

Developing Electoral Logistics/ Supply Chain Benchmarking and Improvement Framework for Sub-Saharan Africa

by

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Executive Summary

The objective of this dissertation is the designing of a performance measurement and continuous improvement framework for electoral logistics in Sub-Saharan Africa. A reference model, named ECOR (Electoral Chain Operations Reference) model has been developed in order to achieve this objective. Extensive research on existing process modelling and other Industrial Engineering techniques that could be used to develop this model was undertaken. The IEC was the main source of the information collected that was required to develop ECOR, and it also assisted in the validation of the ECOR model. The two main tools that were used to develop ECOR are SCOR[®] and KBSI. The project consists of the problem identification, problem analysis, research, model development, validation of model as well as recommendations and conclusion about the ECOR model.

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List of Abbreviations and Acronyms

IEC	Independent Electoral Commission
SCOR®	Supply Chain Operations Reference model
KBSI	Knowledge Based Systems, Inc
ECOR	Electoral Chain Operations Reference model
NTC	National Transitional Council
NEC	National Elections Commission
INEC	Independent National Electoral Commission

1 Introduction

1.1 Introduction and background

In some African countries, successful elections have strengthened democratic practices and institutions, while improving the opportunities for economic growth. In other African countries, elections have opened doors for national reconciliation after periods of civil war and armed conflict. In many African countries however, flawed elections have sparked violence, catalysed the notion of divided societies and reduced public confidence in electoral and political processes. The importance of elections in the democratization of African countries cannot be stressed enough.

The democratization process of Africa is still an on-going experiment, and the success is important for the future of the continent. It is however, difficult to separate the economy from the political system. The election process is at the heart of a successful democratic process because it is the corresponding model of representation. Efficient Supply Chain Management is the key to the delivery of a successful election.

Assuming, however, that what is currently being done in Europe and North America can be transferred wholesale to Africa is unrealistic. Africa has numerous challenges that are common to many of its countries, but absent in most first world countries. There is therefore a need for an objective and scientific framework for performance measurement and continuous improvements in electoral logistics, which is contextualized to the African environment. Some of the challenges faced by African countries, which are not as prevalent in European countries, include the following: low to medium level of societal literacy, insufficient infrastructural facilities to support electoral processes and the effects of chronic and pervasive poverty on electioneering and electoral processes.

Logistics is the main operational support for elections, and this is one of the areas where many African countries have little capacity. This is as a result of the scarcity of necessary logistics infrastructures and the logistics human capital in most African countries.

1.2 Perceived Problem Statement

There are currently serious logistical challenges in meeting Africa's electoral demands. Three of such logistical challenges are sufficient planning, infrastructure and human capital. As a result of these challenges, measurement of the efficiency of utilization of the resources committed to electoral processes needs to be conducted, as it is easy to assume that the election is so important that whatever resource has been committed to it seems justified, and as a result of this, funds and other related electoral resources are not used optimally.

The problem of lack of infrastructures and capacity also usually implies that good electoral processes in Africa are quite expensive. This issue of election cost has been raised recently by the presidents of South Africa and Nigeria in separate instances. It does not seem that the various national electoral bodies in Africa have realized the potential benefits that active collaboration between them can deliver, especially with regards to the management of electoral logistics.

There is a need for the proper definition of an electoral system in the form of a blueprint model of the main electoral processes, so that the performance of logistics infrastructures and resources can be measured. If something cannot be measured, it is difficult to improve.

1.3 Project Aim

To develop a framework that can be used to measure the performance of logistics infrastructures and resources used to support electoral processes in African nations.

1.4 Project Scope

Even though the final product of the project is aimed at improving electoral planning processes for countries in Sub-Saharan Africa, the country that has been selected for the design of the process documentation framework (which is the main aim of the project) is South Africa. The source of modelling consultation for the project is the IEC, South Africa. The project scope covers the logistics involved in supporting the registration process and election process of national elections.

The project scope does not include the practical implementation of the model.

1.5 Key deliverables

- Documentation of all the SCOR[®] processes into a blueprint model that can be used by any electoral body in an African country
- Graphical depiction of how SCOR[®] is applied, in the form of a blueprint model
- Identifying the core level 2 processes (defined using SCOR[®] framework) for election and registration processes
- Normalization and documentation of level 3 registration and election processes based on the identified core level 2 processes
- Documentation of the IEC's level 3 best practices for registration and election processes
- Documentation of SCOR[®] best practices

1.6 Research Methodology

This project aims to contribute to the body of knowledge on electoral logistics in Africa. Extensive research on how to approach the identified problem and develop a solution formed a great part of the project. This project consists of 4 distinct phases, which are listed sequentially. Each phase focuses on a different aspect of the solution and different tasks and activities will be performed according to the key deliverables of each phase. The processes in SCOR[®] 10 are defined as follows, “The Process section in SCOR[®] provides a set of pre-defined descriptions for activities most companies perform to effectively execute their supply chains. The five macro-level SCOR[®] processes Plan, Source, Make, Deliver and Return are well-known and widely adopted. SCOR[®] identifies 2 more levels of process. Level here indicates the span of the process: Level 2 process categories determine the capabilities within the level 1 process. A level 3 process is focused on a more detailed activity. A level 1 process spans multiple level 3 processes.”

1.6.1 Phases of the solution

1.6.1.1 Phase 1: Information and Skills gathering

The first step to the implementation of a solution was to gain a basic understanding of the SCOR[®] model which is the main tool that was used for the project. SCOR[®] is a reference model regarding the current industry standards in supply chain strategic management. Extensive research on the project topic, which formed part of the literature study was undertaken.

1.6.1.2 Phase 2: Identification and documentation of the level 2 and 3 registration and election processes

The process of identifying the core level 2 processes (in terms of SCOR[®]) will consist of meetings with the IEC members (senior level and below) who are currently working in the logistics and infrastructure department. Once the core level 2 processes have been identified, the new level 3 processes, which are currently not included in the SCOR[®] framework, can be developed and documented.

1.6.1.3 Phase 3: Reference Model Development

A context diagram, with all the various departments which constitute a typical electoral body had to be developed. Once that had been completed, the documentation of the current SCOR[®] processes as well as the corresponding level 3 best practises took place. The registration and election processes as well as the identified best practises were also documented. The ICOR (Input Control Output Resource) methodology was incorporated into the reference model, by documenting the various inputs, controls, outputs and resources which are required for a level 3 process, where possible.

1.6.1.4 Phase 4: Validation of Reference Model

Validation of the Reference Model by the IEC team members involved in the project as well as the project sponsor, Dr.Olufemi Adetunji.

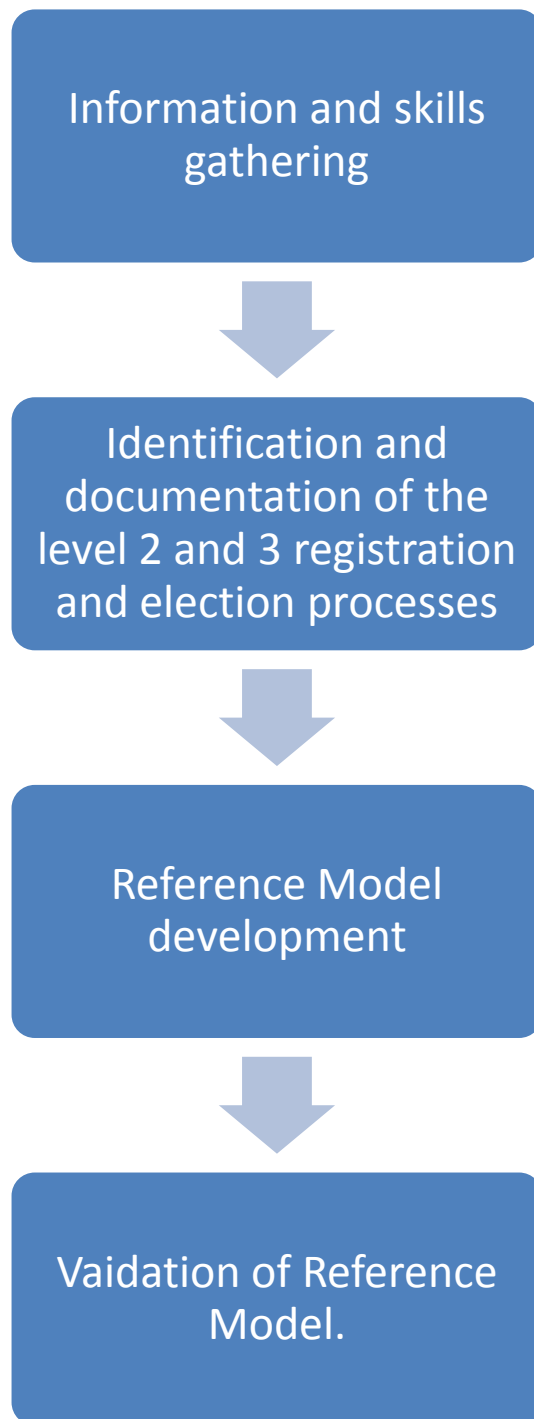


Figure 1: Research Methodology

1.7 Document Structure

Chapter 1- Introduction

This chapter consists of the introduction and background of the problem, the problem statement, the aim and definition of the scope of the project as well as the problem and research methodology that will be used to solve the problem.

Chapter 2- Literature Review

This chapter is a study of current literature about electoral logistics in Africa, the Industrial Engineering tools and techniques that can be used to solve the problem, as well as an overview of the IEC.

Chapter 3- Model Development

This chapter consists of the development of a reference model that creates a framework of the main electoral processes, so that the performance of logistics infrastructures and resources can be measured.

Chapter 4- Validation of Model

This chapter will consist of the validation of the reference model by the IEC, as well as the project sponsor, Dr.Olufemi Adetunji.

Chapter 5- Conclusions and Recommendations

The last chapter concludes the dissertation and provides recommendations on the improvement and further development of the model.

2 Literature Review

2.1 Dearth of literature

There is a dearth of literature with regards to the topic of electoral logistics/supply chain benchmarking in the African continent. This literature review will therefore not focus on previous research on how to tackle the electoral logistics problems in Africa, as there is a lack thereof, it will however focus on the logistical challenges during elections which are faced by many African countries. Various literature sources including academic journals, newspapers, books and the internet were utilised to compile the literature review. The focal point of the literature review will provide an understanding and appreciation of why this project is necessary, as there is currently a lack of knowledge and research with regards to electoral logistics in Africa, a gap in the area of logistics and supply chain which this project attempts to fill. This literature review is not an attempt to summarize the arguments in the articles that follow. What it attempts to do is to draw attention to the problem of electoral logistics in African countries.

2.2 Lack of electoral logistics/ supply chain benchmarking- the results

There are serious logistical challenges in meeting Africa's electoral demands. Some of these challenges include sufficient planning, infrastructure and human capital. The following paragraph is an examination of previous cases in which there has been a breakdown in electoral logistical in African nations, some of these countries include Libya, Nigeria, Sudan and the DRC (Democratic Republic of Congo). It is worth noting that logistics is the main operational support for elections, and this is one of the areas where many African countries have minor capacity.

2.2.1 Nigeria

In 2011, many Nigerians who flocked to the voting centres around the country to exercise their civic rights went home disappointed as they could not cast their votes due to logistics problems with arrangements made by the electoral commission. Madu (2011) argued the following in the Business Day: Any election will be successful if the availability the right election materials, in the right quantity and condition, at the right place, at the right time, with the right electoral officer are ensured. One of the biggest problems faced by Nigerian elections is the politicians, who have become nearly impossible to manage. Madu (2011) asks the question, "Why will the sensitive materials not come in time if not for the fear that politicians will tamper with them?" The INEC (Independent National Electoral Commission) argued that the reason for not having a successful election was as a result of vendors, who have failed them. However, what this could imply is that the selection criteria of vendors were faulty, as the vendors are just middle men. The way to improve the current situation in Nigeria is to adopt a pro-active method to planning. Long term planning is important, as flawless logistics cannot be achieved if electoral bodies do not appreciate the right tools and strategies involved in planning. Madu (2011) saw the training plan of INEC before the election, and did not find any core logistics training, even to the logistics in the organisation.

He states that it may seem silly to start talking about the next election just after the 2011 election was concluded; however, the time to start is immediately after this 2011 election. People need to be trained, as they cannot give what they do not have. The saying, if you don't train them, don't blame them, applies here.

Madu (2011) clearly portrays the need for long term planning and an improvement in electoral logistics. Without the correct strategies and methods to plan for electoral logistics, election processes are prone to being unsuccessful.

2.2.2 Sudan

Sudan is Africa's largest country, much of it lacking existing infrastructure. The following is an extract from a newspaper article written by Widge (2009), before the 2010 national elections in Sudan. The article clearly demonstrates the vast electoral problems which were faced in Sudan.

Widge (2009) stated the following: "Static Registration Centres are located in central locations with higher populations. They are supported by Mobile Teams that travel to remote areas of the South to register voters under the village tree and report back to the Static Centres. In a country where hardly anyone carries any identification papers, identification of potential voters can be difficult. According to NEC's Election Law, an individual's identity may be confirmed by three fellow villagers. At the end of the process, registered voters will obtain a laminated slip of paper each with its unique serial number. Proof of registration will help facilitate the work at the April 2010 elections polling stations. Only registered voters will be allowed to participate in the process of selecting government representatives of the Sudan in next year's elections."

The logistics challenges faced in the 2009 Sudan elections were overwhelming. Approximately 120 000 kgs of materials- including forms, training supplies and registration kits, were sent to start the November, 2009 registration period to locations identified by the NEC (National Elections Commission). Various means of transport including boats, motorbikes, trucks, helicopter, airplanes and pedestrian porters were required for the difficult operations. Sudan's multi-level elections required millions of paper ballots, which were delivered to remote corners of a country the size of Western Europe. More than 1200 different ballot papers were printed for all the legislative bodies. This was the largest logistical operation the country had to undertake, considering the difficulty of ensuring that each polling station should receive the correct quantity of the voting material it requires to hold credible elections. The April 2010 Sudan elections were the very first elections in 24 years, that being 4 years after the end of a 21 year civil war. The logistics challenges faced by Sudan were immense, even without considering the complicated and fragile political settings within which the Sudan elections were held.

Once again, the article demonstrates the logistical challenges faced by some Africa nations, in this case, the largest African nation, which include a lack of planning, infrastructure and resources required for elections.

2.2.3 Libya

Eljarh (2012) stated the following in a newspaper article written in the Tripoli Post: “Exercising the right to vote for some would require much effort, as citizens might have to travel long distances and wait hours in front of a polling station in order to make their voice heard. One must underline the logistical challenge posed by the organisation of elections in Libya, as the NTC has just managed to draw up the voting districts map, which undoubtedly would fuel regional debate on the issue. Also, the formal registration process for elections has not started yet with only three months left. Census data in Libya is unreliable or unavailable, transport could prove to be difficult.”

The Gaddafi regime did not only block development, but it also led to the absolute collapse of infrastructure, making the task of the electoral body more complicated than what it should have been. It can be rather tricky to determine which malfunctions were tied in with fraud, informal mechanisms or technical problems when political manipulations combine with logistical challenges. Many areas in Libya lacked the expertise, skills as well as the human resources that were required to manage and lead the election process. A large number of people in Libya still talk about the success story of the Misurata elections; however, the successful results which were achieved in those elections would be difficult to achieve, considering that national elections are a different story, both technically and logistically.

2.2.4 Democratic Republic of Congo (DRC)

The following was stated in the Guardian, Nigeria (2011): “However, elections held in the 60,000 polling stations in the Africa's third largest nation with the anticipated logistics problem and electoral violence. Materials had to be conveyed to the largely inaccessible vast expanse of land with helicopters. There were shortages of ballot papers as well as late arrival of voting materials in some polling stations. Observers reported ballot stuffing in the Eastern city of Goma. Violence also reared its ugly head during the elections. For example, vehicles conveying election materials were attacked in Lubumbashi in south of the country while three polling stations were burnt and a female electoral observer was badly injured in West Kasai. These, combined with the pre-election atmosphere in which security forces and candidates in the election fomented violence, cast a gloom over the electoral exercise.”

In both the cases of Libya and the DRC, the portrayal of the great problem experienced in electoral logistics is evident. These two countries, along with Sudan and Nigeria are a mere fraction of the number of African countries which experience the same problems. From the analysis of the cases, it is clear that a solution to the identified problems needs to be developed, and contextualised to the African continent.

This section is concluded with the following extract taken from a book written by Dundas (2011), in which he argues that: “Many flawed elections in AU (African Union) Member States during the first decade of the 21st Century could be traced back to inadequate or more perhaps more accurately the absence of proper management of election logistics, whether through intent, or innocence of its importance.” This deficiency has led to defects in election planning and execution, spanning from the selection of poor voting sites, to the incorrect calculation of voting materials, such as ballot papers and boxes as well as the appointment of

inadequately trained electoral officers. Many of the defects in organizing and planning free and fair elections in African countries could be overcome by placing a greater emphasis on logistics and ensuring that a focused plan on correcting past mistakes is put into place.

2.3 Election Monitoring- An attempt to solve electoral problems

There has been an attempt at solving the electoral problems in Africa as a whole, by the practise of Election Monitoring. According to Chipfunde (2002), monitoring and observation of elections is a process through which an election is scrutinized and evaluated for “purposes of determining its impartiality in terms of organization and administration”. It involves “stationing of independent missions, officials or individuals representing international or local organizations for a specified time in a country which is in the process of organizing a national election with a mandate to closely observe and pronounce on the entire process and outcome.” This means that election monitoring is in essence, a third-party role that is to assist in ensuring free and fair elections. The process of election monitoring is usually a short-term activity, which covers the activities of voting, vote counting and the declaration of results. van Cranenburgh (2000) describes long-term observation as “observing the events that define the electoral process from the setting up of electoral management bodies, voter registration, voter education, candidate nomination and political party registration, political campaigning and media issues, voting and the counting, through to the installation of elected bodies.” From this definition of long-term observation, it is clear that there is a lack of long-term planning in African elections, and the current methods of evaluating elections, are based on short-term evaluations, which do not provide a full picture of the electoral process cycle, which then makes the legitimacy of the observations questionable. While Election Monitoring has been good at identifying problems, it has not developed foundations and theoretical principles that can be used to solve the identified problems, which require long-term planning. Election Monitoring is one attempt at an electoral performance measurement of sorts that has been documented, which fails to address the core issues of the logistical challenges facing Africa. This project is an attempt at providing the necessary framework that can be used to measure the performance of logistics infrastructures and resources used to support electoral processes in African nations, which will also assist in the long-term planning of elections, something that is needed, but has yet to be developed.

2.4 The IEC- An Overview

The IEC (Independent Electoral Commission) of South Africa, whose headquarters are based in Centurion, South Africa, provided most of the information that was required to complete this project. The senior manager of Logistics and Infrastructure was the main source of contact for the project, and he assisted in the validation of the reference model.

The Independent Electoral Commission (IEC) is a permanent body established in terms of the Electoral Commission Act of 1996 to promote and safeguard democracy in South Africa. It is a publicly funded body and is accountable to Parliament, but is independent of government.

The IEC has five full-time commissioners, appointed by the President, whose brief is to deliver regular, free and fair elections at all levels of government – national, provincial and local. The IEC achieves this by:

- Dividing the country into voting districts;
- Making logistical arrangements for elections;
- Registering eligible voters;
- Ensuring the smooth running of voting; and
- Counting, verifying and announcing the results of elections.



Vision, Mission and Values of the IEC

Vision

To strengthen constitutional democracy through the delivery of free and fair elections in which every voter is able to record his or her informed choice.

Mission

The Electoral Commission is an independent and impartial permanent body created by the Constitution to promote and strengthen constitutional democracy in South Africa through the delivery of free and fair elections at all levels of government.

Values

To enable the Commission to serve the needs of stakeholders, including the electorate, political parties, the media and permanent and temporary staff.

2.5 Possible engineering tools and techniques to solve problem

There a number of theoretical foundations and principles on which this project can be developed. There are documented frameworks for performance measurement, process modelling and business architecture in the supply chain environment. Even though there area number of frameworks that can be used to build this work, none can be exclusively utilised to deliver on the management of electoral logistics in Africa. The main Industrial Engineering modules that have been studied over the past three years that can assist in building this model include: Business Logistics, Business Engineering and Operations Management.

2.5.1 SCOR®

The Supply Chain Operations Reference (SCOR®) model has been identified as the key tool that will be used to build the reference model for this project. The following information about SCOR® may be obtained on the Supply Chain Council's website.

What is SCOR®?

The Supply Chain Operations Reference (SCOR®) model is the product of Supply Chain Council (SCC), an independent, non-profit, global corporation with membership open to all companies and organizations interested in applying and advancing the state-of-the-art in supply chain management systems and practices. The SCOR® model is a framework that links metrics, best practises and business processes into a structure that improves communication amongst supply chain partners and effectively supports supply chain management.

How does SCOR® Help?

SCOR® is a standardized language, with standardized metrics and common business processes that help to manage a widespread set of business problems. This then results in accelerated business change and can ultimately improve performance. Organizations which use SCOR® have stated that they enjoy annual bottom-line improvements of 1-3%. Some of the common business problems which are solved using SCOR® are:

Technology Services

- Optimization of IT service provisioning by using service-oriented architecture and workflow
- Software implementations such as ERP, MRP and PLM, which are best practices

Business Management Challenges

- Benchmarking
- Management alignment
- Process Outsourcing
- Strategy Development
- Re-engineering and Supply optimization

- New business start-up
- Standardization
- Merger, Divestiture or Acquisition

How is SCOR[®] used?

SCOR[®] is generally used to firstly identify, then measure, reorganize and ultimately improve supply chain processes. This is achieved by

1. Capturing the configuration of a supply chain. A supply chain configuration is driven by 5 macro-processes, namely:
 - **Plan** aggregation levels and information sources
 - **Source** products and locations
 - **Make** methods and production sites
 - **Deliver** products and channels
 - **Return** methods and locations

2. Measuring the performance of the supply chain by comparing against industry goals (internally and externally). The following performance metrics are used:
 - **Reliability**—level of customer demand achieved in the right condition, in the right quantity, at the right place, at the right time etc.
 - **Responsiveness**—the amount of time that it takes to respond (firstly react, then fulfil) customer demand
 - **Agility**—the flexibility capability of the supply chain to adapt to changes in demand, within a specific period that has been planned for
 - **Cost** – Assessing all costs involved along a supply chain
 - **Assets** – Assessing all the resources that are used to fulfil customer demand

3. Re-alignment of supply chain processes and best practices to achieve desired business objectives. Re-alignment can be achieved through a combination of the following:
 - **Process re-engineering**
 - **Lean Manufacturing**
 - **Six-Sigma**
 - **Theory-of-Constraints**
 - **ISO-9000**
 - **Balanced SCOR[®] cards**
 - **Benchmarking**
 - **Industrial engineering** based best-practice techniques

While the SCOR[®] model is good for industry applications, it has not yet been applied to the electoral environment in African countries, and this, therefore provides an opportunity for the documentation of the SCOR[®] framework in the electoral environment, which can be used to aid the implementation of SCOR[®] practises.

2.5.2 KBSI (Knowledge Based Systems, Inc)

In order to build the reference model for the project, a number of business engineering software packages were researched. KBSI (Knowledge Based Systems, Inc) will be used as the main tool to develop the reference model. The AI08 WIN[®] programme, which makes use of the IDEF \emptyset Activity Modelling Method, in particular will be used.

The IDEF \emptyset Activity Modelling Method

An activity model is a structured representation of the activities that occur in a manufacturing system or environment and the information and objects that link or contextualize the activities. Activity modelling can be used to describe the different occurrences of activities, by system or subsystem, according to the information or objects that serve to distinguish these occurrences. The primary focus of activity modelling is on the information and objects that create a unique occurrence of a given activity.

Models and Diagrams

Models are used to provide a context for the specific occurrences of activities and concepts and for the different activations of an activity. Each model (a repository can have any number of models) is represented by a single activity-the A0 activity- which serves as the parent activity for the hierarchy of decomposition diagrams that branch out beneath it.

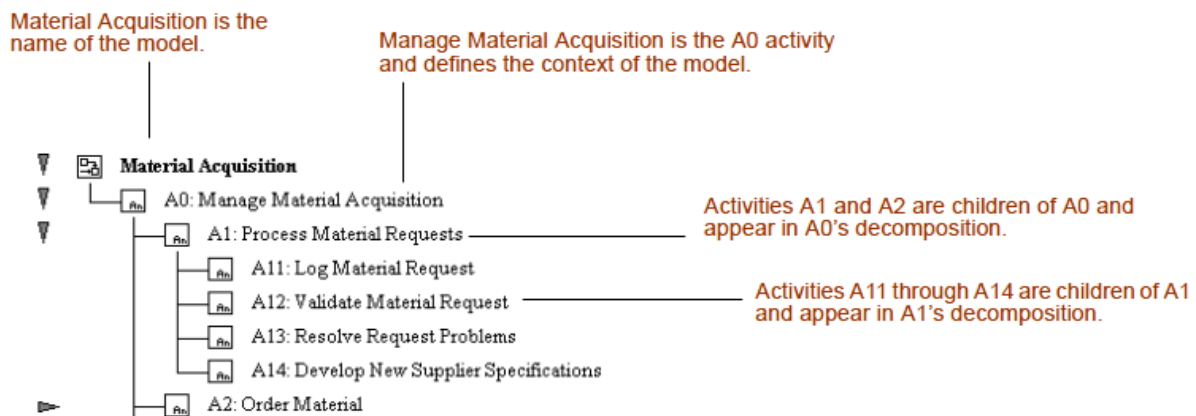


Figure 2: Model and diagram example on KBSI interface



SCOR[®]
Supply-Chain Council

*SCOR is a registered trademark of the Supply-Chain Council
in the United States and Europe*

Supply-Chain Operations Reference-model



Figure 3: Main tools that will be used to develop model

2.6 Summary

This chapter gives an overview of the literature that is available with regards to electoral logistics in Africa. From the literature discussed in the chapter, it is evident that there is a need for better electoral planning solutions in Africa; which provides the opportunity for the development of a blueprint model that can assist in achieving this. Various Industrial Engineering tools and techniques were researched, and the two which were discussed and will be used to develop the ECOR model are KBSI and SCOR[®]. An overview of the IEC was presented, as it will be the main source of information gathering and model verification. The following chapter is a discussion of the ECOR model development.

3 Model Development

In order to develop the ECOR model, a number of steps were followed. These steps are in effect, the application of SCOR[®] in an election environment. The methodology followed is the sequence in which the activities were undertaken, and this is evident throughout the rest of this chapter. This methodology is an application of SCOR[®] as the steps followed were used to firstly identify, then measure, reorganize and ultimately improve supply chain processes.

Steps followed for model development:

1. Supply chain identification
2. Supply chain characterization
3. Supply chain configuration
4. Supply chain documentation/normalization
5. Supply chain benchmarking
6. Supply chain gap analysis
7. Supply chain improvement

The last two steps, namely, supply chain gap analysis and supply chain improvement could not be implemented for this study. The reason for this being that no data has been collected as input for the model yet, therefore it is not yet possible to analyse the supply chain gaps in greater detail as well as take any implementation actions towards supply chain improvement, even though opportunities for supply chain improvement have been identified.

The methodology explained above was followed in developing the model; however, the rest of this chapter is structured according to the way in which the proposed ECOR model is structured and viewed on KBSI, for the purposes of explanation. The entire model repository can be viewed in Appendix E .

This chapter is structured as follows:

1. Outline of the proposed reference model
2. Logistics and infrastructure
 - a. Supply chain identification
 - b. Supply chain characterization
 - c. Supply chain configuration
 - d. Process framework
 - ICOR(inputs, outputs, controls and resources)
 - e. Performance framework
 - f. Best practices
3. Electoral Processes
 - a. Register and Elect
 - b. Best Practices
 - c. Summary

3.1 Outline of the proposed reference model / Context diagram

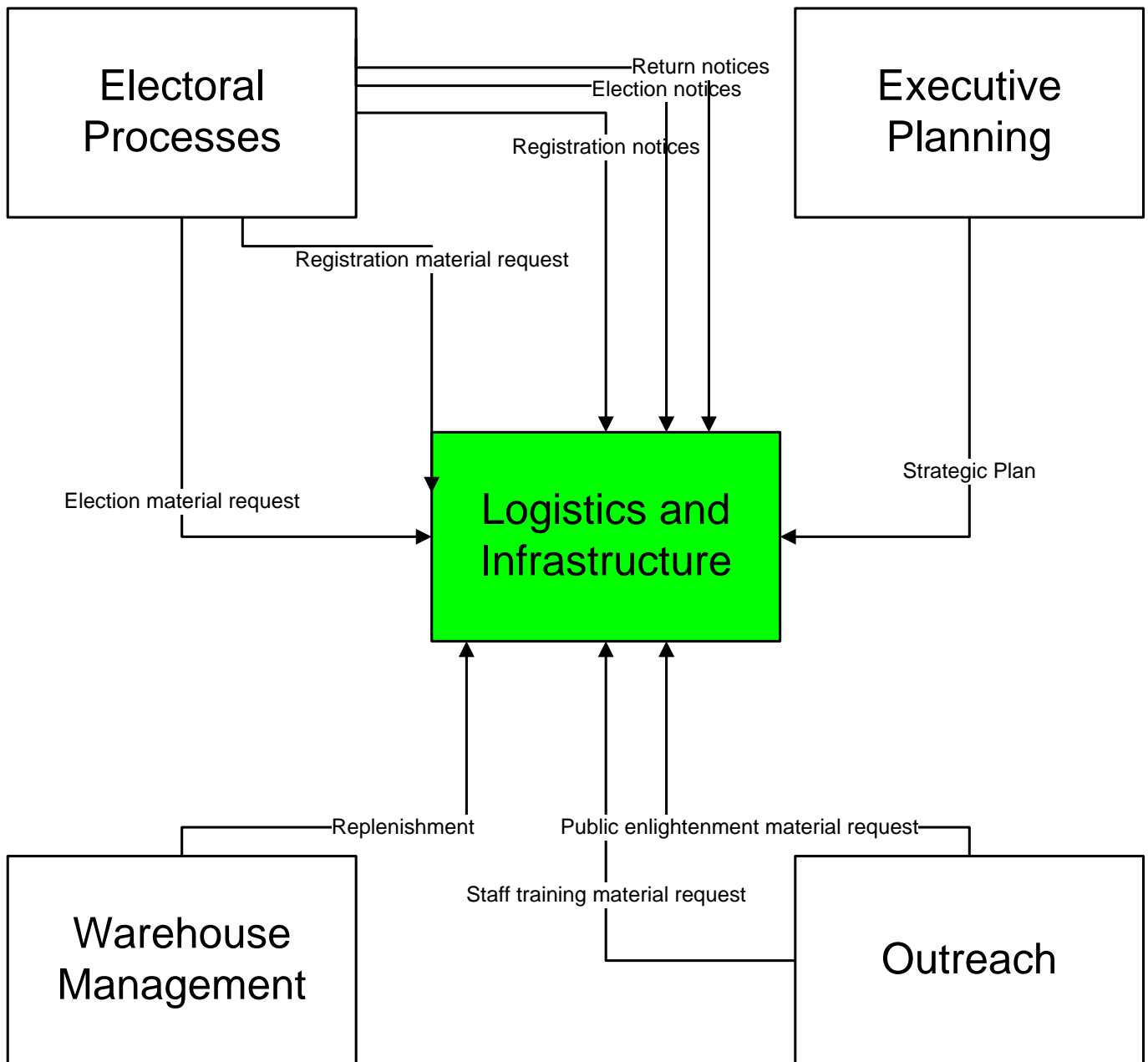


Figure 4: Context diagram

The context diagram is a graphical representation of the major departments that interact with the logistics department. The arrows flowing into the Logistics and Infrastructure department represent information that triggers certain activities in the Logistics and Infrastructure department. Logistics is the main operational support that leads to successful elections and as mentioned earlier in this report, the main focus of this project is to improve the logistics involved in elections by providing a documented process framework that electoral commissions can be able to use, which is why the Logistics and Infrastructure department is the focal point of this study. The other departments seen on the context diagram, cannot be ignored as they provide the input which triggers certain activities in the Logistics department, however, no further analysis of these departments, with the exception of Electoral Processes, has been presented. The analysis of the other departments represents a potential area for future study in Supply Chain Management.

REGISTER and ELECT are new processes, which have been developed, in the same nomenclature and language as existing SCOR[®] processes, to contextualise the entire blueprint model to the election environment. The register and elect processes are the sub-processes of the Electoral Processes, seen in the context diagram. These two processes will be discussed in subsequent sections of this chapter.

There is a great challenge in using SCOR[®] in elections, as it is not only manufacturing based, but it seems to be driven by competition and it focuses heavily on material flow. As a result of this, the existing SCOR[®] framework will be used by the Logistics and Infrastructure department, and guide that specific department towards improved supply chain management.

Throughout the rest of this chapter, screen shots of the model as it appears on the KBSI AI08 WIN[®] programme will be used to explain the model.

The figure below is the context diagram as it appears on the model.

Title:A-1: ECOR Model

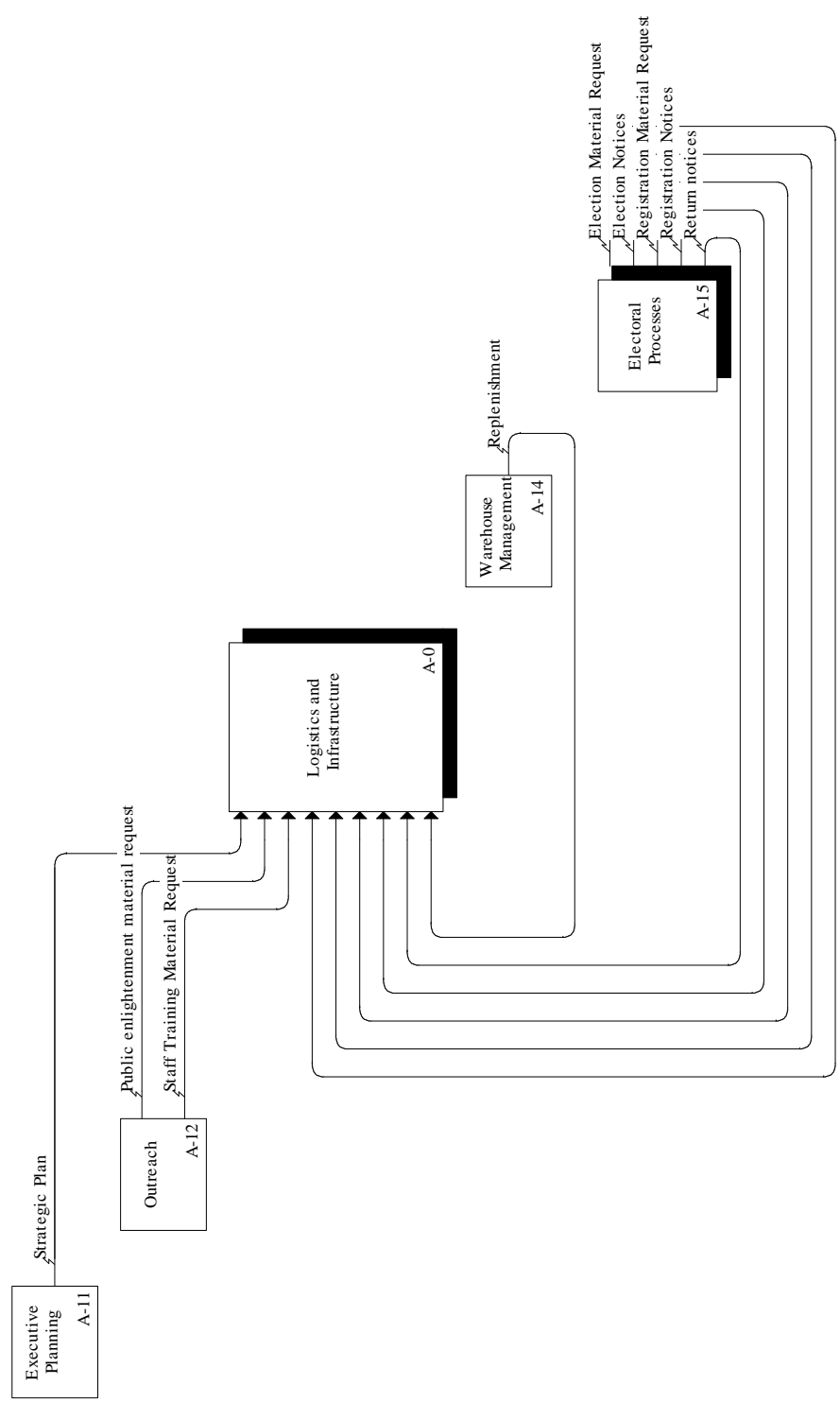


Figure 5: Context diagram on model

3.2 Logistics and Infrastructure

3.2.1 Overview

The logistics and Infrastructure department is responsible for determining the electoral bill of materials for all electoral events, procurement, specifications and disposal of items that are approved in terms of warehousing, bill of materials, distribution of electoral materials and equipment, local infrastructure and voting stations.

