROCESS – GENERATE PAYMENT ACTIVITY - LEVEL 2

The process flow model for the LEVEL 2 generate payment activity is decomposed out of the 'Generate payment' activity in the LEVEL 1 process flow model and is depicted in Appendix V.

This model depicts the method of generating a payment for both a salary - and wage employee; the sending of the payment file to the TPP and the funding of the account at the sponsoring bank.

The 'Generate payment' activity has to be carried for the two types of employee within the Ministry of Education who are employed by the government:

- Salary employee – for a salary employee it is unnecessary to populate the system with their active working hours, since a salary employee receives a fixed monthly payment.
- Wage employee – for a wage employee the activity 'Capture employee working hours' needs to be carried out to populate the government payroll system with the number of active working hours for each wage employee.

After the government payroll system has been populated with the relevant information the 'Information captured' event follows, which in turn initiates the 'Process payroll' activity.

- Out of the activity of processing the payroll a Comma Separated Value (CSV) file is created. A CSV file is a text file that has a particular secure format used for the saving of data or text in an organised manner. A more detailed description and definition can be viewed at < <http://www.softinterface.com/Convert-XLS%5CFeatures%5CCSV-File-Definition.htm>>.

Once the CSV file has been created, the activity of auditing the CSV file can be initiated.

- The activity 'Audit CSV file against HR data' is carried out by the government's Internal Audit Department. They audit and thus verify that the amount each employee should be paid is firstly correct, the correct amount is paid to the correct person and the specific details of each person are correct. Four events could follow as outcomes out of this auditing process:
 - I. Correct, which indicates that the CSV file and HR data do correlate.
 - II. An incorrect amount has been entered into the CSV file to be paid and the details of the employee the payment should be made to are also incorrect.
 - III. An incorrect amount has been entered into the CSV file to be paid, but the details of the employee it should be paid to are correct.
 - IV. The correct amount has been entered into the CSV file to be paid, but the details of the employee it should be paid to are incorrect.

If the outcome of this activity is any of events II, III or IV, the data should be corrected and the payroll should be processed again until the outcome conforms to event I. This event of the CSV file being found correct, initiates the activity to approve the CSV file.

- The activity to approve the CSV file is performed by a senior accountant of the government. The resulting event of the activity is that the CSV file is released for any further activity that it has to undergo.

This initiates the last two activities that must be completed for the payment generation process to be finalised.

- The senior accountant who approved the CSV file should now follow the activity to "Send CSV file" to the TPP (Zampay) and to fund the government account at the sponsoring bank (Zanaco) with the total amount that needs to be paid to employees.

This completes the process flow of the LEVEL 2 generate payment activity and the 'Process payment' activity on the LEVEL 1 electronic payment process contained in Appendix U can now take place.

6.5.3 ELECTRONIC PAYMENT PROCESS – PROCESS PAYMENT ACTIVITY - LEVEL 2

The process flow model for the LEVEL 2 Process payment activity is decomposed out of the 'Process payment' activity in the LEVEL 1 process flow model and is contained in Appendix W. This model illustrates the activities that should be undertaken by the TPP (Zampay) to be able to ultimately pay a Ministry of Education employee via a prepaid salary card.

The 'Process payment' activity contains two activities that need to be executed before a payment can be made:

- Firstly the 'Receive CSV file' activity should be carried out by the TPP before the payment process can continue and to ensure that the file is in a suitable condition.

Three possible events could be the outcome of receiving the file:

- I. The file could well be received, but could be corrupt and thus not suitable for the use of payments by the TPP.
- II. The possibility exists that the file was not received by the TPP.
- III. The file has been received by the TPP.

If the consequence of the activity is any of events I or II, it initiates the activity of requesting the government to resend the CSV file. This would typically be the role of the senior account within the government whose responsibility it is to send the CSV file to the TPP. This process will continue until the status of event III is reached. If the consequence of the activity is event III it indicates that the CSV file was received in a format suitable to make payments.

- Secondly, the 'Verify funds in funding account' activity should be carried out by the TPP to ensure that there are sufficient funds available in the account used for funding the cards, otherwise the employee payments would not be able to be completed.

There are two events that can be the outcome of verifying if there are sufficient funds:

- I. Sufficient funds – this indicates that there is enough money in the government's account used as the funding account for the cards, at the sponsoring bank (Zanaco).
- II. Insufficient funds – this indicates that there is not enough money in the government's account used as the funding account for the cards, at the sponsoring bank (Zanaco).

If the consequence of the activity is event II, this initiates the activity by the TPP to request the government to fund the account; this would typically be the role of the senior account within the government whose responsibility it is to fund the funding account at the sponsoring bank. This process will continue until the status of event I is reached. If the consequence of the activity is event I, there are sufficient funds in the account to make payments.

When the CSV file has been received by the TPP and there are sufficient funds in the funding account, the activity of loading the cards with the specific payments amounts could be initiated.

- The activity to 'Load cards' will now be undertaken by the TPP. This is done by the processing platform of the TPP, provided by FNDS3000. This will credit each card on the processing platform with the payment amount (salary or wage amount) of the CSV file. The event that follows this activity is that the prepaid salary cards have been loaded with the amounts stipulated in the CSV file.
- The activity 'Verify loaded cards against CSV file' should now be carried out by the TPP to ensure that each employee receives the correct payment and preferably avoid any errors that could complicate the process considerably if the incorrect amount is paid. This activity consists of two activities to verify the loaded cards against the CSV file. The first activity is to verify the 'Payment amount' and the second activity is to verify the 'Employee details'. Two events could follow as the outcomes of this activity; the information could be verified and in this case the activity to release the money would be initiated.
- The 'Release money' activity will now be undertaken by the TPP via its processing platform. This activity consists of two activities that the TPP has to perform on the processing platform. This first activity is 'Make money available' – the processing platform has an interface that has direct access to the funding account of the government at the sponsoring bank (Zanaco) and the money will be released onto the cards. The money will be actively available on the cards. The second activity is 'Send SMS notification'; this is a function that forms part of the processing platform and must be activated to send an SMS notification to the cell phones of all the card holders.

The other possibility is that the information cannot be verified and this would initiate corrective action of the loaded cards.

- If the information could not be verified, the TPP would carry out the 'Corrective action' activity. This entails that any of three activities, two of these activities or all of these activities could be undertaken to correct the incorrectly loaded cards. The process to

load the cards and verify the loaded cards would again be followed until all loaded cards have been verified.

The process described above completes the process of loading a Zampay prepaid salary card with the indicated wage or salary payment. The result of this process is that the payments have been processed and the employees have been paid.

In exactly the same manner a Social Grant Benefit payment could be processed and doing so will without doubt decrease the social grant fraud.

6.6 BUSINESS MODEL

6.6.1 INTRODUCTION

The Qbit Complex Organisational Systems Business Architecture Model methodology is used in this project only to the extent necessary as an aid to formulate the Zampay business model to create an **overview** and insight into Zampay functions as a TPP within the Zambian environment, from the viewpoint of Zampay.

The Zampay business model will focus on all three of the main sub systems (departments) within Zampay and **describe** how each sub-sub system (functional unit) functions within the organisation.

The modelling of processes necessary for the complete event chains of the 'Marketing & Sales' and 'Finance' sub-sub systems within the Zampay business model falls outside of the scope of this project.

The Zampay business model incorporates the card manufacturing, card issuing and electronic payment processes where applicable within the event chains of the 'Operations & IT' sub-sub systems, since these processes indicate how Zampay serves the PSU employees employed by the Zambian government and are not strictly internal business processes within Zampay, but are critical for the service Zampay provides.

Activities carried out by Zampay and contained in these processes are indicated with particular icons that correspond with these processes and the Zampay organisational model in Section 6.6.2.

6.6.2 ZAMPAY ORGANISATIONAL MODEL

In order for a business model to be constructed, it is necessary to define the different sub systems and sub-sub systems within Zampay in an organisational model.

An important aspect of Zampay's organisational structure is that it does not have a Human Resources sub system, usually present in the majority of organisations' organisational

structure. The reason for this is that the majority of processes and activities within Zampay are automated financial transactions, while financial reports and Customer Relationship Management (CRM) are also largely automated with Zampay’s electronic payment processing platform provided by FUNDS3000.

This supports the fact that the Qbit Complex Organisational Systems Business Architecture Model methodology used by Zampay is ideal for the organisations’ structure and functionality.

The organisational model is illustrated below:

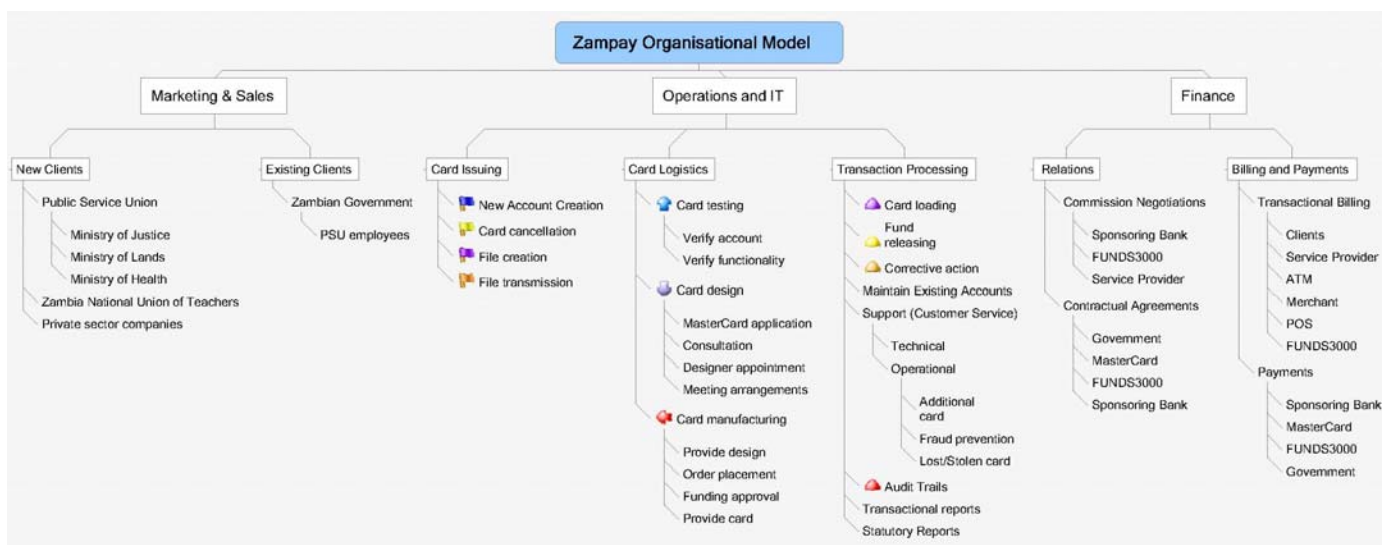


Figure 10 – Zampay organisational model.

The description of the business model in the sections below will be done according to the structure of the Zampay organisational model.

6.6.3 ZAMPAY BUSINESS MODEL

6.6.3.1 ZAMPAY VISION

The vision for Zampay is specifically to generate ‘Commission based income on electronic transactions for prepaid salary cards, supported by an electronic payment processing platform’. This vision is contained in the business model in Figure 11 below and is consistently re-aligned according to the business knowledge derived from the flow of the event chains of the Zampay business model:

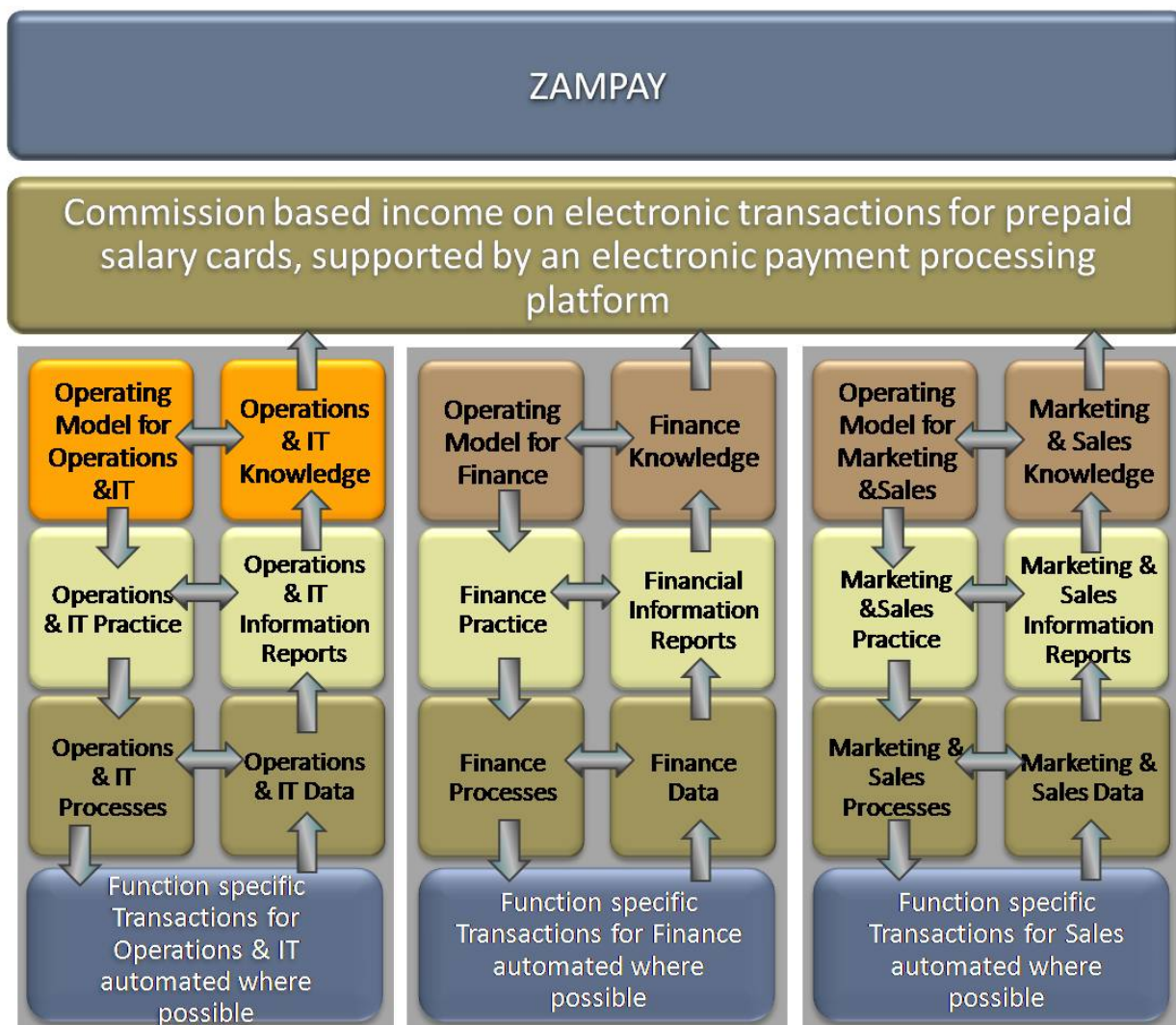


Figure 11 – Zampay business model.

The Zampay business model is described according to the event chains illustrated in the model and by referring back to the business model during the descriptions that follow in the sections below, it would be possible to gain a clear understanding of how Zampay functions.

6.6.3.2 OPERATIONS AND IT SUB SYSTEM

6.6.3.2.1 TRANSACTION PROCESSING SUB-SUB SYSTEM

6.6.3.2.1.1 OPERATING MODEL FOR OPERATIONS OF TRANSACTION PROCESSING SUB-SUB SYSTEM

The operating model for the Transaction Processing sub-sub system within the Operations and IT sub system consists of the operations to:

- Load cards with a wage or salary payment amount.
- Release funds onto cards corresponding with the loaded payment amounts.
- Correct incorrect card loading.

- Maintain the existing accounts on the electronic payment processing platform.
- Provide technical and operational support to clients.
- Create auditing trails for each card on the system.
- Create transactional reports for card holders requesting statements.
- Create statutory reports.

6.6.3.2.1.2 PRACTICE FOR TRANSACTION PROCESSING SUB-SUB SYSTEM

The operations practices to accomplish the operations for the Transaction Processing sub-sub system within the Operations and IT sub system include:

- Strict procedures to load card accounts on the Zampay electronic payment processing platform should be followed.
- Procedures and regulations to release the funds onto the loaded card accounts on the Zampay electronic payment processing platform should be followed.
- Strict procedures should be followed to correct loaded card account(s) / loaded card account holder details which failed verification on the Zampay electronic payment processing platform.
- Strict procedures to maintain the existing accounts on the Zampay electronic payment processing platform should be followed.
- Strict procedures should be followed to resolve technical issues and assist clients who notify Zampay of operational issues, via customer service.
- Regulations on how to create and store audit trails for later use should be followed.
- Procedures should be followed to create transactional reports for clients and rules on what needs to be contained in the transactional reports should be adhered to.
- Statutory reports should be created according to regulations and requirements.

6.6.3.2.1.3 PROCESSES FOR TRANSACTION PROCESSING SUB-SUB SYSTEM

- The process contained in Appendix W should be followed according to the procedures to load card accounts on the Zampay electronic payment processing platform.
- The process contained in Appendix W should be followed according to procedures and regulations to maintain the existing card holder accounts on the Zampay electronic payment processing platform.
- The process contained in Appendix W should be followed according to the procedures to apply corrective action for loaded card account(s) / loaded card account holder details which failed verification on the Zampay electronic payment processing platform.

- Processes should be followed according to strict procedures to maintain the existing card accounts on the Zampay electronic payment processing platform.
- Processes should be followed by customer service according to procedures to provide technical and operational support to clients.
- The process depicted in Appendix W should be carried out to conduct an audit on the verification of loaded cards against the CSV file on the Zampay electronic payment processing platform. Processes should also be followed to create and keep audit trails on the Zampay electronic payment processing platform. These activities should both be carried out in accordance with strict procedures.
- Processes should be followed to create transactional reports with the Zampay electronic payment processing platform for clients according to the defined rules and procedures.
- Processes should be followed for creating the necessary statutory reports for Zampay according to the indicated rules and requirements.

6.6.3.2.1.4 FUNCTION SPECIFIC TRANSACTIONS FOR TRANSACTION PROCESSING SUB-SUB SYSTEM

All the processes defined above should be carried out by the personnel responsible for these processes. The overwhelming majority of these processes would be executed automatically on the Zampay electronic payment processing platform, while some would need manual intervention.

6.6.3.2.1.5 DATA FOR TRANSACTION PROCESSING SUB-SUB SYSTEM

When all the processes necessary have been performed and completed according to the procedures, regulations, rules and requirements, these processes create an enormous amount of data on the Zampay electronic payment processing platform. These data are then compared to the processes to ensure that the correct data are generated by the system through these processes.

It is important to understand that this is only data, which still need to be utilised in the correct manner in order for the process to continue.

6.6.3.2.1.6 INFORMATION REPORTS FOR TRANSACTION PROCESSING SUB-SUB SYSTEM

This data produced by the Zampay electronic payment processing platform are then extracted into various information reports provided by the system. These reports should illustrate that the processes have been performed according to the correct procedures, regulations, rules and requirements.

These reports are then analysed to identify trends; opportunities to improve operations, etc.

6.6.3.2.1.7 KNOWLEDGE FOR TRANSACTION PROCESSING SUB-SUB SYSTEM

The analysis of these information reports provide knowledge to Zampay on how to improve the Transaction Processing sub-sub system.

- This also allows Zampay to align or redirect its vision on the highest level according to the knowledge gained, if necessary.

6.6.3.2.2 CARD LOGISTICS SUB-SUB SYSTEM

6.6.3.2.2.1 OPERATING MODEL FOR CARD LOGISTICS SUB-SUB SYSTEM

The operating model for the Card Logistics sub-sub system within the Operations and IT sub system consist of the operations to:

- Test cards for correct functionality.
- Take part in the design of the card by appointing a card designer.
- Take part in the design of the card by arranging meetings between the card designer and the Zambian government, which Zampay attends.
- Take part in the design of the card by consulting the Zambian government on design requirements.
- Take part in the card design by ensuring MasterCard requirements are met and approved.
- Provide the card design to the card manufacturer.
- Place an order with the card manufacturer.
- Obtain funding approval for manufacturing, from government.
- Provide manufactured cards to government.

6.6.3.2.2.2 PRACTICE FOR CARD LOGISTICS SUB-SUB SYSTEM

The defined practices to accomplish the activities for the Card Logistics sub-sub system within the Operations and IT sub system include:

- Requirements and procedures for testing the manufactured cards should be followed.
- Correct procedures and regulations should be followed to appoint a card designer.
- Requirements and procedures should be followed to arrange meetings with the Zambian government and the card designer for the same time frame.

- Procedures for consulting the Zambian government should be followed while attending meetings.
- Procedures for acquiring MasterCard requirements should be followed. The regulations and requirements should also be adhered to when applying for approval.
- Procedures, requirements and regulations should be adhered to when presenting the card design to the card manufacturer.
- The correct procedures and requirements should be followed and adhered to when placing an order for the manufacturing of the cards.
- Procedures and requirements for obtaining funding approval for the manufacturing of the cards need to be followed.
- The required procedures should be followed when presenting the Zambian government with the printed proof card(s).

6.6.3.2.2.3 PROCESSES FOR CARD LOGISTICS SUB-SUB SYSTEM

- The process contained in Appendix S for testing the functionality of the manufactured cards should be carried out according to the defined requirements and procedures.
- The process contained in Appendix J should be followed to appoint a card designer according to the correct regulations and requirements.
- The process contained in Appendix J to arrange meetings should be carried out according to the necessary requirements and procedures.
- The process contained in Appendix J needs to be followed according to procedures when consulting the government on issues and during meetings.
- The process in Appendix J should be followed according to the correct procedures, regulations and requirements when requesting MasterCard requirements and also when applying for approval from MasterCard.
- The process contained in Appendix K should be carried out when presenting the card manufacturer with the card design, according to the necessary requirements, procedures and regulations.
- The process contained in Appendix K should be followed according to procedures and requirements when placing an order at the card manufacturer.
- The process contained in Appendix K should be followed according to procedures and requirements when applying for funding approval from the Zambian government.
- The process contained in Appendix L should be carried out according to the required procedures when presenting the manufactured cards to the government.

6.6.3.2.2.4 FUNCTION SPECIFIC TRANSACTIONS FOR CARD LOGISTICS SUB-SUB SYSTEM

All the above mentioned processes are carried out by the personnel responsible for completing the activities allocated to them within the Card Logistics sub-sub system. It is important to note that the card testing, card design and card manufacturing activities all require manual intervention, while the card testing processes is the only processes executed automatically by the Zampay electronic payment processing platform.

6.6.3.2.2.5 DATA FOR CARD LOGISTICS SUB-SUB SYSTEM

When all the processes and activities mentioned above and allocated to the Card Logistics sub-sub system have been performed and completed according to the procedures, regulations and requirements, the card testing process creates an enormous amount of data on the Zampay electronic payment processing platform. This data are compared to the activities within the card testing process in Appendix S to ensure that the correct data were generated for this process and the process was completed according to the correct practice.

This raw data will now be processed and utilised in the correct manner in order for the Card Logistics sub-sub system event chain to continue.

6.6.3.2.2.6 INFORMATION REPORTS FOR CARD LOGISTICS SUB-SUB SYSTEM

The data produced by the Zampay electronic payment processing platform for the card testing process are extracted and compiled into various information reports provided by the system. These reports illustrate whether the processes have been performed according to the correct procedures, regulations and requirements.

If the processes were carried out according to the appropriate practice, these information reports are analysed to identify the accuracy with which the functionality of the cards has been measured and to determine the percentage of cards not functioning in the correct manner.

6.6.3.2.2.7 KNOWLEDGE FOR CARD LOGISTICS SUB-SUB SYSTEM

The knowledge gained by Zampay management from these information reports potential provide management with room for improvement of operations, practices and processes specifically for the card testing process. The card design and manufacturing processes definitely have potential for further improvement through automation and the knowledge gained through information reports would provide guidance on where the best opportunities for automation are.

This ultimately allows Zampay to align its vision according to potential improvement and existing opportunities.

6.6.3.2.3 CARD ISSUING SUB-SUB SYSTEM

6.6.3.2.3.1 OPERATING MODEL FOR CARD ISSUING SUB-SUB SYSTEM

The operating model for the Card Issuing sub-sub system within the Operations and IT sub system consist of the operations to:

- Create new card accounts on the Zampay electronic payment processing platform.
- Cancel cards on the Zampay electronic payment processing system during the issuing phase or because of card misuse by the card user or a third party.
- Create embossing - and CSV files with the Zampay electronic payment processing system.
- Send files to the relevant parties, using the Zampay electronic payment processing system.

6.6.3.2.3.2 PRACTICE FOR CARD ISSUING SUB-SUB SYSTEM

The operations practices to accomplish the operations for the Card Issuing sub-sub system within the Operations and IT sub system includes:

- Strict procedures and safety regulations to create new accounts on the Zampay electronic payment processing platform should be adhered to.
- Strict procedures and safety regulations to cancel cards on the Zampay electronic payment processing platform should be adhered to.
- Procedures should be followed to create embossing and CSV files with the Zampay electronic payment processing platform.
- Strict requirements and procedures should be adhered to when preparing for the transmission of a file and also the actual sending of a file to a relevant party.

6.6.3.2.3.3 PROCESSES OF CARD ISSUING SUB-SUB SYSTEM

- The process contained in Appendix Q should be followed according to procedures for creating new accounts on the Zampay electronic payment processing platform.
- The processes contained in Appendix S and Appendix R should adhere to strict procedures and safety regulations to cancel cards on the Zampay electronic payment processing platform.

- The processes contained in Appendix S, Appendix R and Appendix Q should be followed according to defined procedures, when creating embossing and CSV files with the Zampay electronic payment processing platform.
- The processes contained in Appendix S and Appendix R should adhere to strict requirements and procedures, when preparing for the transmission of a file or the actual sending of a file.

6.6.3.2.3.4 FUNCTION SPECIFIC TRANSACTIONS FOR CARD ISSUING SUB-SUB SYSTEM

All the above mentioned processes are carried out by the personnel responsible for completing the activities allocated to them within the Card Issuing sub-sub system. While some need manual intervention, all of these activities are executed automatically with the Zampay electronic payment processing platform.

6.6.3.2.3.5 DATA FOR CARD ISSUING SUB-SUB SYSTEM

When all the processes and activities allocated to the Card Issuing sub-sub system have been performed and completed according to the procedures, regulations and requirements, these processes create an enormous amount of data on the Zampay electronic payment processing platform. This data are then compared to the activities within certain processes in Appendices S, R, Q to ensure that the correct data were generated for these processes by the Zampay electronic payment processing platform.

It is important to understand that this is raw data, which still need to be processed and utilised in the correct manner in order for the Card Issuing sub-sub system event chain to continue.

6.6.3.2.3.6 INFORMATION REPORTS FOR CARD ISSUING SUB-SUB SYSTEM

The data produced by the Zampay electronic payment processing platform are extracted and compiled into various information reports provided by the system. These reports illustrate whether the processes have been performed according to the correct procedures, regulations and requirements.

These information reports are analysed to identify negative operational trends, opportunities for improvement during the execution of activities or processes, the accuracy with which activities and processes are executed and a measurement of improvement over the previous measurement period.

6.6.3.2.3.7 KNOWLEDGE OF CARD ISSUING SUB-SUB SYSTEM

The knowledge gained from the information reports places the management of Zampay in a position to improve the operations, processes and practice of the Card Issuing sub-sub system where necessary.

This also allows Zampay to re-align its vision according to the knowledge it had gained and opportunities that might exist through potential improvement.

6.6.3.3 MARKETING AND SALES SUB SYSTEM

6.6.3.3.1 NEW CLIENTS SUB-SUB SYSTEM

6.6.3.3.1.1 OPERATING MODEL FOR NEW CLIENTS SUB-SUB SYSTEM

The operating model for the New Clients sub-sub system within the Marketing and Sales sub system consists of the operations to:

- Identify potential clients within the Zambian environment.
- Promote brand awareness in identified target markets.
- Establish appropriate marketing and sale strategies for different clients.
- Acquire new clients through CRM, marketing and sale principles.
- Manage relationships with newly established clients and their employees by applying CRM techniques.

6.6.3.3.1.2 PRACTICE FOR NEW CLIENTS SUB-SUB SYSTEM

- Procedures for identifying potential clients within the Zambian environment should be followed.
- The necessary rules, regulations and procedures should be adhered to when promoting Zampay and the services Zampay offers with the appropriate marketing tool to the identified client or market.
- Procedures and requirements for establishing marketing and sales strategies for different clients should be followed.
- Requirements for Zampay's electronic payment processing platform CRM functionality should be met, before relationships with new clients and their employees can be established and maintained.
- The requirements and procedures for applying CRM, marketing and sales principles should be followed when engaging with new clients.

6.6.3.3.1.3 PROCESSES FOR NEW CLIENTS SUB-SUB SYSTEM

- The process of identifying Zampay's potential clients according to the demographics, behaviour, geography and psychographic qualities should be followed according to the correct procedures.
- The process for identifying the appropriate marketing tool to promote brand awareness should be followed according to the rules, regulations and procedures.
- The process of developing the appropriate marketing and sales strategies should be executed according to procedures and requirements.
- The processes verifying if all requirements for Zampay's electronic payment processing platform CRM functionality have been met should be completed.
- The processes for applying CRM, marketing and sales principles and using the Zampay electronic payment processing system's CRM functionality should be carried out according to requirements and procedures.

6.6.3.3.1.4 FUNCTION SPECIFIC TRANSACTIONS FOR NEW CLIENTS SUB-SUB SYSTEM

The processes and activities within the New Clients sub-sub system to identify and approach potential clients such as the Zambia National Union of Teachers and private sector companies are all currently carried out manually.

The processes of converting these potential clients into established clients are supported by the automated CRM functionality provided by Zampay's electronic payment processing system.

Activities and processes to manage relationships with clients such the Zambian PSU, which provide the potential for more ministries to make use of Zampay, are nearly fully automated.

6.6.3.3.1.5 DATA FOR CLIENTS SUB-SUB SYSTEM

Data are created by the CRM functionality of Zampay's electronic payment processing platform for specific periods specified on the system. This data could be compared to the processes carried out to create the data to establish if the processes have been carried out in the correct way.

6.6.3.3.1.6 INFORMATION REPORTS FOR NEW CLIENTS SUB-SUB SYSTEM

Zampay's electronic payment processing platform extracts the data into valuable information reports. These reports indicate whether the processes and activities to manage relationships have been executed according to the correct practice.

6.6.3.3.1.7 KNOWLEDGE FOR NEW CLIENTS SUB-SUB SYSTEM

Knowledge is gained through these reports on where the CRM functionality in Zampay's electronic payment processing system could improve and where shortcomings are which could derail the management of client relationships. The activities and processes currently undertaken manually could also potentially be improved through automation.

Zampay can ultimately re-align its vision if necessary through the knowledge gained.

6.6.3.3.2 EXISTING CLIENTS SUB-SUB SYSTEM

6.6.3.3.2.1 OPERATING MODEL FOR EXISTING CLIENTS SUB-SUB SYSTEM

The operating model for the Existing Clients sub-sub system within the Marketing and Sales sub system consists of the operations to manage relationships and retain the Zambian PSU and its members as clients.

6.6.3.3.2.2 PRACTICE FOR EXISTING CLIENTS SUB-SUB SYSTEM

- Follow the established CRM principles and techniques to communicate and manage relationships with the Zambian PSU and its members.

6.6.3.3.2.3 PROCESSES FOR EXISTING CLIENTS SUB-SUB SYSTEM

- Processes to communicate any relevant information and to manage the relationship with the Zambian PSU and its members should be carried out according to CRM principles and techniques.

6.6.3.3.2.4 FUNCTION SPECIFIC TRANSACTIONS FOR EXISTING CLIENTS SUB-SUB SYSTEM

All the processes to communicate and manage relations with the Zambian PSU and its members are automatically executed via the Zampay electronic payment processing platform. Manual intervention may be needed when deemed necessary.

6.6.3.3.2.5 DATA FOR EXISTING CLIENTS SUB-SUB SYSTEM

The processes of communication and relationship management generate data. This data could be used to verify whether the processes and activities within these processes have been carried out according to the defined CRM principles and techniques.

6.6.3.3.2.6 INFORMATION REPORTS FOR EXISTING CLIENTS SUB-SUB SYSTEM

The data generated by the CRM functionality of the Zampay electronic payment processing system are extracted and compiled into information reports. This data could be compared against Zampay's CRM practices and these reports would serve as an indicator of how accurate Zampay's CRM tasks have been performed and where the necessary manual intervention was not applied by personnel responsible for it.