Once the Logistics and Infrastructure decomposition is opened in the model, the following is image is seen.

Title:A-0: Logistics and Infrastructure

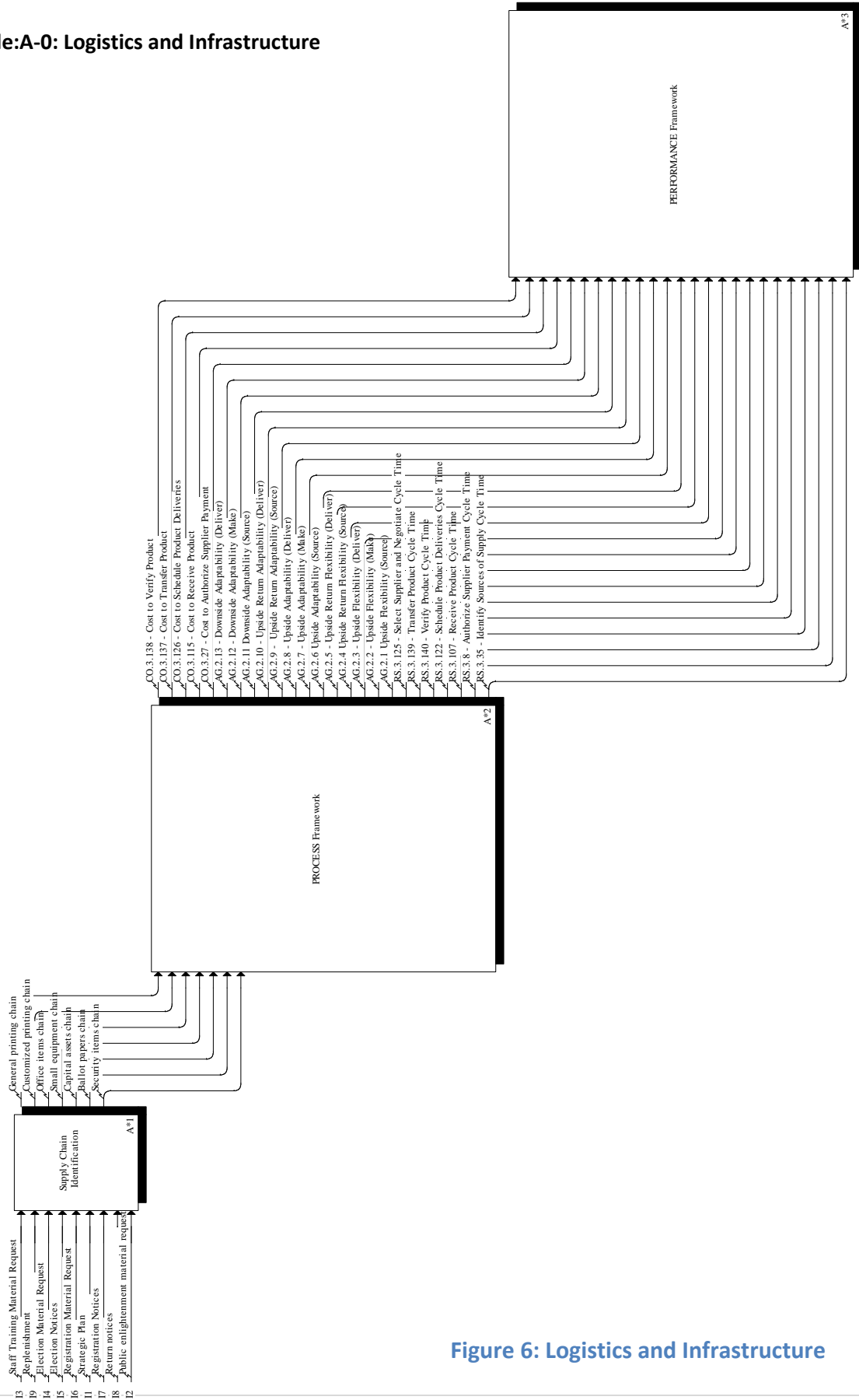


Figure 6: Logistics and Infrastructure

The three blocks represent three different frameworks and are listed in the order in which they appear, namely Supply Chain Identification, Process Framework and Performance Framework. Each of the three frameworks will be discussed in greater detail throughout the rest of this chapter. The Logistics and Infrastructure model has been designed in a manner that represents the sequence of activities that are required to implement SCOR® in industry. Firstly, the main supply chains of an organization need to be identified, and then the configuration of the identified supply chain is captured in the Process Framework. Once the supply chains have been mapped to the various processes, the performance of the supply chain can be measured against industry standards, using various metrics. As seen in Figure 6 on the previous page, each output of a certain process in the various frameworks, is the input for the next process in the following framework.

The sequence of processes as described above, are depicted graphically as follows:



3.2.2 Supply Chain Identification

One of the most significant outcomes of this project was the identification of the key supply chains of the IEC. More importantly, once the key supply chains were identified, they were linked to various metrics, which then make it possible to measure the performance of a specific supply chain in the future. In order to identify the main supply chains of the IEC, which affect the Logistics and Infrastructure Department, a meeting with the Logistics and Infrastructure Department was held. The following worksheet is the outcome of the meeting, which assisted in the definition of the main supply chains that needed to be focused upon, and as a result, provide an opportunity for improvement.

Number	Supply Chain	Examples
1	Security Items	Ink, Stamps, Seals, Tamper evident Tapes, sealing bags etc
2	Ballot Papers	
3	Unique Equipment	Zip-zip scanner
4	Re-usable assets	Computers
5	Office Items	Stationary
6	Customised Items	Voter education material Staff training material Registration and other forms Voting station materials

Six main supply chains were identified:

1. Security items chain
2. Ballot papers chain
3. Unique equipment chain
4. Re-usable assets chain
5. Office items chain
6. Customized items chain

3.2.3 Supply chain Characterization

Each of the identified supply chains were then characterized according whether they are: Make-to-Stock, Make-to-Order or Engineer-to-Order. This is an important part of the implementation of SCOR[®] because the characteristics of the supply chain map it to the respective processes within the SCOR[®] process framework, which then make it possible to start comparing an organization's processes to SCOR[®] processes, making it possible to identify areas of improvement. The identified supply chains were then grouped according to the type of chain, as seen in the table below.

Table 1: Supply chain identification

Number	Supply Chain	Examples	Type of Chain
1	Security Items	Ink, Stamps, Seals, Tamper evident Tapes, sealing bags etc	Engineer to Order
2	Ballot Papers		
3	Unique Equipment	Zip-zip scanner	
4	Re-usable assets	Computers	Make To Stock
5	Office Items	Stationary	Make to Stock
6	Customised Items	Voter education material Staff training material Registration and other forms Voting station materials	Make-to-order

For each identified supply chain, the relevant triggers (both direct and indirect) to the Logistics Department were identified. Indirect triggers are triggers which affect the planning of the Logistics and Infrastructure Department, whilst direct triggers are physical material requests that the Logistics and Infrastructure Department need to deliver upon. The triggers are then the input into the Supply Chain identification framework, as it is important to know which triggers affect which supply chains.

The following table is a summary of the results obtained in the Supply Chain identification process, listing the various direct and indirect triggers of each supply chain.

Number	Supply Chain	Examples	Type of Chain	Triggers to Logistics Dept	
				Direct Triggers	Indirect Triggers which trigger planning of the Logistics
1	Security Items	Ink, Stamps, Seals, Tamper evident Tapes, sealing bags etc	Engineer to Order	Election Material Request	Election Notices
2	Ballot Papers				Registration Notices
3	Unique Equipment	Zip-zip scanner			Strategic Plan
4	Re-usable assets	Computers	Make To Stock	Replenishment request	Return notices
					Strategic Plan
					Replenishment notice
5	Office Items	Stationary	Make to Stock	Replenishment request	Strategic Plan
					Replenishment notice
6	Customised Items	Voter education material Staff training material Registration and other forms Voting station materials	Make-to-order	Registration Material Request Public enlightenment material request Staff Training Material Request	Registration Notices Strategic Plan

The performance attributes of the supply chains were then discussed and determined in order to determine which attributes need to be focused upon when measuring the performance of the supply chain.

The following table is a summary of the performance attributes which were determined for each of the identified supply chains:

Number	Supply Chain	Performance Attributes	Rating
1	Security Items	Reliability	I
		Ballot Papers	C
		Unique Equipment	I
3		Agility	I
		Costs	N
		Asset Management	N
4	Re-usable assets	Reliability	I
		Responsiveness	N
		Agility	N
		Costs	C
		Asset Management	C
5	Office Items	Reliability	I
		Responsiveness	N
		Agility	N
		Costs	N
		Asset Management	C
6	Customised Items	Reliability	C
		Responsiveness	I
		Agility	N
		Costs	N
		Asset Management	N

For the ratings:
C=Critical
I=Important
N=Normal

Description of each Performance Attribute:

Reliability

Reliability is a measure of the ability to perform tasks as expected; it therefore focuses on the predictability of the outcome of a process. The key performance indicator for reliability in SCOR[®] is the perfect order fulfilment metric.

Responsiveness

Responsiveness is a description of the speed at which tasks are performed. It addresses the repeated speed of doing business. Cycle time metrics are usually used to measure responsiveness, where order fulfilment cycle time is the key performance indicator.

Agility

Agility describes the speed to change a supply chain. It is an attribute which describes the ability to respond and change to external influences, such as natural disasters or increases/decreases in demand that could not be forecasted. The key performance indicators for agility are: upside supply chain flexibility, upside supply chain adaptability, downside supply chain adaptability and overall value at risk (VAR).

Costs

The cost attribute is simply the cost of operating the process. Some typical costs include transportation and labour costs. The key performance indicators for cost in SCOR[®] are cost of goods sold and supply chain management costs.

Asset Management

This attribute describes the ability to utilize assets efficiently. Inventory reduction and sourcing vs. outsourcing are some asset management strategies that can be used in supply chains. The key performance indicators in SCOR[®] include: return of working capital, return on supply chain fixed assets and cash-to-cash cycle time.

It is important to determine the critical performance attributes of a specific supply chain, so that greater emphasis is placed on those factors which could potentially have a great impact on the improvement of the supply chain. The following paragraph is a discussion of the rating of each performance attribute for each supply chain.

Security Items, Ballot Papers and Unique Equipment Chain

Number	Supply Chain	Performance Attributes	Rating
1	Security Items	Reliability	I
2	Ballot Papers	Responsiveness	C
3	Unique Equipment	Agility	I
		Costs	N
		Asset Management	N

The ballot paper, security items and unique equipment items supply chains have been rated in the same way. This is because they are all engineer-to-order supply chains, in which responsiveness is the most critical performance attribute that needs to be measured when it comes to such chains. Responsiveness is important as it is a customer-focused attribute and a major aspect of the success of an election is measured by whether the ballot papers, security items and unique equipment were delivered to the correct place ON TIME. Therefore, when the IEC wants to measure their performance in terms of their ballot paper chain, they would focus on the responsiveness attribute more than any other attribute in the Performance Measurement Framework stage. This is where the beauty of benchmarking and ultimately active collaboration amongst other African electoral commissions will come to play. If the IEC can share information on how they managed to achieve a certain level of success when it comes to ensuring good responsiveness of the ballot paper chain, then perhaps some other African country can benefit from such. The potential benefits of active collaboration amongst African electoral commissions are immense and can be the key role-player in improved elections in the African continent. Reliability and Agility are important, but not as critical as Responsiveness as there is no room for error when it comes to the distribution of ballot papers. Costs and Asset Management are rated as normal because the amount of money that is spent to ensure efficient management and distribution of ballot papers, security items and unique item is not the most important factor when trying to achieve responsiveness of the supply chains.

Re-usable Assets Chain

Number	Supply Chain	Performance Attributes	Rating
4	Re-usable assets	Reliability	I
		Responsiveness	N
		Agility	N
		Costs	C
		Asset Management	C

Costs and Asset Management are the critical performance attributes for the re-usable assets supply chain, which consists of assets such as computers. Asset Management is critical because re-usable assets must be used in the most efficient and effective way possible. Reliability of the computers is important, but not stressed as a critical factor, because the reliability of the computers are determined by the type of computers which are used, including the operating system, internet connection capabilities etc., which are things that can be controlled relatively easily. Responsiveness and Agility are rated as normal, because the re-usable assets are a make-to-stock product, which means that they can be bought off-the-shelf if the need for more assets arises.

Office items chain

Number	Supply Chain	Performance Attributes	Rating
5	Office Items	Reliability	N
		Responsiveness	N
		Agility	N
		Costs	C
		Asset Management	I

Reliability, Responsiveness and Agility are rated as normal because office items are make-to-stock items such as stationary, which can be bought off-the-shelf. As a result, Agility and Responsiveness are not factors that are difficult to overcome. Unless specialised stationary such as Parker pens are required for use in the office, which is currently not the case, reliability is not a huge factor when it comes to office items. Asset Management is rated as important because it is important to ensure the efficient utilization of office items. Costs however, are rated as critical because office items can be bought in bulk quantities, and this presents an opportunity to save on costs.

Customised Items Chain

Number	Supply Chain	Performance Attributes	Rating
6	Customised Items	Reliability	C
		Responsiveness	I
		Agility	N
		Costs	N
		Asset Management	N

Customised items chain consists of items such as voter education material, staff training material and voting station material, which are items designed or modified by the IEC. Reliability is the most critical attribute, as it is essential to ensure that all the voter and staff education material are produced with no errors, and that they are produced and distributed in the correct quantity. It is for this reason that responsiveness is important; as the supply chain needs to be able to improve on the various cycle times, such as deliver cycle time, if necessary. Agility, costs and asset management are rated as normal because most of the customised items are not re-used in the exact form, and costs are negligible in the quest for quality education of voters and staff.

As seen on Figure 6, the identified supply chains from the Supply Chain Identification process come out as outputs, and feed into the Process Framework.

The supply chain identification documentation looks as follows in the model:

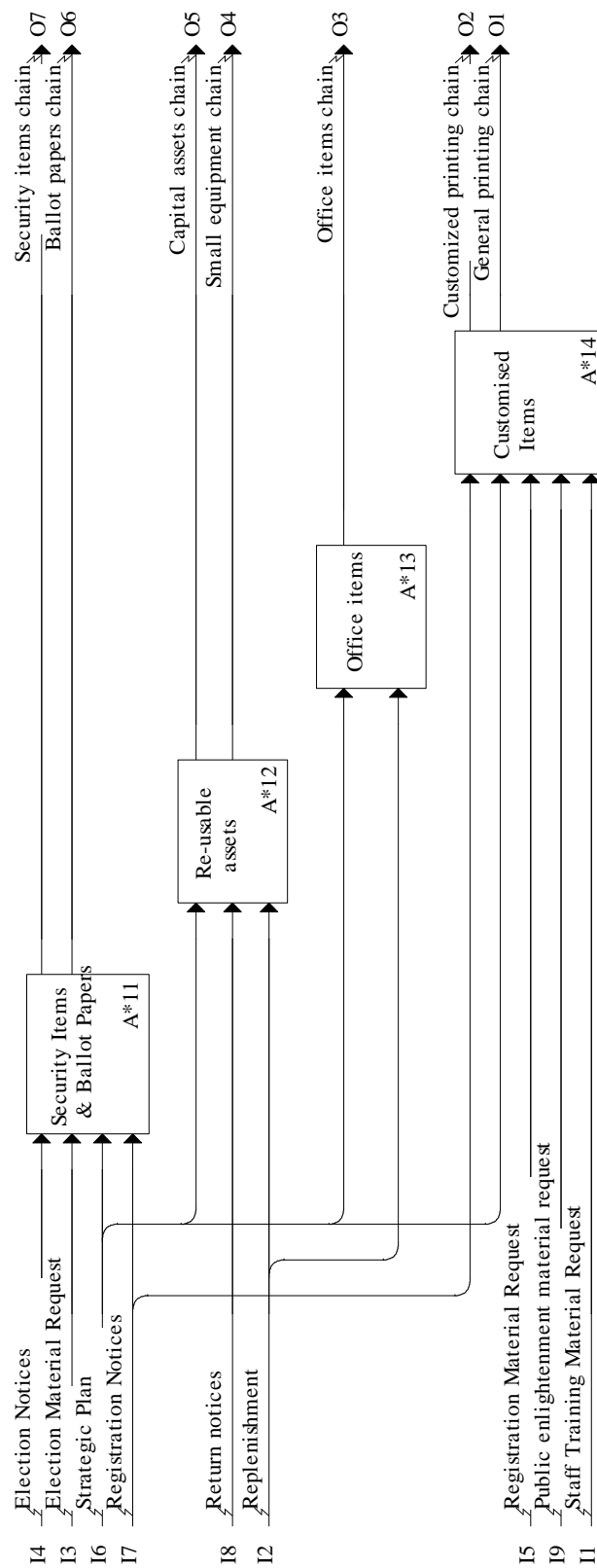


Figure 7: Supply Chain Identification

3.2.4 Supply Chain Configuration

A supply chain configuration is driven by 5 macro-processes, namely Plan, Source, Make, Deliver and Return. Each of these processes will be discussed in more detail under the Process Framework section of this chapter. Each of the supply chains are configured to their respective processes. An example which shows which supply chains are linked to which level 2 Source processes is viewed below. For each of the 5 macro-processes, each supply chain is linked to its respective processes, based on its supply chain characterization. For example, when dealing with the sourcing of office item chains and re-usable assets chain, one would look at the SCOR[®] processes under the Source Stocked Product category. The same interpretation of the diagram holds for the other supply chains.

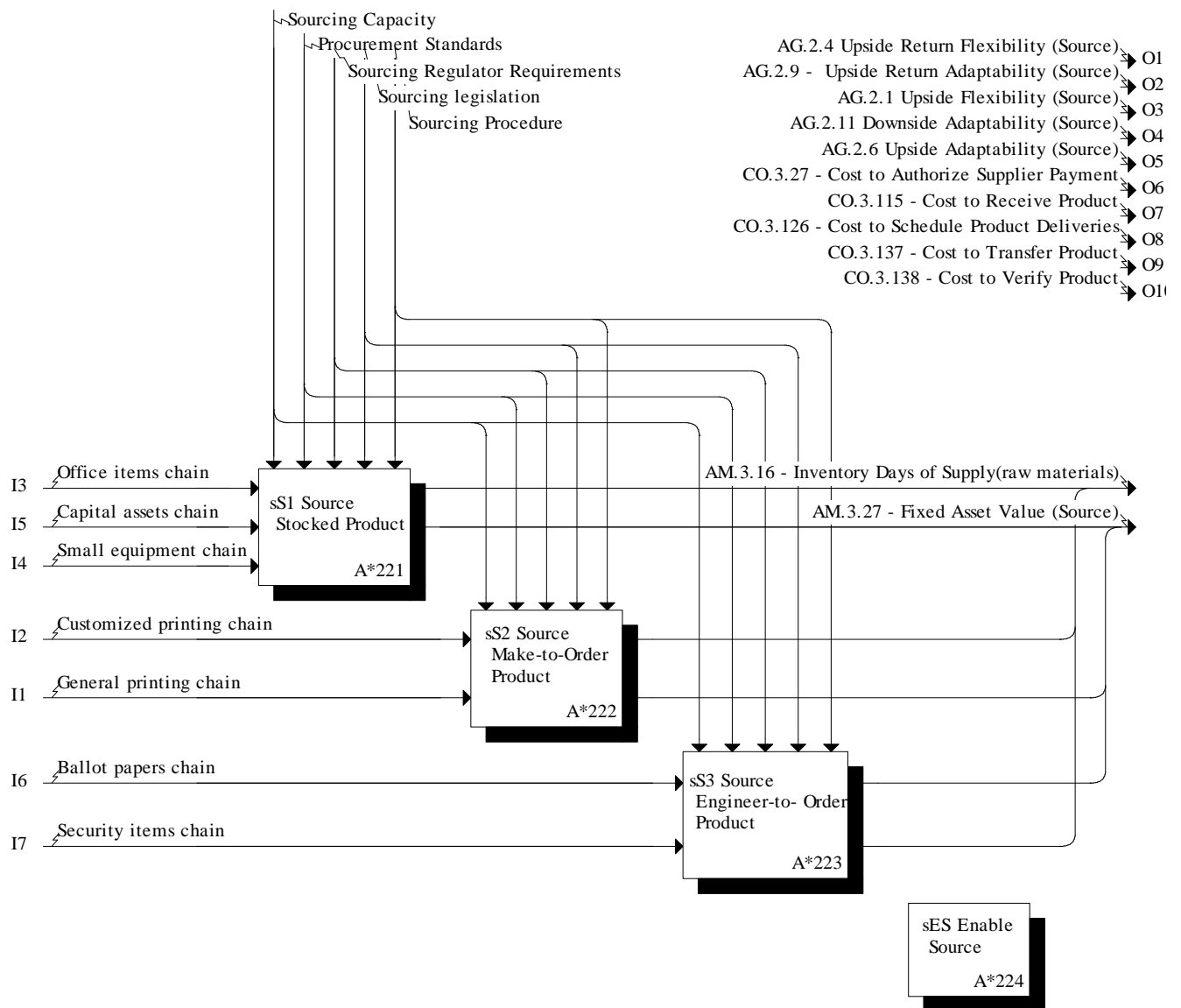


Figure 8: Level 2, Source

3.2.5 Process Framework

A process is an activity which is unique, and is performed to meet a set of pre-defined outcomes. The processes defined in SCOR[®] have been recognized as distinctive processes that a supply chain requires to execute in order to support its primary goal, which is to fulfil customer orders. SCOR[®] recognizes 5 major, level 1 processes:

Plan

The plan processes describe the activities that are associated with developing the plans that will determine the operation of the entire supply chain. Some of the plan processes include the gathering of information on available resources, supply chain requirements as well as aligning requirements and resources to pre-determined capabilities and gaps in demand or resources. Actions to correct these gaps in demand or resources need to be considered in the plan processes.

Source

The scheduling and/or ordering of deliveries and receipt of goods and services describe the main function of Source processes. This includes scheduling deliveries, receiving, validation and storage of goods as well as accepting the invoice from the supplier.

Make

The conversion of materials or the production of the content for services constitutes the Make processes. Make is a representation of all types of material conversions, not just production. These conversions include assembly, maintenance, repair, overhaul, recycling, chemical processing and remanufacturing, just to mention a few.

Deliver

The Deliver process consists of the receipt, validation and creation of customer orders, scheduling order delivery, pick, pack, shipment and invoicing the customer. It is all the activities that involve the creation, maintenance and fulfilment of customer orders.

Return

The Return processes are self-explanatory, they are all the activities associated with the reverse flow of goods. This can include the organization's return of goods to the suppliers, or customer returns to the organization.

For each of the level 1 processes, 3 or more differentiating level 2 processes categories exist. Each level 2 process contains level 3 process elements. This hierarchy arrangement of processes provides a description and classification of processes.

The process Framework looks as follows in the model:

- RS.3.122 - Schedule Product Deliveries Cycle Time → O2:
- RS.3.125 - Select Supplier and Negotiate Cycle Time → O1:
- RS.3.139 - Transfer Product Cycle Time → O2:
- RS.3.140 - Verify Product Cycle Time → O2:
- RS.3.107 - Receive Product Cycle Time → O2:
- RS.3.8 - Authorize Supplier Payment Cycle Time → O2:
- RS.3.35 - Identify Sources of Supply Cycle Time → O2:

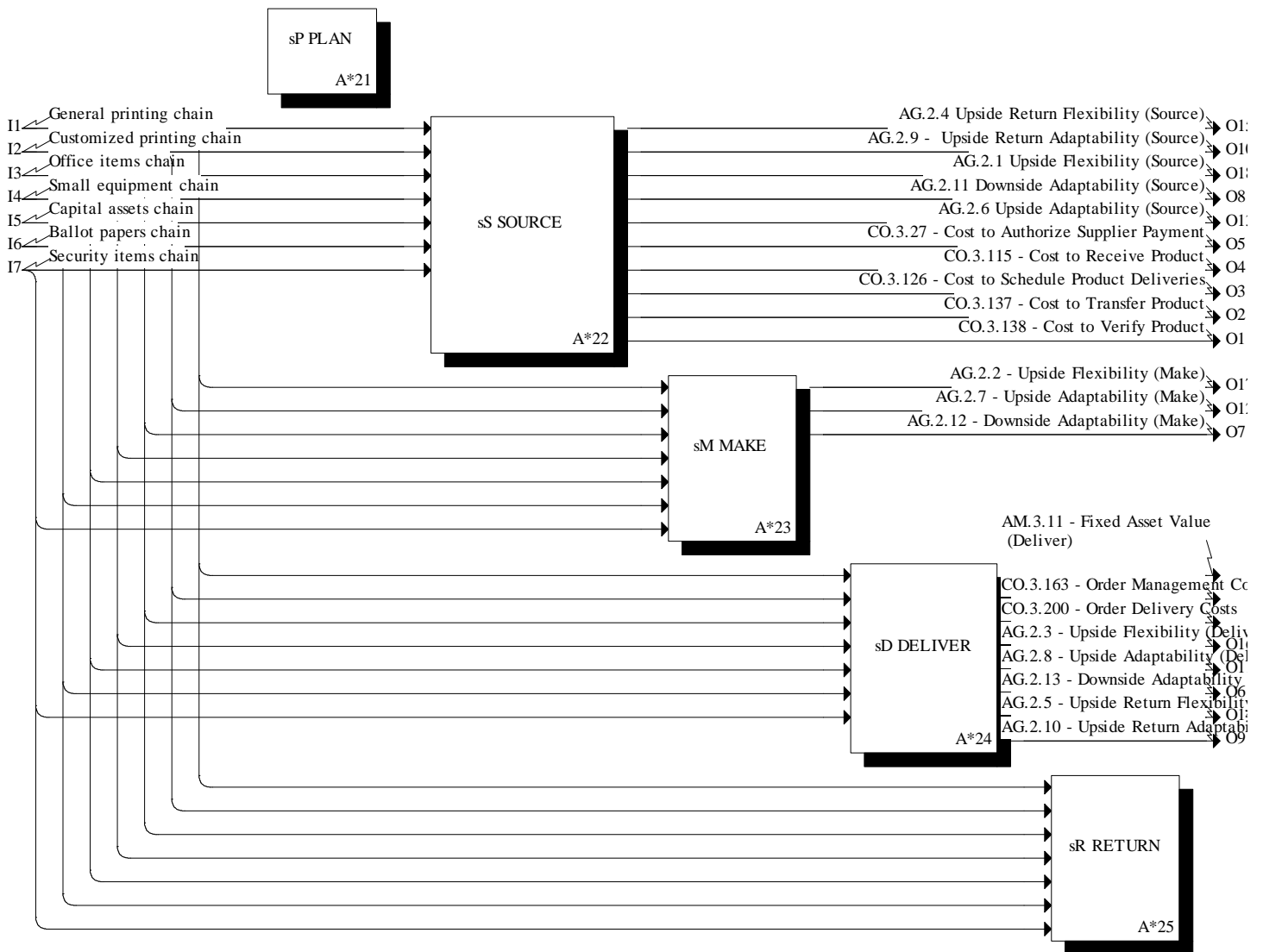


Figure 9: Process Framework

3.2.5.1 ICOR methodology

The ICOR (inputs, outputs, controls and resources) methodology was used for each of the processes defined in the process framework, where possible. ICOR is an internationally accepted process analysis methodology, which is used for process mapping. ICOR results in the decomposition of processes into simpler, manageable units. The map defines the inputs, outputs, controls and resources for both the high level process and sub-processes.

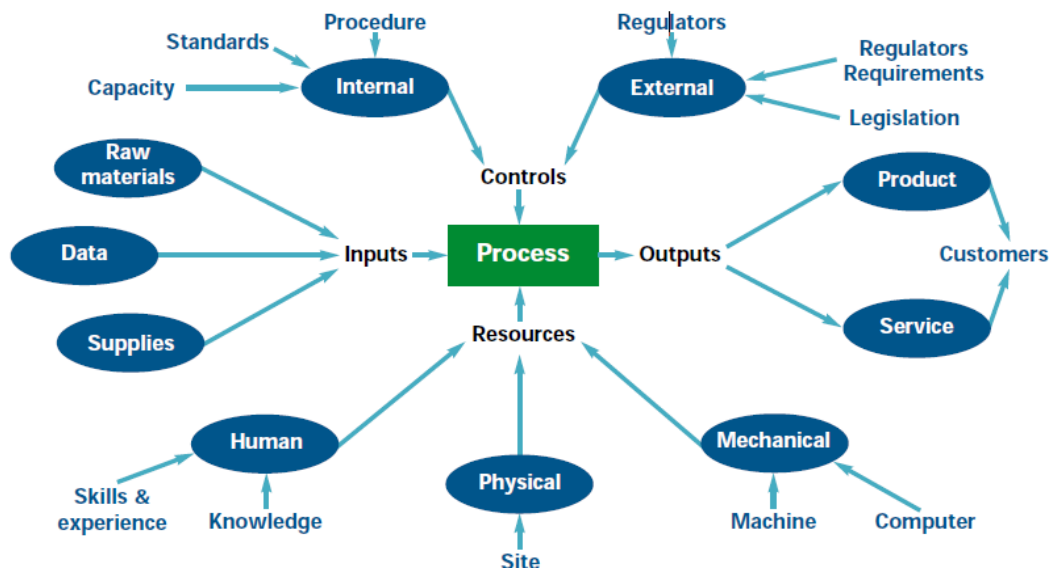
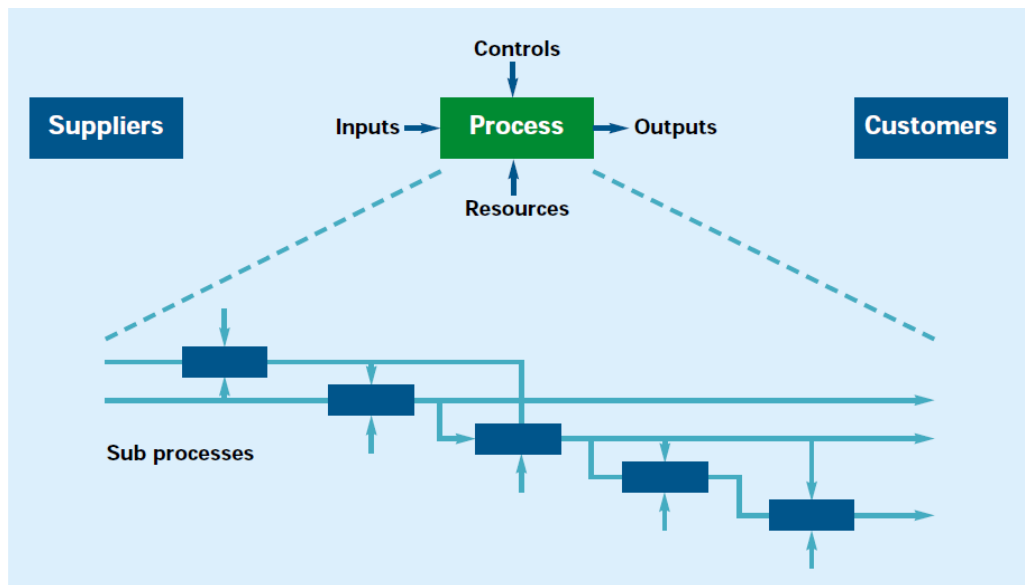


Figure 10: ICOR methodology

Source: UK Department of Trade and Industry. *Tools and Techniques for process improvement*. [pdf]. [Online] Available at: www.dti.gov.uk/quality/tools. [Accessed 10 March 2012]

For each of the processes defined in the ECOR model, under the Process Framework, the ICOR methodology was applied. The outputs of the 5 macro-processes are either tangible or metric. The metric outputs were defined as outputs, so that they could feed as inputs into the Performance Framework and as result, make it possible to measure the performance of a certain supply chain, according to the relative importance of each supply chain attribute that was considered. The outputs were initially defined at the level 3 processes and then brought up to the higher levels. All of the 5 macro-processes in the model have can be decomposed further into sub process (levels), and this decomposition of all the processes can be viewed in Appendix E. Each supply chain identified in the Supply Chain identification Framework is linked to various processes in the Process Framework.