6.6.3.3.2.7 KNOWLEDGE FOR EXISTING CLIENTS SUB-SUB SYSTEM

Knowledge gained by Zampay management on deficiencies in the Existing Clients sub-sub system's operations, practice, processes and technology implies that deficiencies could be improved or potentially eliminated.

Zampay's management could also re-align Zampay's vision according to the knowledge it has gained, if necessary.

6.6.3.4 FINANCE SUB SYSTEM

6.6.3.4.1 RELATIONS SUB-SUB SYSTEM

6.6.3.4.1.1 OPERATING MODEL FOR RELATIONS SUB-SUB SYSTEM

The operating model for the Relations sub-sub system within the Finance sub system consists of the operations to:

- Negotiate commission on each type of transaction and the fixed payments to the parties involved in the TPSS.
- Compose contractual agreements between Zampay and the parties involved in the TPSS.
- Manage relationships with the parties involved in the TPSS.

6.6.3.4.1.2 PRACTICE FOR RELATIONS SUB-SUB SYSTEM

- Negotiations with the parties involved in the Transactional Payments Service Solution should be carried out in an orderly fashion, according to accepted practice and the stated rules and regulations.
- Contractual agreements between Zampay and the parties involved in the TPSS should comply with Zambia's laws, rules and regulations.
- The relationship with the parties involved should be managed according to Zampay's CRM principles.

6.6.3.4.1.3 PROCESSES FOR RELATIONS SUB-SUB SYSTEM

- The processes followed to arrange meetings, communicate and negotiate with the parties involved in the Transactional Payments Service Solution should be carried out in an orderly fashion, according to accepted practice and the documented rules and regulations.
- Processes performed by Zampay personnel to compose contractual agreements should ensure that all documentation complies with Zambian laws, rules and regulations.
- The processes to manage the relationships with the parties involved should be managed according to Zampay's CRM principles.

6.6.3.4.1.4 FUNCTION SPECIFIC TRANSACTIONS RELATIONS SUB-SUB SYSTEM

The processes and activities to negotiate with the parties involved and compose contractual agreements are accomplished by Zampay's management and personnel.

Activities and processes to manage relationships with the parties involved in the TPSS are accomplished with the CRM functionality in Zampay's electronic payment processing platform.

6.6.3.4.1.5 DATA FOR RELATIONS SUB-SUB SYSTEM

The data specified in the contractual agreements could be compared to the negotiation activity when the negotiation process was carried out to ensure the correct transactional fees are specified in the contractual agreements. This data will ultimately be the revenue gained on transactional activities. Refer to Appendix X for the Zampay revenue model which contains all the revenue amounts for each transactional type and to Section 8 for a description of the revenue model.

For a description of how CRM data are utilised, please refer to Section 6.6.3.3.2.5.

6.6.3.4.1.6 INFORMATION REPORTS FOR RELATIONS SUB-SUB SYSTEM

Information reports could be generated according to the transactional fees in the Zampay electronic payment processing platform and estimated transactional activity. This could serve as revenue targets for Zampay.

For a description of how CRM information reports are utilised, please refer to Section 6.6.3.3.2.6.

6.6.3.4.1.7 KNOWLEDGE FOR RELATIONS SUB-SUB SYSTEM

For a description of how knowledge gained from the CRM information reports are utilised, please refer to Section 6.6.3.3.2.7.

6.6.3.4.2 BILLING AND PAYMENTS SUB-SUB SYSTEM

6.6.3.4.2.1 OPERATING MODEL FOR BILLING AND PAYMENTS SUB-SUB SYSTEM

- Receive transactional revenue from Zambian PSU members employed by the Zambian government when they take part in various transactional activities.
- Make payments to MasterCard for card requirements and approval.
- Make payments to FUNDS3000 for Zampay's electronic payment processing system and the maintenance of the system.
- Make payments towards service providers. This includes suppliers of Zampay's technical, communication and logistic infrastructure etc.
- Create financial reports for Zampay.

6.6.3.4.2.2 PRACTICE FOR BILLING AND PAYMENTS SUB-SUB SYSTEM

- Zampay is entitled to revenue on each transaction conducted with each card, according to the agreed terms and conditions.
- Zampay is obligated to pay its share of the requested amount for approval of the card to MasterCard, according to the correct procedures and requirements.
- Zampay is obligated to pay FUNDS3000 according to the agreed payment method and requirements for the Zampay electronic payment processing platform and the maintenance of the system.
- Zampay is required to pay entities which provide services to Zampay according to requirements and agreed methods.
- Zampay's financial reports have to be created and finalised during each financial period according to the necessary statutory rules and regulations.

6.6.3.4.2.3 PROCESSES FOR BILLING AND PAYMENTS SUB-SUB SYSTEM

- The processes for deducting transactional fees and receiving Zampay's share of the revenue should be executed according to the agreed terms and conditions.

- The process of paying MasterCard should be followed according to the correct procedures and requirements.
- Processes for paying FUNDS3000 for Zampay's electronic payment processing platform and the maintenance of the system needs to be executed according to the agreed methods and requirements.
- The processes for creating Zampay's financial reports for each financial period have to be created according to the necessary statutory rules and regulations.

6.6.3.4.2.4 FUNCTION SPECIFIC TRANSACTIONS FOR BILLING AND PAYMENTS SUB-SUB SYSTEM

The payment processes described above are processes need to be carried out manually for each invoice received by the FUNDS3000, MasterCard or the relevant service provider.

All the transactional revenue gained by means of transactions executed by card holders are received and controlled automatically by Zampay's electronic payment processing system. Any processes for creating the required financial reports are also generated automatically by the system.

6.6.3.4.2.5 DATA FOR BILLING AND PAYMENTS SUB-SUB SYSTEM

Data are created for each transaction executed by each card on Zampay's electronic payment processing system. This data enables Zampay to verify if the processes for gaining transactional revenue have been executed by the system in correct way, by comparing the created data to the processes for deducting Zampay's share of transactional costs.

6.6.3.4.2.6 INFORMATION REPORTS FOR BILLING AND PAYMENTS SUB-SUB SYSTEM

The created data are extracted and contained in information reports created by Zampay's electronic payment processing system. These reports could be used to verify if the processes to gain transactional revenue was executed correctly and according to the correct terms and conditions.

6.6.3.4.2.7 KNOWLEDGE FOR BILLING AND PAYMENTS SUB-SUB SYSTEM

Potential knowledge gained by Zampay out of these reports could guide Zampay's management to improve the operations for deducting transactional costs.

Knowledge on how manual operations for payments to third parties could be automated can also be gained out of these reports, although an auditing process will always be necessary for these payments.

Putting the above in perspective, Zampay are able to re-align their business strategy according to potential opportunities and improvements through knowledge gained by completing the Billing and Payment sub-sub system's events chain.

7. QUALITATIVE REQUIREMENT CRITERIA

The qualitative solution requirements provided are to ensure that the TPSS provided by Zampay is functioning in the correct manner and meets the needs of the Ministry of Education employees within the Zambian government, who are represented by the PSU. The employer in the qualitative requirements will refer to the government and the employee to all the payees within the Ministry of Education in Zambia.

It is important to note that there are requirements that have to be met by the solution provided to make the project feasible for Zampay to act as the TPP.

The qualitative requirements are provided below:

- Zampay will provide the employer and its employees with a pre paid card processing service that facilitates the receipt and payment of salaries, wages, social grants benefits and the transfer of funds to employees.
- The service is aimed at providing a saving to the employer on banking costs and / or charges for the electronic transfer of funds to employees, as well as at a reduction in the administrative overheads associated with the payment of salaries, wages and social benefit grants.
- The employees will have access to the funds in the card account that is linked to the prepaid salary card issued to the legal owner of the card.
- Zampay will make the service available to the employer and its employees through access points that are specifically tailored to meet the needs of the employer and employees in the Zambian environment.
- Zampay is the sole issuer of the cards and also has the right and responsibility to cancel prepaid salary cards that are used in an unauthorised manner.
- Zampay performs the card activation through a customer service call centre.

- The electronic payment processing platform provided by FNDS3000 for the processing of all payments should provide a stable communication channel between Zampay (TPP) and Zanaco (sponsoring bank).
- Zampay has power of attorney on the employer's funding account at Zanaco, through the electronic payment processing platform provided by FNDS3000 for any payments to be effected.
- Zampay has access to the employee's card accounts, through the electronic payment processing platform provided by FNDS3000 for any payments and withdrawals to be effected, in the case of incorrect payments.
- The employees may use their prepaid salary cards at any ATM where the MasterCard logo is displayed to make cash withdrawals or to perform a balance enquiry.
- The employees may use their prepaid salary cards at any PSP where the MasterCard logo is displayed to make cash withdrawals or to perform a balance enquiry.
- The employees may use their prepaid salary cards to purchase goods and / or services at any PSP that displays the MasterCard logo that appears on the front of the card.
- The employees may transfer funds from the card account, which is linked to the prepaid salary card, to a specified account or card at another financial institution.

8. FINANCIAL MODEL

8.1 INTRODUCTION

The traditional banking model is designed to harvest transaction and service fees at every possible level. The implications of this are that every entity involved in processing a transaction adds a fully marked up amount onto the total processing fee. It is important to note that international ATM and POS transactions go through the relevant bank card association switch (not the local banking switch) that attracts higher fees. While the local banking switch in Zambia charges much lower fees, legislation and the requirements of a card association such as MasterCard do not always allow banks to go through this switch to clear transactions.

Zampay is allowed to clear payments through the local banking switch, since it is the official processor of these cards and accounts. This allows Zampay to significantly reduce the card fees that are associated with each transaction, since the fees are determined by Zampay and not the banks involved in the solution.

The fee structure for each card would include the following fees:

- Card issuance fee
- POS Signature Transaction Revenue and Bank Interchange
- POS Pin Transaction Revenue and Bank Interchange
- ATM withdrawal and enquiries
- Card-to-card transfers
- Card load / reload fees
- SMS / Mobile phone alert fees
- Monthly card fees
- Fees on call centre services

The revenue model designed for Zampay is contained in Appendix X and is formulated with data provided by Zampay on the fees charged above. Section 8.2 below contains a description of the revenue model in order to gain a better understanding of the purpose of the model.

8.2 REVENUE MODEL DESCRIPTION

Description of the Zampay revenue model:

The 'Monthly Transaction Rate' values in the revenue model are calculated with data provided by Zampay that are not available for publication purposes. This value indicates the number of times a certain type of transaction is estimated to be performed by each card holder per month. The formula used to calculate these values is:

$$= \frac{\text{Number of transactions per month}}{\text{Total number of card holders}}$$

- The '% Revenue' column indicates what percentage of the overall revenue of each transaction / activity is earned by Zampay.
- The 'Per Transaction Data' column indicates the cost of each transaction for the card holder.
- The 'Monthly Total per Card' column calculates the revenue Zampay and the third parties each generates out of each card for every type of transaction per month. This is calculated with the following formula:

= Monthly Transaction Rate * % Revenue * Per Transaction Data

- The 'Once off card issuing fee' is the revenue that Zampay generates through the issuing of each card. This is a revenue it receives only once and the formula used to calculate this is:

= % Revenue * Per Transaction Data for 'new card + issue fee'

- Transaction numbers 26 and 27 forms part of the fees for a secondary card linked to the first card and do not form part of the totals at the bottom of the model.
- Transaction number 28 forms part of the fee to replace a lost card. This does not form part of the totals at the bottom of the model.
- Transaction 29 forms part of the fee to cancel a card and also don't form part of the totals at the bottom of the model.

This concludes the description necessary to understand the financial model.

The prepaid salary card solution also provides important financial advantages in terms of cost savings to the employer and its employees that do not form part of this financial revenue model for Zampay. The two most important advantages are provided below:

- The government only has to make one single deposit into the funding account at the sponsoring bank for the total value of payments. This deposit will cost the government the equivalent of one depositing fee. This is in stark contrast to the nearly 180 000 cheques that had to be printed and distributed each month.
- All the previous cash handling and cheque processing fee expenditure of the employees is reduced to the transaction fees charged by Zampay.

9. USER MANUAL AND DECLARATION DOCUMENT



9.1 INTRODUCTION

The 'Zambian Government Prepaid Salary Card User Manual' contained in this section is provided to all employees enrolled as prepaid salary card users who are Zambian PSU members, after the card has been issued to them and the employees have indicated their acceptance of the card by signing a declaration document.

The user manual provides a description by means of frequently asked questions on how the card should be used when an employee engages in transactional activities. The user manual also contains the transactional fee for each transaction the employee wants to conduct.

The declaration document is accompanied by the terms and conditions stipulated for the acceptance and use of the card. The act of signing the declaration document serves as confirmation by the employee that he /she accepts the terms and conditions for the usage of the Zambian government prepaid salary card. The government acts as the witness and indicates with the government official's signature that it has been informed of the acceptance of the terms and conditions by the employee and is now lawfully obligated to present the employee with the card.

9.2 DECLARATION DOCUMENT

 <p>ONE ZAMBIA ONE NATION</p>	<h2>DECLARATION FORM</h2>	 <p>[Zampay]</p>				
<p>I _____ (Name and Surname),</p> <p>Employed at _____,</p> <p>Hereby declare that I have received my Zambian Government Prepaid Salary Card and read and understood the Terms and Conditions for usage of the Card:</p> <p>Card number _____ and expiry date _____</p> <p>Signed at _____ on _____ 2010.</p> <table border="0" style="width: 100%;"><tr><td style="width: 50%; text-align: center;">_____ Cardholder</td><td style="width: 50%; text-align: center;">_____ Witness</td></tr><tr><td style="width: 50%; text-align: center;">_____ Name (Print)</td><td style="width: 50%; text-align: center;">_____ Name (Print)</td></tr></table>			_____ Cardholder	_____ Witness	_____ Name (Print)	_____ Name (Print)
_____ Cardholder	_____ Witness					
_____ Name (Print)	_____ Name (Print)					

**Terms and Conditions for the use of
the Zambian Government Prepaid Salary Card**



ISSUE OF THE CARD

The Zampay salary card ("the card") is issued by Zampay, in terms of an agreement with the Zambian government and Zanaco bank and will be trading as the Zambian Government Prepaid Salary Card ("Zampay salary card") to the authorised cardholder ("you") being a Zambian Government employee and a Zampay salary card client.

This document constitutes the agreement stating the terms and conditions under which a Prepaid MasterCard Zampay Salary Card is issued. By accepting and using the Zampay Salary Card, you agree to be bound by the terms and conditions of this agreement.

This card is owned by Zampay and will remain the property of Zampay at all times and must be returned to Zampay on request. You agree to sign the back of the card immediately upon receipt with a ballpoint pen.

USE OF THE CARD

The card is not a credit card. The card provides access to a special card account allowing you to draw funds received from your employer in such account. The card is not directly linked to any other account or credit card account. Over the counter deposits are allowed on the card at accredited parties.

You will choose a personal identification number (PIN) to prevent unauthorised use of the card. You are the only person who may use the card. You may not allow any other person to use the card or to have access to your PIN. The use of the card by a third party is a criminal offence and will be prosecuted accordingly.

You agree:

- Not to disclose the PIN to anyone or to record it on the card or otherwise make it available to anyone else.
- To promptly notify Zampay of any loss or theft of the card or the PIN by phoning ---- --- ---. Delay in notifying Zampay of the loss or theft will be deemed as negligence on your part. This service is available 24 hours.
- That if your card is lost or stolen and your card is used, you will be responsible for all amounts debited to your account through the use of the card.
- That the use of the card is at your own risk and Zampay or the Zambian government is not responsible for any loss or theft resulting from the use of the card.
- To comply with the exchange control regulations when using the card outside of the common monetary area.
- That you will be liable for payments made by Zampay in respect of the use of the card.

- Not to use the card for any unlawful purpose, including but not limited to, the purchase of goods or services prohibited by law.

The card enables you to purchase goods and to procure Cash Advances by electronic means only.

You must at all times comply with all the relevant legislation including but not limited to legislation to combat money laundering. In this regard you acknowledge that Zampay and the Zambian government have certain rights and obligations arising from such legislation.

DEDUCTION OF FEES

You hereby authorise and agree that Zampay may deduct on their behalf from the card, without any notice, all standard service fees (where applicable) from time to time and all applicable government levies in respect of the card.

You also agree that Zampay deduct on their behalf fees for services you may have requested that are not included in these terms and conditions.

Zampay or the Zambian government will not be liable for dishonouring any transaction presented for payment because of insufficient funds being in the card as a result of deducting fees. However, Zampay reserve the right to collect fees at a later date, without notice, if fees could not be deducted at the due date because of insufficient funds.

INTEREST

No credit interest will be paid on the credit balance of the card.

Should your account, for any reason, have a debit balance, interest at the maximum rate as prescribe or a rate determined by Zampay from time to time, will be debited to your card.

Such interest will accrue on a daily basis from the date of the debit balance upon and including the date on which full repayment is credited on the card. Nothing herein shall be construed as entitling you to be overdrawn on your card.

FOREIGN TRANSACTION

When you use or obtain funds (or make a purchase) in a currency other than the currency that your card was issued, the amount deducted from your funds will be converted by MasterCard into an amount in the currency of your card. MasterCard International will establish a currency conversion rate for this convenience.

DISPUTE RESOLUTION

When you believe that errors exist regarding transactions, you must notify Zampay immediately by calling --- --- ---. Zampay will require you to confirm this error in writing and such document can be faxed to --- --- --- within ten days of your verbal notification. Should Zampay not receive your written notification within ten days your claim will be rejected.

TERMINATION OF CARD FACILITY

You may terminate your right to use the card on written notice to Zampay and the Zambian government. The said notice towards Zampay must be accompanied by the card, which must be cut through the magnetic stripe and in half to prevent further use. Zampay may at any time in their sole and absolute discretion close or terminate your card. If Zampay closes your card it must be returned to Zambian government immediately.

LIABILITY

Zampay shall not be liable for any loss or damage that you may suffer as a result of our provision of incorrect information to any person or as a result of any terminal failure or malfunction beyond Zampay's reasonable control.

Zampay shall not be liable for any loss or damage of whatsoever nature and howsoever arising from all other clauses.

GENERAL

Zampay shall not be liable to you if any merchant does not accept the card or Zampay refuse to authorise any transaction on the card. You must resolve any dispute you have with any merchant directly with the merchant. Such dispute will not affect the rights of Zampay to receive payment from you.

If there is a difference between your records and the records of Zampay, the records of Zampay will be binding.

Zampay may amend this agreement at any time. Publication of such amendments by such means as they may select will constitute valid notice of the amendment to you. Any such amendments will not constitute a notation of this agreement. You may not amend or vary these terms and conditions at all.

You agree that Zampay may proceed against you in a magistrate's court having territorial jurisdiction even if the amount of your claim exceeds the value jurisdiction of the court.

In the event that legal action is taken against you to recover monies due in terms of this agreement, you will be liable for all costs incurred (including legal fees and collection commission) on the scale as between attorney and own client.

The agreement will be governed by and construed in accordance with the laws of Zambia.

You herewith instruct and authorise Zampay to issue you with a Zambian Government Prepaid Salary Card and you herewith indemnify Zampay and the Zambian government against any claims, damages and losses arising from this authority and instruction.

9.3 USER MANUAL

Zambian Government Prepaid Salary Card User Manual



In terms of the Copyright Act, No 98 of 1978, no part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording or by any information storage and retrieval system, without permission in writing from ZAMPAY. Infringements of copyright or any other infringements set forth above may lead to claims for damages, including penal damages, suffered by ZAMPAY.

CARD DESCRIPTION, FREQUENTLY ASKED QUESTIONS AND TRANSACTIONAL FEES

The cards are prepaid debit cards that can be used at any ATM or POS device throughout Africa and the world displaying the MasterCard logo. You can shop; pay bills; transfer money; have additional cards for family members and benefit from linked loyalty schemes.

1. How do I activate my card?

To activate your Zampay salary card and select your Personal Identification Number (PIN) you must phone ---- and conduct the entire process over the telephone; or SMS **activate** with the last four digits of your card number to ----.

2. How do I select a PIN?

Your PIN is a four-digit number that you should memorise and keep secret. Do not write this number on your card or put it in your wallet or purse. You should protect your salary card just like cash. Protect both your card and PIN and never keep them in the same place. Even without a PIN, your card is still valuable and should not be left with anyone else. Keep your PIN secret at all times and do not share your PIN with anyone else. We will never ask you for your PIN over the phone and we will never ask you to send us your PIN via an email. If you receive a telephone call or email from anyone that asks for your PIN, you should contact Customer Service immediately at ----.

3. Why am I asked personal questions?

These are for your security so that we can ensure that the correct person has the card when asking for assistance.

4. Who do I call when I have a Diamond Cash Card query?

Please call Customer Service on ----, you will receive automated assistance or be able to talk to an operator.

5. Where can I use the card?

At any ATM (Automated Teller Machine) and POS (Point of Sale) device at a retailer displaying the MasterCard logo.

6. How do I use the card at an ATM?

You can withdraw cash at any ATM using your PIN.

7. How do I use the card to purchase goods?

You do not use your PIN, you just sign the receipt handed to you by the merchant/retailer and your card balance will automatically be reduced by the amount of the transaction, by Zampay.

8. How do I check my balance?

By i) requesting a balance enquiry transaction at an ATM and POS terminal, ii) calling Customer Service or accessing the automated telephone system at ----, iii) viewing account information on the secure Zampay salary card web site _____ or iv) SMS **balance** to ----.

9. How do I transfer money?

You can quickly and easily transfer money from one card to another card, such as cards issued by you to family members. Card-to-card transfers can be performed by calling Customer Service or accessing the automated telephone system at ---- or visiting the secure Zampay salary card web site.

10. How do I obtain another card for a family member?

Please call Customer Service at ---- - - - - to request additional Zampay salary cards linked to the primary card.

11. Can the card balance be overdrawn?

No, the balance on the card cannot be overdrawn. If the amount of your purchase or cash withdrawal, together with any relevant charges, is more than the balance on the card, the transaction will be declined. All balance information and transaction activity is updated in real-time and available immediately.

12. What happens if the card is lost or stolen?

PLEASE CALL ZAMPAY IMMEDIATELY AT ---- - - - - TO REPORT A LOST OR STOLEN CARD.

Once you have reported the loss or theft, the card number will be cancelled and you will not be able to use that card again. A new card will be issued to you to replace the stolen or lost card. You will have no risk of loss after you call us to report a lost or stolen card. The value of any purchase or cash withdrawal made with your card before you report a lost or stolen card cannot be refunded.

13. What happens if I leave the company or take another job?

The Zampay salary card can continue to be used until the funds on the card are depleted or you can call Customer Service at ---- - - - - to request payment of the remaining card balance, by the government.

14. Can I still keep another Bank account?

You can have the card as well as other banking facilities. You can transfer funds from the card into another bank account that you may have and this can be a full or partial transfer of your balance. This can be done by calling Customer Service or accessing the automated telephone system at ---- - - - -.

15. Can I manage my card via the internet?

You can manage all your transactions over the internet by firstly following the instructions and registering on the client interface at _____. You will be asked to choose a User Name and Password and will also need to SMS PIN and the last four digits of your card number to ---- - to get a PIN to access your card transaction details. This PIN is valid for 30 days when you will have to SMS for a new one. Each time you login to your card details you will be able to see all recent transactions; pull down historical transactions; create your own beneficiaries for automatic payment of all your bills/accounts; draw down statements; change certain personal details etc. For further information on how to use the client interface click on "downloads" on the Zampay website and read through the instructions.

16. How do I get a statement?

You can request a statement by calling Customer Service at ---- - - - - and they will, after verifying your details, fax, post or email a statement to you. You can also draw down a statement yourself by logging into the client interface on the secure Zampay website.

17. Can I pay my bills and buy prepaid air time?

You can make third party payments either by an instruction to Customer Service at ---- - - - - or by undertaking the payments yourself through the client interface at _____. You can also create your own beneficiaries for automatic payment of all your bills/accounts via the client interface. You are able to transact through sms payments, by purchasing prepaid airtime.

18. Can I purchase goods over the internet?

You can purchase over the internet by choosing the credit card option on the shopping site and, when asked for the CCV number, typing in the last three digits appearing on the signature panel at the back of your card.

20. How do I find out more detail about the card?

The Zampay website contains a lot of up-to-date and exciting information as well as training material. You can call Customer Service at ---- - - - - or email at any time if there is anything further you would like to find out.

21. Is there additional value to having a card?

You will be able to take part in loyalty schemes; micro loans and make insurance purchases. Details will be updated regularly on the website

CARD PRICING FEES

ATM Transactions	Pricing
ATM Domestic Withdrawals	R 2.00
ATM Intl Withdrawals	R 4.70
ATM Balance Enquiry	R 0.90
ATM Declines	R 1.70
POS Transactions	
POS Domestic	R 0.45
POS Enquiry	R 0.60
POS Decline	R 0.30
POS - International	R 1.50
POS Enquiry - Intl	R 1.80
POS Decline - Intl	R 0.90
SMS Transactions	
SMS Transaction	R 1.50
Transfer	
Transfer to current/savings account	R 3.85
Card to card - ZAMBIA	
Payment / Transfer	R 3.50
Card to card - INTERNATIONAL	
Payment / Transfer	R 5.60
Call Centre	
Pin change	R 0.00
2nd Pin change	R 0.15
Keypad assisted balance	R 0.90
Operator assisted balance	R 1.20
Statements	
Statements - Mailed	R 0.50
Notifications	
SMS Load notifications)	R 0.05
SMS Balance Enquiry	R 0.15
EFT	
EFT Bill Pay	R 0.70
Secondary cards	
Secondary Card Issue fee	R 10.00
Secondary Card Monthly Fee	R 2.30

10. CONCLUSION

The management of cheques is, despite all the brilliant supporting technology and computer software doomed to be relegated to the past. A cheque is ultimately a legal document that requires extensive physical handling and manipulation to achieve its purpose. In a new financial era, which is a predominately cash-less society, cheque volumes are diminishing and cheques will ultimately disappear from use. Electronic transactions need no fetching or delivery, occur in an instant and can be verified and approved without human intervention. They are cheap, fast, reliable and convenient and therefore the medium of choice for the future.

Research done and results obtained clearly illustrate that the new generation of electronic payment technologies will in future dominate and replace traditional payment systems based on simplified processing structures and cost effectiveness. As a result the observations of the research could in future be used as a model that may be applied to any situation where unbanked populations are drawn into the banking network.

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12. APPENDIX A – LIST OF DEFINITIONS AND ABBREVIATIONS

ATM, means an Automated Teller Machine

BPR, means Business Process Re-engineering

CRM, means Client Relationship Management

EPC, means Event driven Process Chains

FTP, means File Transfer Protocol

POS, means a Point of Sale device

PSP, means Payment Service Provider

PSU, means the Public Service Union

TPP, means Third Party Processor

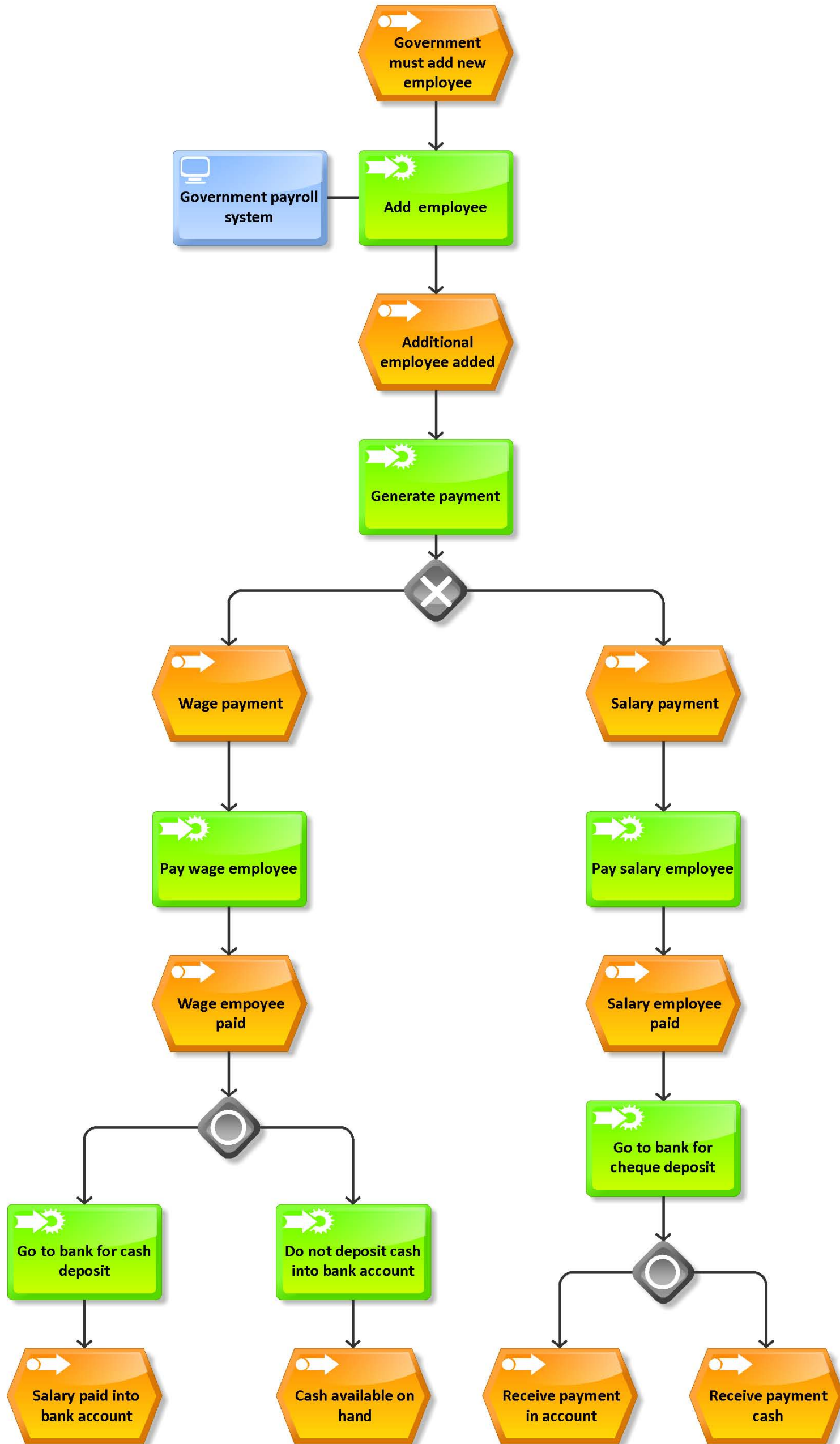
TPPS, means Transactional Payment Service Solution

UNBANKED, means people that has no participation in or access to any financial services.

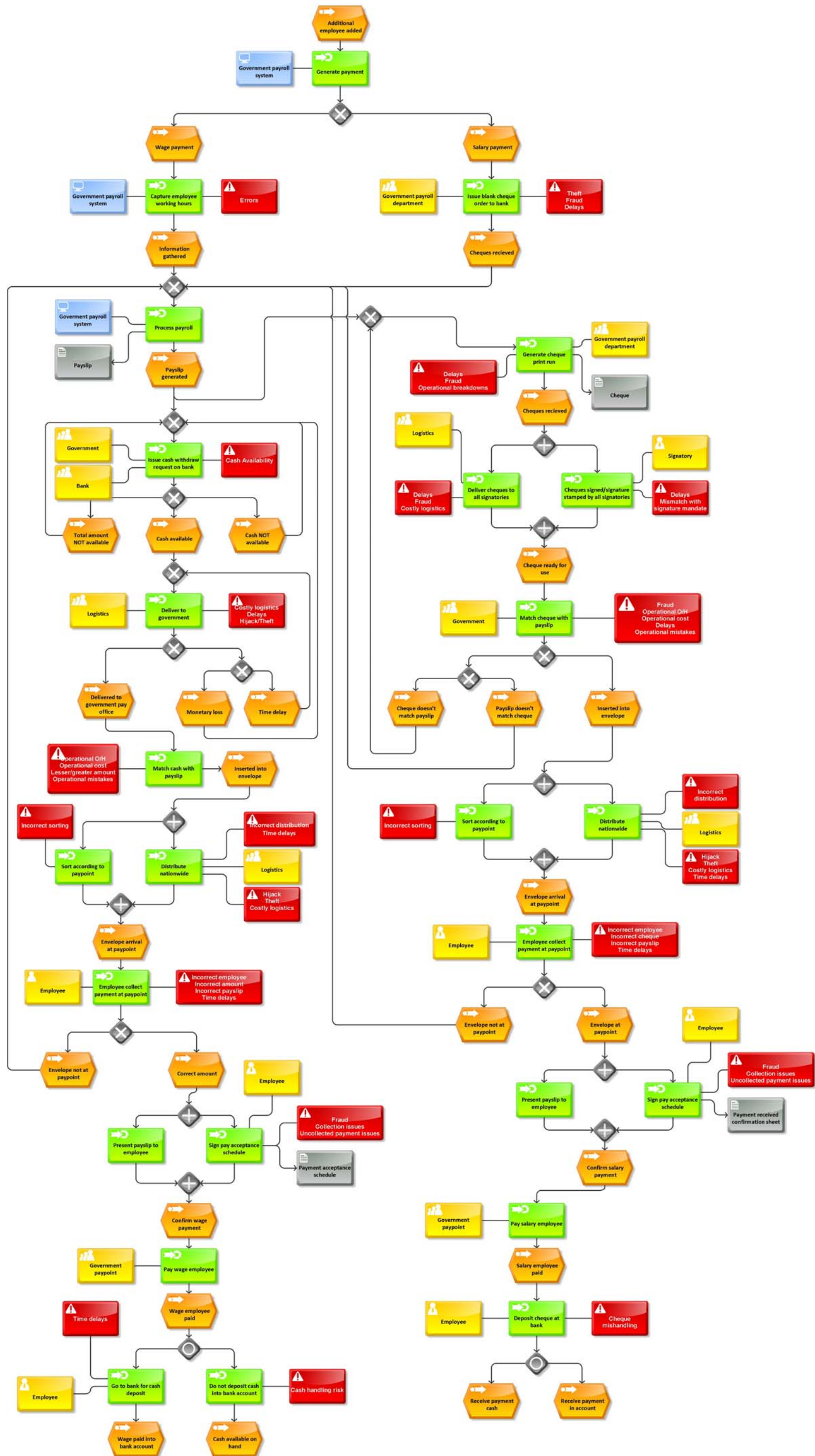
UNDER-BANKED, means people that have limited access to primary financial services and functions.