To illustrate how the process framework is viewed in the model, the implementation of ICOR is viewed in three steps, which, in this example represent the three different levels of sourcing. The three levels are explained further, by a visual depiction of how ICOR is used in the various processes. A level 3 source process, namely ‘Schedule Product Deliveries’ consists of the following elements:

INPUTS

- Sourcing plans
- Production schedule
- Replenishment signal

OUTPUTS

Metric Outputs

- RS.3.122 - Schedule Product Deliveries Cycle Time
- CO.3.126 - Cost to Schedule Product Deliveries

Tangible Outputs

- Product on order
- Scheduled receipts
- Procurement signal (supplier)

CONTROLS

- Procurement standard
- Sourcing capacity
- Sourcing procedure
- Sourcing legislation
- Sourcing regulatory requirements

RESOURCES

- Procurement department

Level 3: Source Stocked Product

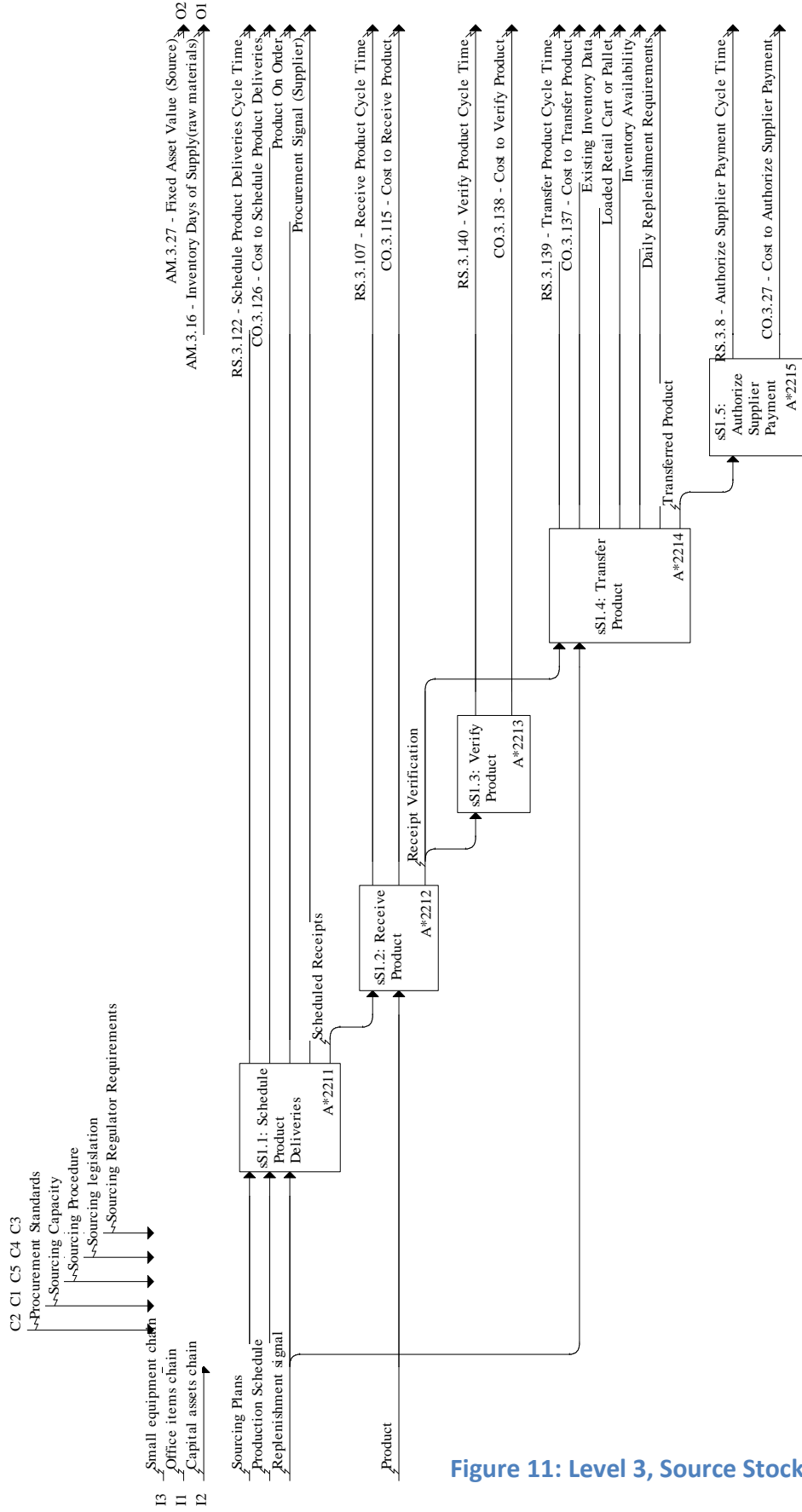


Figure 11: Level 3, Source Stocked Product

Level 2: Source

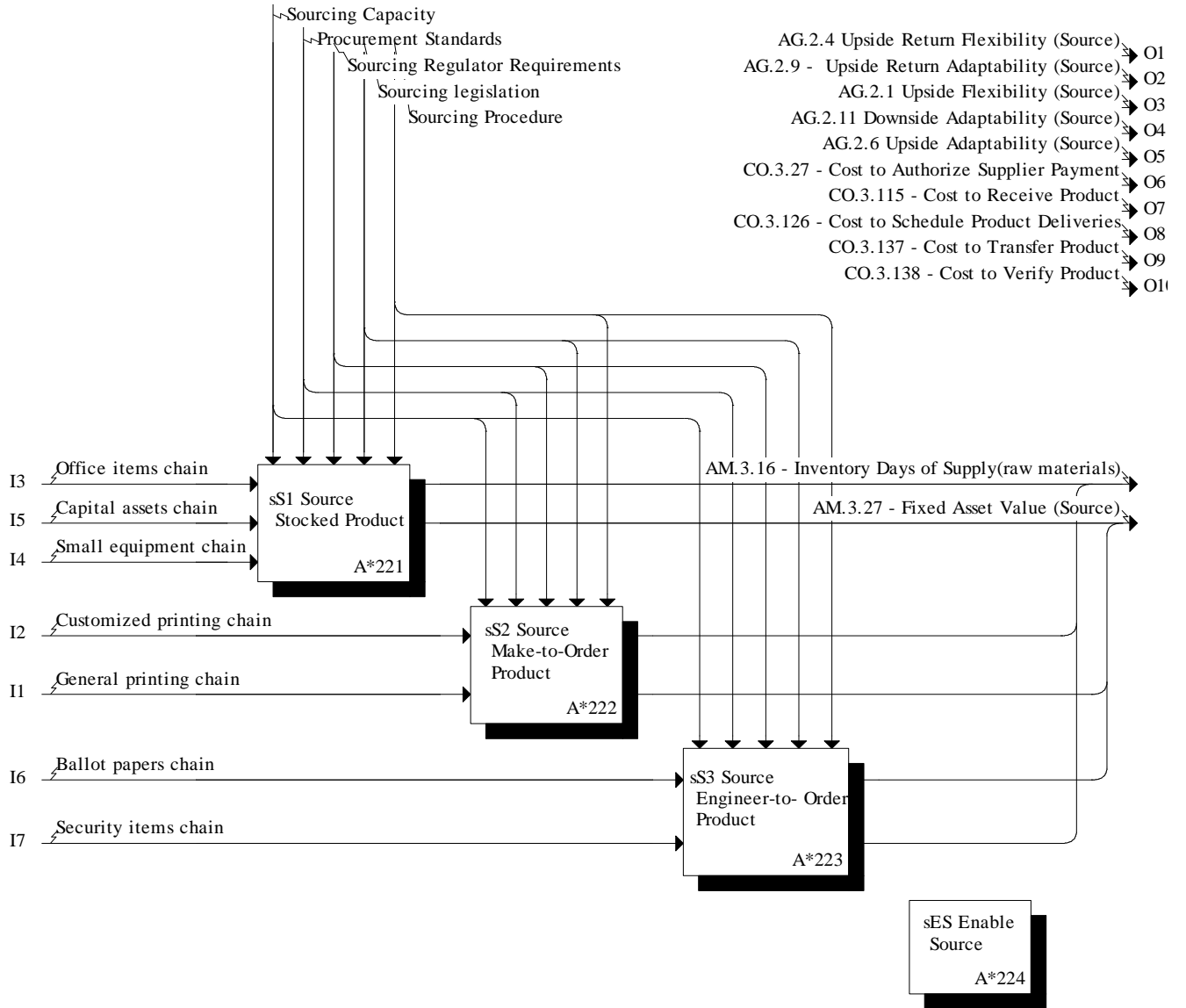


Figure 12: Level 2, Source

Level 1: Source

- RS.3.122 - Schedule Product Deliveries Cycle Time → O2
- RS.3.125 - Select Supplier and Negotiate Cycle Time → O1
- RS.3.139 - Transfer Product Cycle Time → O2
- RS.3.140 - Verify Product Cycle Time → O2
- RS.3.107 - Receive Product Cycle Time → O2
- RS.3.8 - Authorize Supplier Payment Cycle Time → O2
- RS.3.35 - Identify Sources of Supply Cycle Time → O2

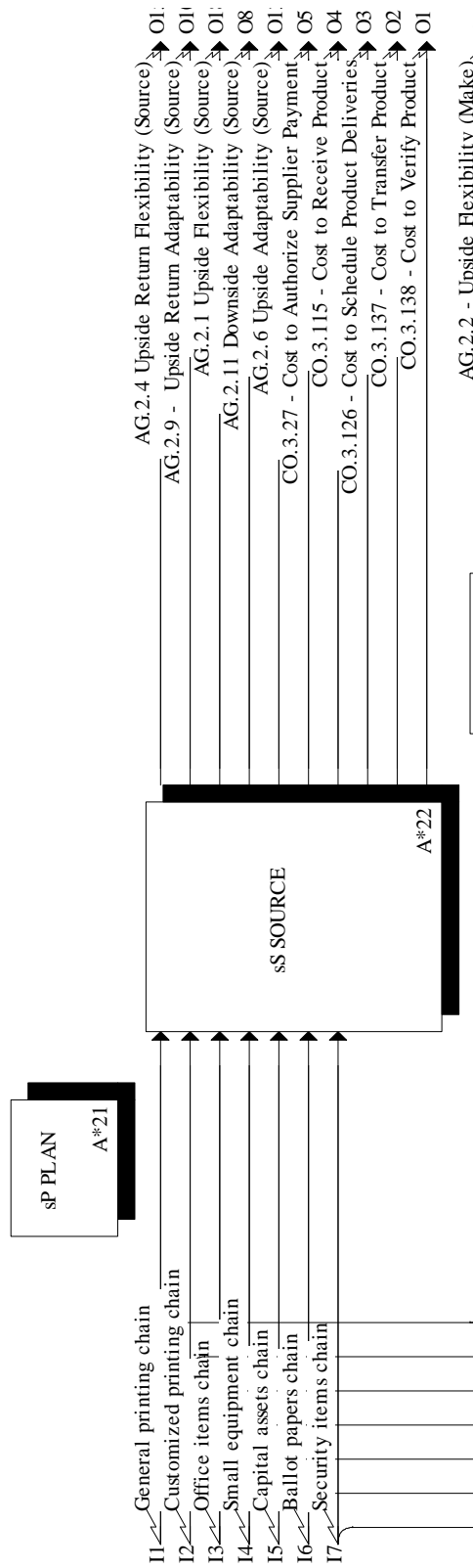
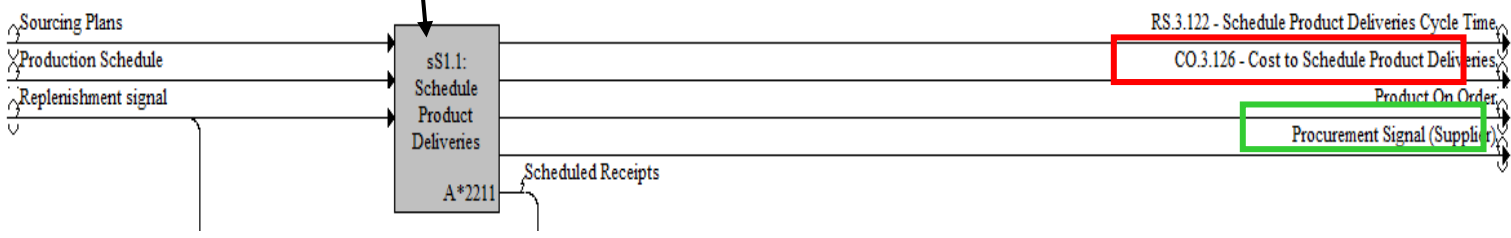
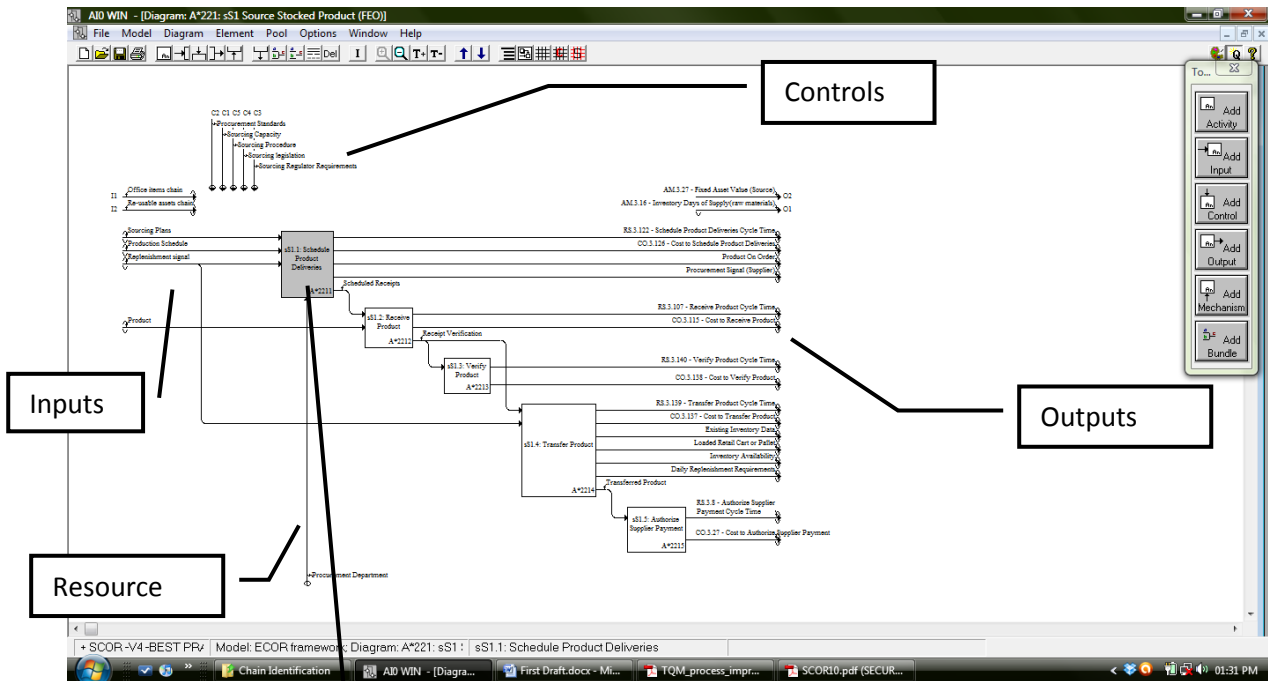


Figure 13: Level 1, Source

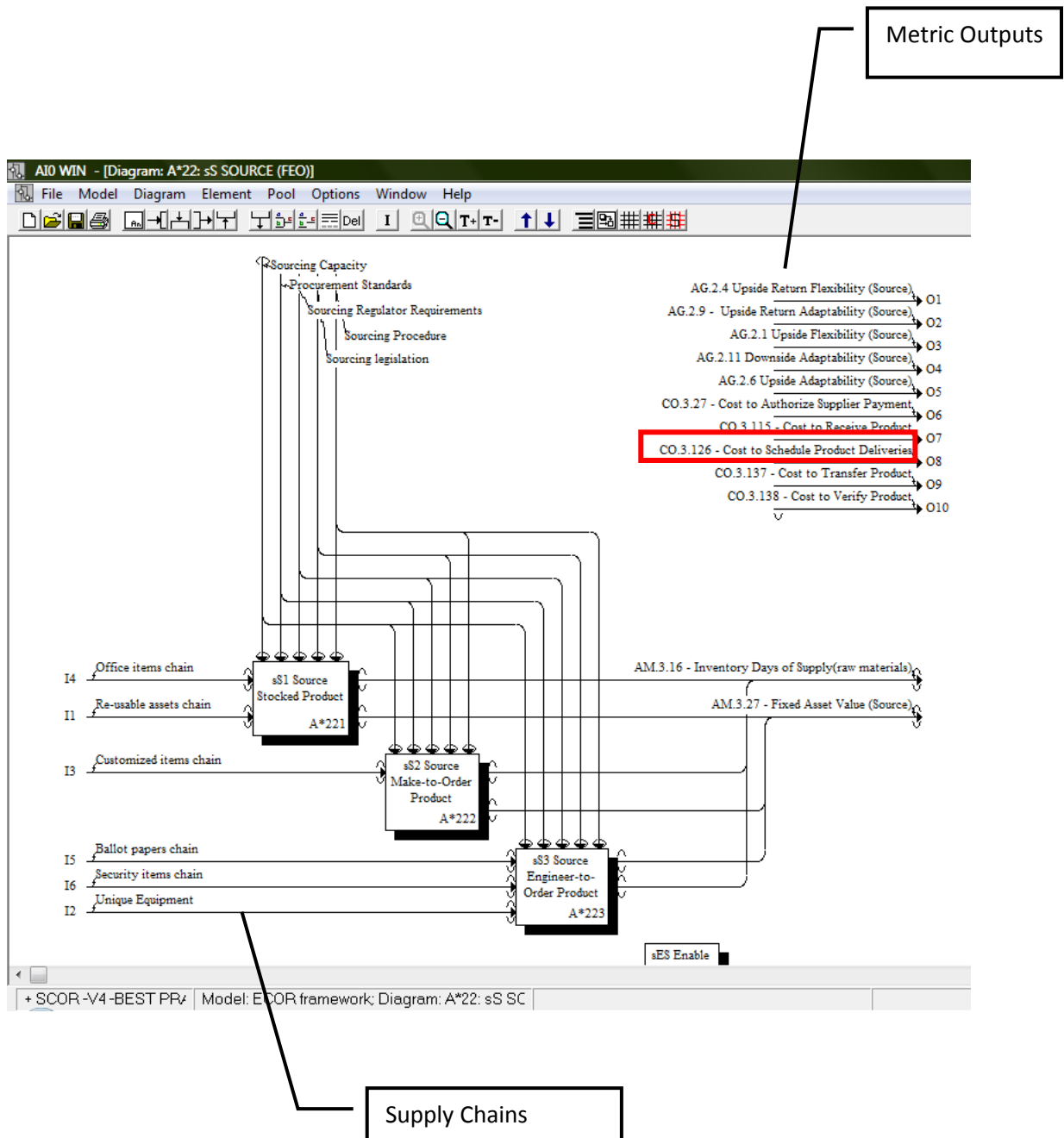
Step 1: Level 3 of Source Stocked Product

Note: make special note of the metric output that is highlighted in red and shown throughout each of the process levels.

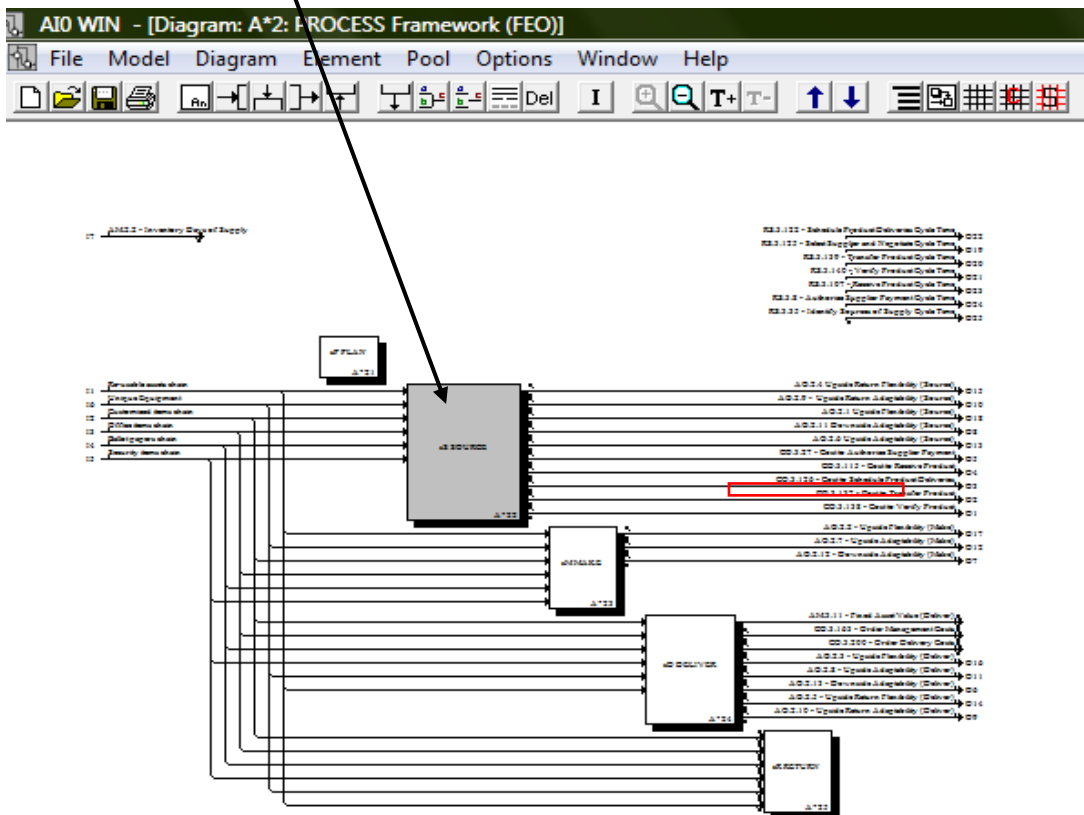
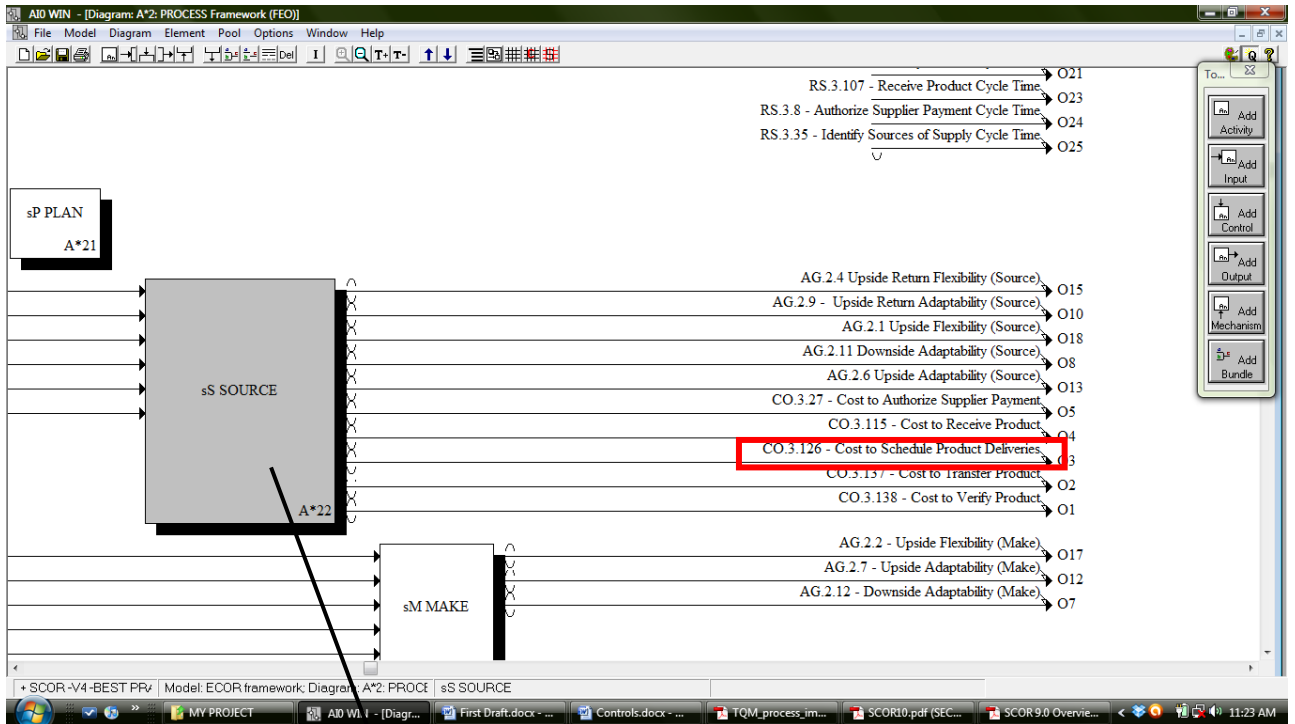


- Metric Output
- Tangible Output

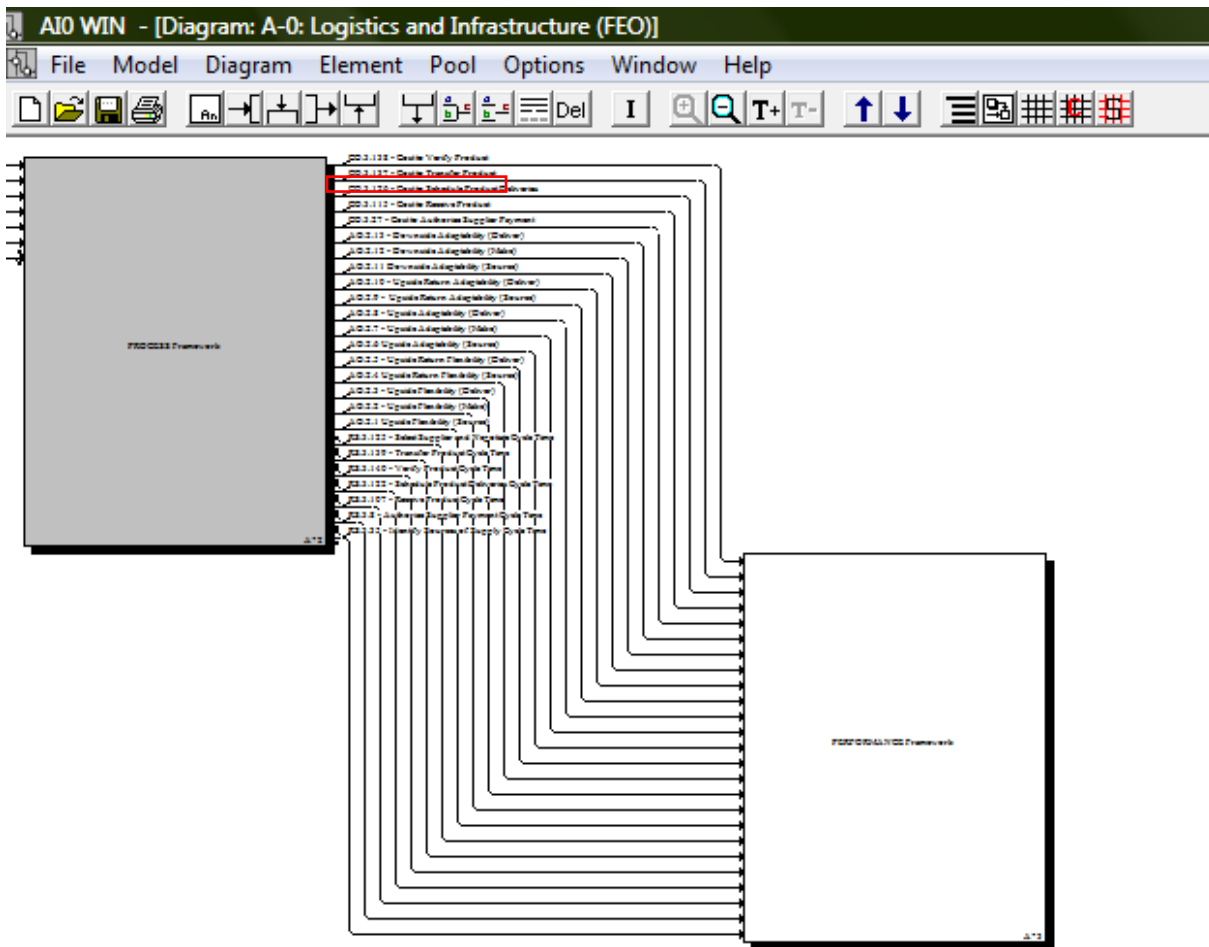
Step 2: Level 2 of Source



Step 3: Level 1 of Source



Step 4: Process Framework



It is important to note how the metric output from the process framework, feeds in as input into the Performance Framework, which will be discussed in more detail in the following section.

3.2.6 Performance Framework

The performance framework in SCOR[®] consists of two main elements, namely, Performance Attributes and Metrics. A performance attribute cannot in itself be measured, it is a grouping of metrics used to express some strategy of the organisation. Metrics measure the ability of the supply chain to achieve the strategic attributes, and just as there are different process levels, there are different metric levels. Each of the five performance attributes were explained in the Supply Chain identification section, therefore no further explanation is required for this section. Metrics are the calculations an organisation uses to measure how successful it is in achieving its strategic goals, within the market space.

Table 2: Performance Attributes and Level 1 metrics

Performance Attributes and Level 1 Metrics					
Level 1 Metrics are primary, high level measures that may cross multiple SCOR processes. Level 1 Metrics do not necessarily relate to a SCOR Level 1 process (PLAN, SOURCE, MAKE, DELIVER, RETURN).					
Level 1 Metrics	Performance Attributes				
	Customer-Facing			Internal-Facing	
	Reliability	Responsiveness	Flexibility	Cost	Assets
Perfect Order Fulfillment	✓				
Order Fulfillment Cycle Time		✓			
Upside Supply Chain Flexibility			✓		
Upside Supply Chain Adaptability			✓		
Downside Supply Chain Adaptability			✓		
Supply Chain Management Cost				✓	
Cost of Goods Sold				✓	
Cash-to-Cash Cycle Time					✓
Return on Supply Chain Fixed Assets					✓
Return on Working Capital					✓

Source: Supply Chain Council. [Online] Available at: <http://supply-chain.org/>. [Accessed 1 September 2012]

The following image is viewed on the model when the Performance Framework is decomposed.

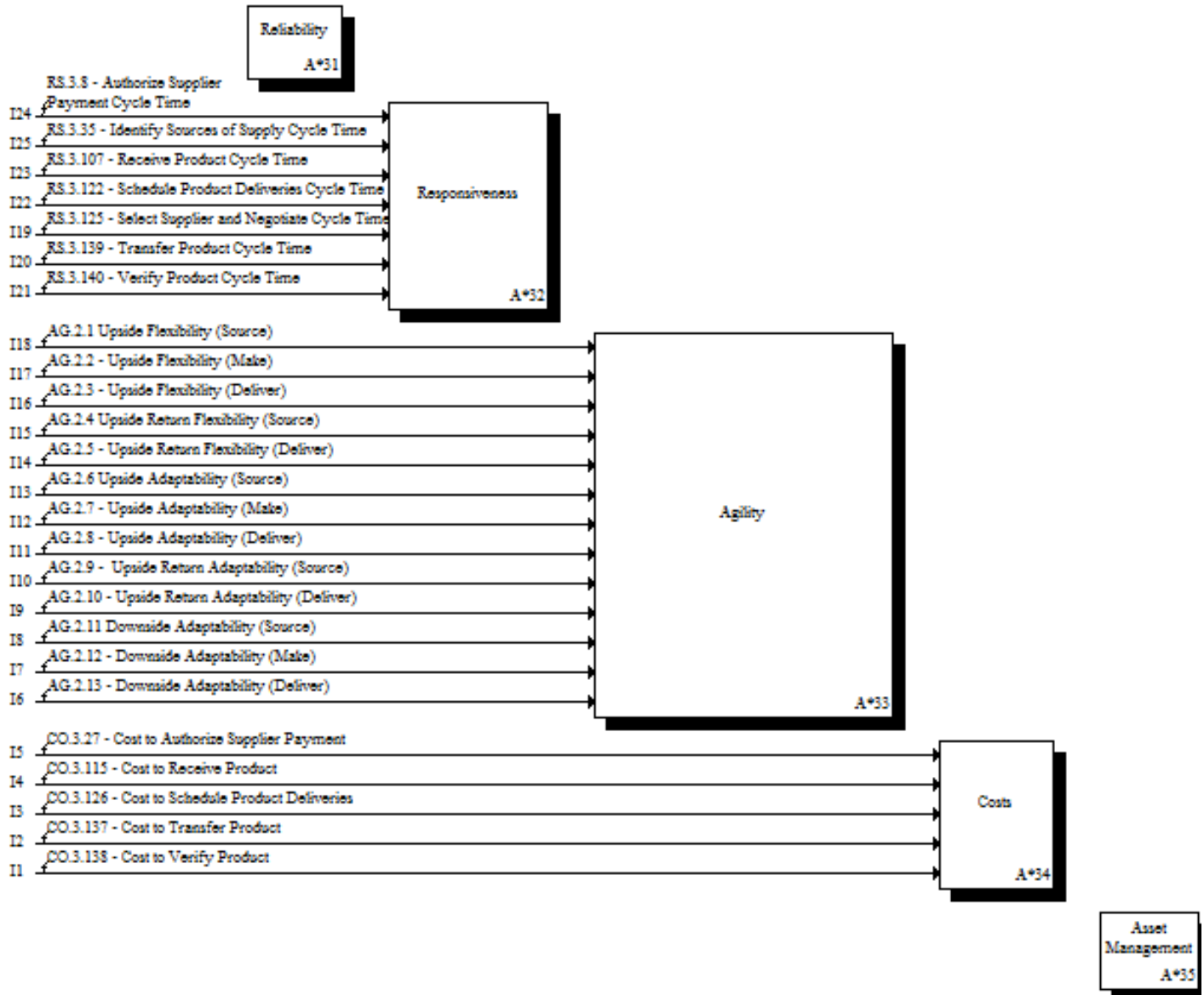


Figure 14: Performance Framework

Each of the performance attributes can be decomposed further, to reflect which metrics are used to measure which attribute. All the attributes and their respective metrics can be viewed graphically in Appendix E. For the purpose of explaining how the performance framework is used, the Responsiveness attribute will be illustrated. The following image is seen once the Responsiveness attribute is decomposed in the model.

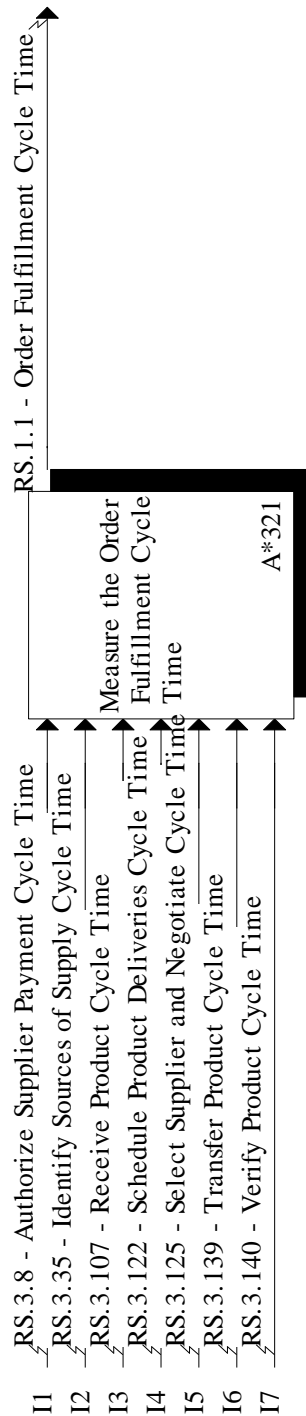


Figure 15: Measure the Order Fulfilment Cycle Time

In order to determine how successful an organisation is when it comes to Responsiveness, the Order Fulfilment Cycle Time has to be measured. A number of metrics, which are outputs from the Process Framework, are the inputs which are required to calculate the Order Fulfilment Cycle Time. These inputs include:

1. RS.3.8 - Authorize Supplier Payment Cycle Time
2. RS.3.35 - Identify Sources of Supply Cycle Time
3. RS.3.35 - Identify Sources of Supply Cycle Time
4. RS.3.122 - Schedule Product Deliveries Cycle Time
5. RS.3.125 - Select Supplier and Negotiate Cycle Time
6. RS.3.139 - Transfer Product Cycle Time
7. RS.3.140 - Verify Product Cycle Time

The resulting output is the total order Fulfilment Cycle Time, which is an indication of the Responsiveness of a certain supply chain. In order to measure the Order Fulfilment Cycle Time, a variety of calculations need to be computed. When the Order Fulfilment Cycle Time activity block is decomposed in the model, the image on the following page is viewed.

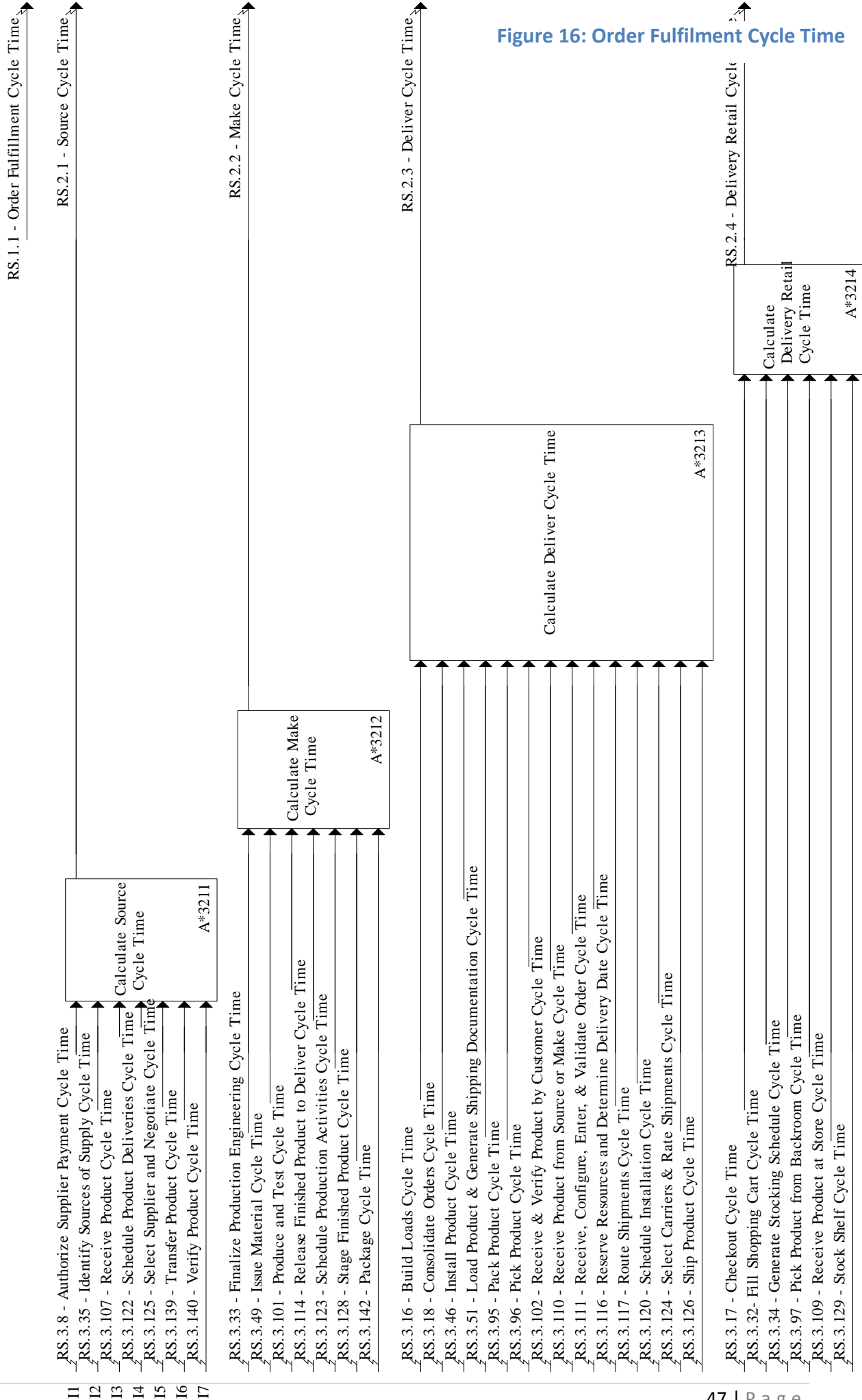
The Order Fulfilment Cycle time is the sum of the Source, Make, Deliver and Delivery Retail Cycle Time, all of which consist of various inputs from the various processes. The ECOR model makes it possible to see exactly which components are used in the calculation of various performance attributes, which makes it easier to identify which areas require improvement.

For example, the order fulfilment cycle Time may be computed as follows:

Level 2 performance metric	Time (in days)
Source Cycle Time	3
Make Cycle Time	+4
Deliver Cycle Time	+2
Delivery Retail Cycle Time	+1
Order Fulfilment Cycle Time	=10

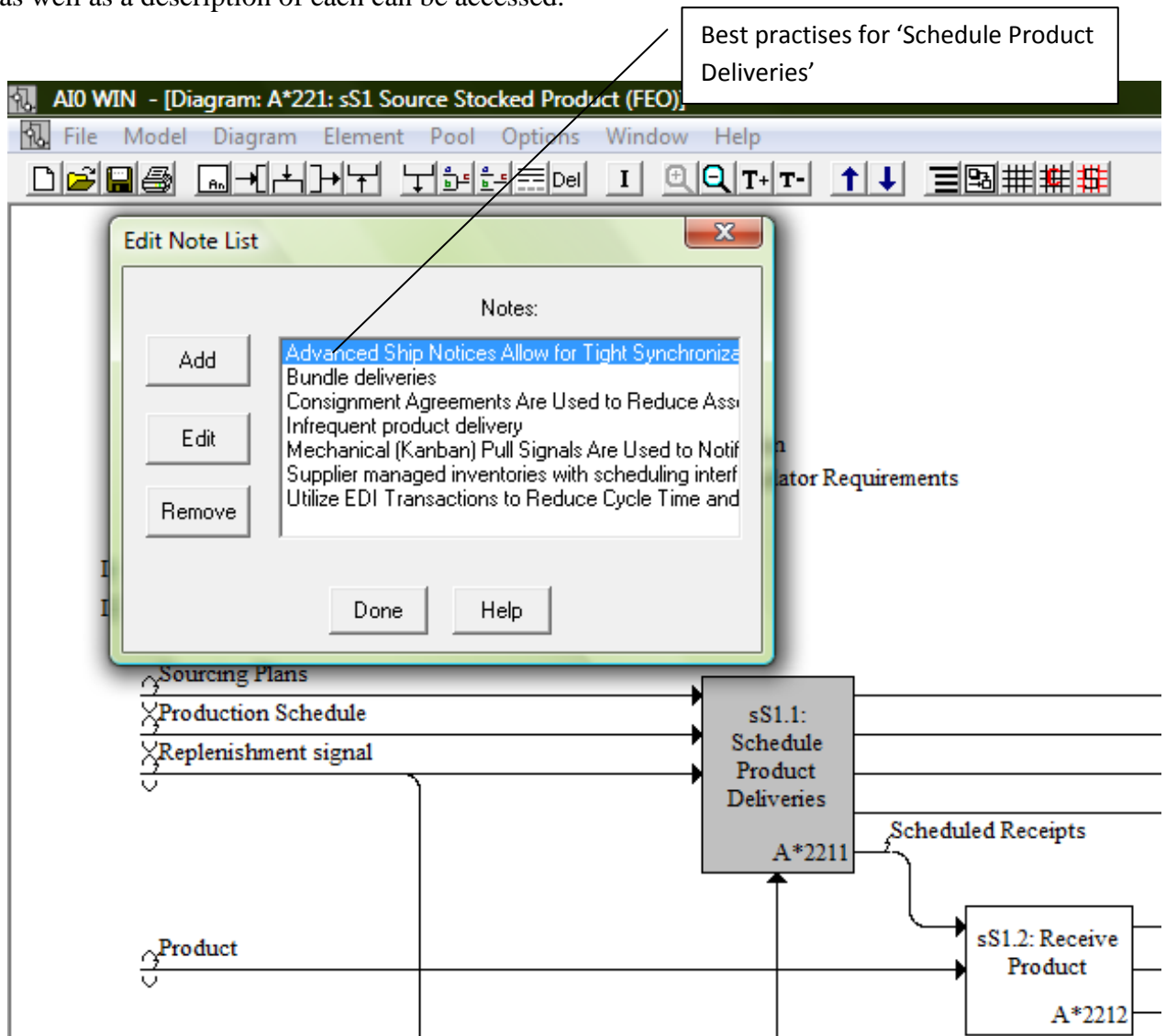
Perhaps an organisation has the goal of an 8 day order fulfilment cycle time, which they have failed to achieve by 2 days. Each component of the cycle time can be evaluated and improved, for example, if a different vendor is used, perhaps the source cycle time can be decreased to 1 day instead of 3. Each of the performance attributes in the ECOR model can be calculated by their respective metrics. The model does not in itself calculate the various performance attributes, it is simply a visual depiction of how the attributes can be calculated, including, which inputs are required for calculation and what output should be expected.

Figure 16: Order Fulfilment Cycle Time



3.2.7 Best Practises

A best practise is a distinctive way of configuring a process or set of processes. The distinction can be as a result of technology, automation, special skills applied to the process or a unique method of carrying out the process. All of the known SCOR[®] best practises have been documented for each process in the Process Framework. This makes it possible to click on a certain process, and view a list of the best practises available for that specific process. The best practises are viewed as notes under each process, whereby a list of the best practise as well as a description of each can be accessed.



There are a number of best practises which are not listed in the SCOR® best practises, that the IEC Logistics and Infrastructure department make use of. An important part of this project was to document those best practises, and include them in the ECOR model.

Best practises by the IEC

Process	Best Practise	Description
sSR2.2: Disposition MRO Product	Accurate monitoring of MRO product movement (RSA)	Maintaining good relationship with supplier and ensuring that a service contract is in place
sD1.15: Invoice sD2.15: Invoice sD3.15: Invoice	Electronic Transfer of Shipment Information to Finance(RSA)	Using ERP system (e.g. SAP)
sSR2.1: Identify MRO Product Condition	Establish test protocols (RSA)	Methodology and systems to establish operational functionality
sEM.4: Manage In-Process Products (WIP)	First In - First Out (RSA)	Part / WIP location by date received for those parts that must be stocked or staged in a holding area
sS1.1: Schedule Product Deliveries	Monitor minimum stock levels (RSA)	Procure additional stock when levels are below pre-determined minimum
sS3.1: Identify Sources of Supply sS3.2: Select Final Supplier(s) and Negotiate	Online real-time e-procurement system (RSA)	IEC VOTA quotes system
sD1.10: Pack Product sD1.12: Ship Product sD2.10: Pack Product sD3.10: Pack Product	Pack to suite delivery route (RSA)	Example: First deliveries packed closest to exit (LIFO)
sSR4.5: Return Re-usable Inward Product	Return to stock (RSA)	Track movement of re-usable products (Utilize SAP for documentation)
sP1.2: Identify, Prioritize, and Aggregate Supply Chain Resources sP1.4: Establish and Communicate Supply Chain Plans sSR1.1: Identify Defective Product Condition	Service Level Agreement Strategy (RSA)	Contract in all supply chain resources not within the EMB(electoral management body)
sSR1.2: Disposition Defective Product sSR2.2: Disposition MRO Product	Supplier rectify onsite (RSA)	Supplier rectifies defective good onsite, which results in minimized time loss for election supplies.
sP1.1: Identify, Prioritize, and Aggregate Supply Chain Requirements	Utilize LIS(Logistics Information system) RSA	Planning and needs forecasting tool

3.3 Electoral Processes

In the beginning of this chapter it was mentioned that the core focus of this study is the Logistics involved in election processes, therefore the Logistics and Infrastructure department is the department that would initially utilize the SCOR[®] processes defined in the ECOR framework. The other departments which have an impact on the planning of electoral logistics are viewed in the context diagram below, and will not be discussed in detail, with the exception of the Electoral Processes. In order to contextualise SCOR[®] to an election environment, the electoral processes, which consist of the Registration and Election processes, have been developed, because they are the driving force of activities which take place in the Logistics and infrastructure department. Such significant inputs from the Electoral Processes department to the Logistics and Infrastructure department include: election notices, return notices, registration notices, registration material requests and election material requests. One of the key deliverables of this project was the identification of the core level 2 processes (defined using SCOR[®] nomenclature) for election and registration processes. Once the level 2 processes were identified and defined, the normalization and documentation of the level 3 processes was completed. Upon completion of the documentation of the Register and Elect processes, the IEC's best practises which could be identified were then added to the ECOR framework. The IEC validated the new REGISTER and ELECT processes, and the processes are defined in such a manner that any electoral body can compare the processes to their own registration and election processes, and therefore upon comparison, improve their own processes.

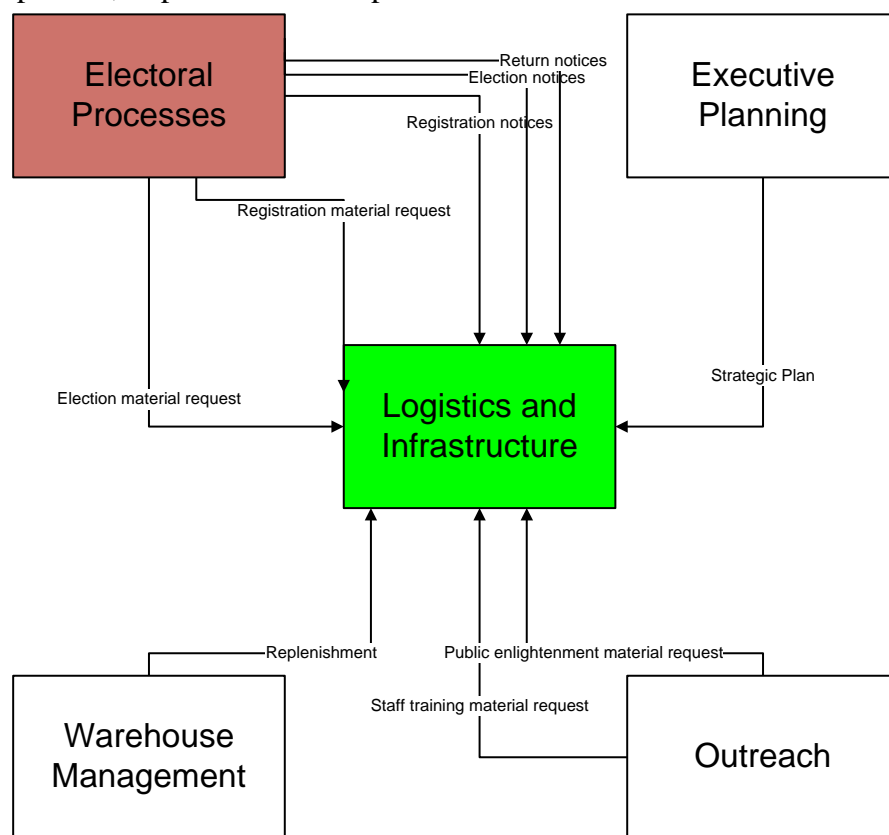
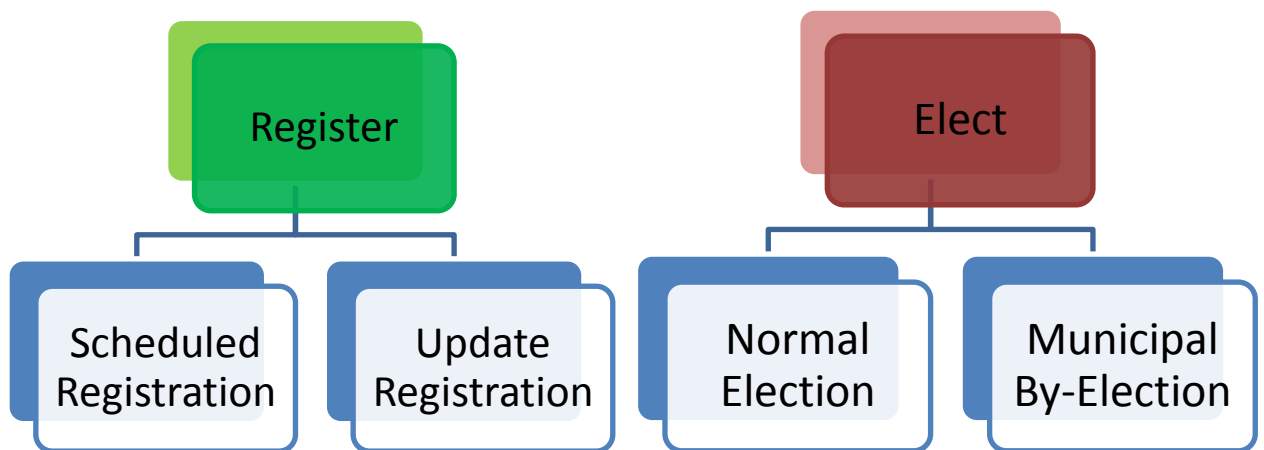


Figure 17: Electoral Processes in context diagram

A variety of sources were utilised to gather information on the Registration and Election processes of the IEC, from one-on-one interviews with staff members in the departments which deal with electoral processes, to gathering information from the IEC's events Gantt chart and its strategic documents, all the way to finding information on various internet sources.

The rest of the chapter is the outcome of the development of two new processes in the ECOR framework, namely Register and Elect.

Electoral Processes



The two level one processes defined for elections are Register and Elect. Each of these processes were then decomposed into their level 2 process. For registration, these two processes are Scheduled Registration and Update Registration. Scheduled Registration consists of all the activities which take place during the registration weekends announced to the public, this type of registration takes place every 5 years. Update Registration is the registration that takes place on a continuous basis, as members of the public are allowed to visit their local municipal electoral office and register there. Elections have been classified into two level 2 processes, namely, Normal Election and Municipal By-Election. The normal election is the election that takes place on a scheduled date and is announced to the public by the IEC, this election takes place every 5 years. The Municipal By-Elections are elections that take place between regular elections; usually within 90 days after a municipal ward council seat becomes vacant due to death, expulsion or resignation of a ward councillor.

3.3.1 Register and Elect

The following table lists the proposed level 3 processes for the Register and Elect.

Table 3: Register and Elect Tables

sRE REGISTER	
sR1 Scheduled Registration	sR2 Update Registration
sR1.1: Declare registration, and release registration schedule	sR1.1: Make municipal location and details available to the public
sR1.2: Educate staff and voters	sR1.2: Obtain registration details and identification
sR1.3: Open registration stations	sR1.3: Upload data
sR1.4: Obtain registration details and identification	sR1.4: Verify identification
sR1.5: Upload data	sR1.5: Manage exceptions
sR1.6: Verify identification	sR1.6: Update register
sR1.7: Produce register	
sR1.8: Manage exceptions	
sR1.9: Certify voters' roll	

sRE Enable Register

sRE.1:

Manage business rules for registration processes

sRE.6:

Manage registration transportation

sRE.2:

Assess registration performance

sRE.7:

Manage registration network

sRE.3:

Manage register information

sRE.8:

Manage register regulatory requirements and compliance

sRE.4:

Manage registration inventory

sRE.9:

Manage supply chain registration risk

sRE.5:

Manage register capital assets

sE ELECT

sE1 Normal Election

sE2 By-Election

sE1.1:

Declare election, publish election timetable

sE2.1:

Declare By-Election, notify dates

sE1.2:

Educate staff and voters

sE2.2:

Open and close application for special votes

sE1.3:

Receive notice to contest and receive candidate list

sE2.3:

Certify voters' roll

sE1.4:

Manage exceptions

sE2.4:

Receive notice to contest and receive candidate list

sE1.5:

Compile and certify party/ candidate list

sE2.5:

Manage exceptions

sE1.6:

Open and close application for special votes

sE2.6:

Compile and certify candidate list

sE1.7:

Start, proceed, facilitate and complete special voting

sE2.7:

Start, proceed, facilitate and complete special voting

sE1.8:

Start, proceed, facilitate and complete voting

sE2.8:

Start, proceed, facilitate and complete voting

sEE Enable Elect

sEE.1:

Manage business rules for election processes

sEE.6:

Manage election transportation

sEE.2:

Assess election performance

sEE.7:

Manage election network

sEE.3:

Manage elect information

sEE.8:

Manage elect regulatory requirements and compliance

sEE.4:

Manage election inventory

sEE.9:

Manage supply chain election risk

sEE.5:

Manage election capital assets

The Register and Elect level 3 processes can be viewed in a listed view, as follows:

Electoral Processes

Scheduled Registration

1. Declare registration, release registration schedule
2. Educate staff and voters
3. Open registration stations
4. Obtain registration details and identification
5. Upload data
6. Verify identification
7. Produce voters' roll
8. Manage exceptions
9. Certify voters' roll

Update Registration

1. Make municipal location and details available to the public
2. Obtain registration details and identification
3. Upload data
4. Verify identification
5. Manage exceptions
6. Update register

Normal Election

1. Declare election, publish election timetable
2. Educate staff and voters
3. Receive notice to contest and receive candidate list
4. Manage exceptions
5. Compile and certify party/ candidate list
6. Open and close application for special votes
7. Start, proceed, facilitate and complete special voting
8. Start, proceed, facilitate and complete voting

Municipal By-Election

1. Declare By-Election, notify dates
2. Open application for special votes
3. Certify voters' roll and close application for special votes
4. Receive notice to contest and receive candidate list
5. Manage exceptions
6. Compile and certify candidate list
7. Start, proceed, facilitate and complete special voting
8. Start, proceed, facilitate and complete voting

The following is the context diagram on the model:

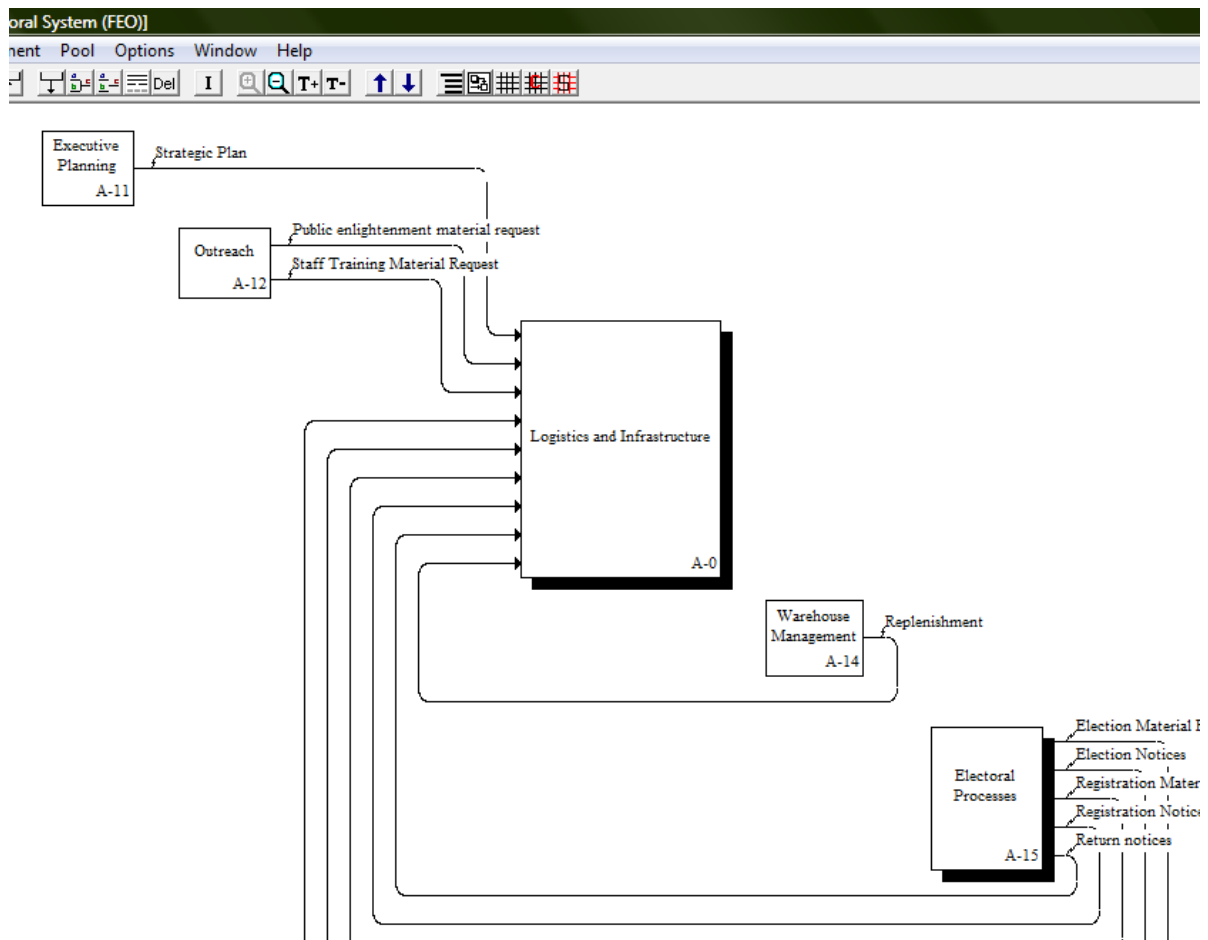


Figure 18: Electoral Process in context diagram

Once the Electoral Processes is decomposed, the follow diagram is seen:

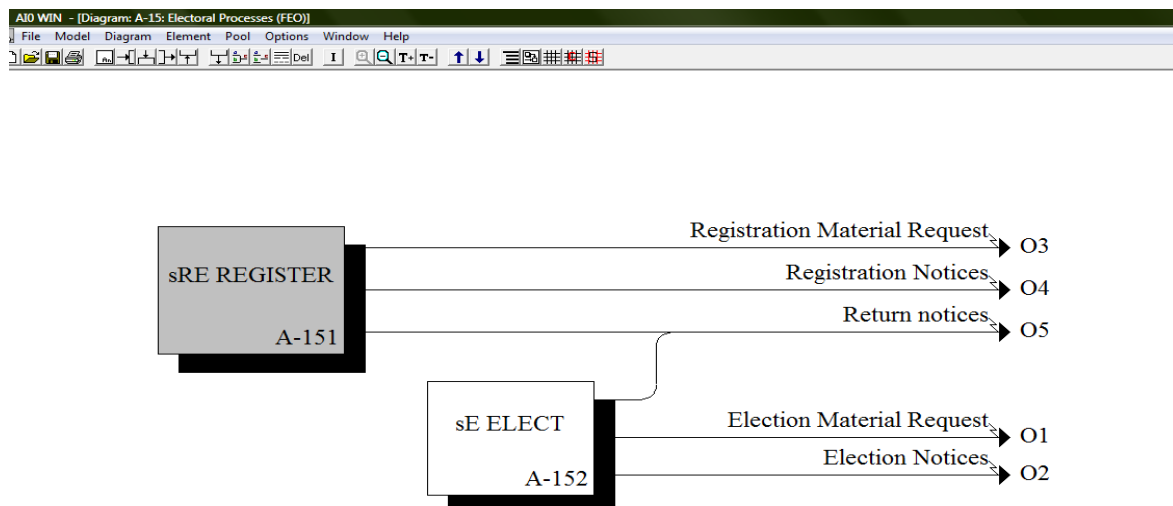


Figure 19: Level 1: Register and elect processes

The Register Process looks as follows:

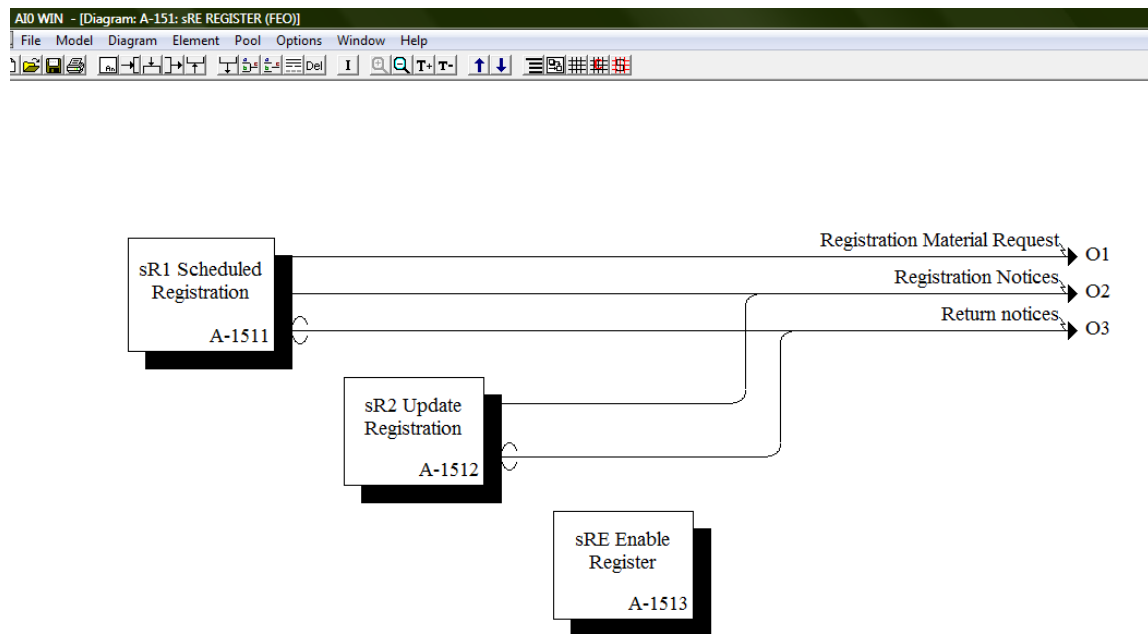


Figure 20: Level 2: Register processes

Once the Schedule Registration is decomposed, the follow is seen:

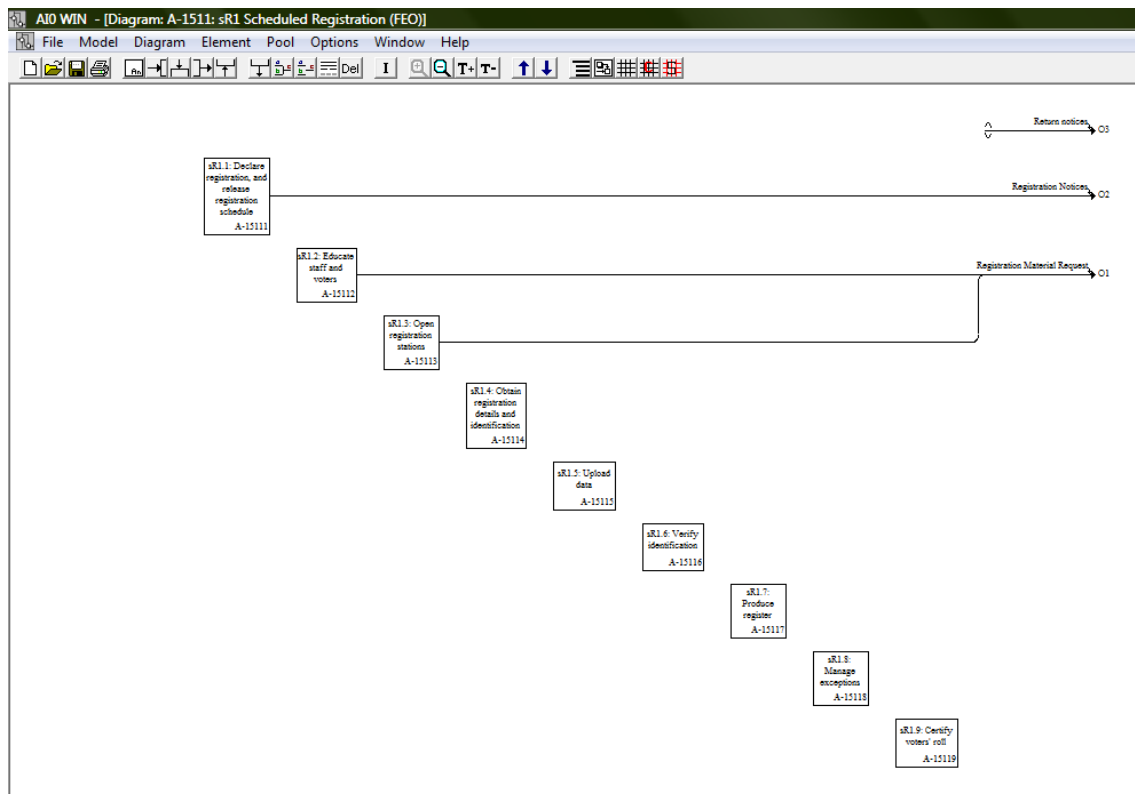


Figure 21: Level 3: Scheduled Registration

Similar images are viewed for the Elect processes once decomposed.

3.3.2 Best Practises

Most of these level 3 practises have best practises, and where possible, these IEC best practises were documented. However some processes did not have best practises that could be documented at a level 3 “level” The best practises are viewed in the following section. The best practises for the Normal Elections are applicable to the Municipal By-Elections and the best practises for the Normal Registration are also applicable to the Update Registrations, where the processes are similar.

Scheduled Registration	
Process	Best Practice
1. Declare registration, release registration schedule	<ul style="list-style-type: none"> • Registration dates are communicated clearly to the public (Available 4 weeks before registration, widely publicized 1 week before registration) • Security services (SAPS) are advised of the dates well in advance (2 months or more) and conduct their own security assessment • Political parties (PLC party liaison committee) are advised of the dates well in advance (2 months or more) to assist canvassing
2. Educate staff and voters	<p>Staff Education</p> <ul style="list-style-type: none"> • Highly experience trainers are appointed to train newcomers • High quality training material(per person) • Training weekends which address specific modules
3. Open registration stations	<ul style="list-style-type: none"> • Compile a bill of materials to support the event and communicate to logistics for implementation • Location and identification of the venues are communicated clearly to the public (Available 4 weeks before registration, widely publicized 1 week before registration) • Secure each venue with the landlord by means of a contract several months before the registration • Security services (SAPS) are advised of the venues well in advance (2 months or more) and conduct their own security assessment • Political parties (PLC party liaison committee) are advised of the venues well in advance (2 months or more) to assist canvassing • Report that stations are open using an electronic tracker at a central Operations Centre
4. Obtain registration details and identification	<ul style="list-style-type: none"> • Utilize PBSU (Zip Zip) to record and transfer voter data (name, ID number, voting district)

	<ul style="list-style-type: none"> • Hard copy registration forms are scanned and stored electronically • Retrieve addresses from stored forms electronically
5. Upload data	<ul style="list-style-type: none"> • Utilize PBSU (Zip Zip) to upload voter data directly to server (WAN)
6. Verify identification	<ul style="list-style-type: none"> • Close cooperation with DHA (department of home affairs) to allow monthly/ad hoc verification of voter data against national population register
7. Produce register	<ul style="list-style-type: none"> • Automated process from data already captured in server
8. Manage exceptions	<ul style="list-style-type: none"> • Legal provision for complaints and objections
9. Certify voters' roll	<ul style="list-style-type: none"> • Done in accordance with the pre-determined date defined in the election time-table • Available and accessible for public inspection (online, sms, physical printouts)

Normal Election

Process	Best Practise
1. Declare election, publish election timetable	<ul style="list-style-type: none"> • Election dates are communicated clearly to the public (Available 4 weeks before registration, widely publicized 1 week before registration) • Security services (SAPS) are advised of the dates well in advance (2 months or more) and conduct their own security assessment • Political parties (PLC party liaison committee) are advised of the dates well in advance (2 months or more) to assist canvassing
2. Educate staff and voters	Staff Education <ul style="list-style-type: none"> • Highly experience trainers are appointed to train newcomers • High quality training material(per person) • Training weekends which address specific modules
3. Receive notice to contest and receive candidate list	<ul style="list-style-type: none"> • Clearly defined and delineated in election timetable • Avoid cash payments, accept EFT payments • Transfer hard copy forms into electronic records for accuracy and visibility (WAN)
4. Manage exceptions	<ul style="list-style-type: none"> • Legal provision for complaints and objections • Allow time in election time table for rectification • Educate political parties to minimize errors
5. Compile and certify party/ candidate list	<ul style="list-style-type: none"> • Automated process that is pre-defined in election timetable
6. Open and close application for special votes	<ul style="list-style-type: none"> • Clearly defined and delineated election timetable • Close application sufficiently early to permit resource planning in response (21 days)
7. Start, proceed, facilitate and complete special voting	
8. Start, proceed, facilitate and complete voting	<ul style="list-style-type: none"> • Ensure adequate supply of ballot papers to match voter numbers

3.3.3 Summary

This chapter is an overview of the entire ECOR model as it appears on KBSI, as well as the methodology which was followed in order to develop the model.

4 Validation

The outcome of this project is a blueprint model based on SCOR[®] that has been contextualised to the election environment. The model is a framework that requires further development as no data has been collected as input, therefore the model itself cannot be tested as yet, which makes the task of validating the model complex, and rather impractical at this point of the study. However, throughout the entire development of the model, the IEC has validated the model. From the identification of supply chains, to the documentation of best practises all the way through the development of two new processes in the framework, namely Election and Registration. A letter from the senior manager of the Logistics and Infrastructure Department of the IEC can be viewed in Appendix D. It states the view that is held by the IEC with regards to the ECOR model and can be understood to be some form of validation of the blueprint model at this stage.

5 Conclusion

A blue-print model, namely ECOR, which is the documentation of SCOR[®] in a process framework, has been developed. ECOR is a visual representation of how SCOR[®] can be implemented in the election environment, from the identification of supply chains, through to the configuration of processes, and ultimately measuring the performance of a supply chain. Because of the way ECOR is presented, any electoral commission in Africa can use the ECOR model to aid in the implementation of SCOR[®] in their organisation. The ECOR framework can be used as a template for the development of an Information System that can be used to share information amongst various African electoral commissions, and it therefore presents an opportunity for continued improvement. This model has provided the basic framework that is necessary to create a sort of hub of knowledge, which can be used and populated by various African electoral commissions. The power of active collaborative amongst African nations has yet to realise its full potential, and ECOR can be a driving tool towards establishing constructive relationships amongst African countries, aimed at improving elections all over Africa. The complete benefits of the utilization of the model can only be realized once its development is complete, and various African electoral commissions start to populate the model with data.

The shortfall of the model however, is that its success is highly dependent upon the cooperation of the various African electoral bodies, which can be a challenging task. Not only do the various electoral bodies need to be persuaded of the potential benefits of this model, they also need to be educated about how SCOR[®] works in order to understand how to make use of the ECOR model to its full advantage.

Many of the defects in organizing and planning free and fair elections in African countries could be overcome by placing a greater emphasis on logistics and ensuring that a focused plan on correcting past mistakes is put into place. It is with this view, that the aim of this study has not only been to create awareness of the serious electoral logistics problems faced by African countries, but to provide a means to tackle this problem through a basic reference model.

The outcomes of the project are as follows:

- Documentation of all the SCOR[®] processes into a blueprint model that can be used by any electoral body in an African country
- Graphical depiction of how SCOR[®] is applied, in the form of a blueprint model
- Documentation of SCOR[®] best practices
- Introduction of two new processes, namely Register and Elect to the SCOR framework to contextualize the ECOR model to the election environment

Supply Chain management methods have been applied throughout the entire development of the model, as logistics is the driving force behind successful elections. In due course, ECOR is a model that can be used by electoral commissions to measure the performance of logistics infrastructures and resources used to support electoral processes.