UNICEF, means the United Nations Children Fund

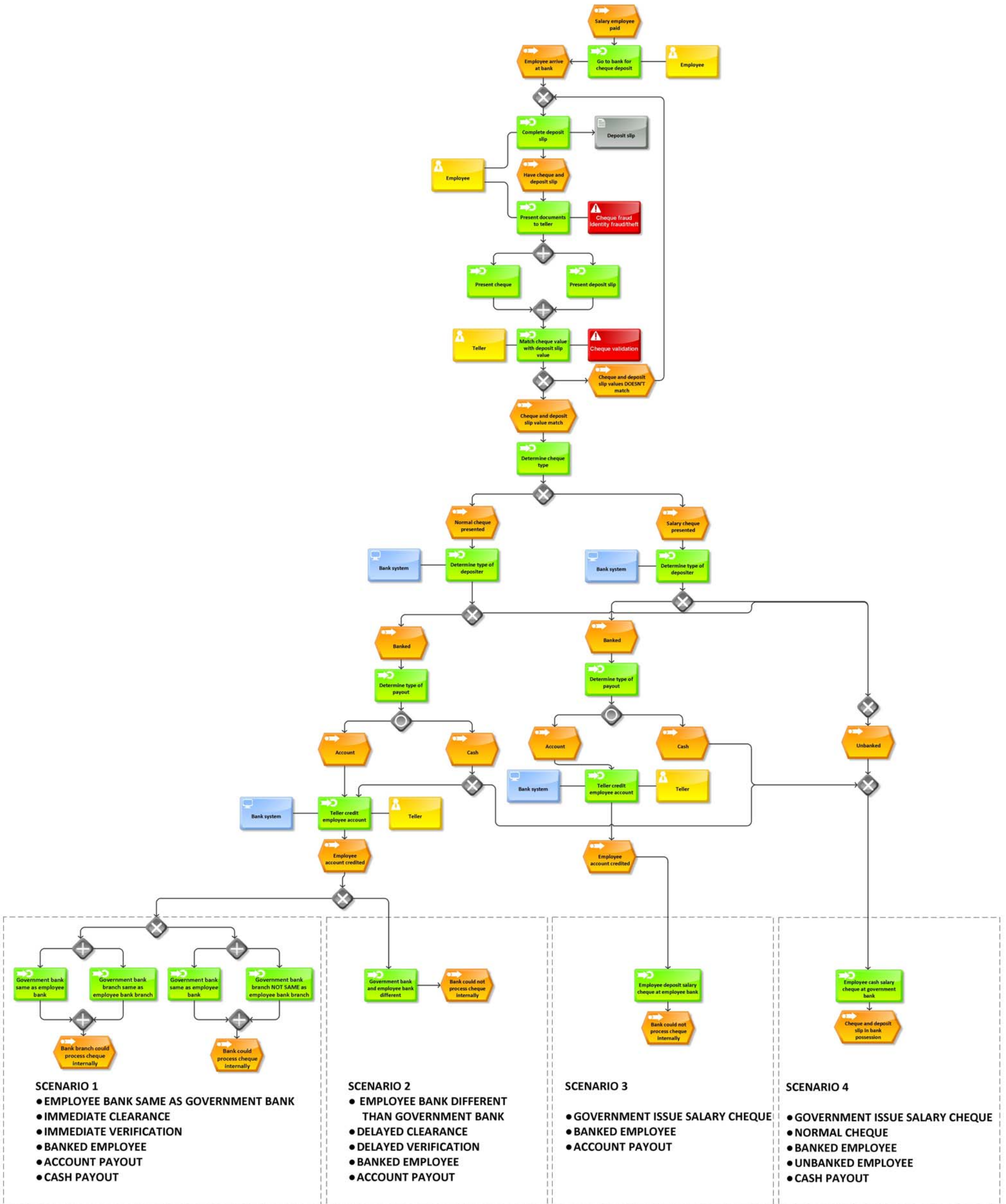
USA, means United States of America



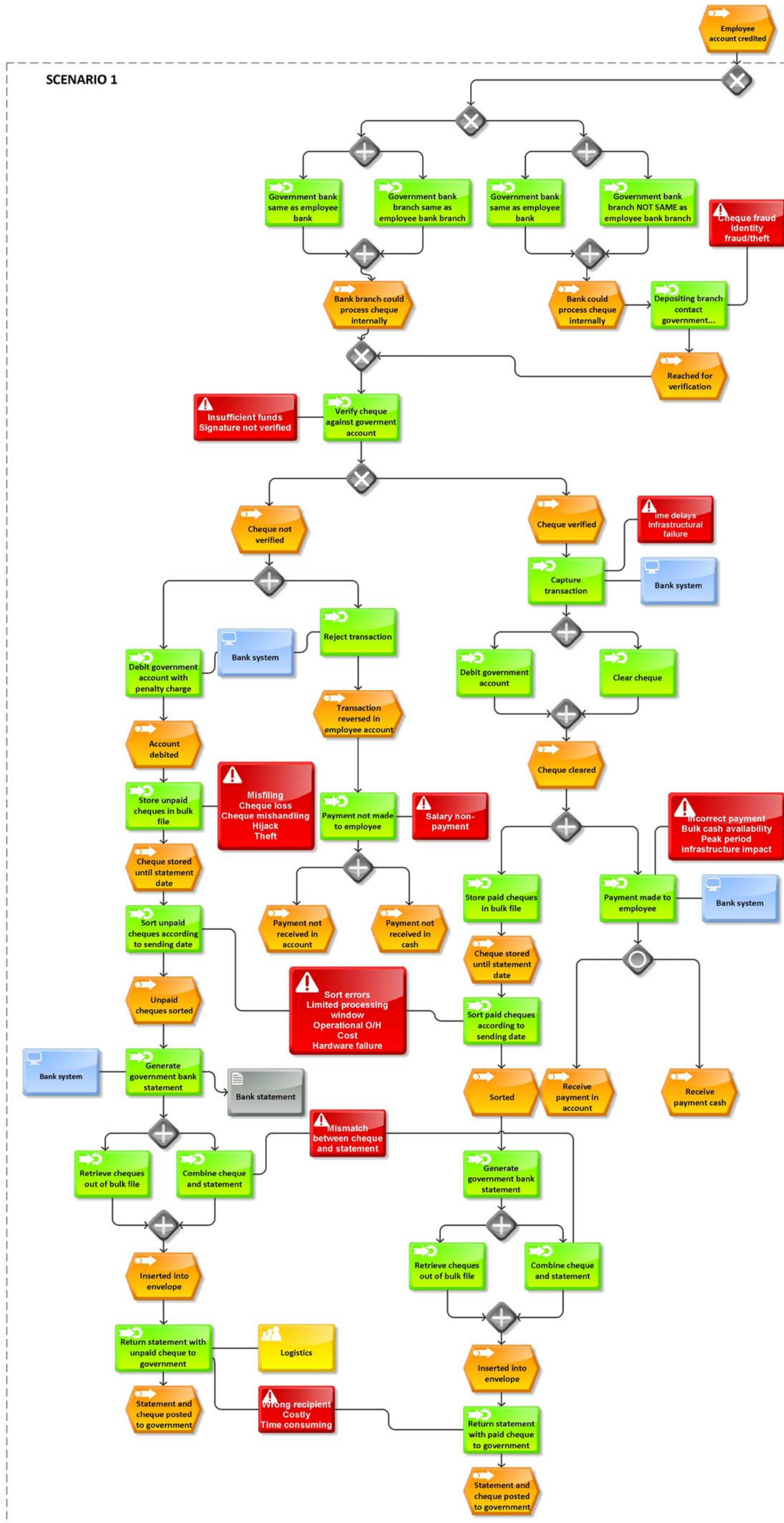
14. APPENDIX C – LEVEL 2



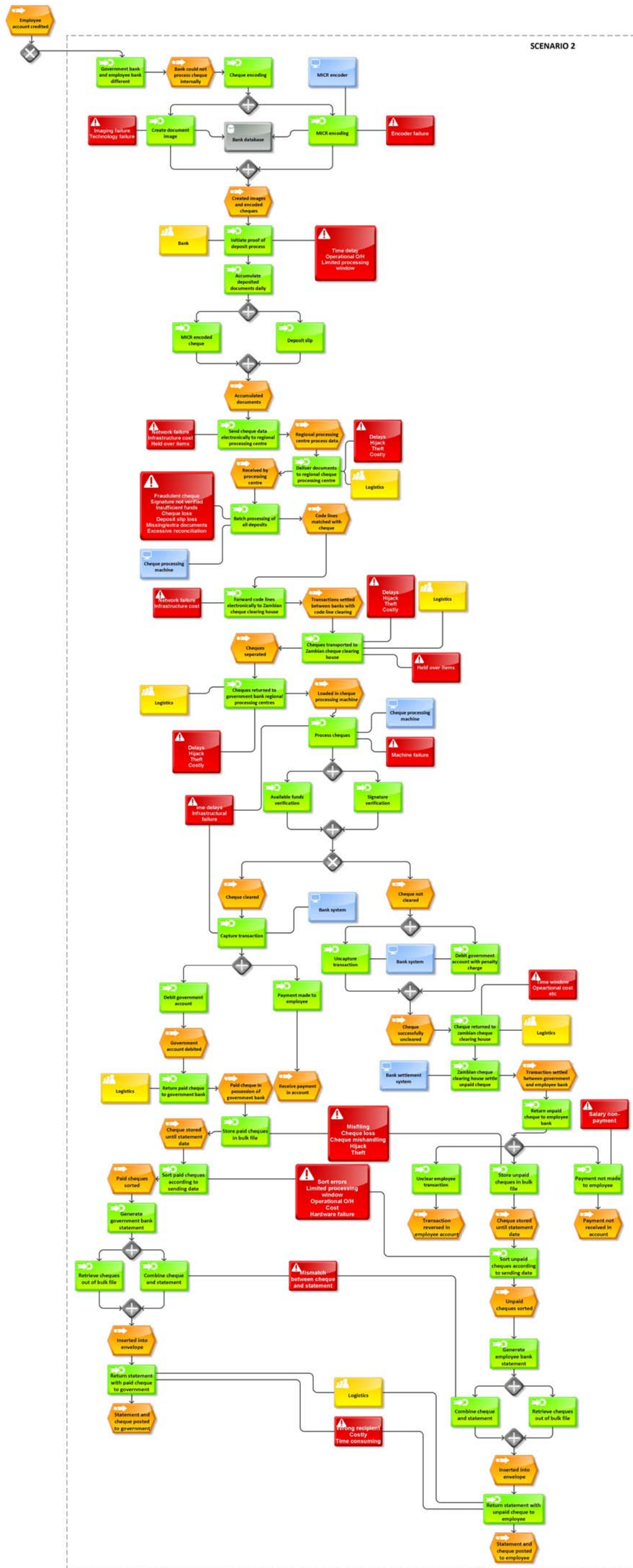
15. APPENDIX D- LEVEL 3 – SCENARIO FRAMEWORK