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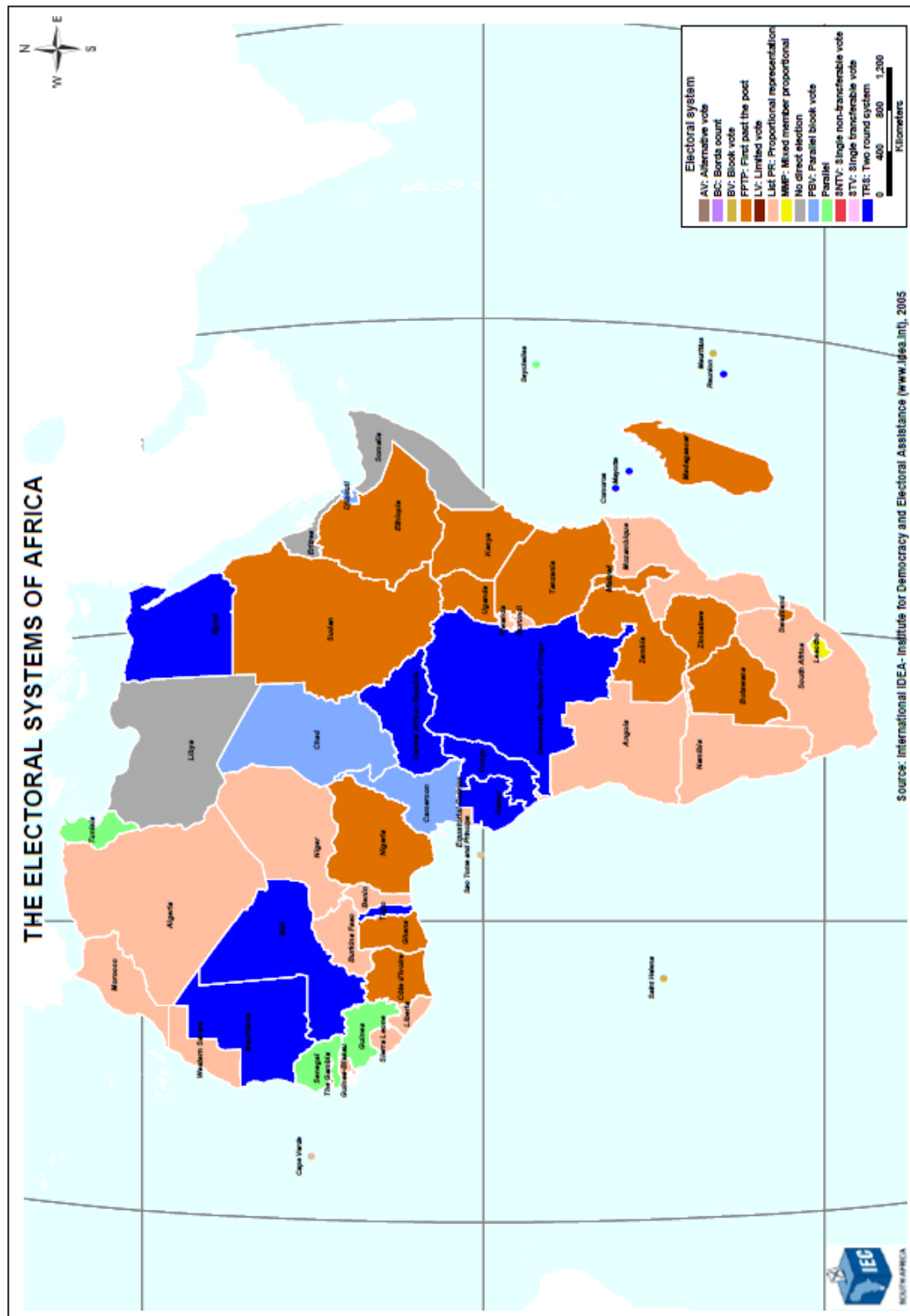
RindaiChipfunde: “Lesotho elections 2002: The Importance of Drawing election Observers from Civil Society”. Paper *presented at EISA Seminar on the Role of Election Observers in the SADCRegion*, 8 May 2002

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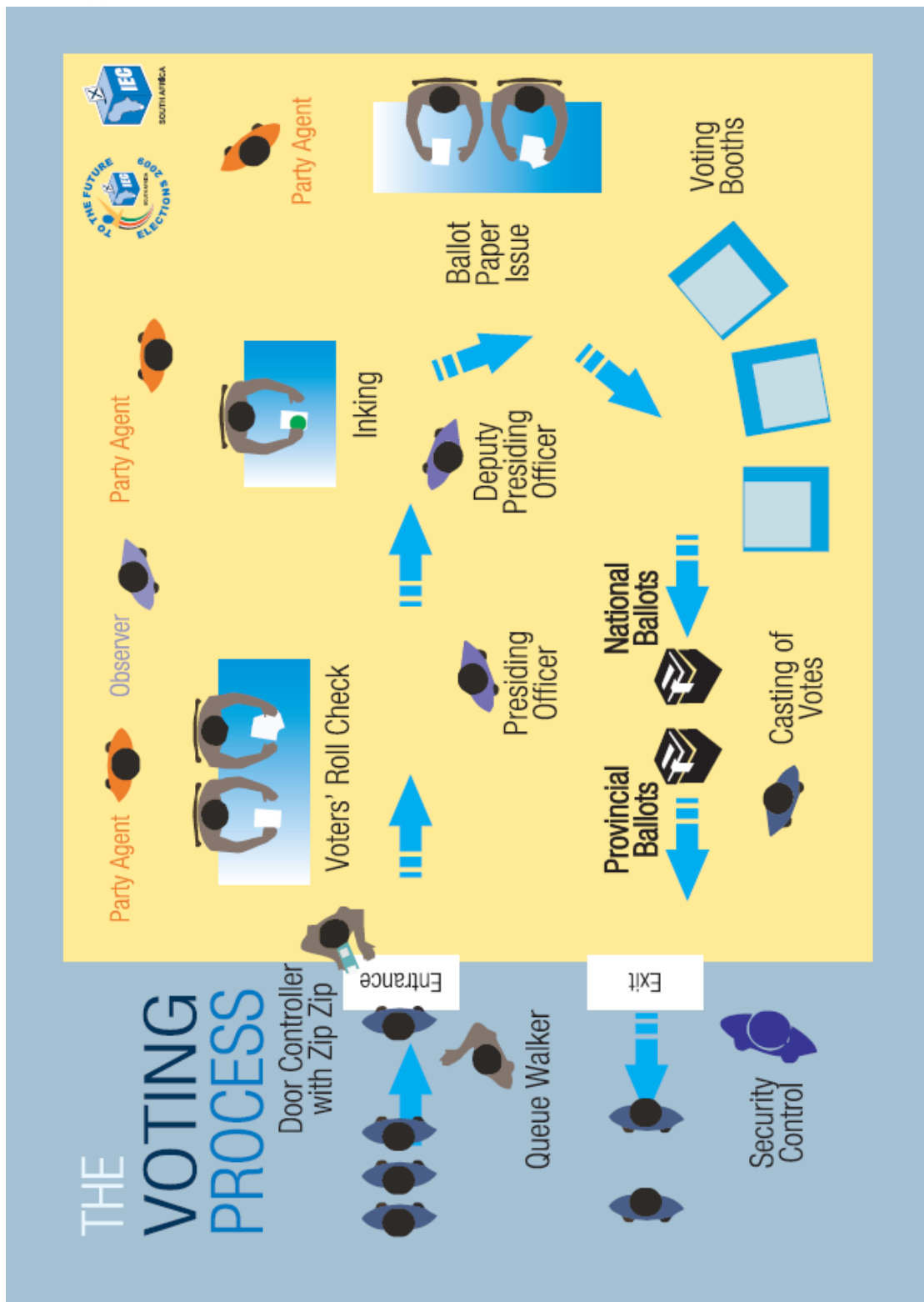
7 Appendices

7.1 Appendix A- Electoral Systems in Africa



Source: International IDEA- Institute for Democracy and Electoral Assistance (www.idea.int), 2005

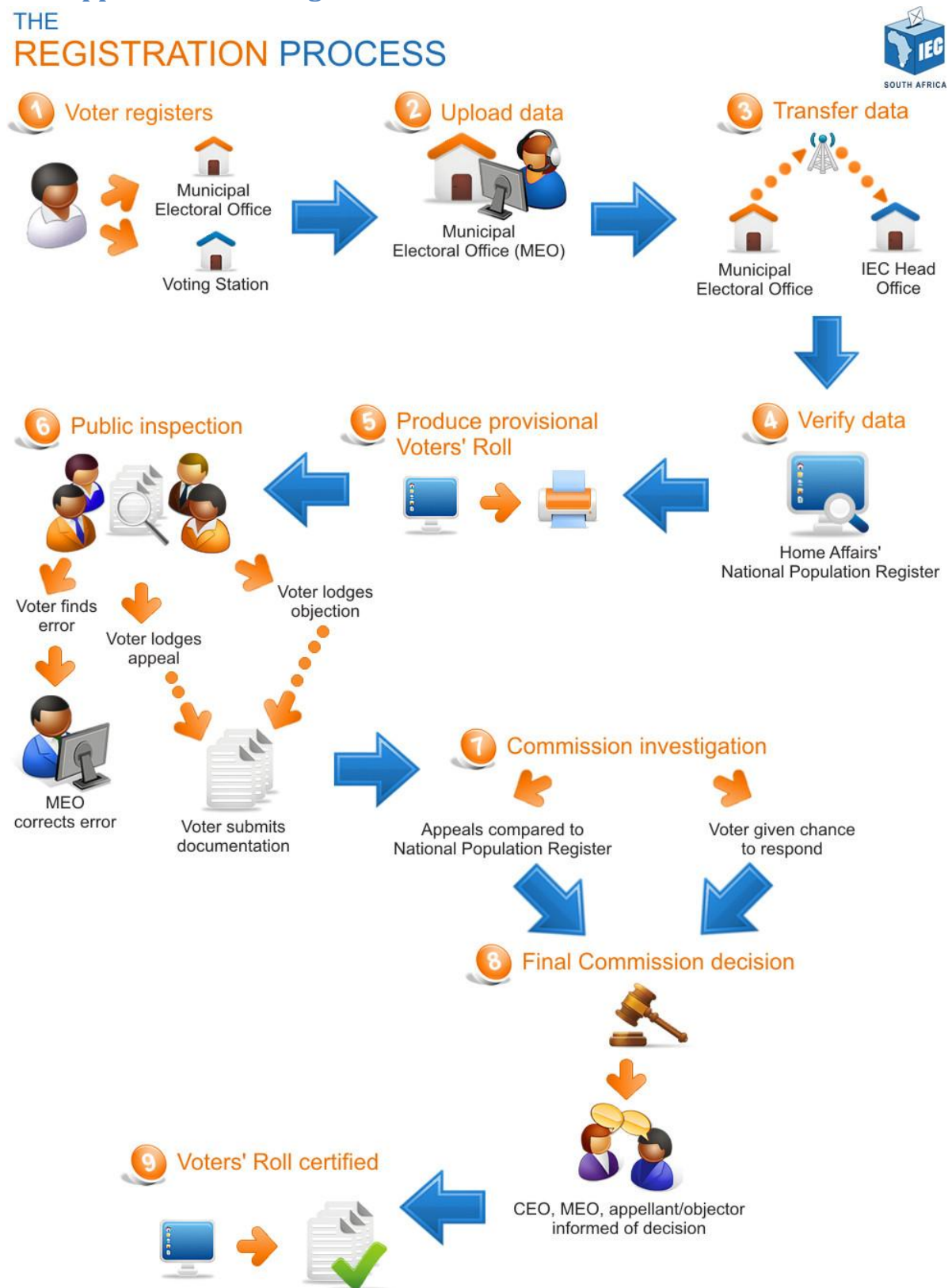
7.2 Appendix B: The Voting Process in South Africa



Source:IEC, 2009. *National and Provincial Elections*. [online] Available at: <http://www.elections.org.za/content/Default.aspx>. [Accessed 29 April 2012].

7.3 Appendix C: The Registration Process in South Africa

THE REGISTRATION PROCESS



Source: IEC, 2009. *National and Provincial Elections*. [online] Available at: <http://www.elections.org.za/content/Default.aspx>. [Accessed 02 October 2012].

7.4 Appendix D: Validation letter from the IEC

ELECTORAL COMMISSION

Ms Manai Bonolo Aphane

**c/o University of Pretoria
Pretoria, South Africa**

Dear Ms Aphane,

The ECOR Model

In response to your recent query I am able to say that the ECOR model, as it has been proposed, is one which shows lot of potential for effective review, management and improvement of supply chains within an Electoral Management Body (EMB).

It is my understanding that the model, when fully developed and if fully utilised, will offer – *inter alia* – the following potential benefits:

- A methodology for structured review of work methods within electoral supply chains.
- Insight into supply chain processes and techniques utilised by other EMBs.
- Insight into risk assessment and risk management techniques practiced by other EMBs.
- Awareness of inter-departmental linkages and dependencies within an EMB, and the resultant influence and impact on electoral supply chains.

It is my opinion that the ultimate value of the program will be dependent on the extent of participation by different EMBs. One or two participants alone will naturally not be able to provide sufficient comparisons and/or alternatives for effective benchmarking.

The Commission remains committed to assist with your further investigations and information gathering. In that context we await your notification of the next steps.

Yours sincerely

Simon Boyle
Senior Manager: Logistics & Infrastructure

ELECTORAL COMMISSION
ENSURING FREE AND FAIR ELECTIONS
S O U T H A F R I C A



7.5 Appendix E: Entire ECOR model

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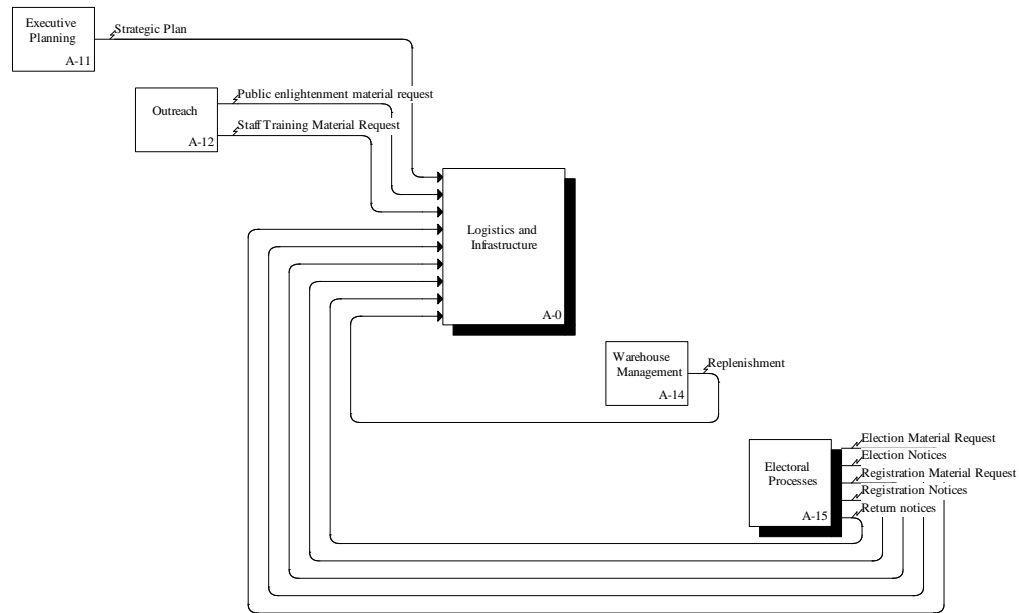
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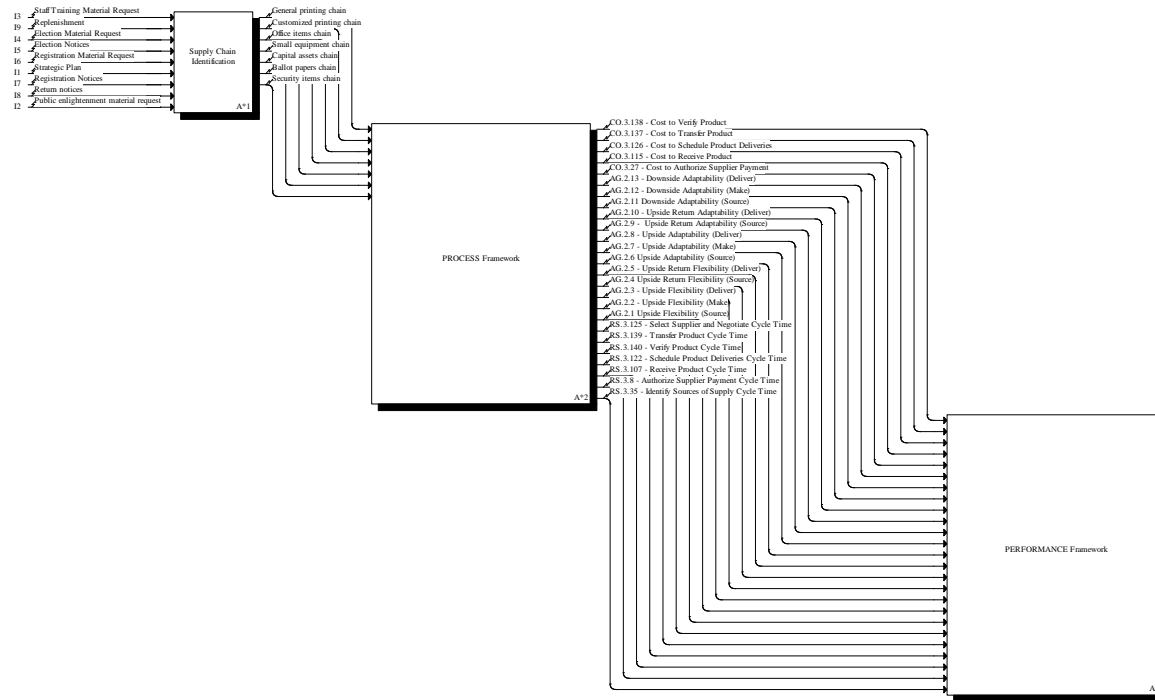
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Electoral
System
A-1

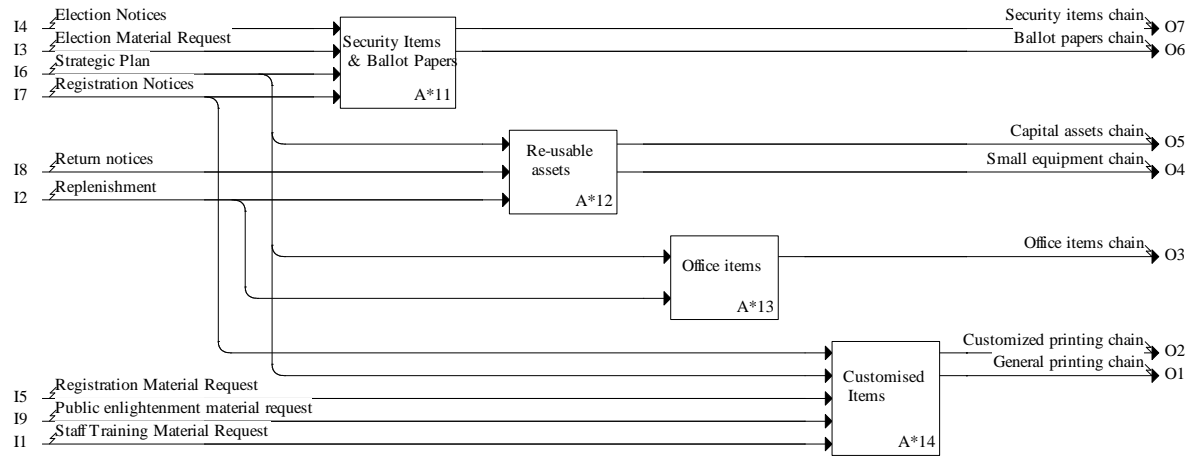
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Title:A-0: Logistics and Infrastructure



Title:A*1: Supply Chain Identification

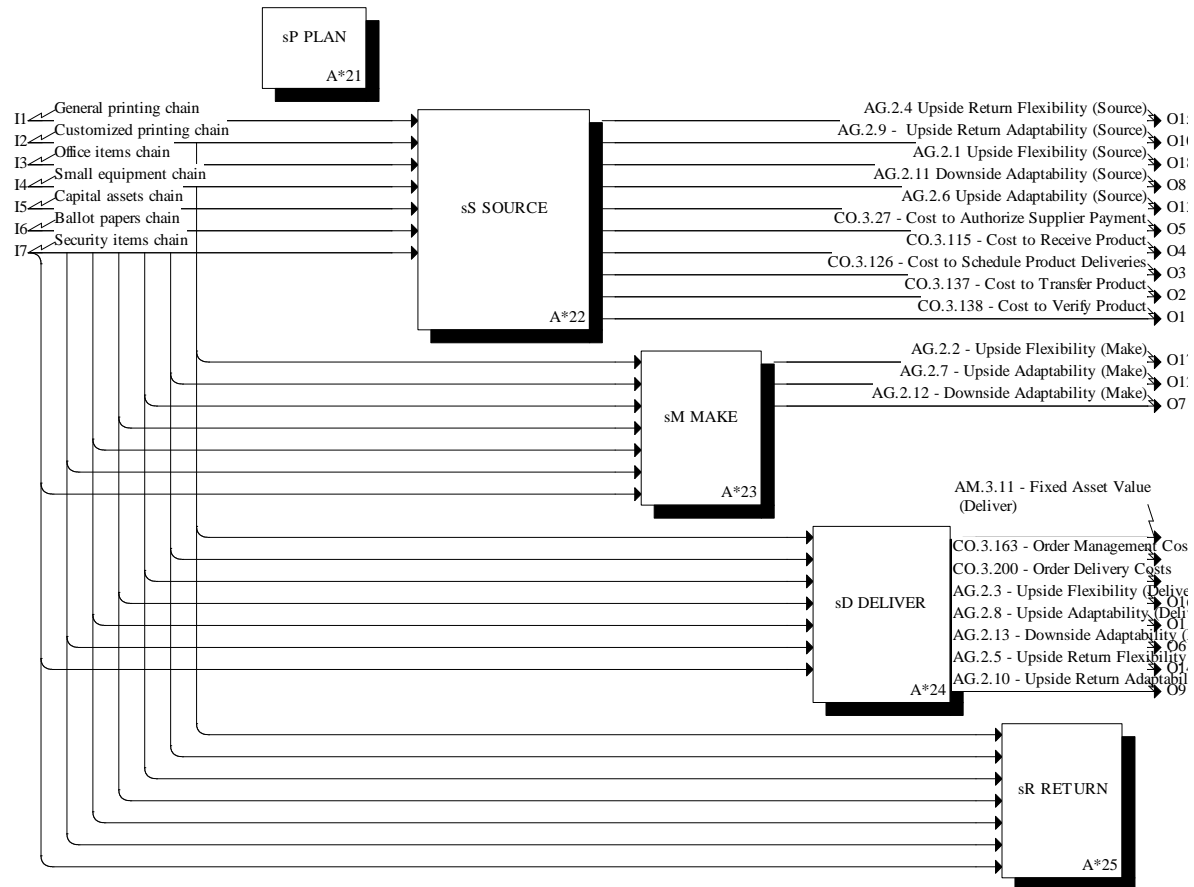


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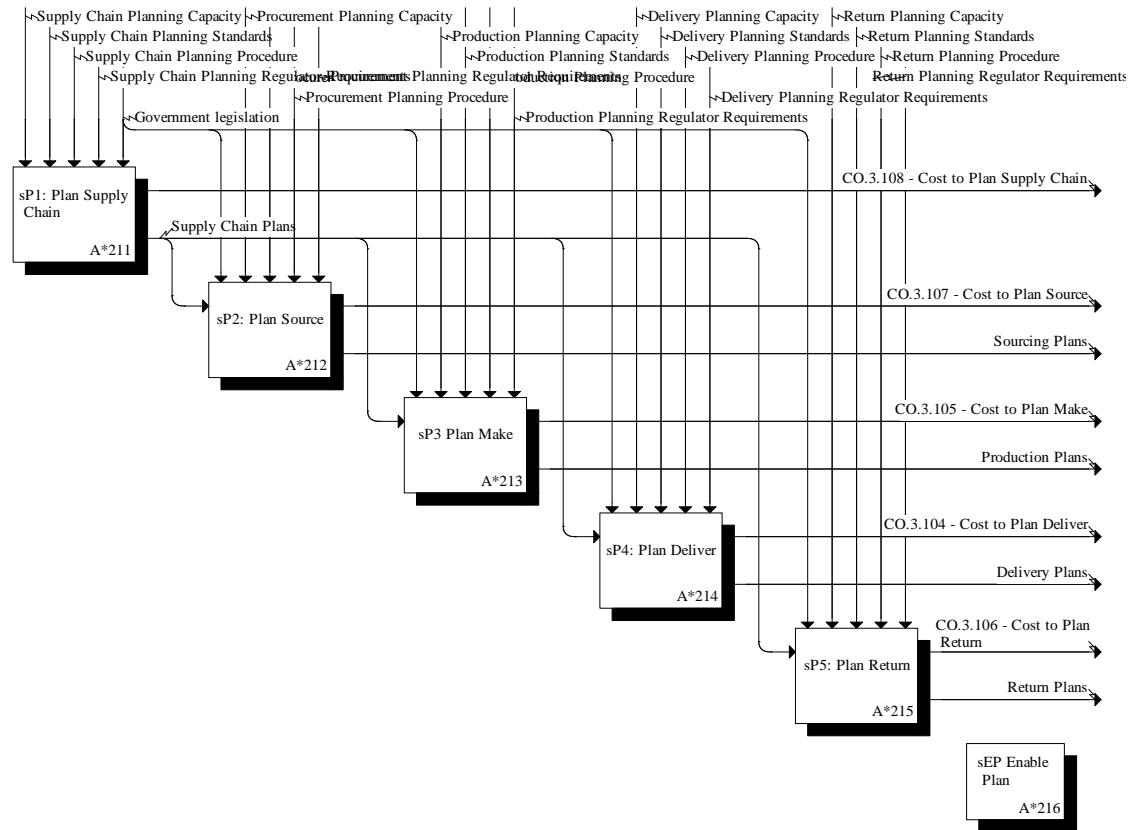
Title:A*2: PROCESS Framework

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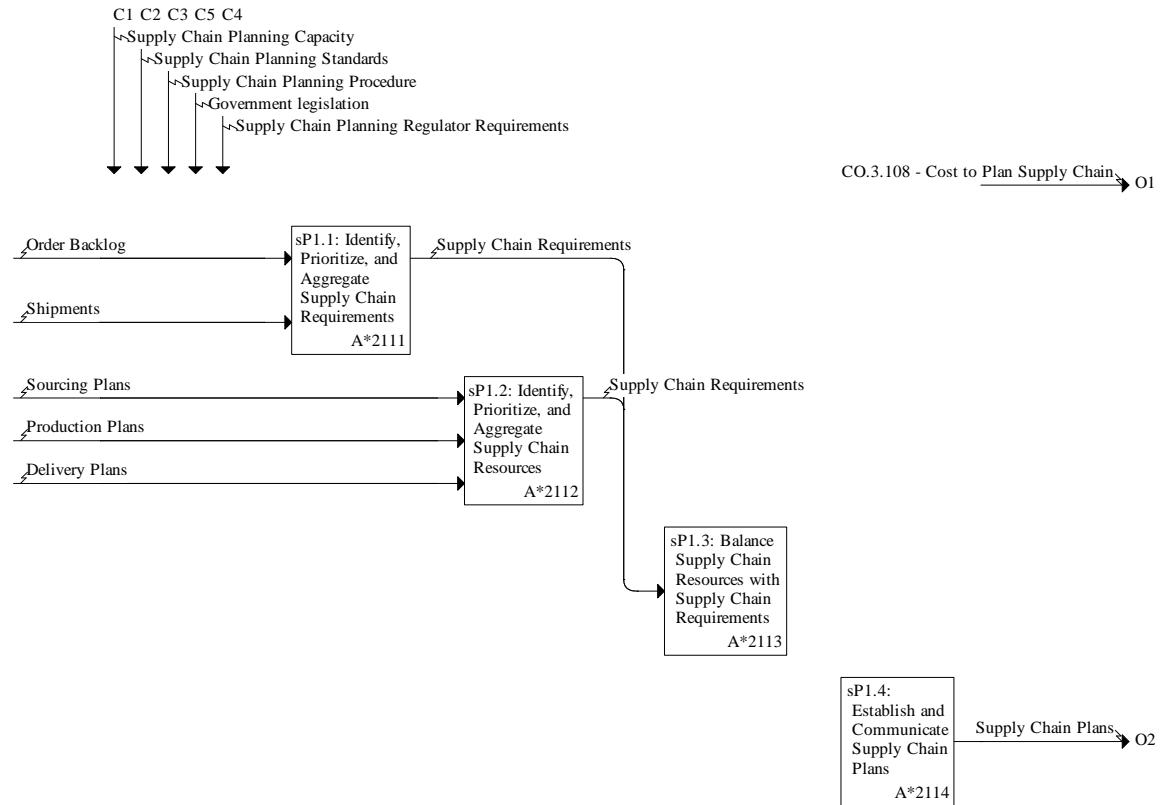
- RS.3.122 - Schedule Product Deliveries Cycle Time → O2
- RS.3.125 - Select Supplier and Negotiate Cycle Time → O1'
- RS.3.139 - Transfer Product Cycle Time → O2
- RS.3.140 - Verify Product Cycle Time → O2
- RS.3.107 - Receive Product Cycle Time → O2
- RS.3.8 - Authorize Supplier Payment Cycle Time → O2
- RS.3.35 - Identify Sources of Supply Cycle Time → O2



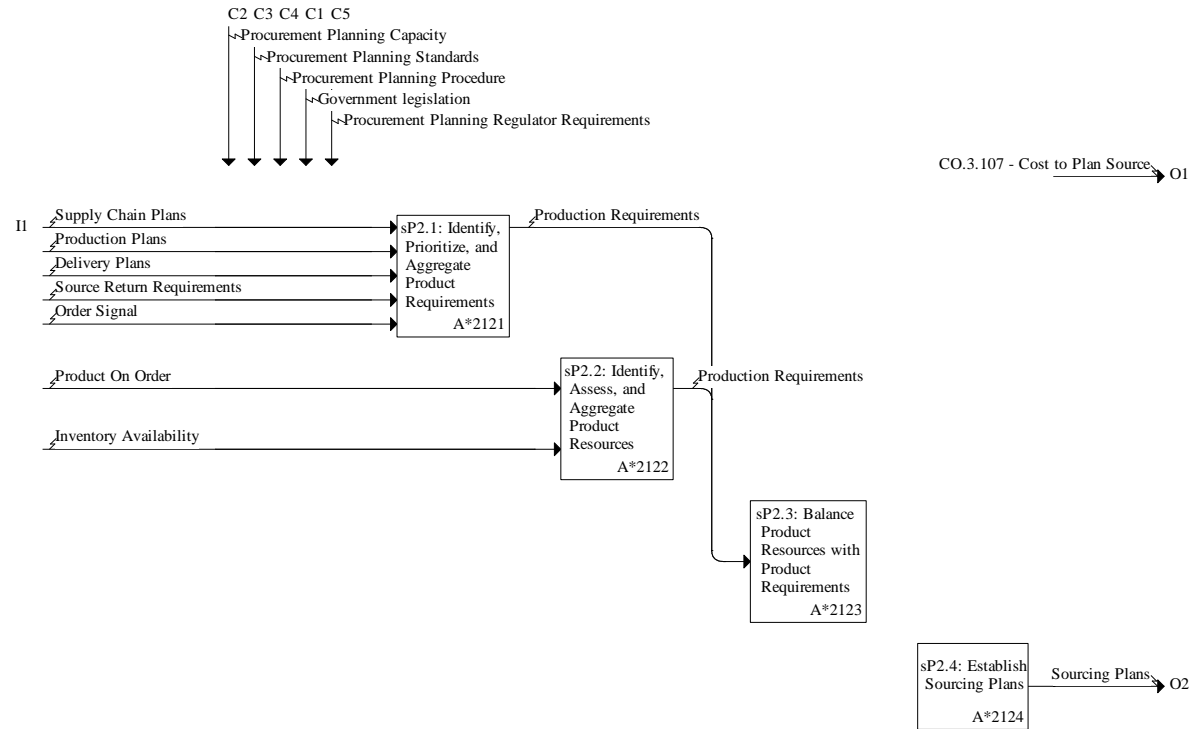
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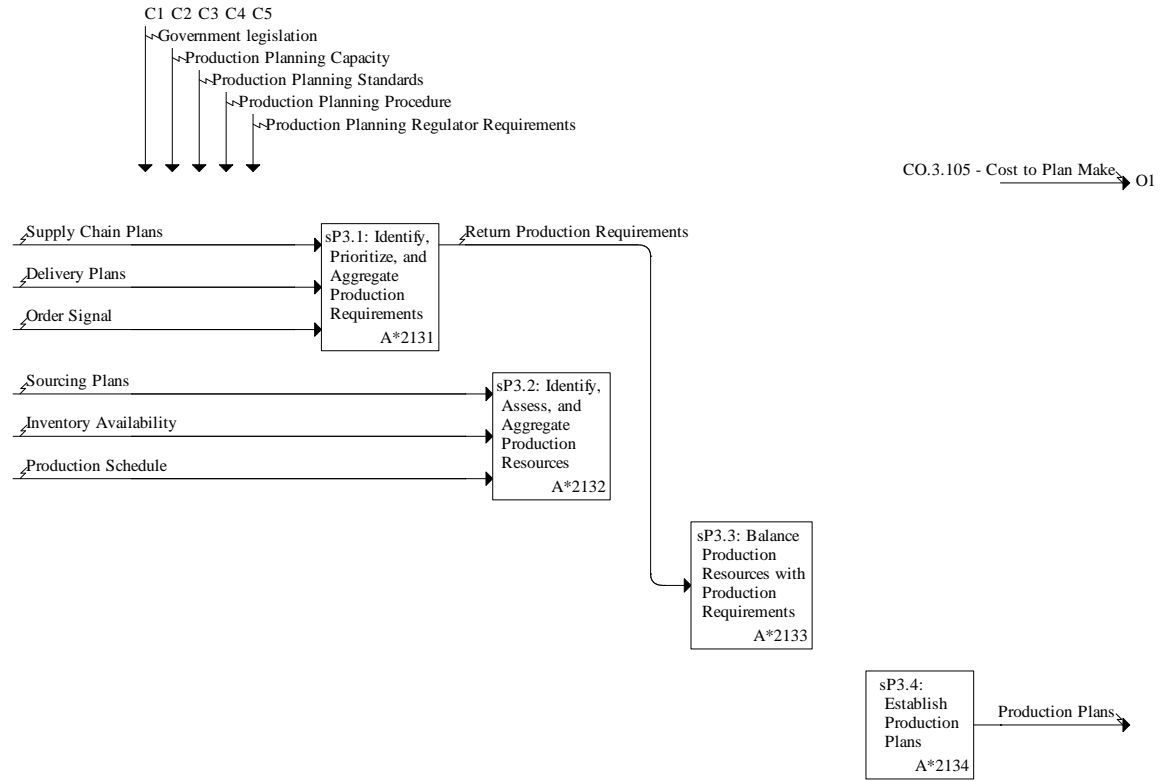
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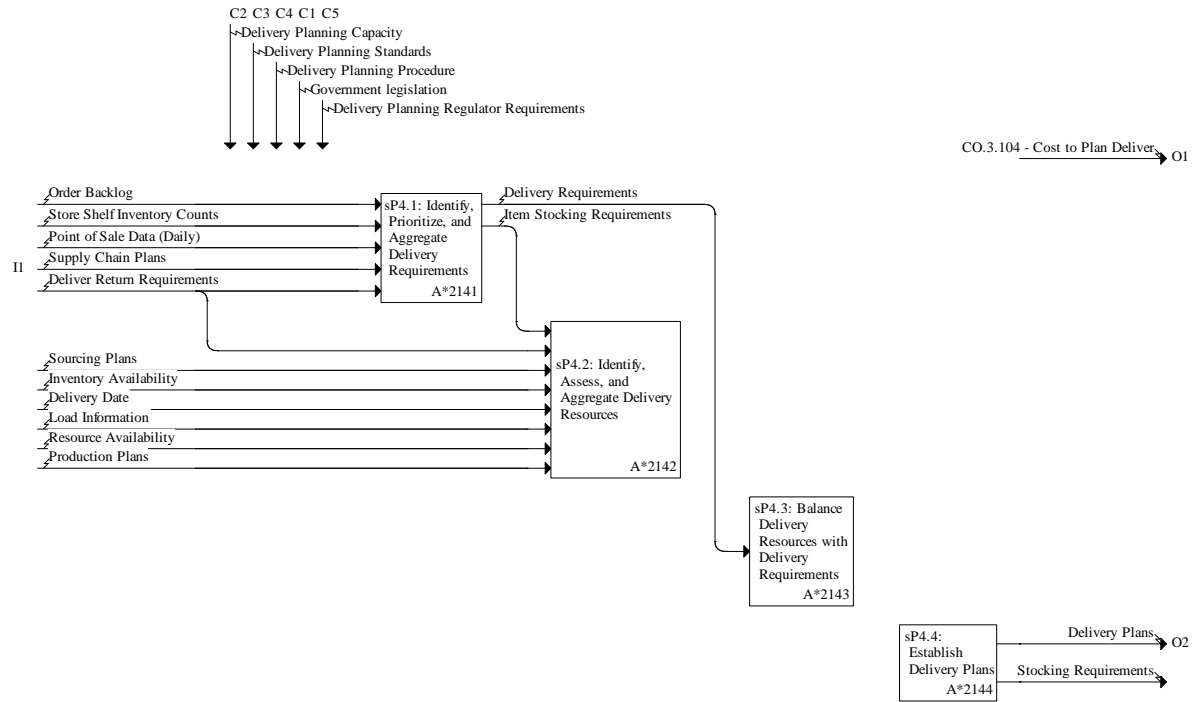
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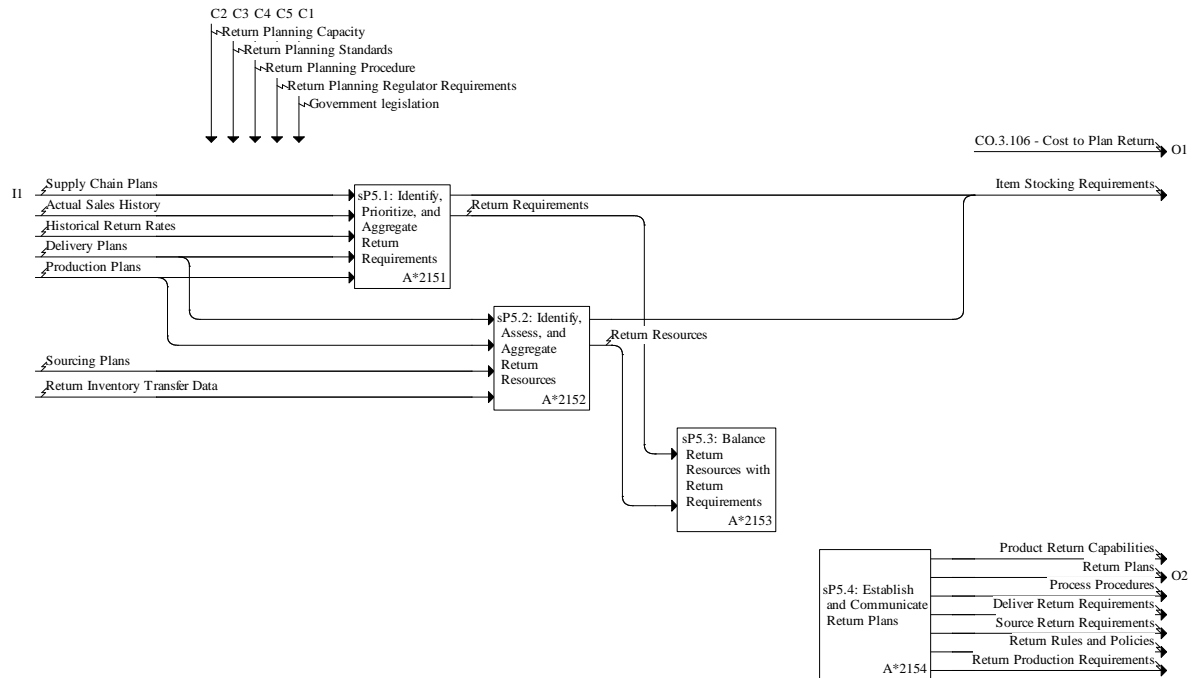
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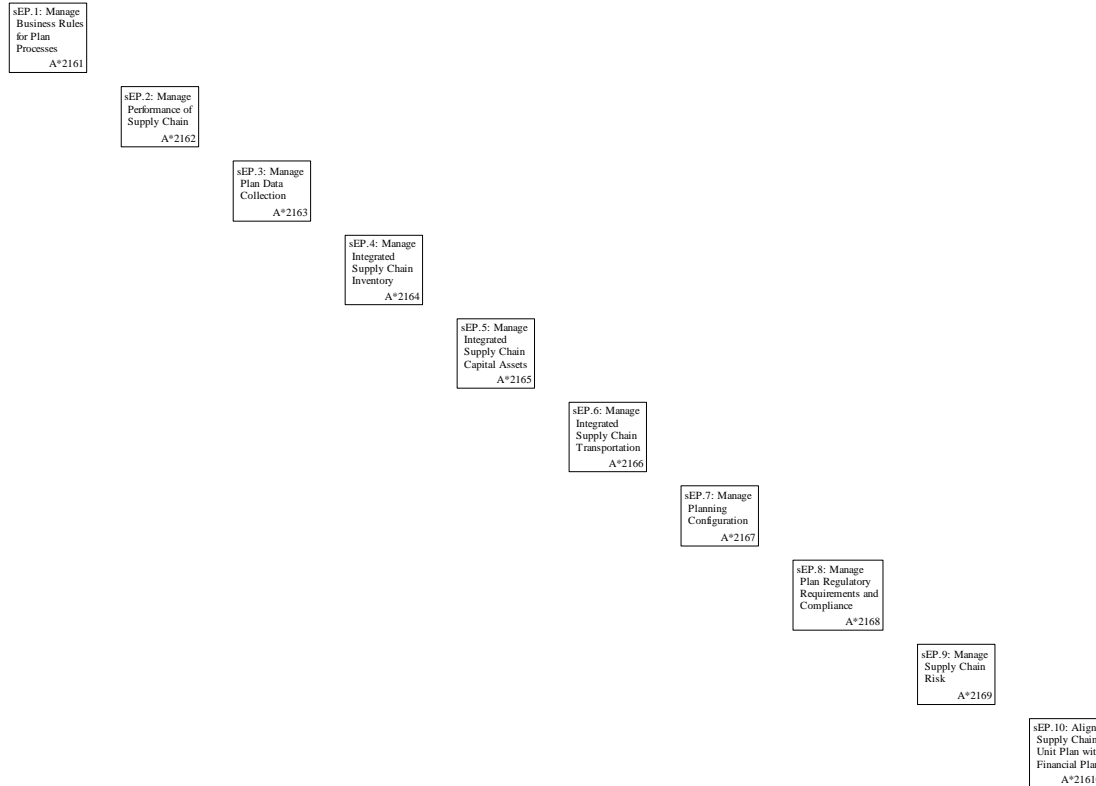
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Title:A*215: sP5: Plan Return