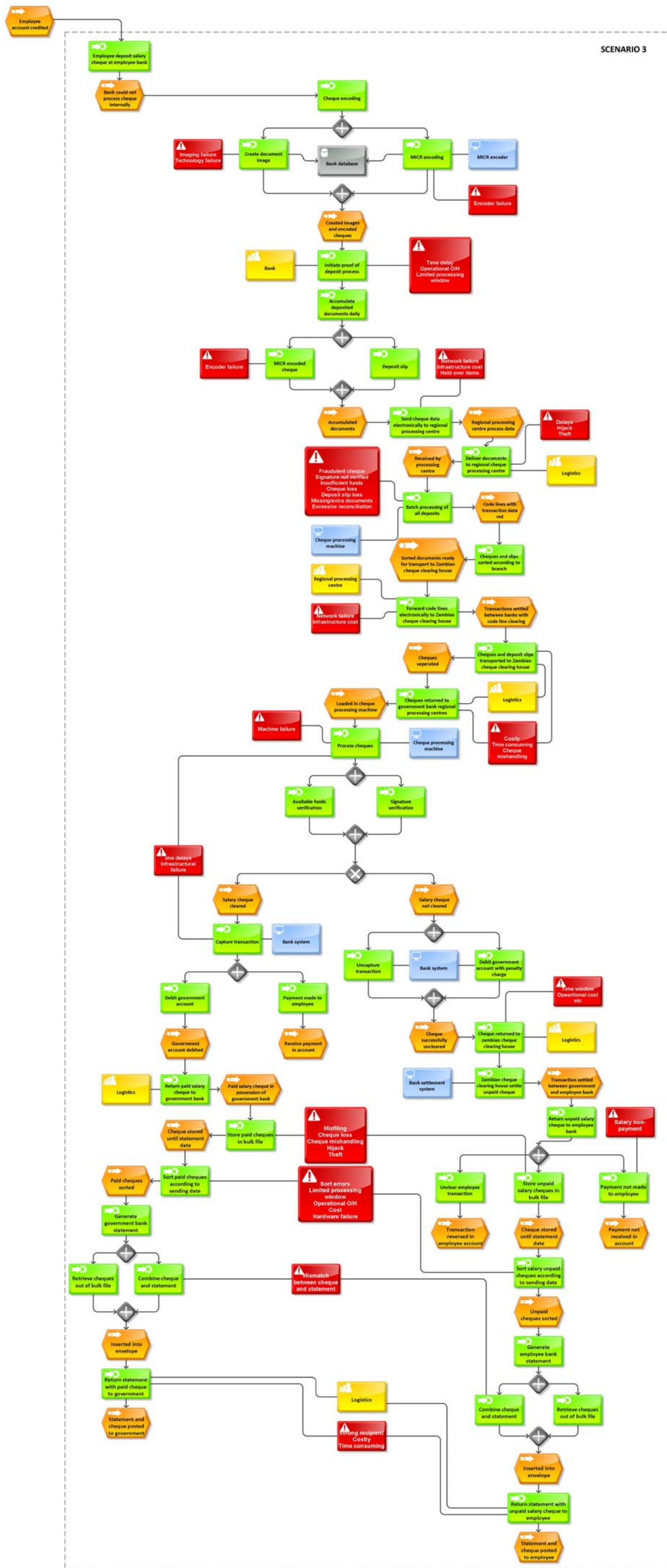
16. APPENDIX E – LEVEL 3 – SCENARIO 1



17. APPENDIX F – LEVEL 3 – SCENARIO 2



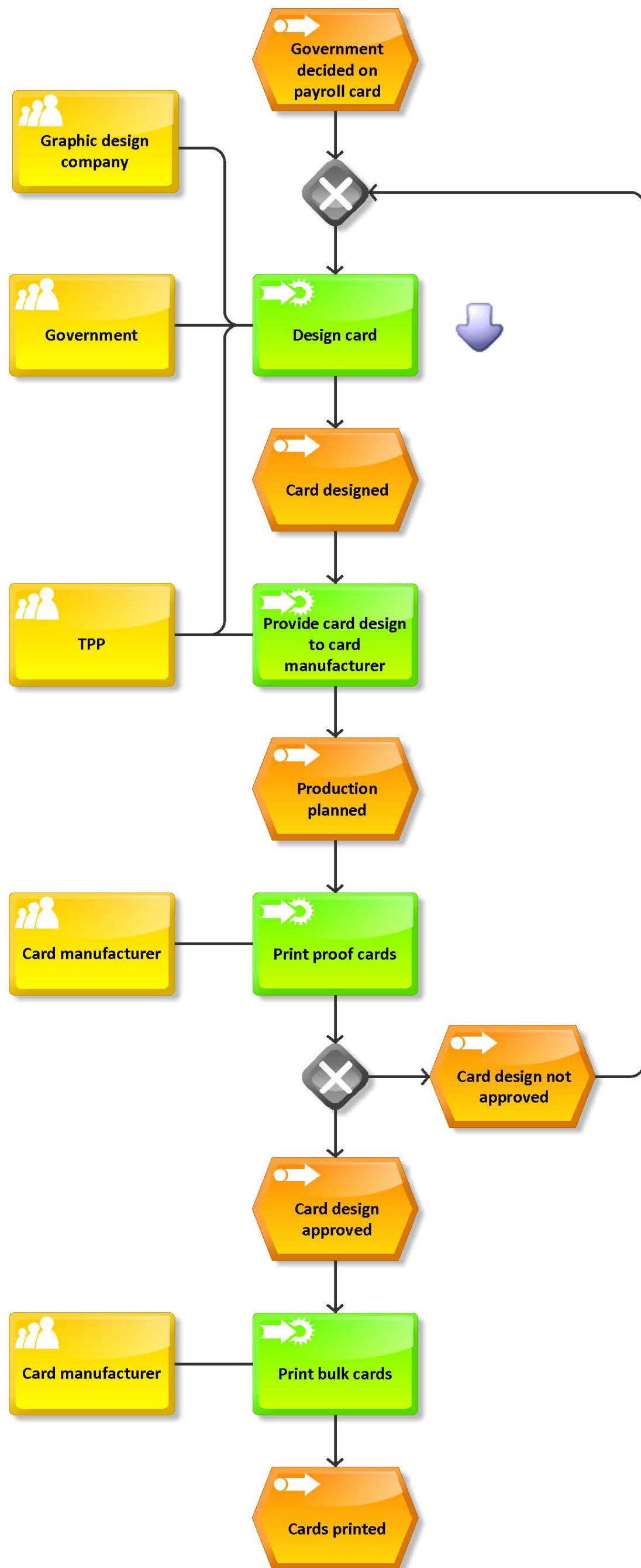
18. APPENDIX G – LEVEL 3 – SCENARIO 3



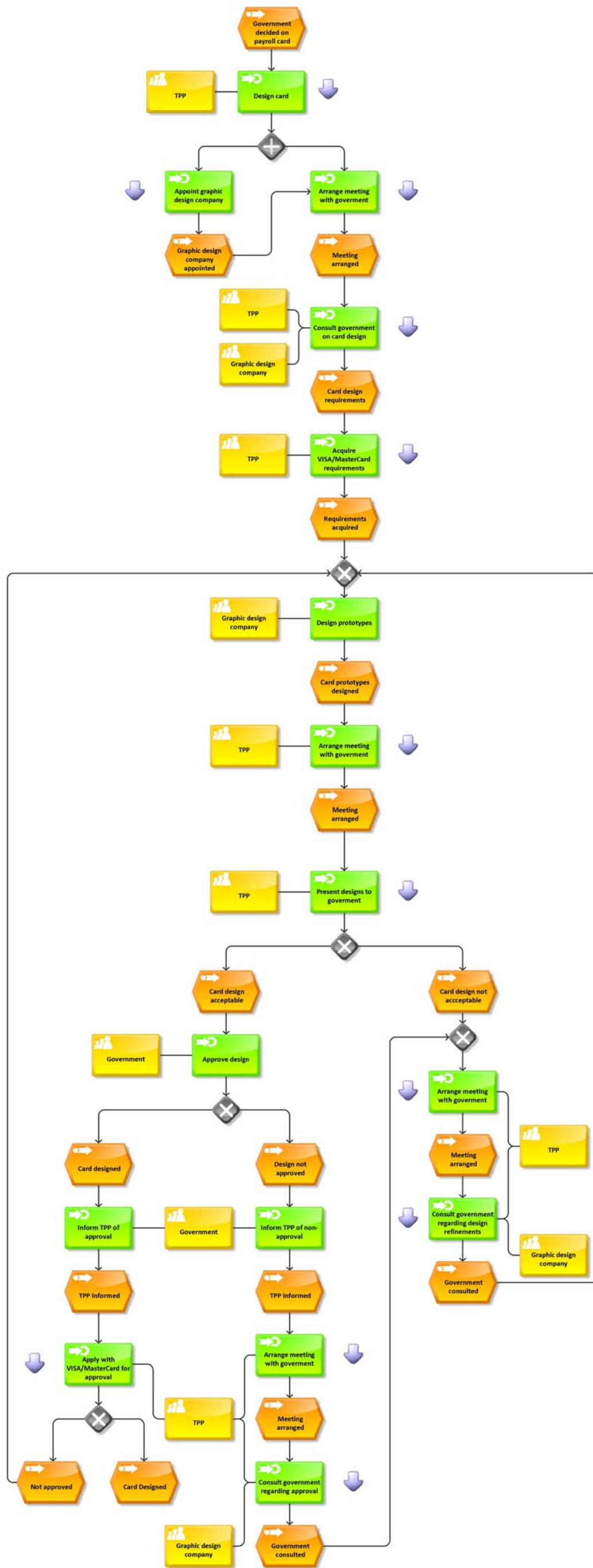
19. APPENDIX H – LEVEL 3 – SCENARIO 4



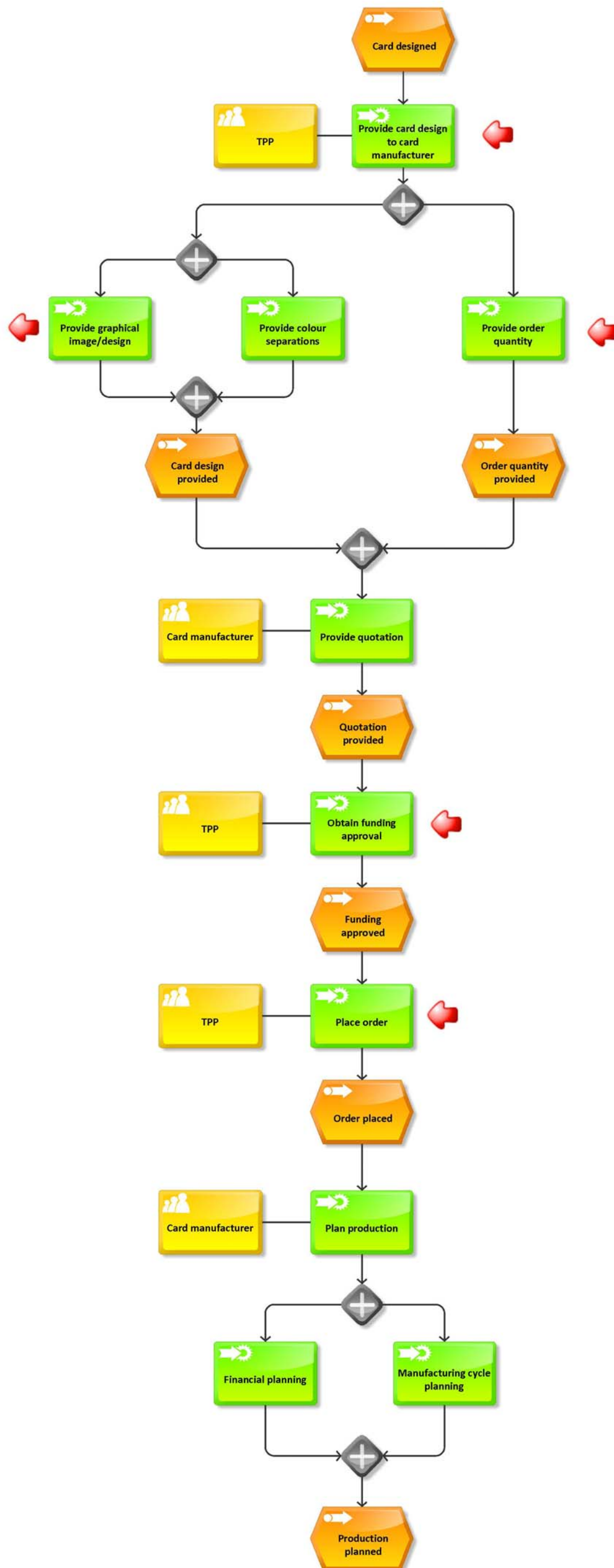
20. APPENDIX I – CARD MANUFACTURING PROCESS – LEVEL 1



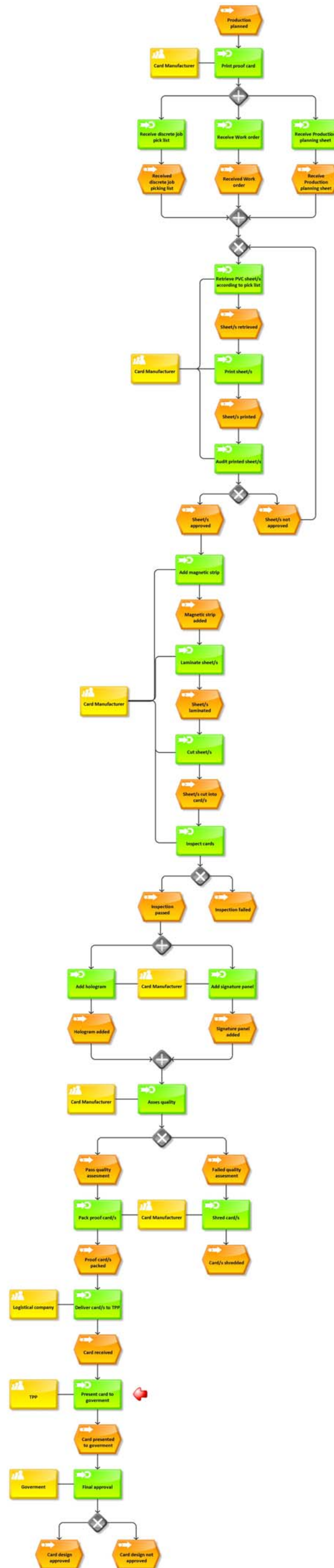
21. APPENDIX J – CARD DESIGN ACTIVITY – LEVEL 2



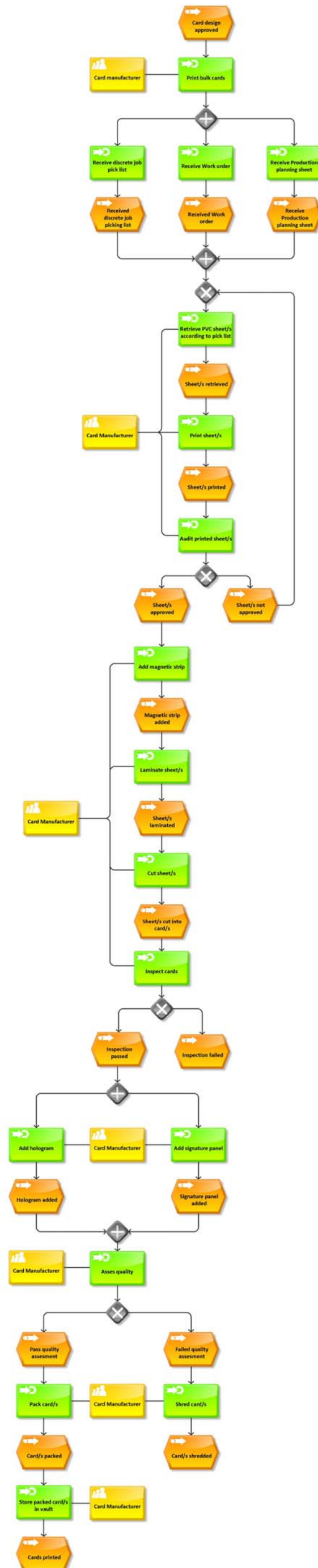
22. APPENDIX K – PROVIDE CARD DESIGN TO CARD MANUFACTURER ACTIVITY – LEVEL 2



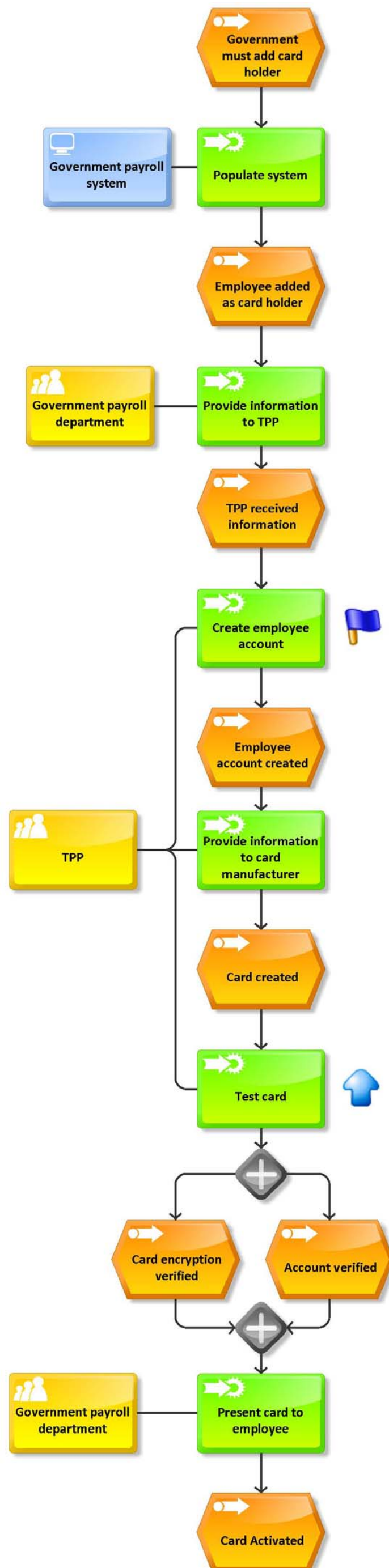
23. APPENDIX L – PRINT PROOF CARD ACTIVITY – LEVEL 2