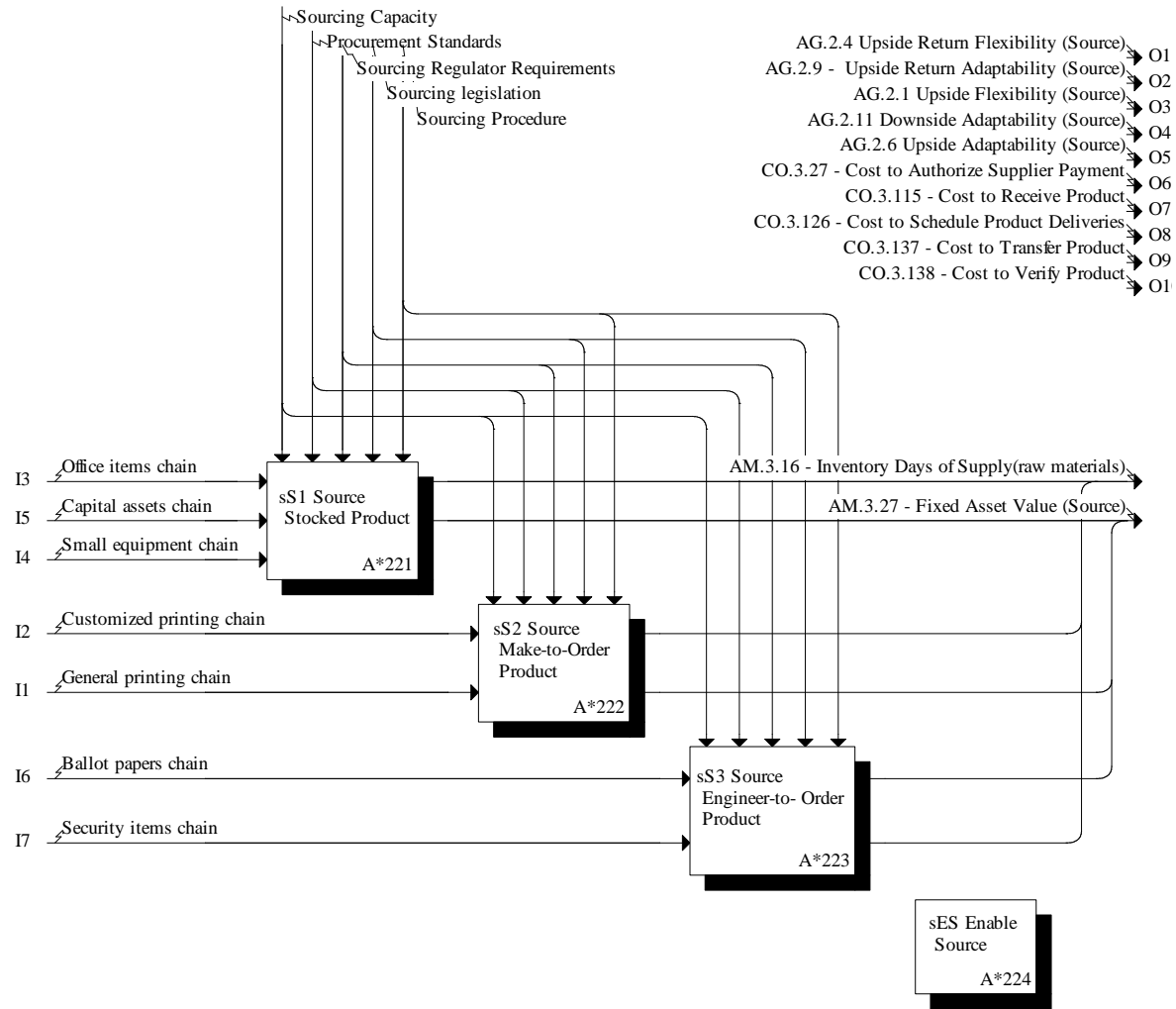
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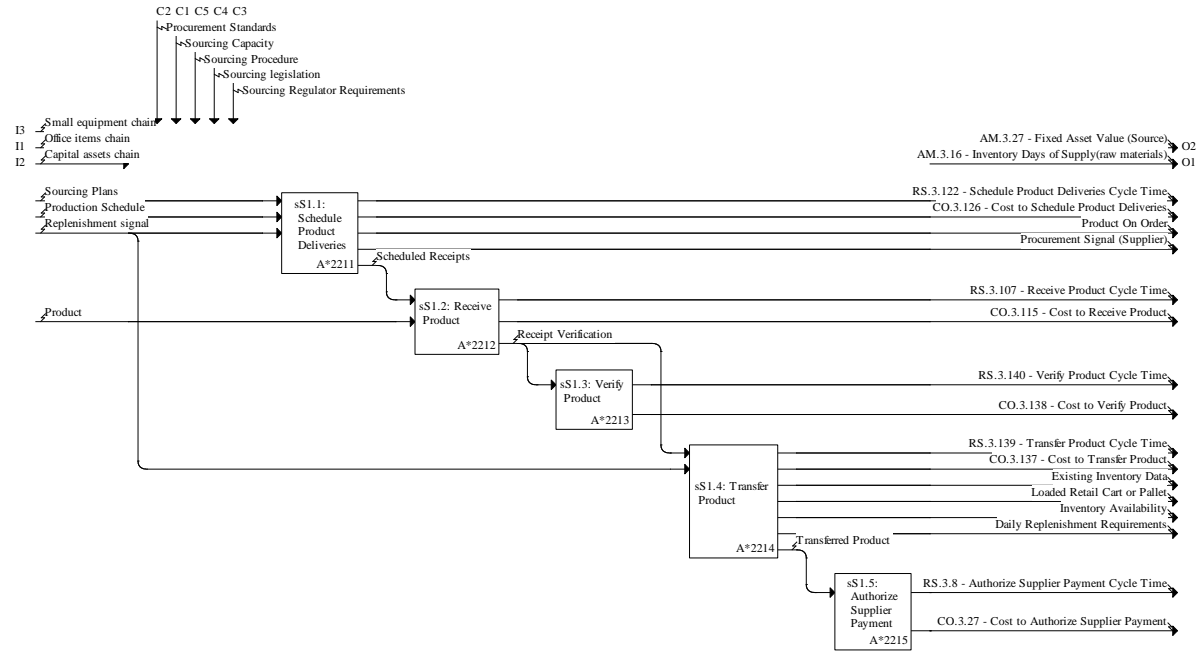
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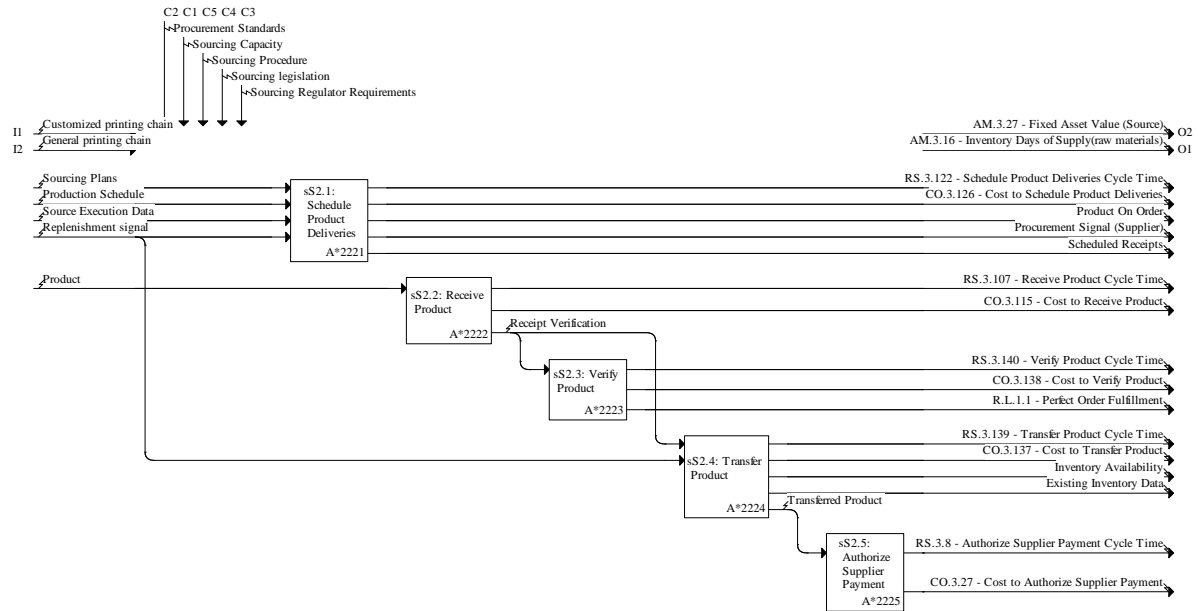
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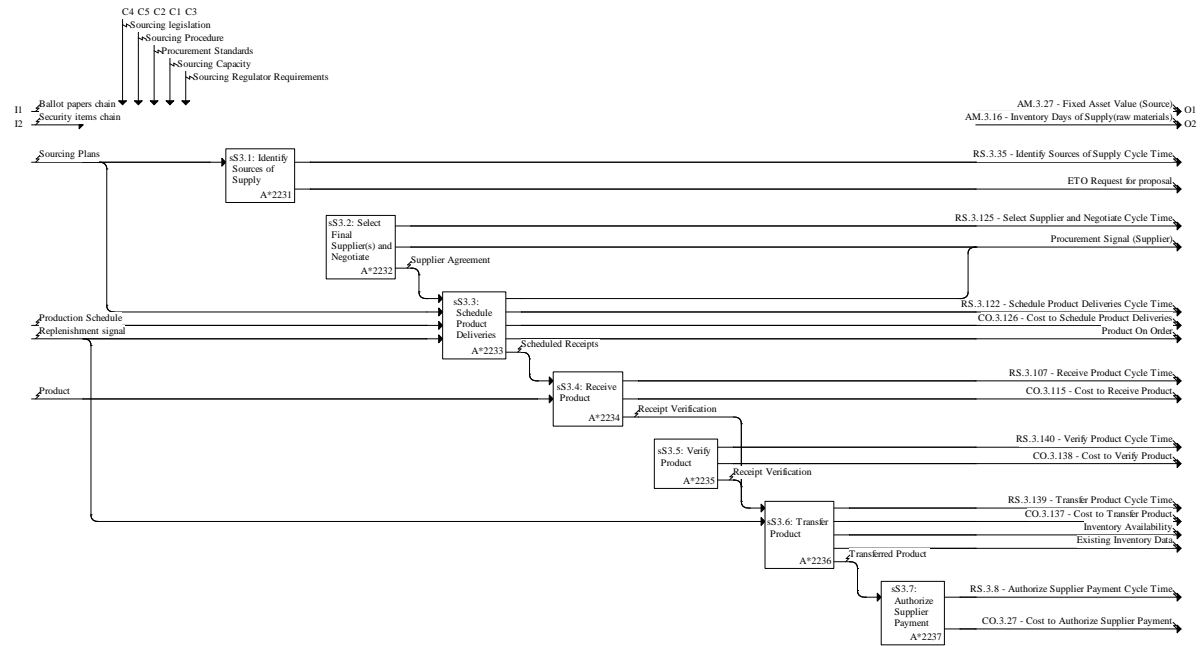
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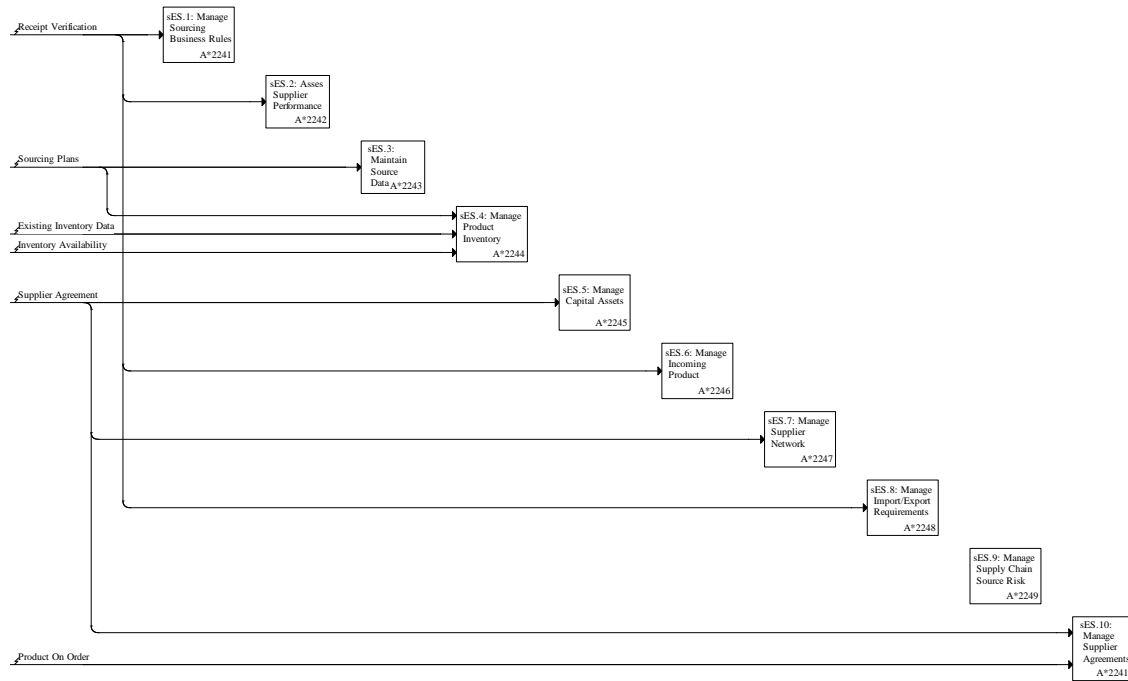
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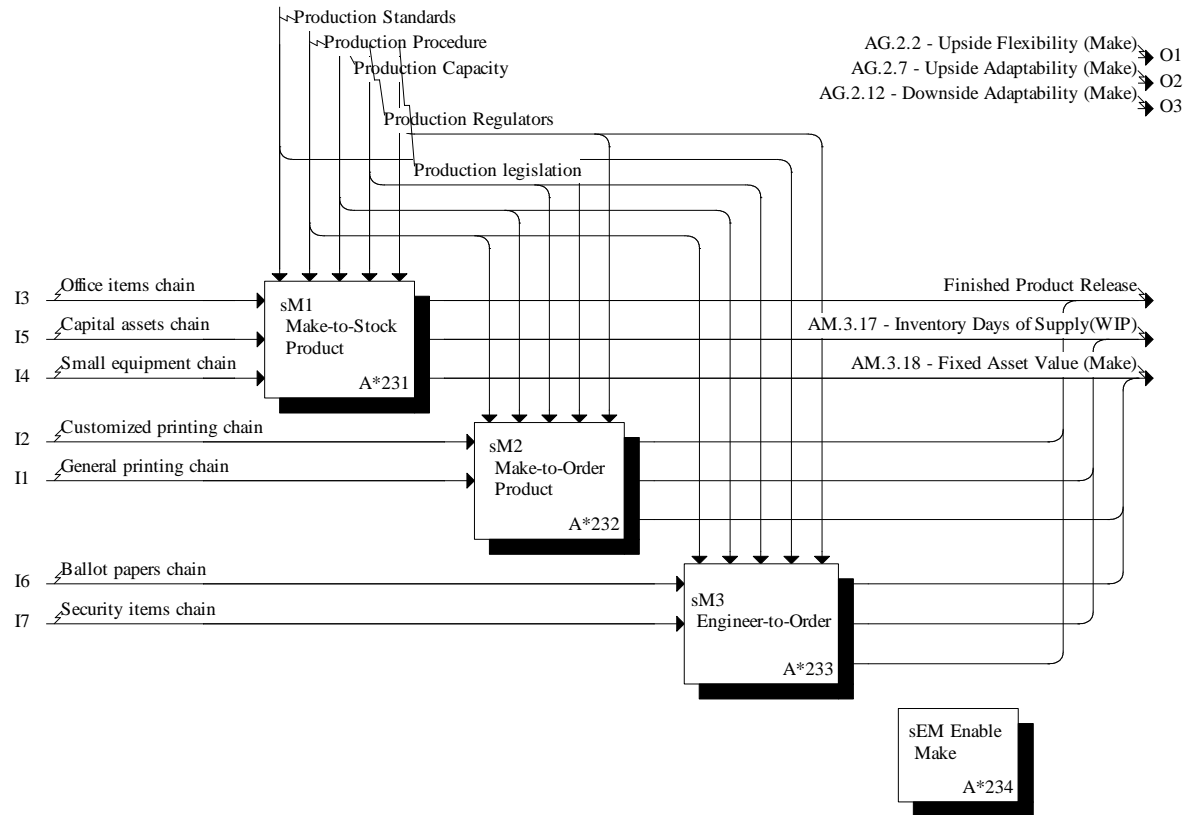
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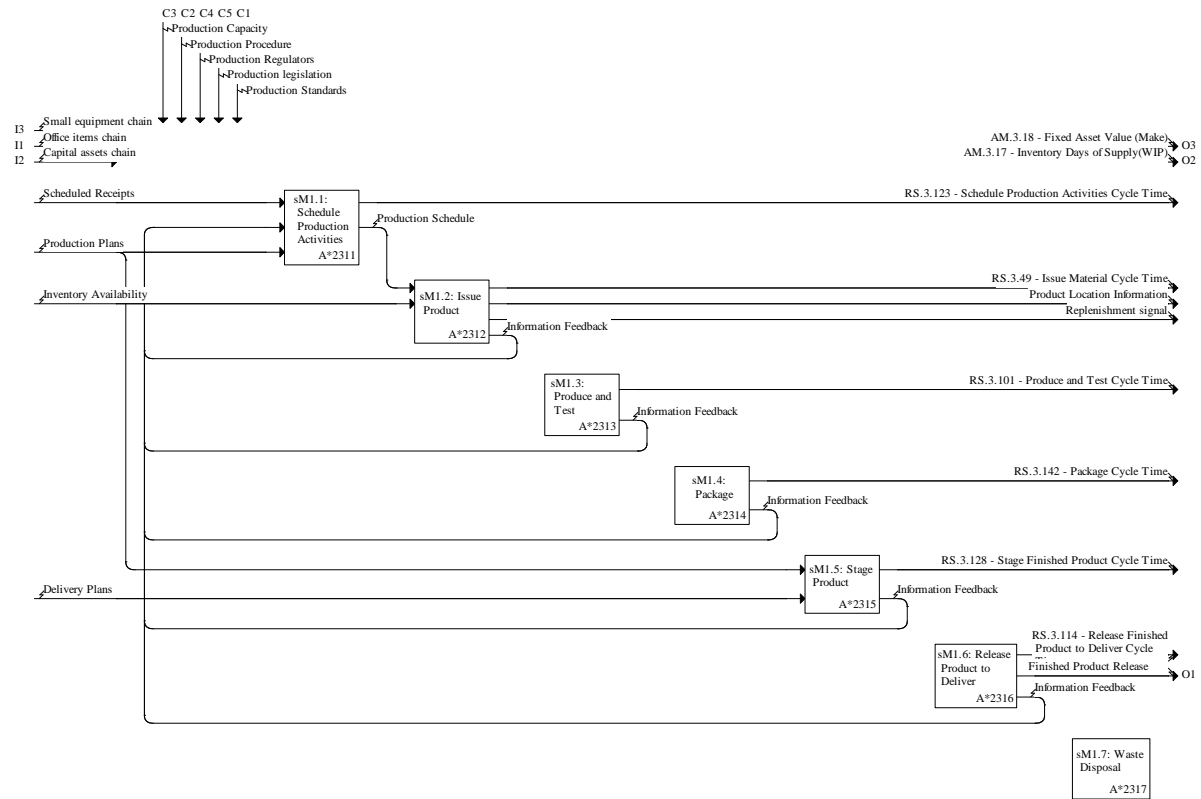
Title:A*224: sES Enable Source



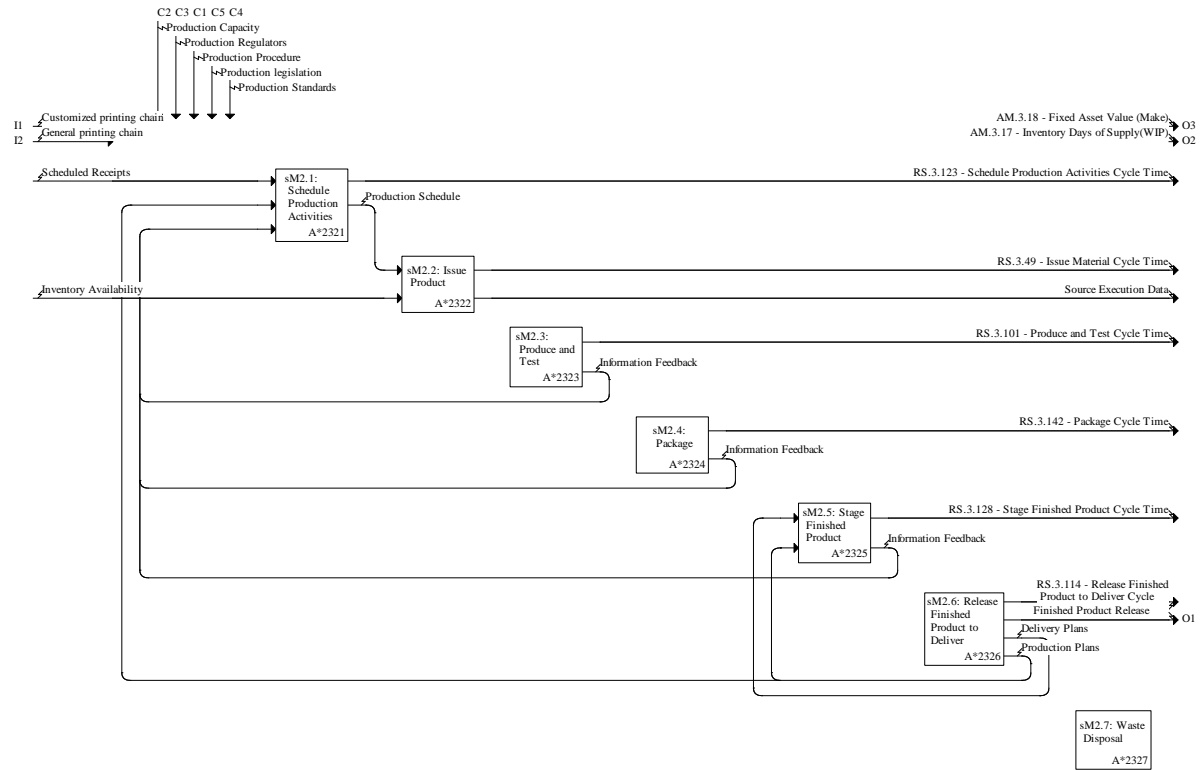
Title:A*23: sM MAKE



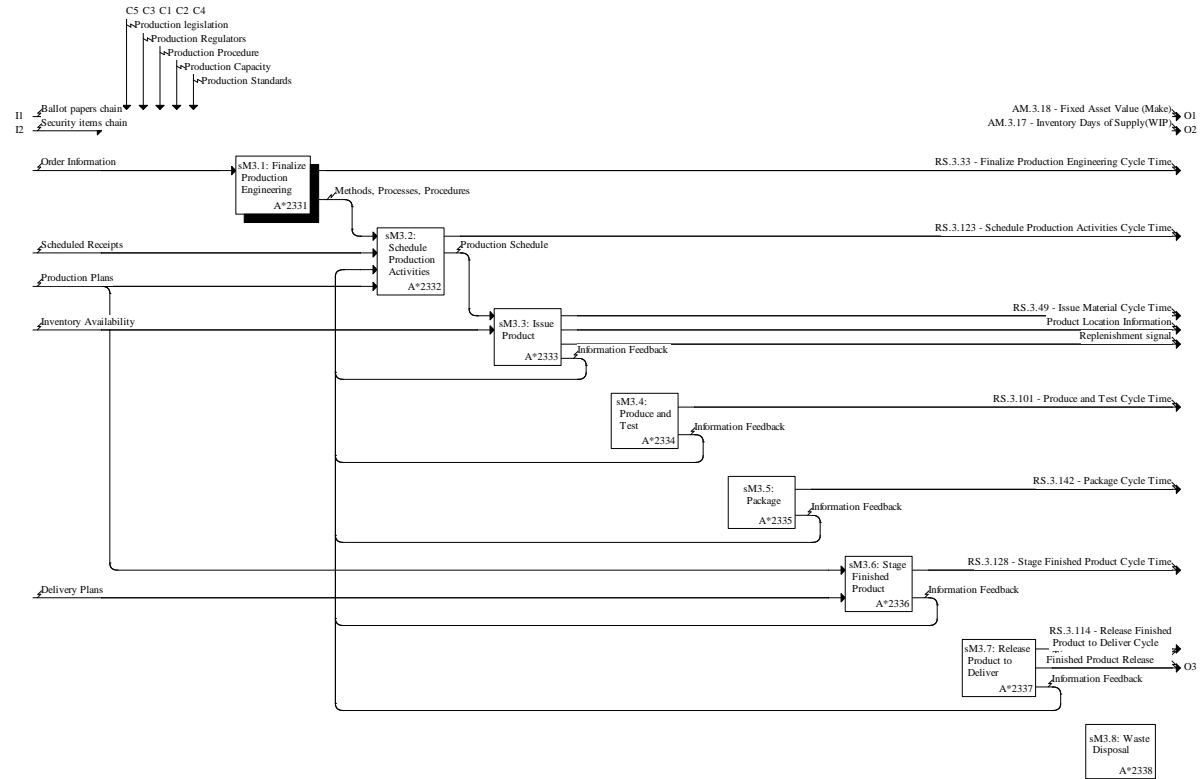
Title:A*231: sM1 Make-to-Stock Product



Title:A*232: sM2 Make-to-Order Product



Title:A*233: sM3 Engineer-to-Order

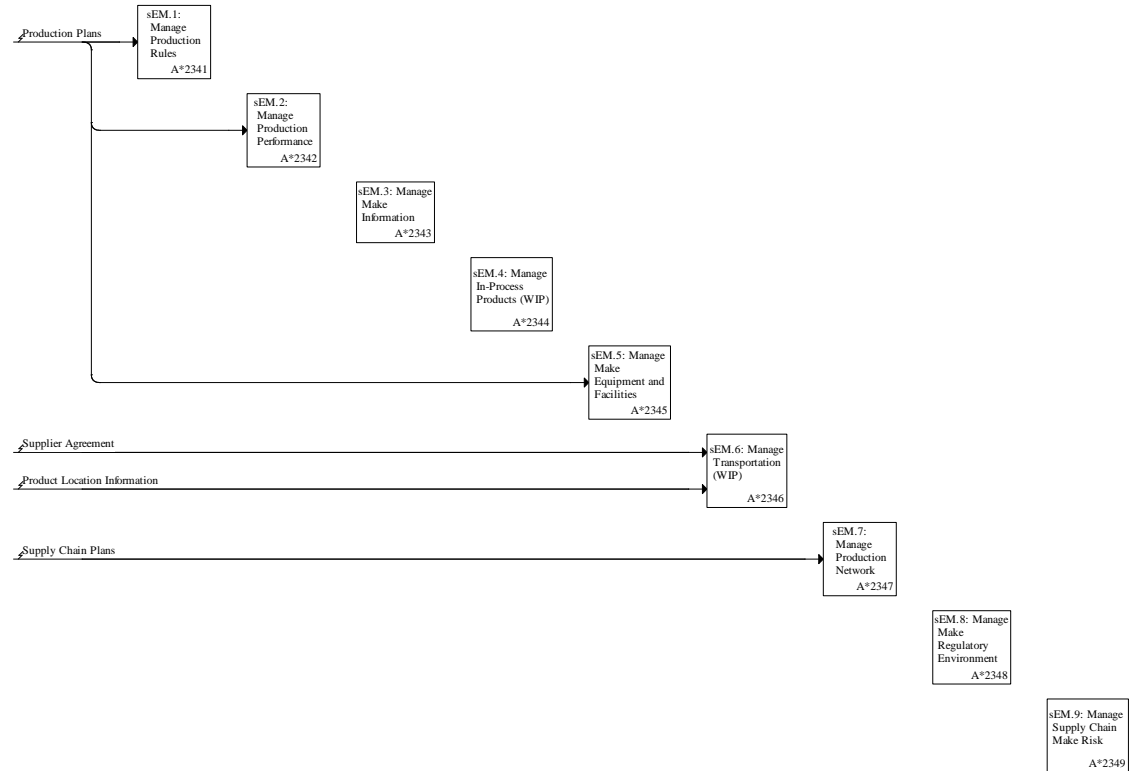


Repository: ; Date: 10/10/2012

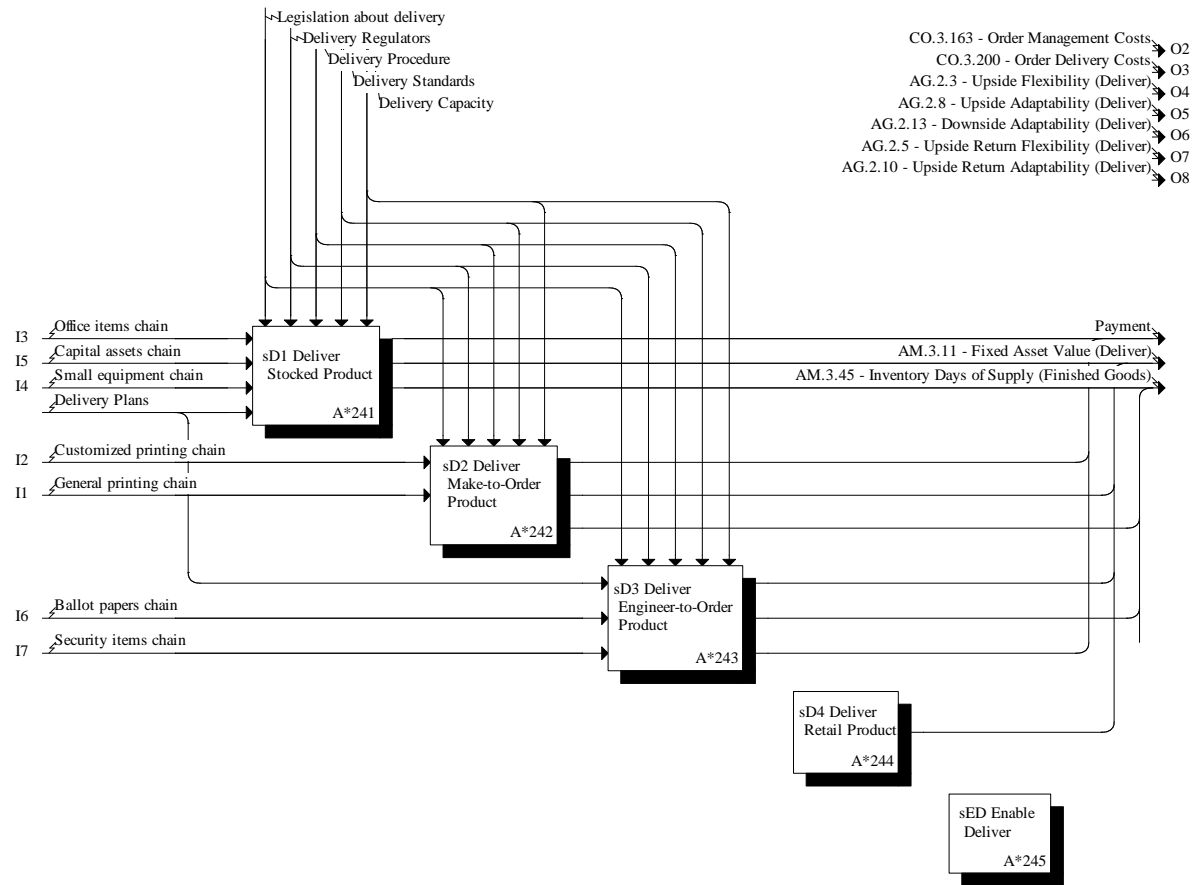
Title:A*2331: sM3.1: Finalize Production Engineering