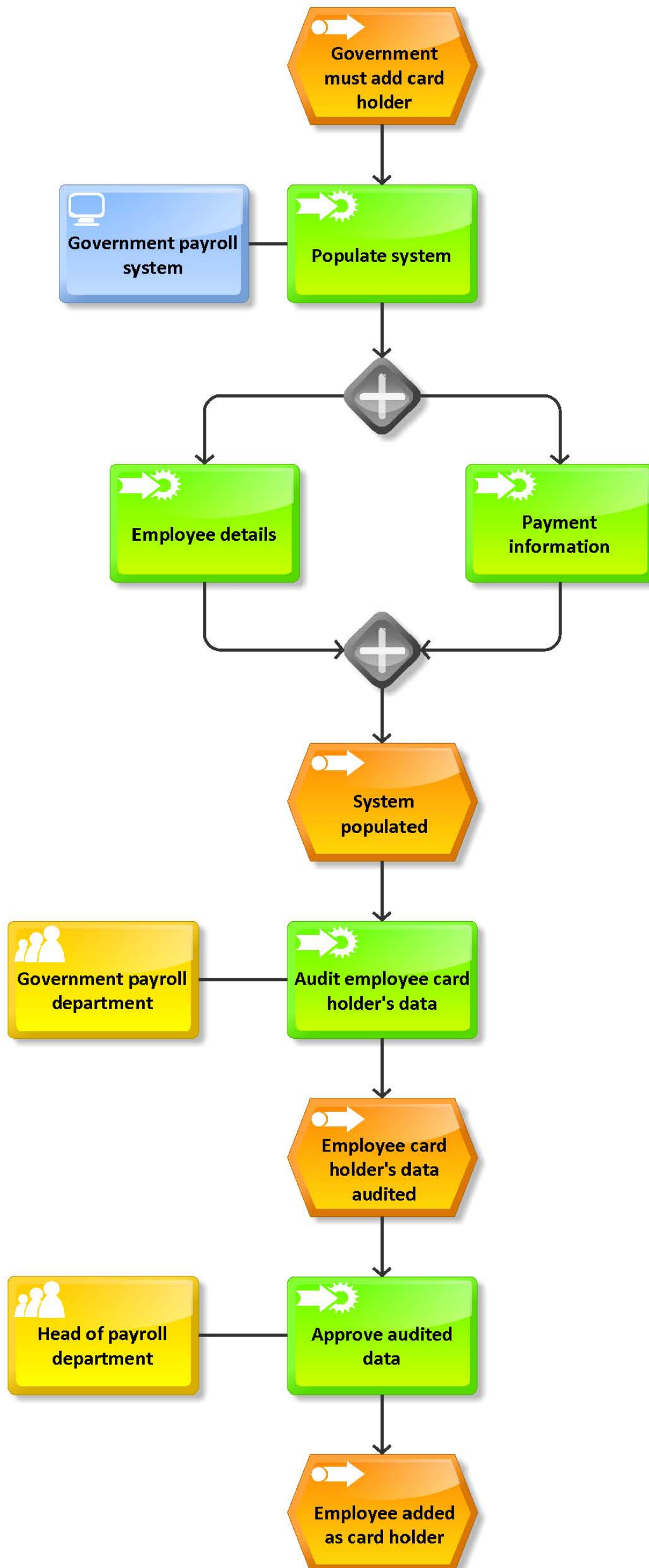


24. APPENDIX M – PRINT BULK CARDS ACTIVITY – LEVEL 2

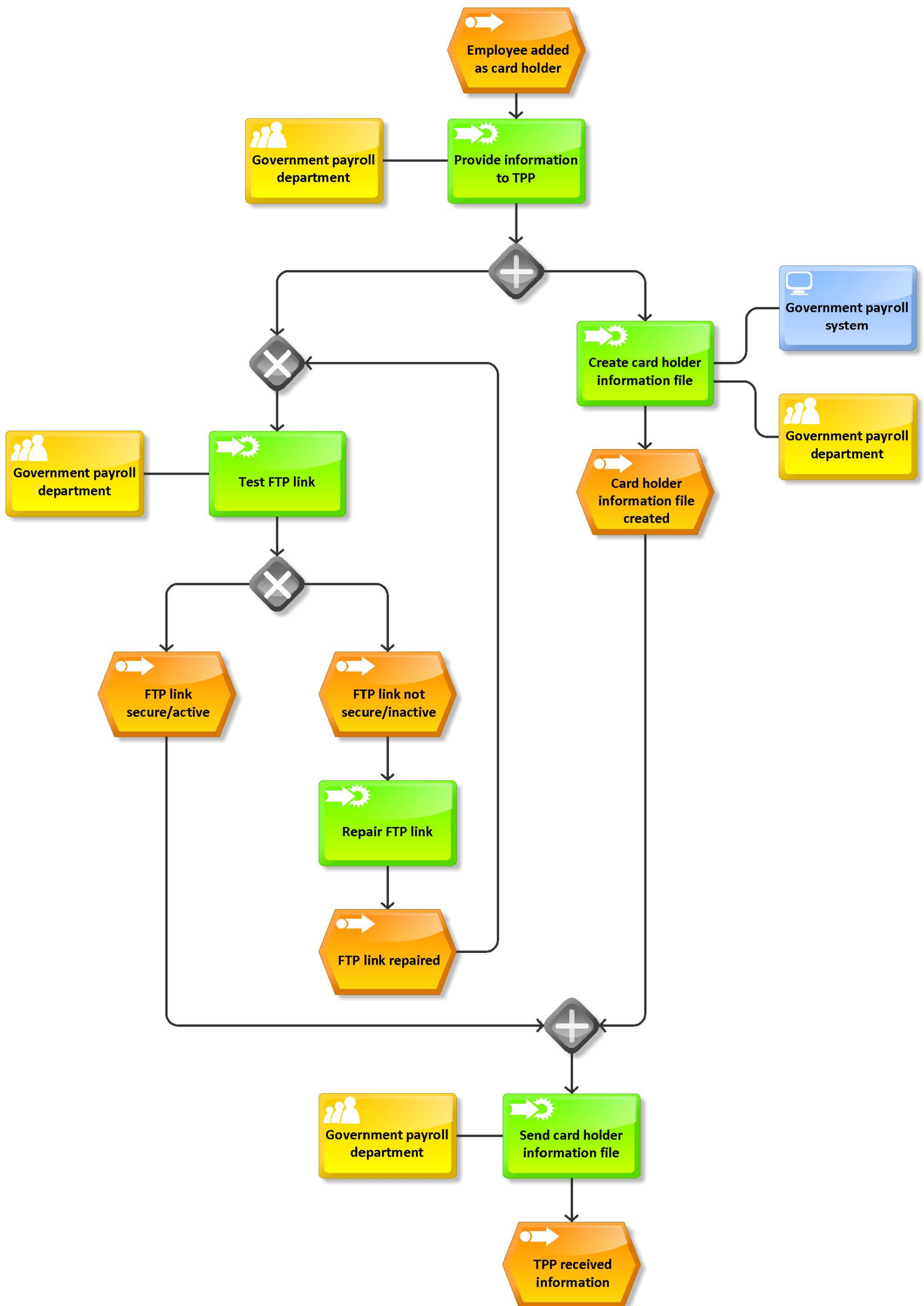


25. APPENDIX N – CARD ISSUING PROCESS – LEVEL 1

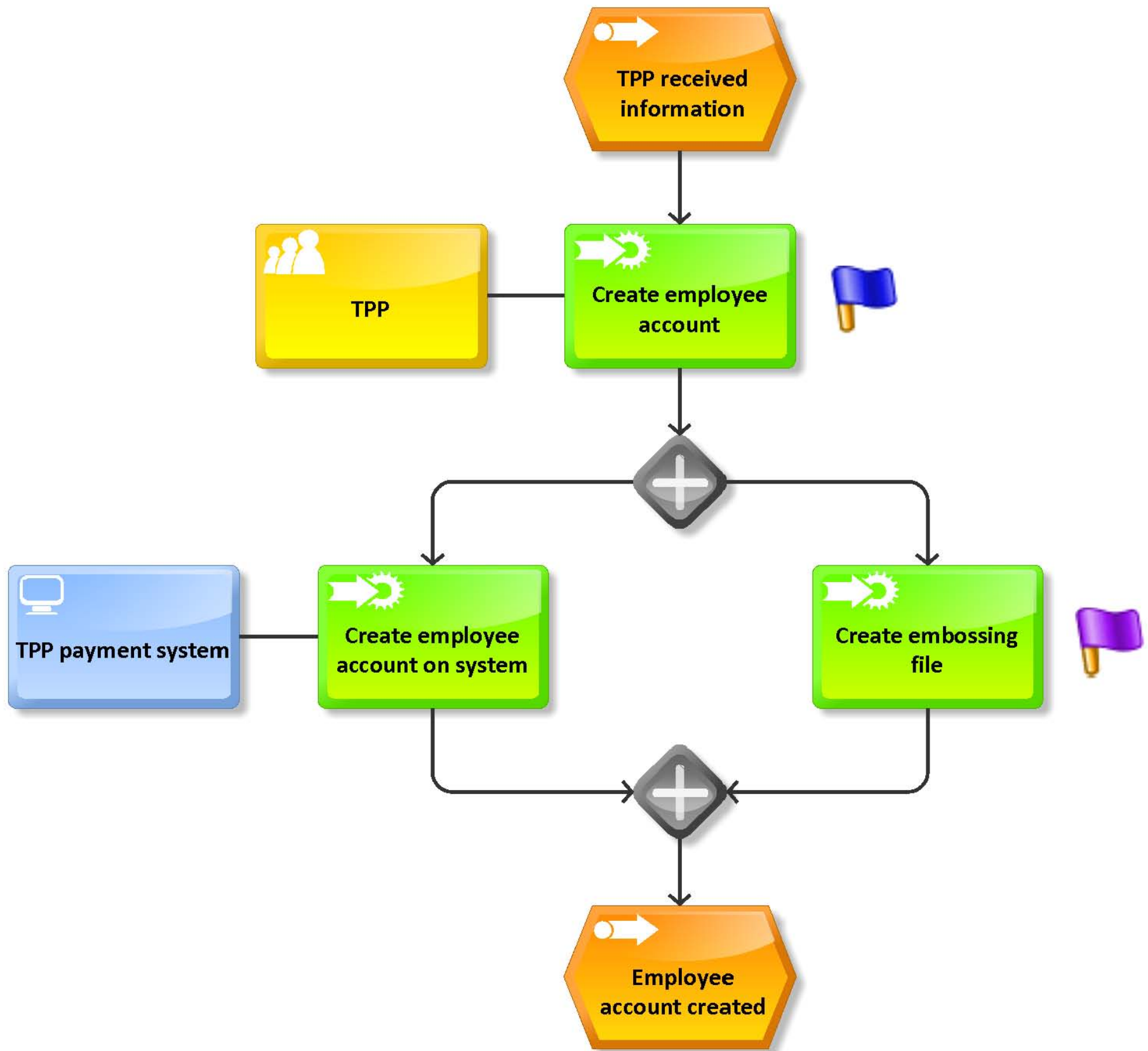




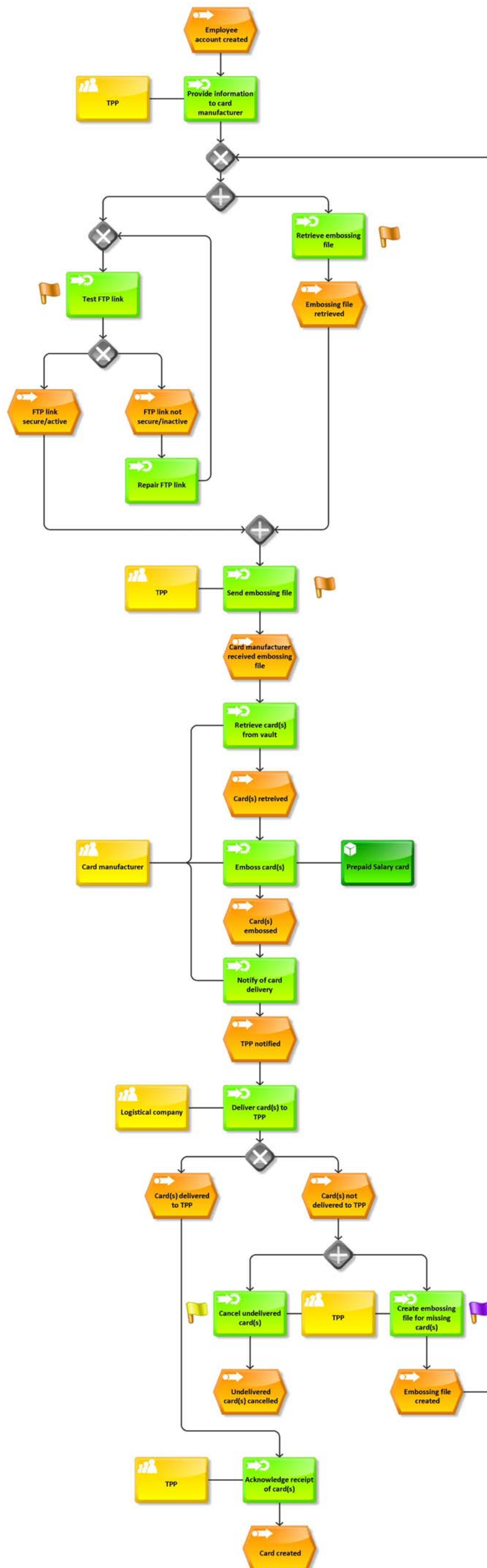
27. APPENDIX P – PROVIDE INFORMATION TO TPP ACTIVITY – LEVEL 2



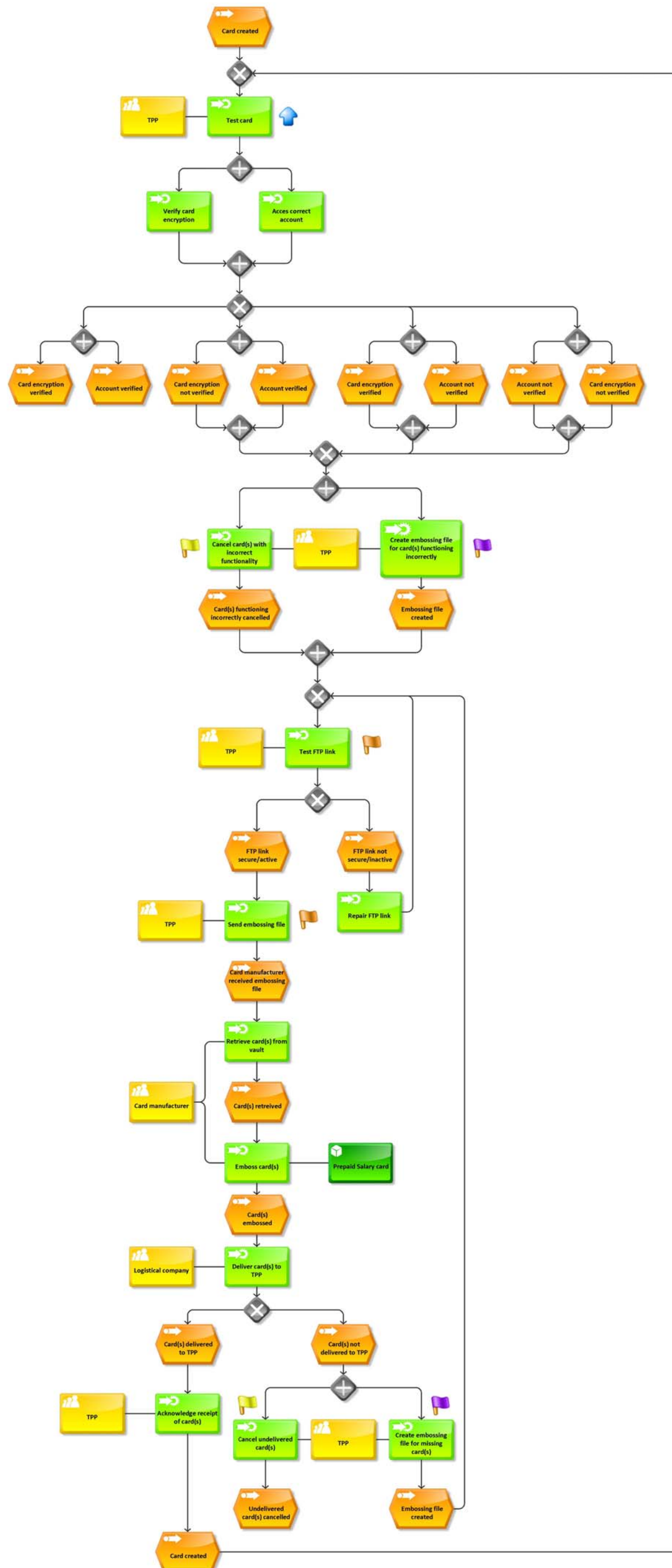
28. APPENDIX Q – CREATE EMPLOYEE ACCCOUNT ACTIVITY – LEVEL 2



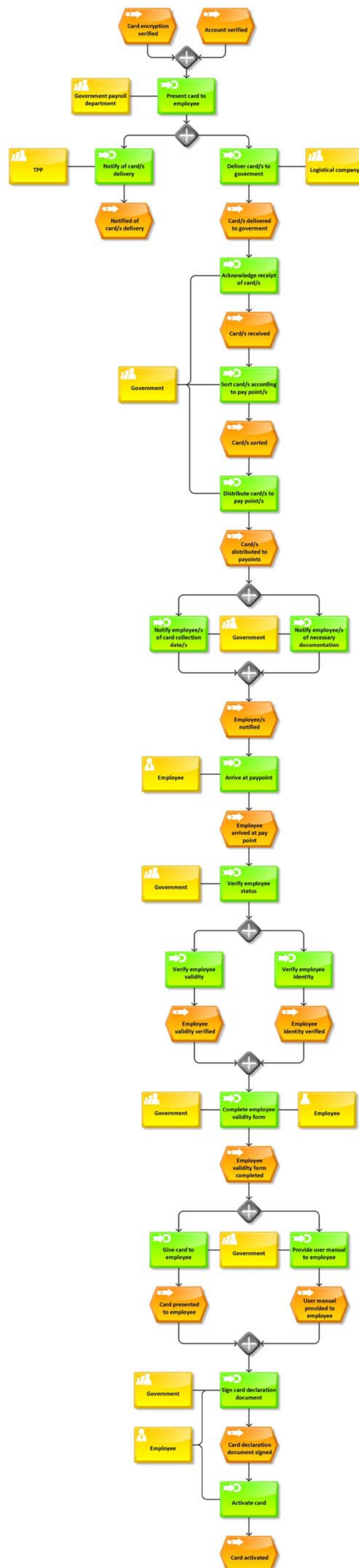
29. APPENDIX R – PROVIDE INFORMATION TO CARD MANUFACTURER ACTIVITY – LEVEL 2

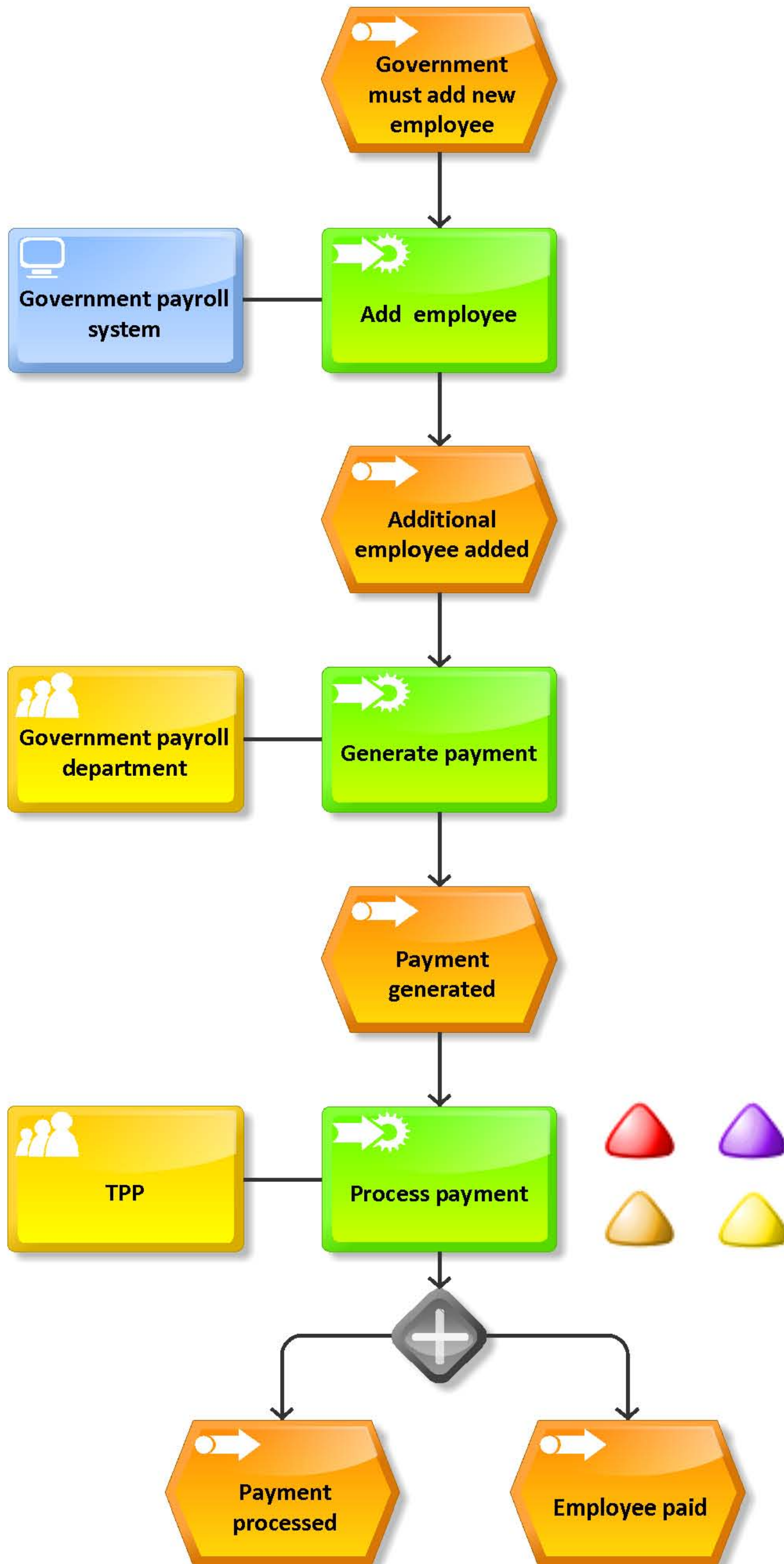


30. APPENDIX S – TEST CARD ACTIVITY – LEVEL 2

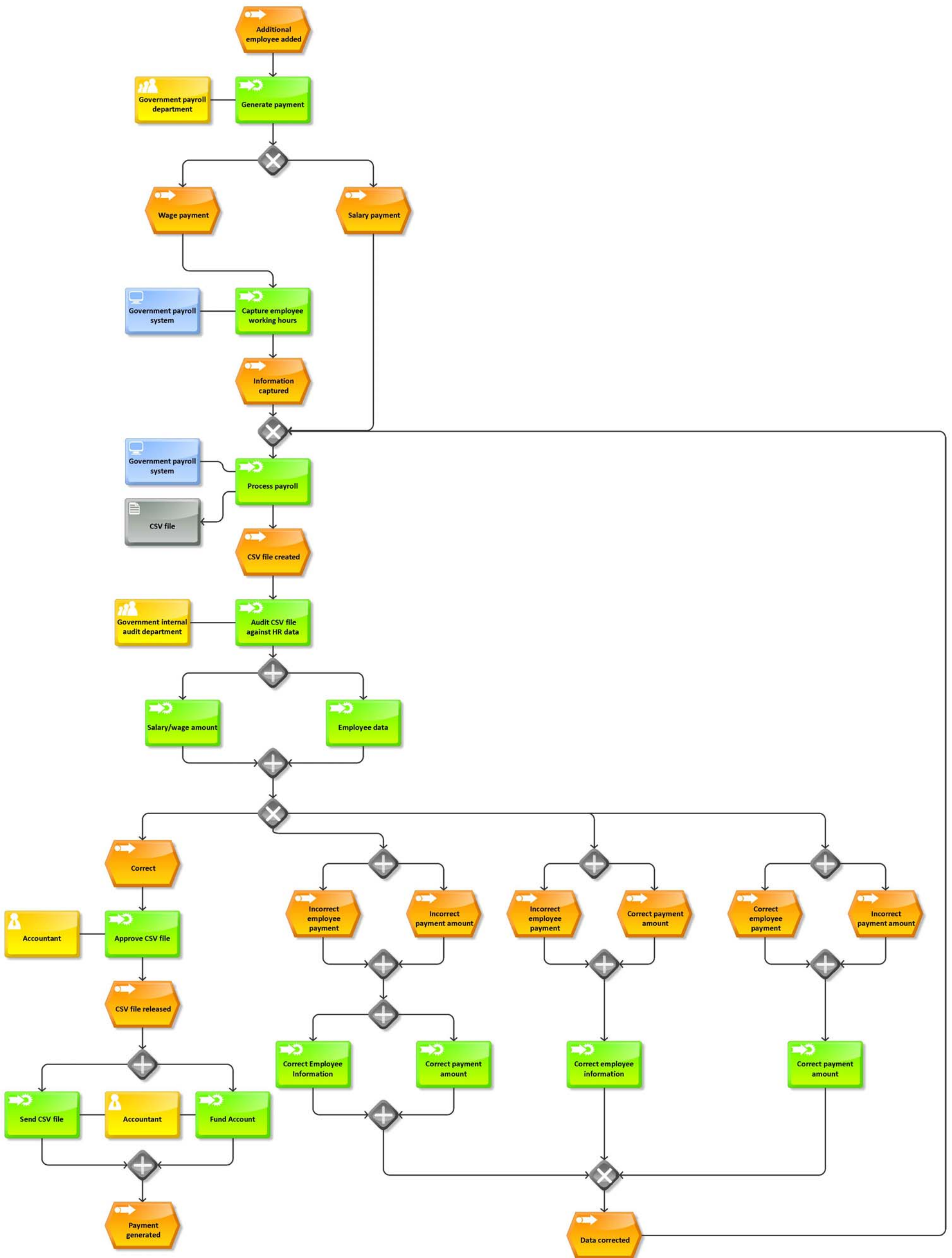


31. APPENDIX T – PRESENT CARD TO EMPLOYEE ACTIVITY– LEVEL 2

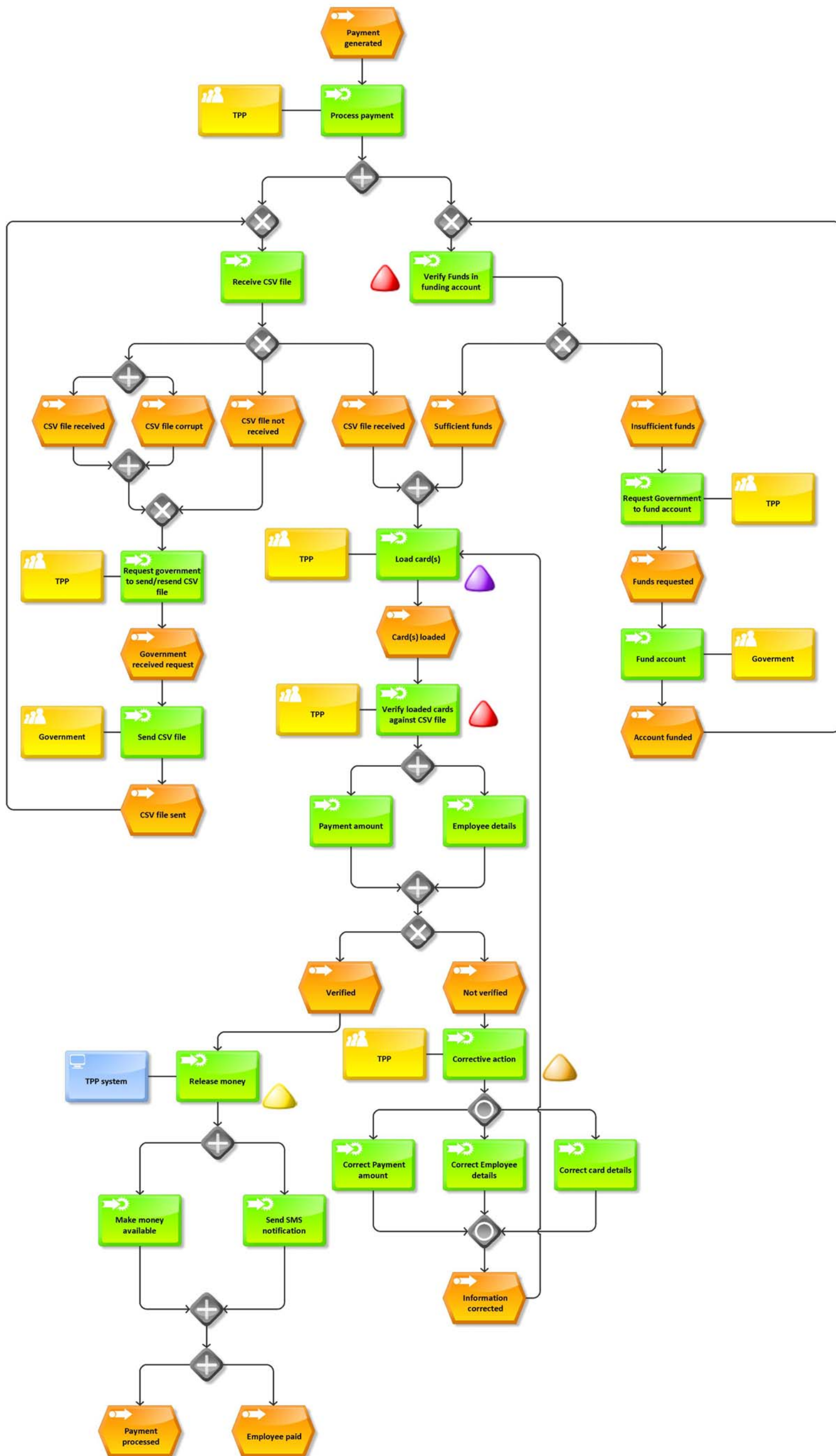




33. APPENDIX V – GENERATE PAYMENT ACTIVITY – LEVEL 2



34. APPENDIX W – PROCESS PAYMENT ACTIVITY - LEVEL 2



35. APPENDIX X – ZAMPAY REVENUE MODEL

ZAMPAY REVENUE MODEL

No	Charge Type	Monthly Transaction Rate	% Revenue		per Transaction Data Cardholder Pricing	Monthly Totals Per Card		
			Zampay	Third Parties		Zampay	Third Party Fees	Collective income
Ministry of Education card holders		180000						
Once off card issuing fee		R 360,000.00						
Basic costs								
1	New Card + Issue fee	1.00	0.40	0.60	R 5.00	R 0.00	R 0.00	R 0.00
2	Monthly Service Charge	1.00	0.50	0.50	R 1.20	R 0.60	R 0.60	R 1.20
ATM Transactions								
3	ATM Domestic Withdrawals	5.00	0.10	0.90	R 2.00	R 1.00	R 9.00	R 10.00
4	ATM Intl Withdrawals	0.05	0.08	0.92	R 4.70	R 0.02	R 0.22	R 0.24
5	ATM Balance Enquiry	2.00	0.55	0.45	R 0.90	R 0.99	R 0.81	R 1.80
6	ATM Declines	0.50	0.55	0.45	R 1.70	R 0.47	R 0.38	R 0.85
POS Transactions								
7	POS Domestic	2.50	0.22	0.78	R 0.45	R 0.2475	R 0.8775	R 1.13
8	POS Enquiry	0.30	0.25	0.75	R 0.60	R 0.0450	R 0.1350	R 0.18
9	POS Decline	0.50	0.20	0.80	R 0.30	R 0.0300	R 0.1200	R 0.15
10	POS - International	0.01	0.15	0.85	R 1.50	R 0.0023	R 0.0128	R 0.02
11	POS Enquiry - Intl	0.002	0.17	0.83	R 1.80	R 0.0006	R 0.0030	R 0.00
12	POS Decline - Intl	0.005	0.12	0.88	R 0.90	R 0.0005	R 0.0040	R 0.00
Loading Transactions								
13	Batch File Load	1.25	1.00	0.00	R 0.85	R 1.0625	R 0.0000	R 1.06
SMS Transactions								
14	SMS balance	1.00	0.50	0.50	R 1.50	R 0.7500	R 0.7500	R 1.50
Card to Card - ZAMBIA								
15	Payment / Transfer	0.50	0.60	0.40	R 3.50	R 1.0500	R 0.7000	R 1.75
Card to Card - INTERNATIONAL								
16	Payment / Transfer	0.15	0.45	0.55	R 5.60	R 0.3780	R 0.4620	R 0.84
Transfer								
17	Transfer to current/savings account	0.50	0.30	0.70	R 3.85	R 0.5775	R 1.3475	R 1.93
Call Centre								
18	Pin change	0.50	1.00	0.00	R 0.00	R 0.0000	R 0.0000	R 0.00
19	2nd Pin change	0.20	1.00	0.00	R 0.15	R 0.0300	R 0.0000	R 0.03
20	Keypad assisted balance	0.50	1.00	0.00	R 0.90	R 0.4500	R 0.0000	R 0.45
21	Operator assisted balance	0.80	1.00	0.00	R 1.20	R 0.9600	R 0.0000	R 0.96
Statements								
22	Statements - Mailed	1.00	1.00	0.00	R 0.50	R 0.5000	R 0.0000	R 0.50
Notifications								
23	SMS Load notifications)	1.00	0.50	0.50	R 0.05	R 0.0250	R 0.0250	R 0.05
24	SMS Balance Enquiry	5.00	0.50	0.50	R 0.15	R 0.3750	R 0.3750	R 0.75
EFT								
25	EFT Bill Pay	1.50	0.35	0.65	R 0.70	R 0.3675	R 0.6825	R 1.05
SECONDARY CARDS								
26	Secondary Card Issue fee	0.00	0.70	0.30	R 10.00	R 0.0000	R 0.0000	R 0.00
27	Secondary Card Monthly Fee	1.00	0.50	0.50	R 2.30	R 1.1500	R 1.1500	R 2.30
REPLACEMENT CARDS								
28	Card replacement fee	0.10	0.30	0.70	R 4.00	R 1.2000	R 0.2800	R 1.48
Termination Fee								
29	Card cancellation fee	0.00	0.70	0.30	R 5.00	R 0.0000	R 0.0000	R 0.00
TOTALS								
Revenue per card per month						R 9.93	R 16.50	R 30.21
TOTAL revenue per month						R 1,786,986	R 2,970,521	R 5,437,908