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Title:A*234: sEM Enable Make

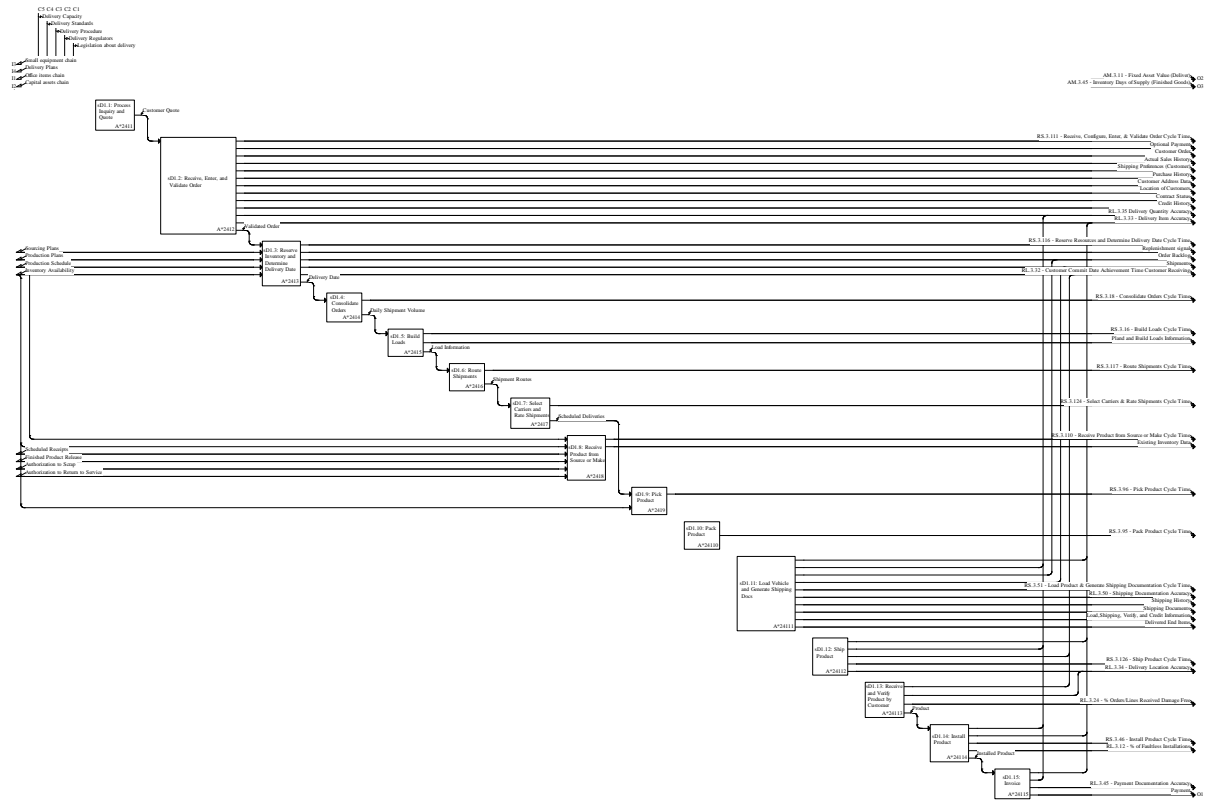


Title:A*24: sD DELIVER



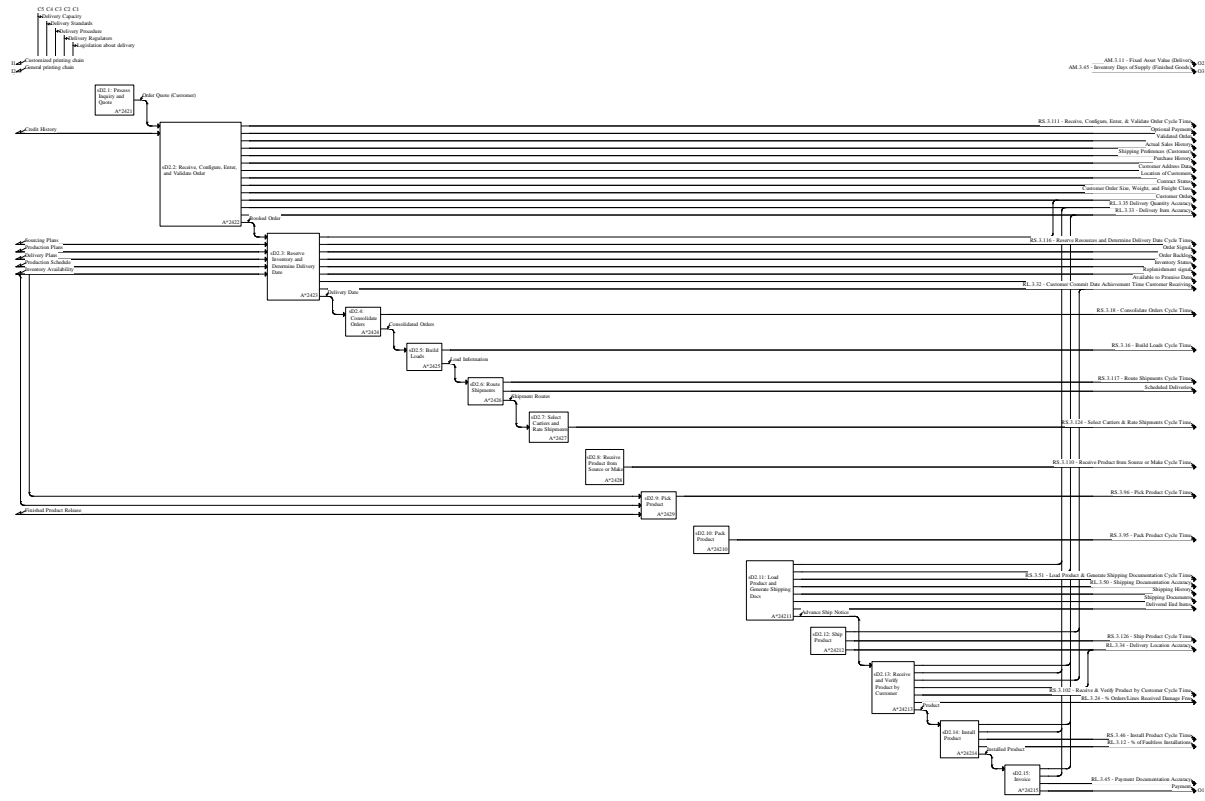
Repository: ; Date: 10/10/2012

Title:A*241: sD1 Deliver Stocked Product

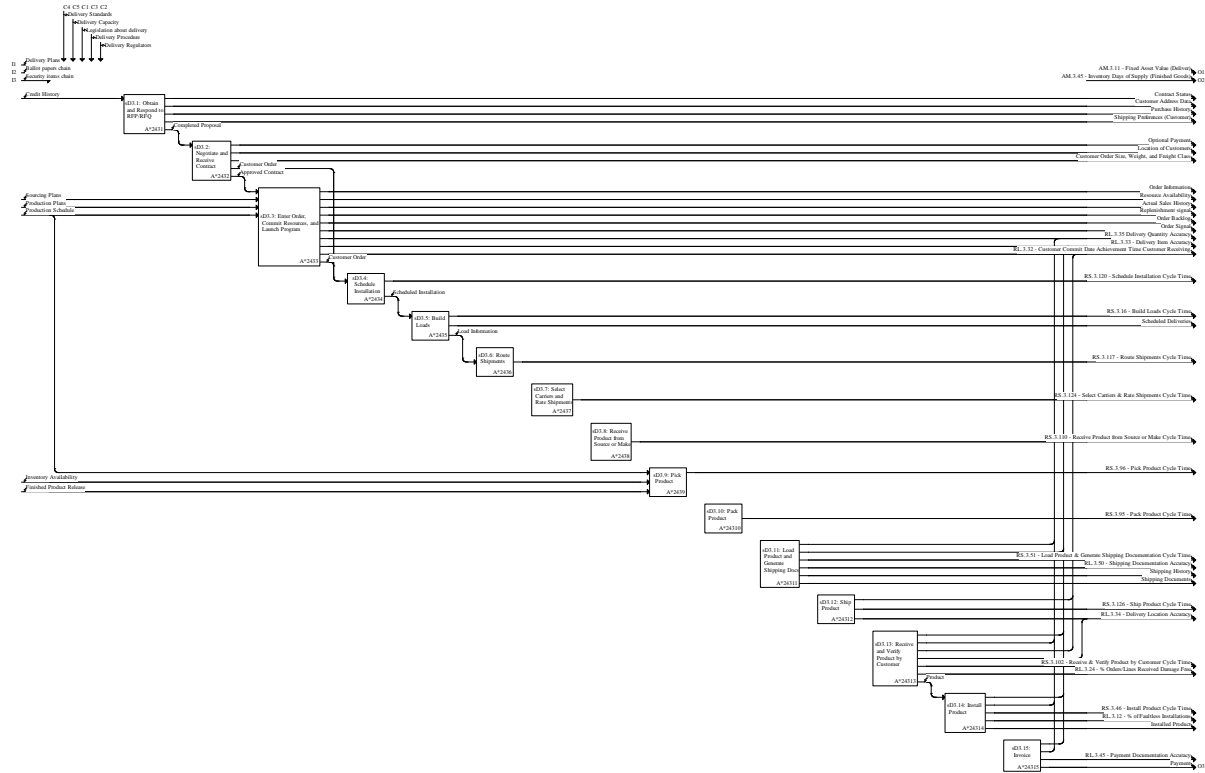


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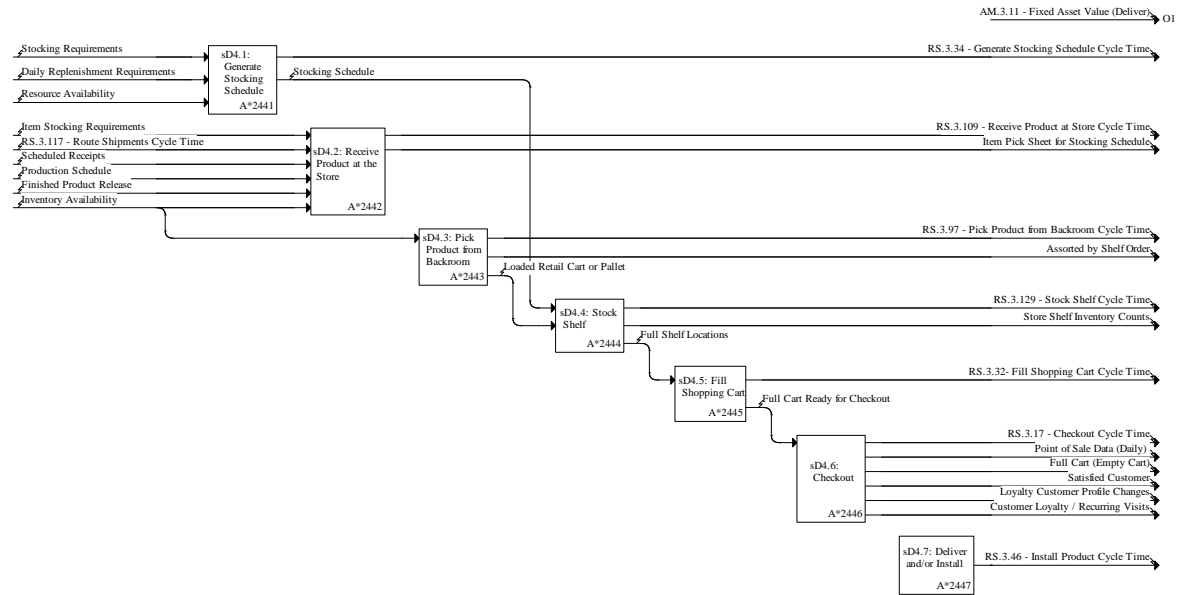
Title:A*242: sD2 Deliver Make-to-Order Product



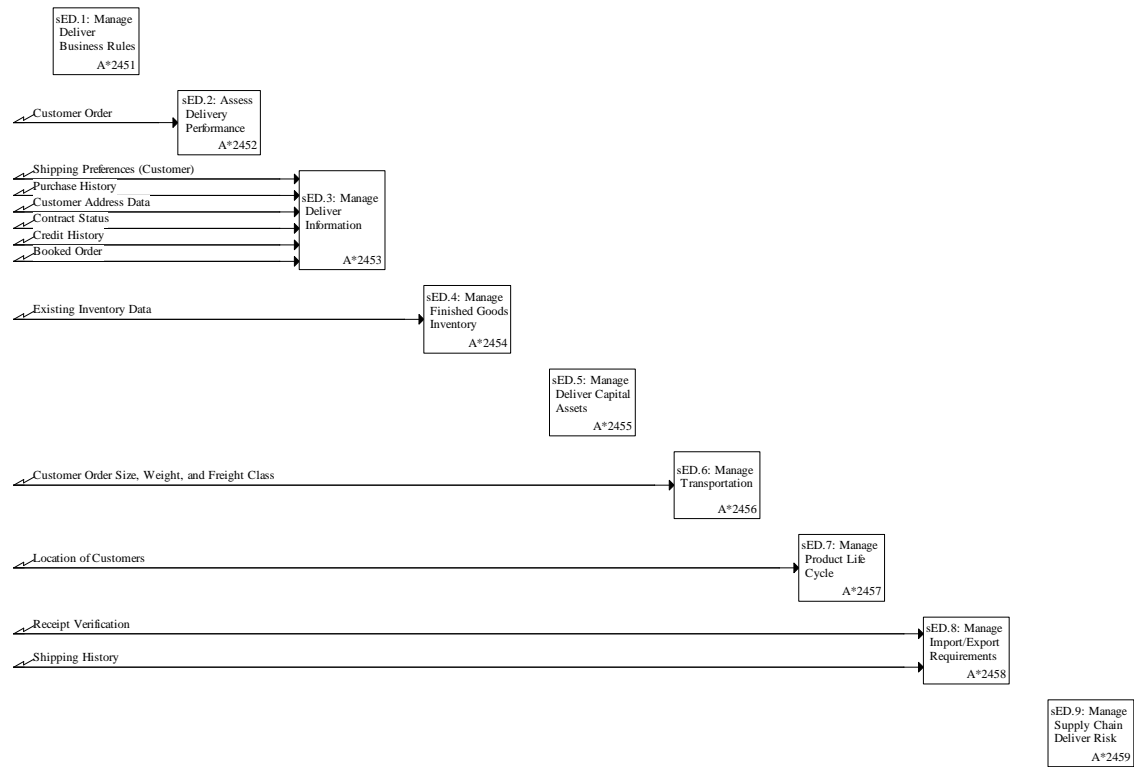
Title:A*243: sD3 Deliver Engineer-to-Order Product



Title:A*244: sD4 Deliver Retail Product

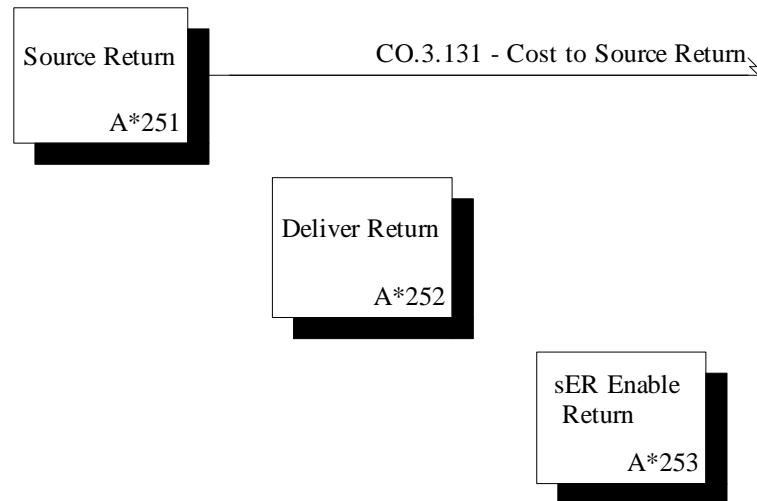


Title:A*245: sED Enable Deliver

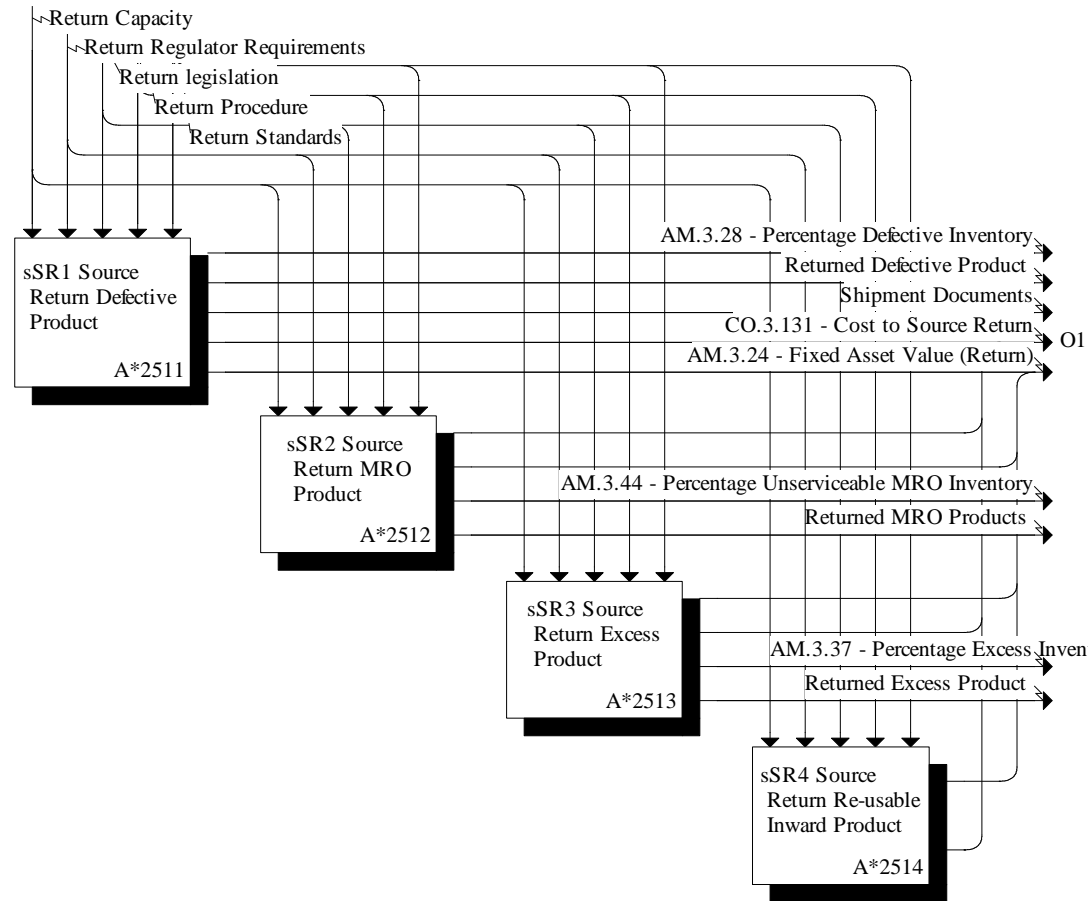


Title:A*25: sR RETURN

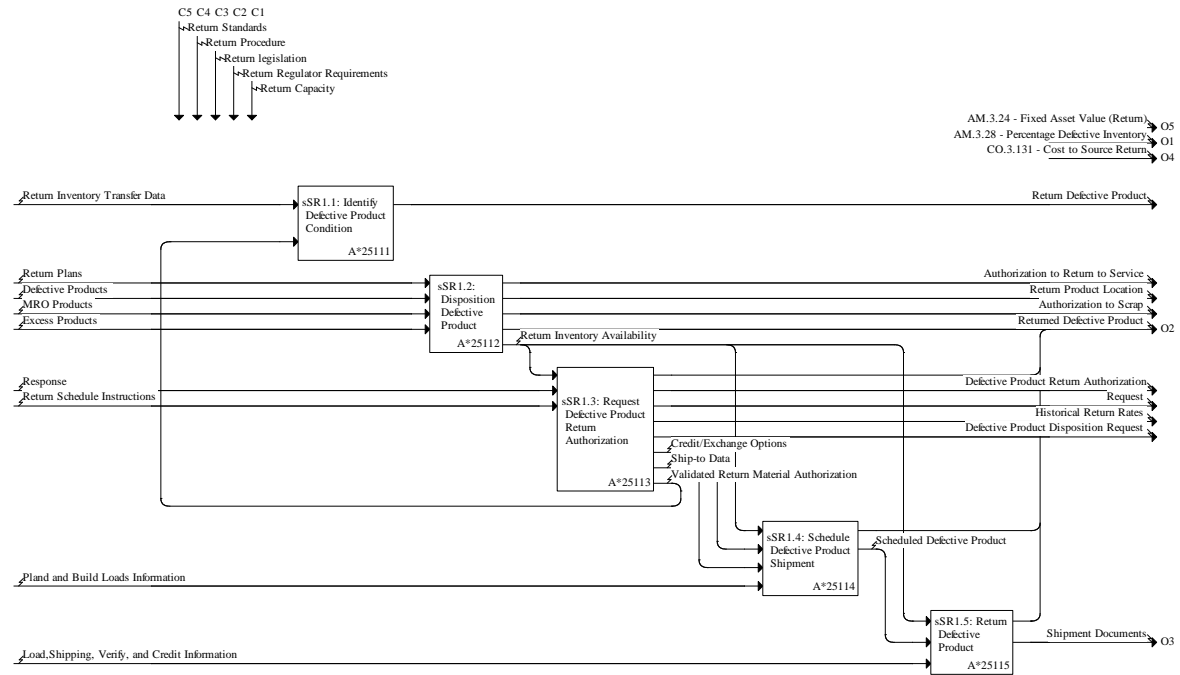
- I1 ← General printing chain
- I2 ← Customized printing chain
- I3 ← Office items chain
- I4 ← Small equipment chain
- I5 ← Capital assets chain
- I6 ← Ballot papers chain
- I7 ← Security items chain



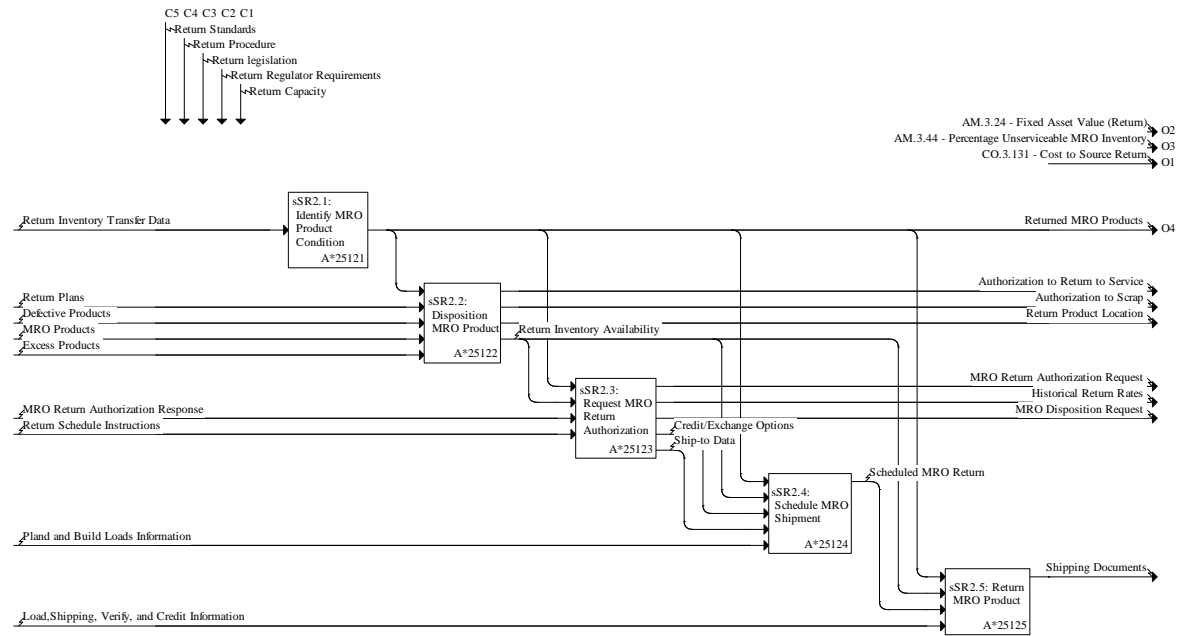
Title:A*251: Source Return



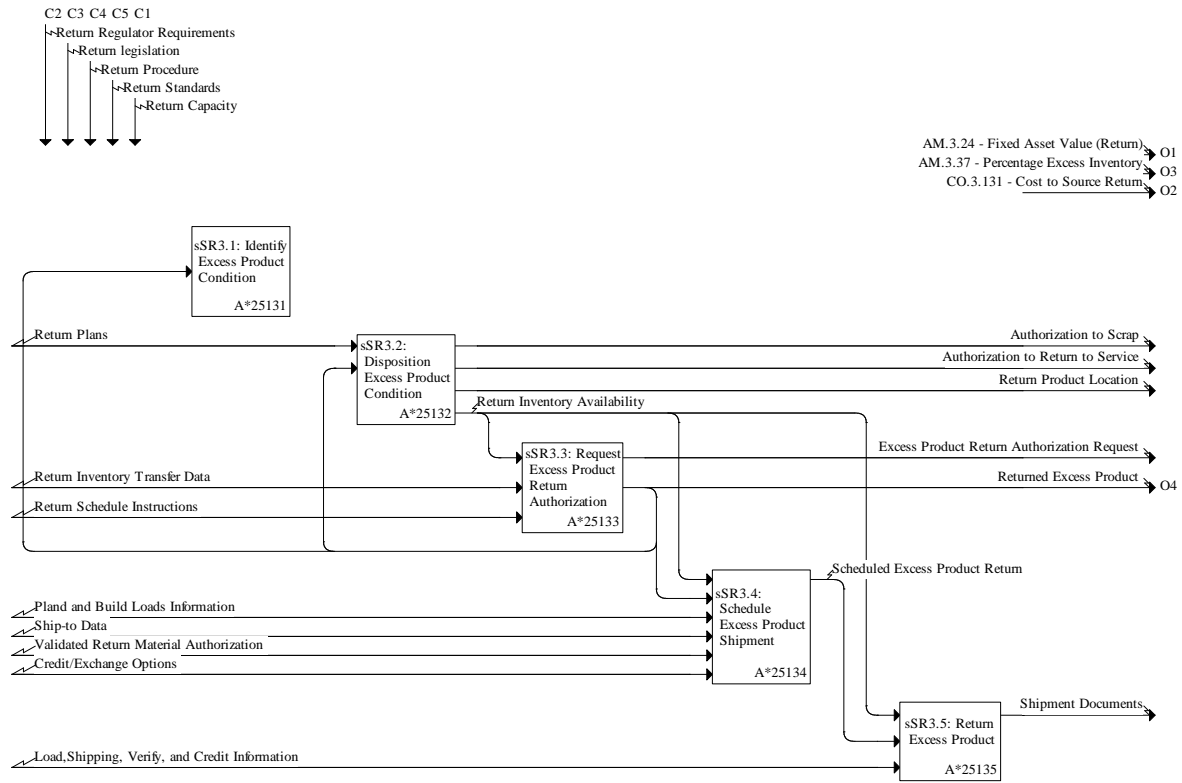
Title:A*2511: sSR1 Source Return Defective Product



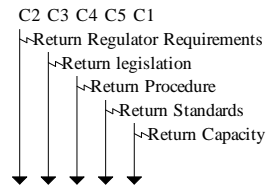
Title:A*2512: sSR2 Source Return MRO Product



Title: A*2513: sSR3 Source Return Excess Product



Title:A*2514: sSR4 Source Return Re-usable Inward Product



AM.3.24 - Fixed Asset Value (Return) → O1
CO.3.131 - Cost to Source Return → O2

sSR4.1: Identify
Re-usable
Inward Product
Condition
A*25141

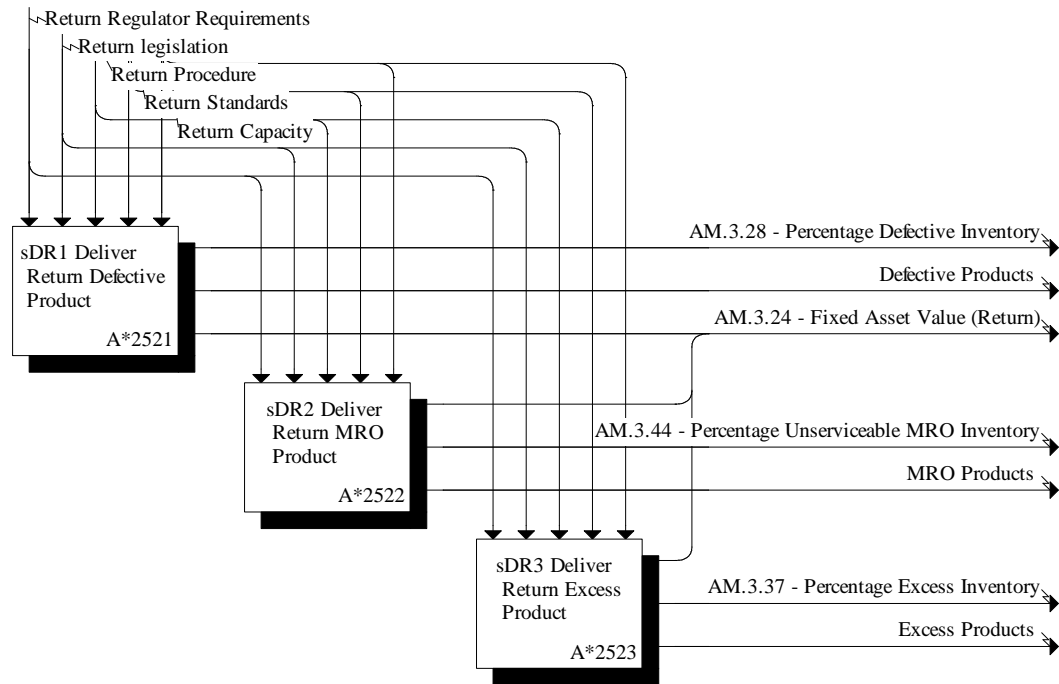
sSR4.2:
Disposition
Re-usable
Inward Product
Condition
A*25142

sSR4.3: Request
Re-usable Inward
Product Return
Authorization
A*25143

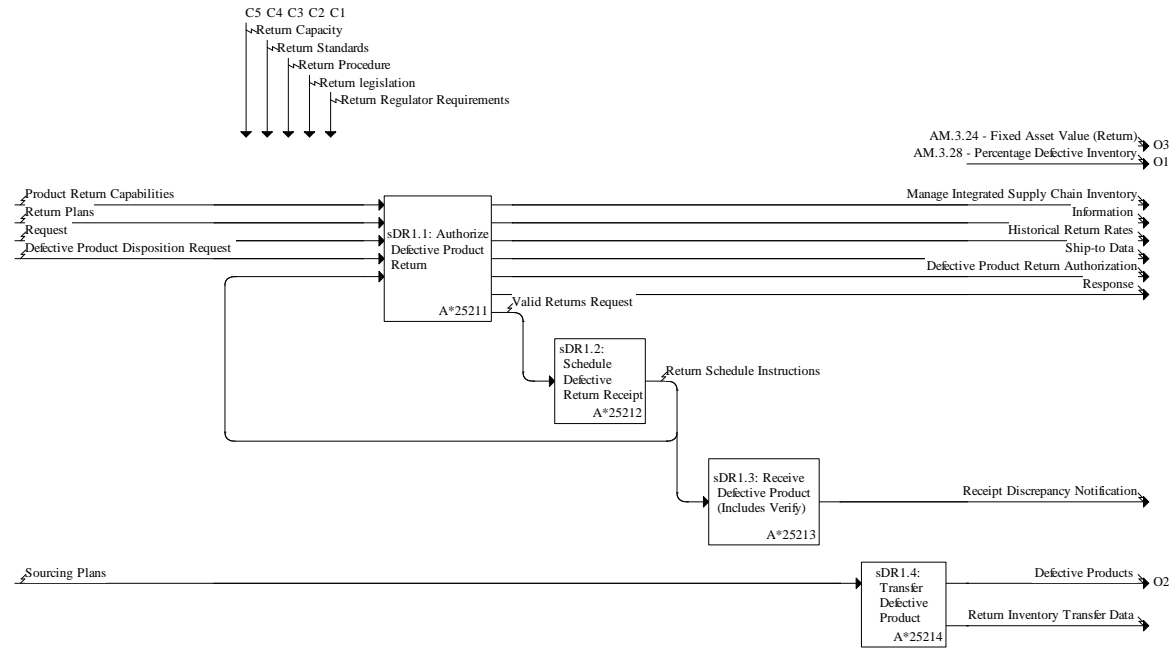
sSR4.4:
Schedule
Re-usable
inward Product
Shipment
A*25144

sSR4.5: Return
Re-usable
Inward Product
A*25145

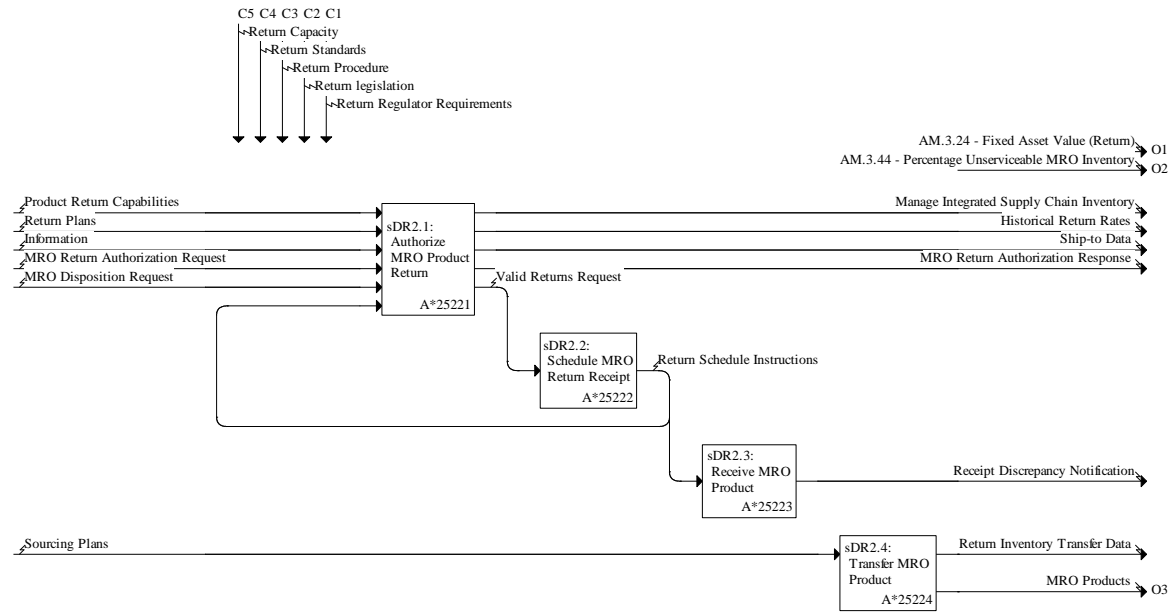
Title:A*252: Deliver Return



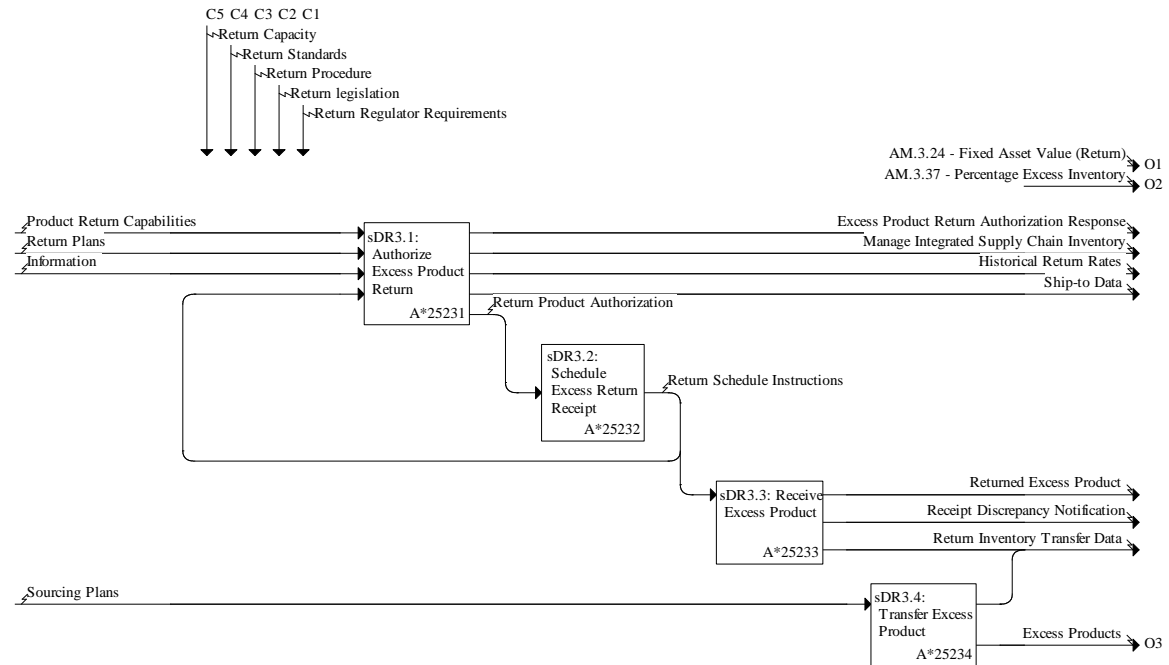
Title:A*2521: sDR1 Deliver Return Defective Product



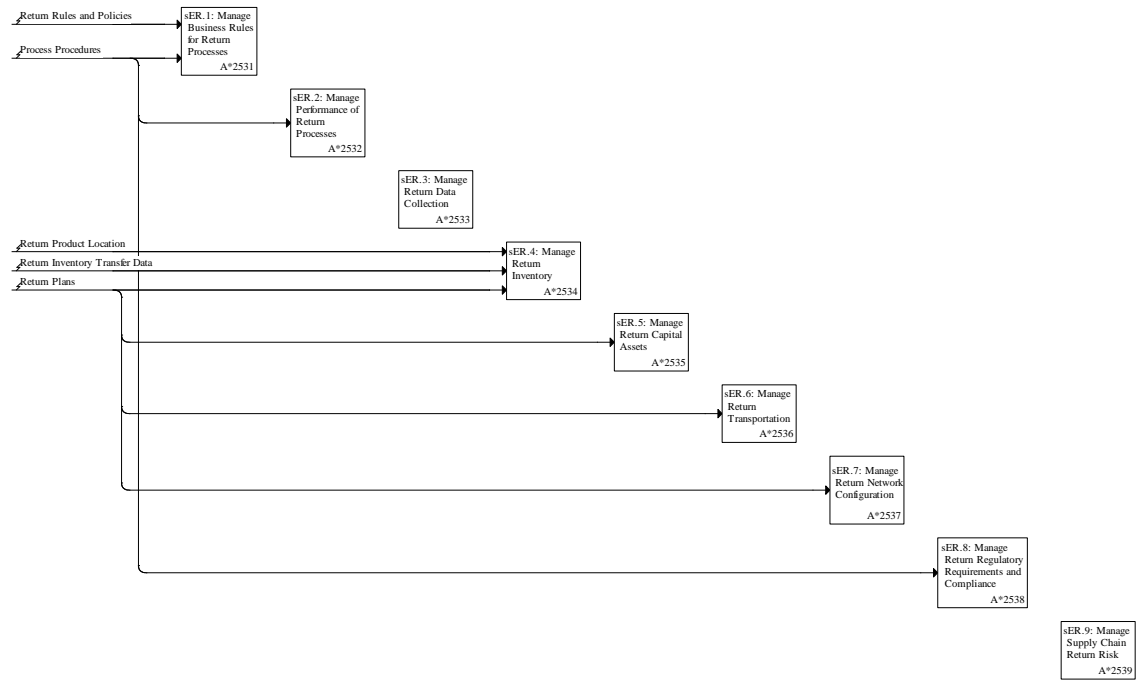
Title:A*2522: sDR2 Deliver Return MRO Product



Title:A*2523: sDR3 Deliver Return Excess Product



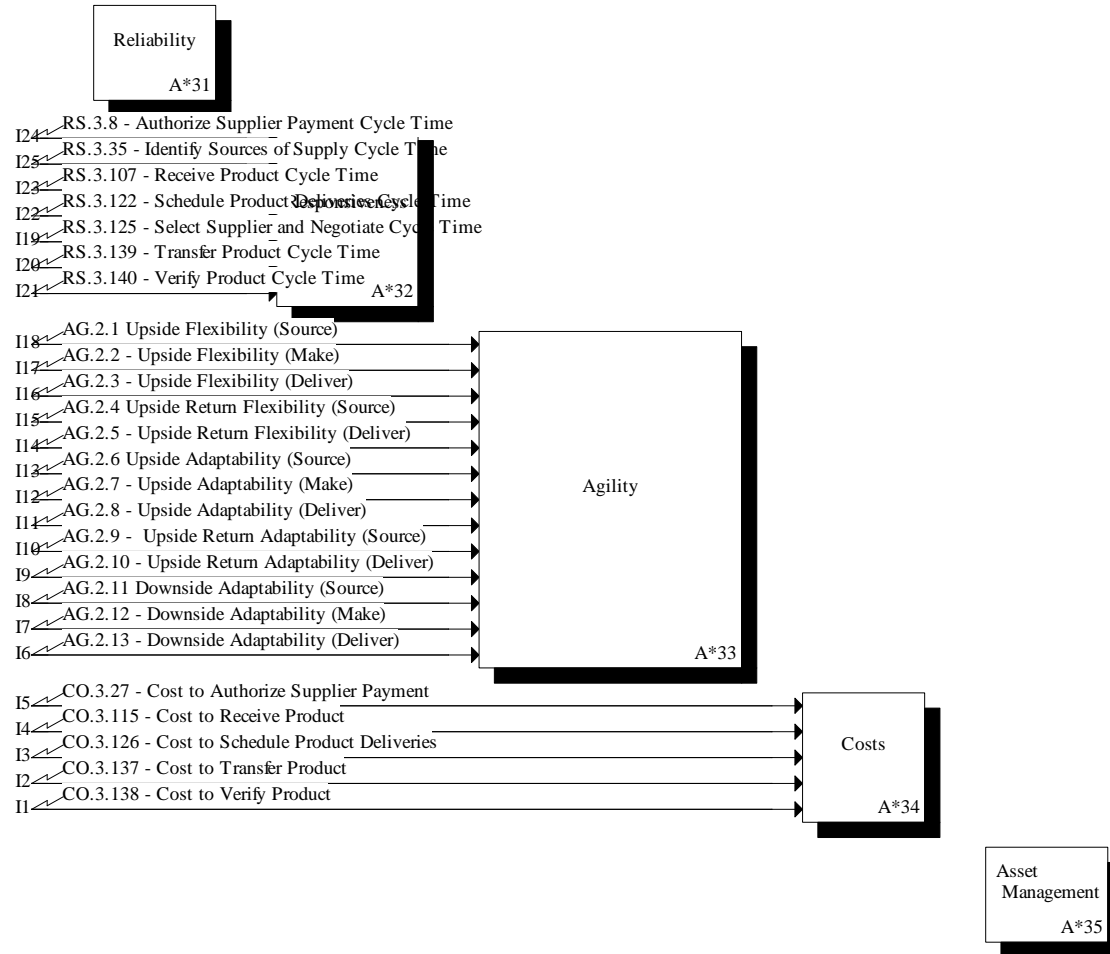
Title:A*253: sER Enable Return



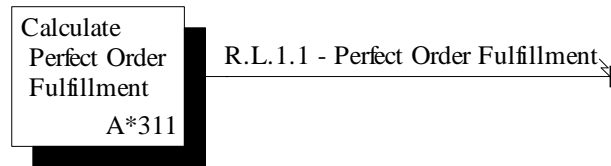
Repository: ; Date: 10/10/2012

Title:A*3: PERFORMANCE Framework

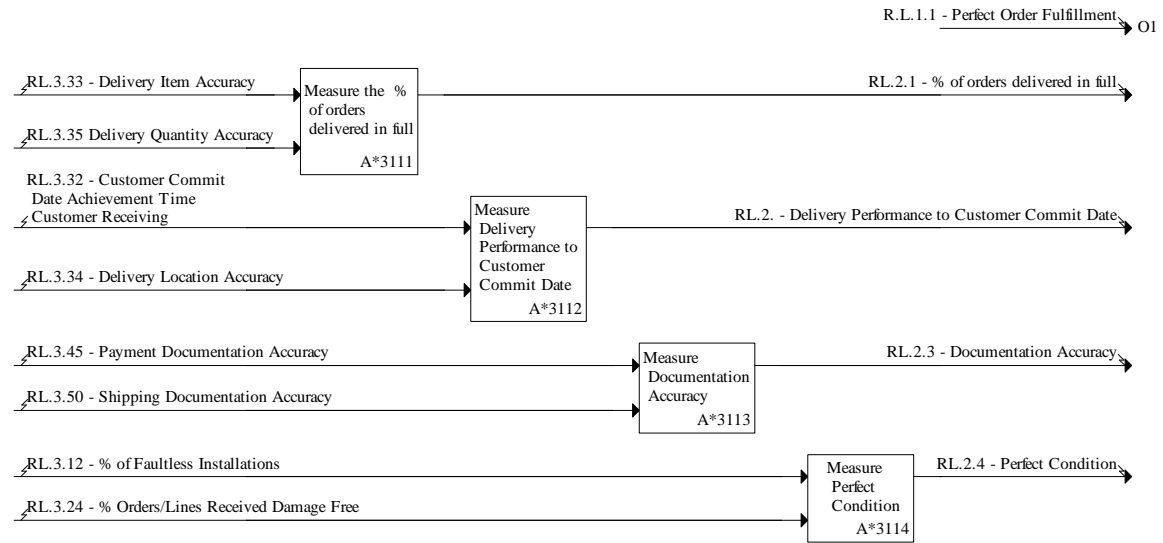
For Official Use Only



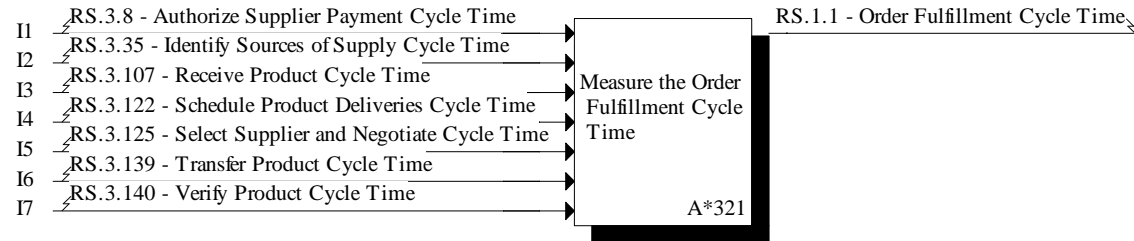
Title:A*31: Reliability



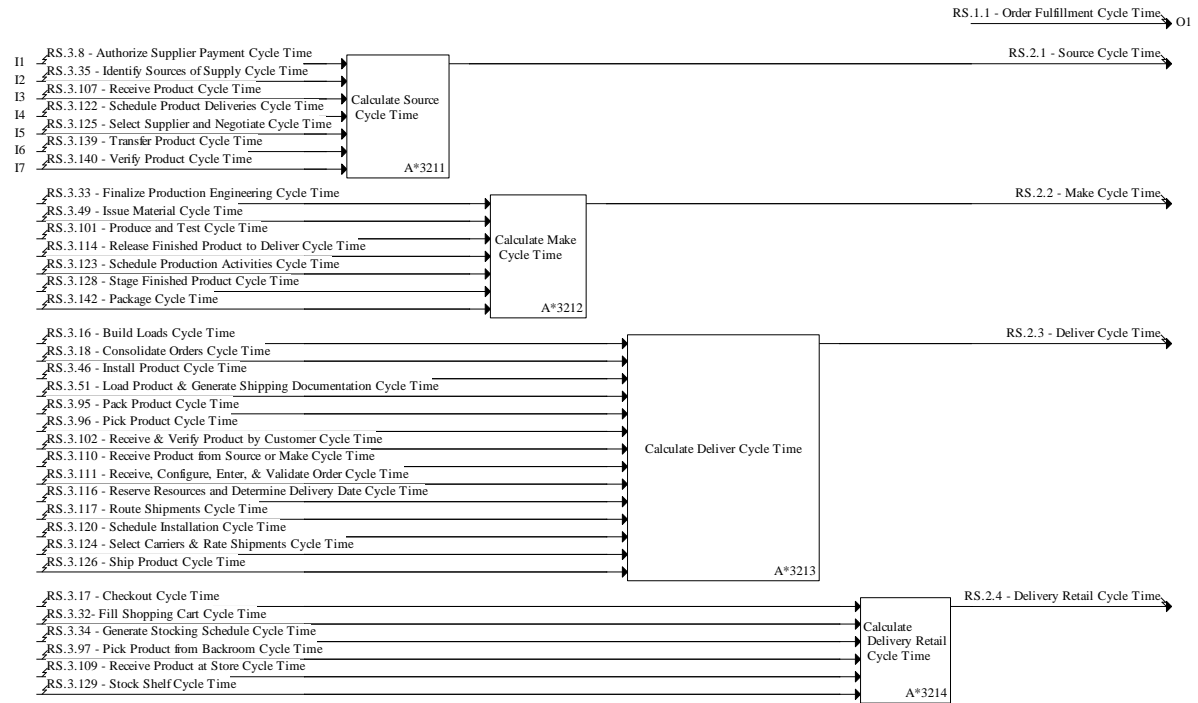
Title:A*311: Calculate Perfect Order Fulfillment



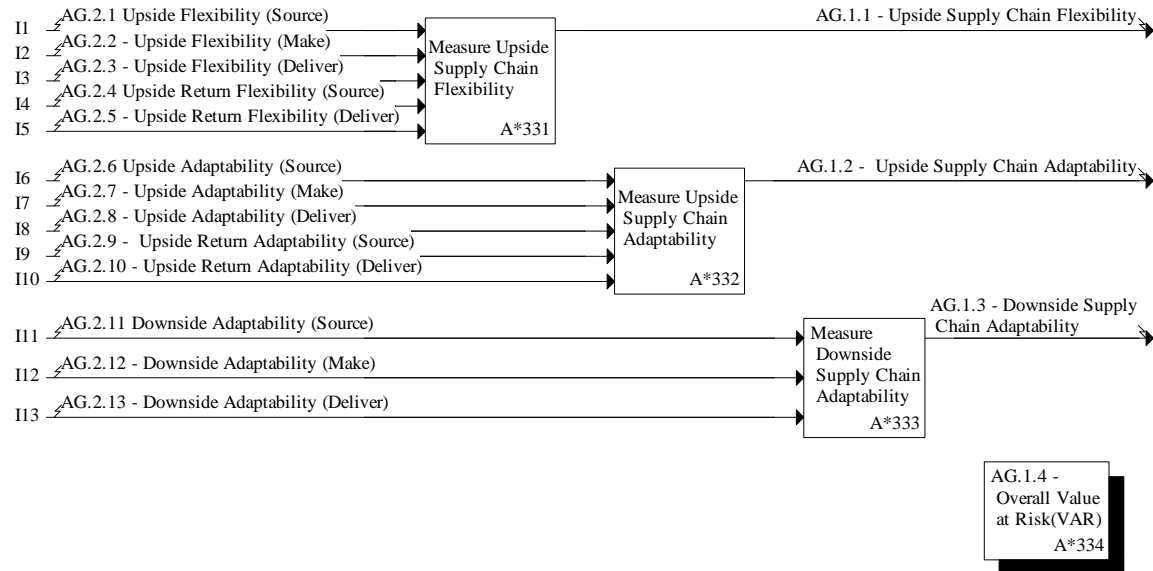
Title:A*32: Responsiveness



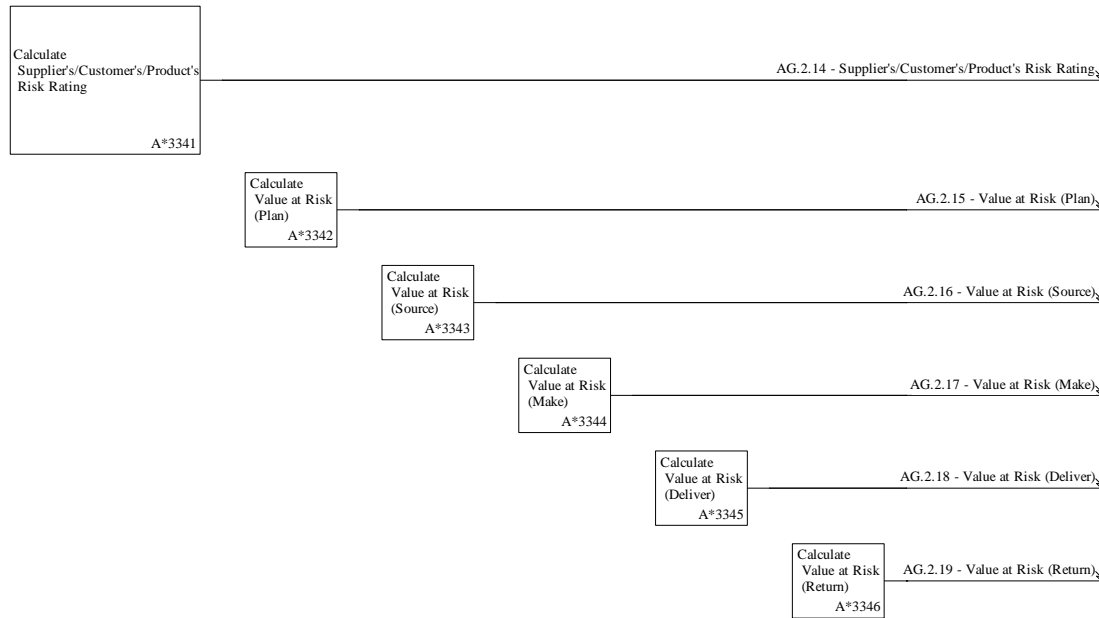
Title:A*321: Measure the Order Fulfillment Cycle Time



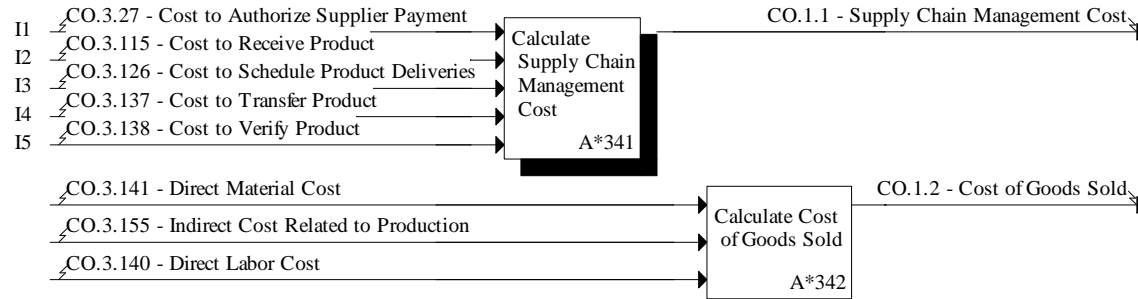
Title:A*33: Agility



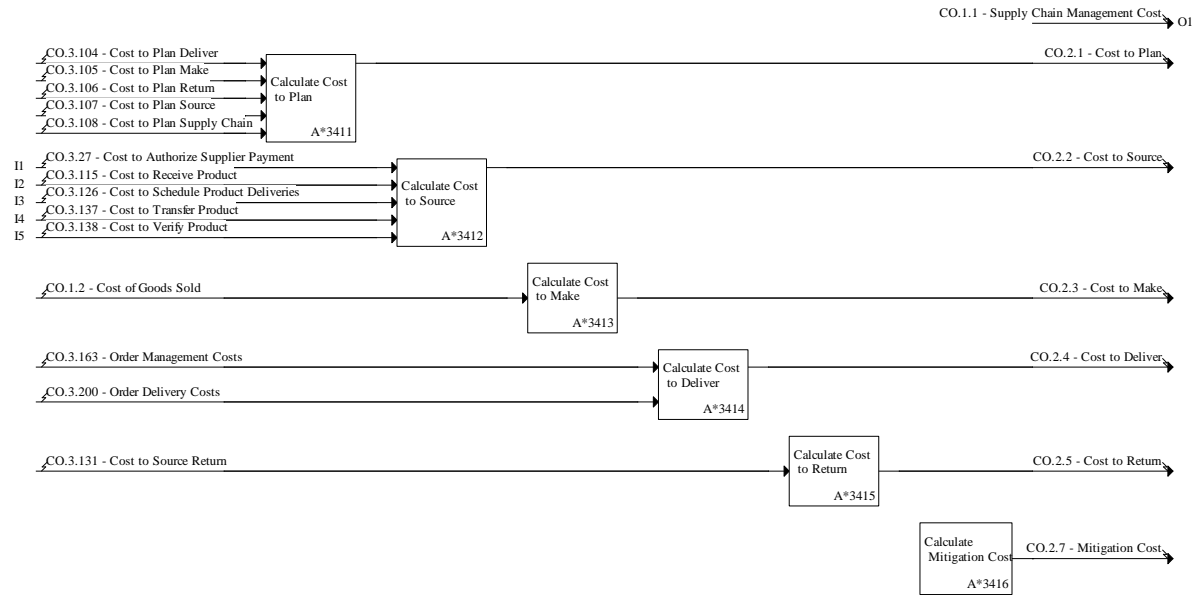
Title:A*334: AG.1.4 - Overall Value at Risk(VAR)



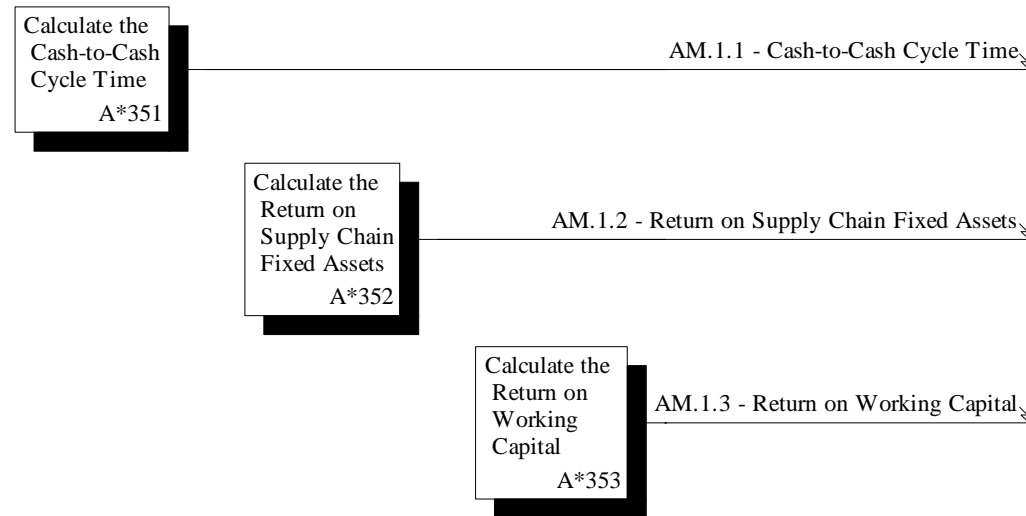
Title:A*34: Costs



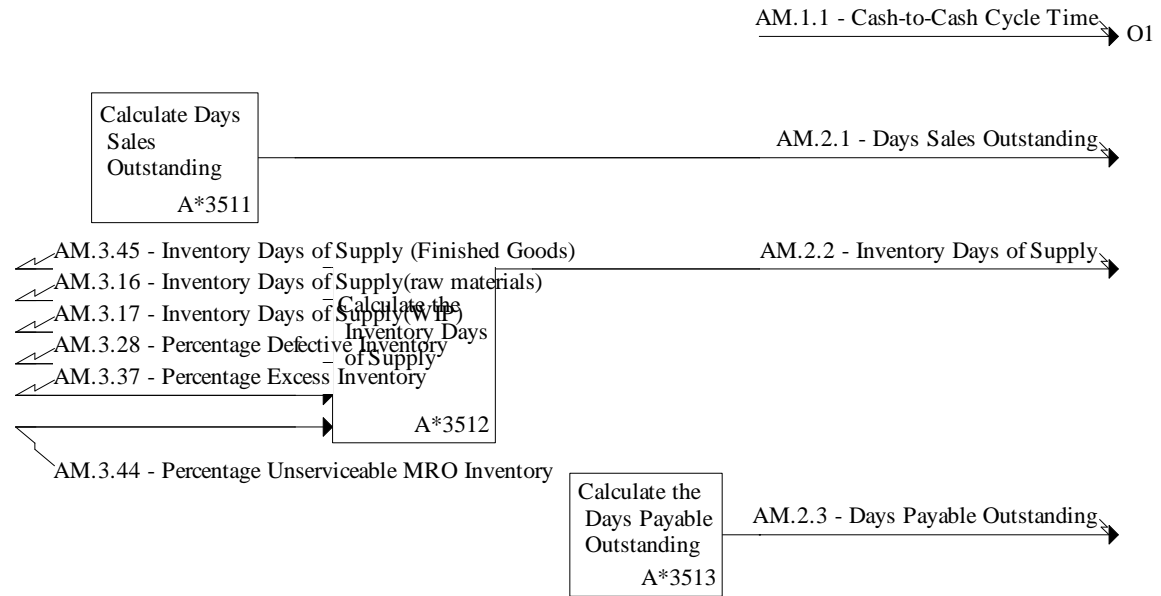
Title:A*341: Calculate Supply Chain Management Cost



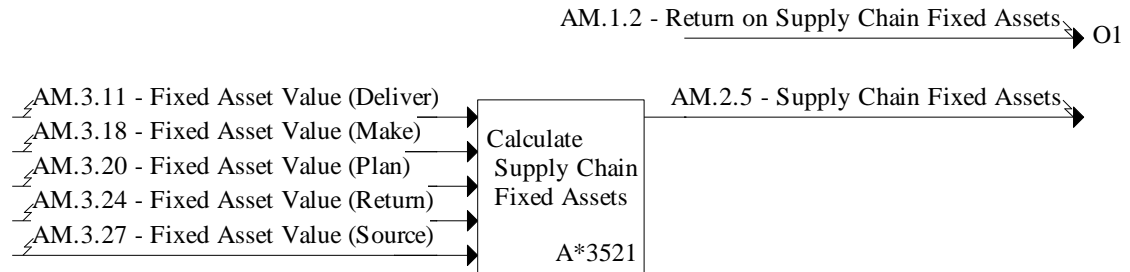
Title:A*35: Asset Management



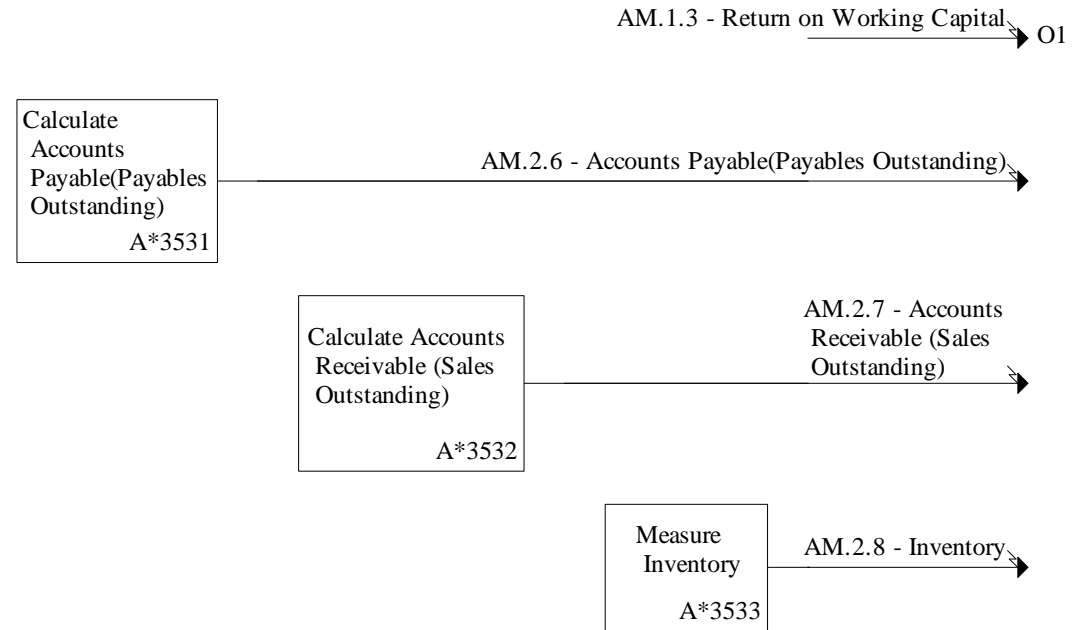
Title:A*351: Calculate the Cash-to-Cash Cycle Time



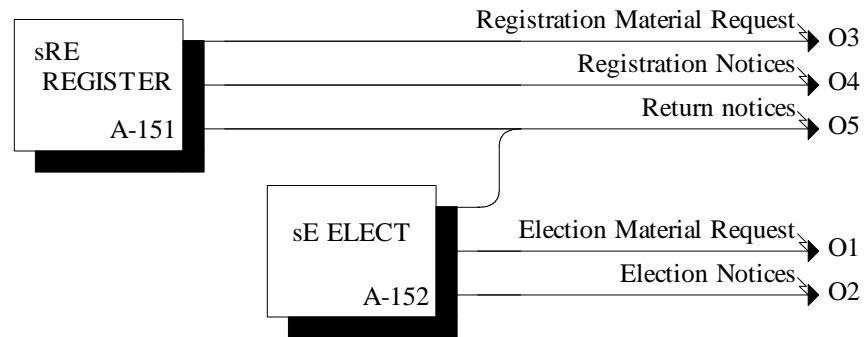
Title:A*352: Calculate the Return on Supply Chain Fixed Assets



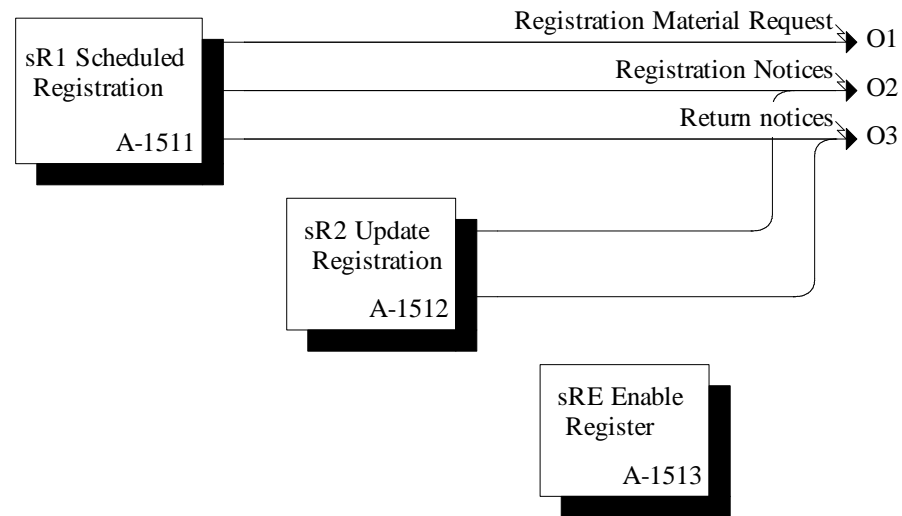
Title:A*353: Calculate the Return on Working Capital



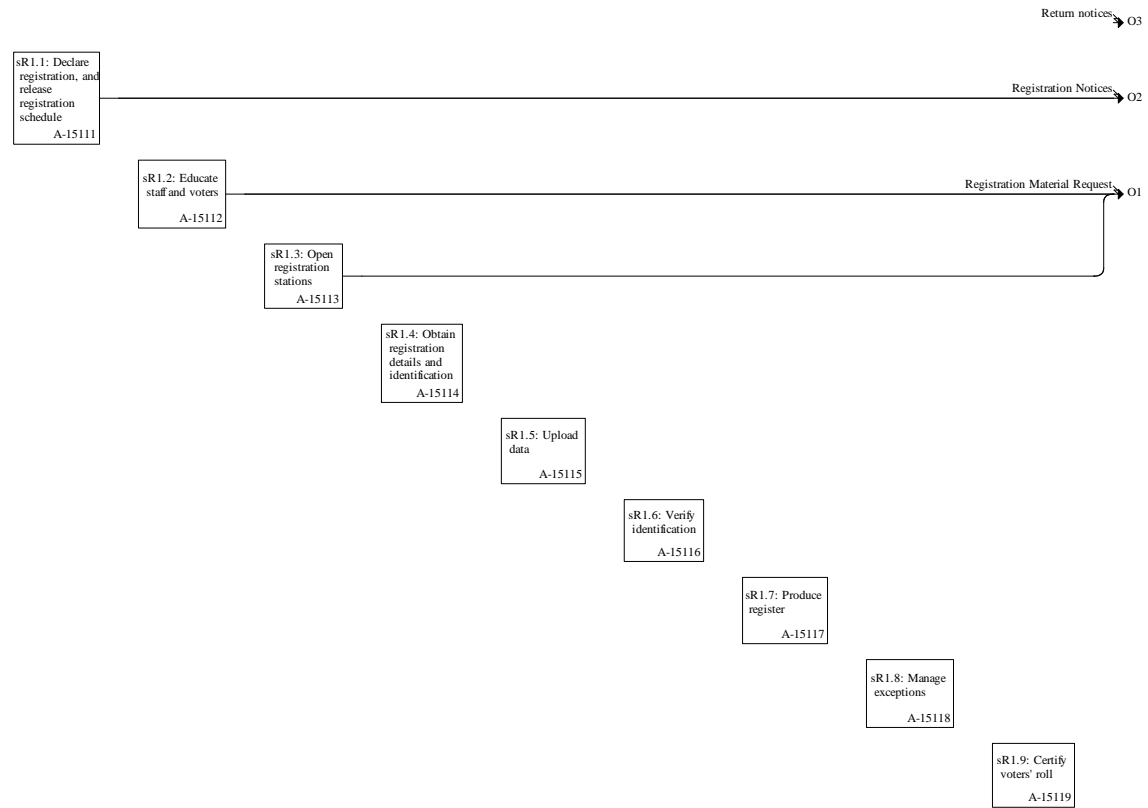
Title:A-15: Electoral Processes



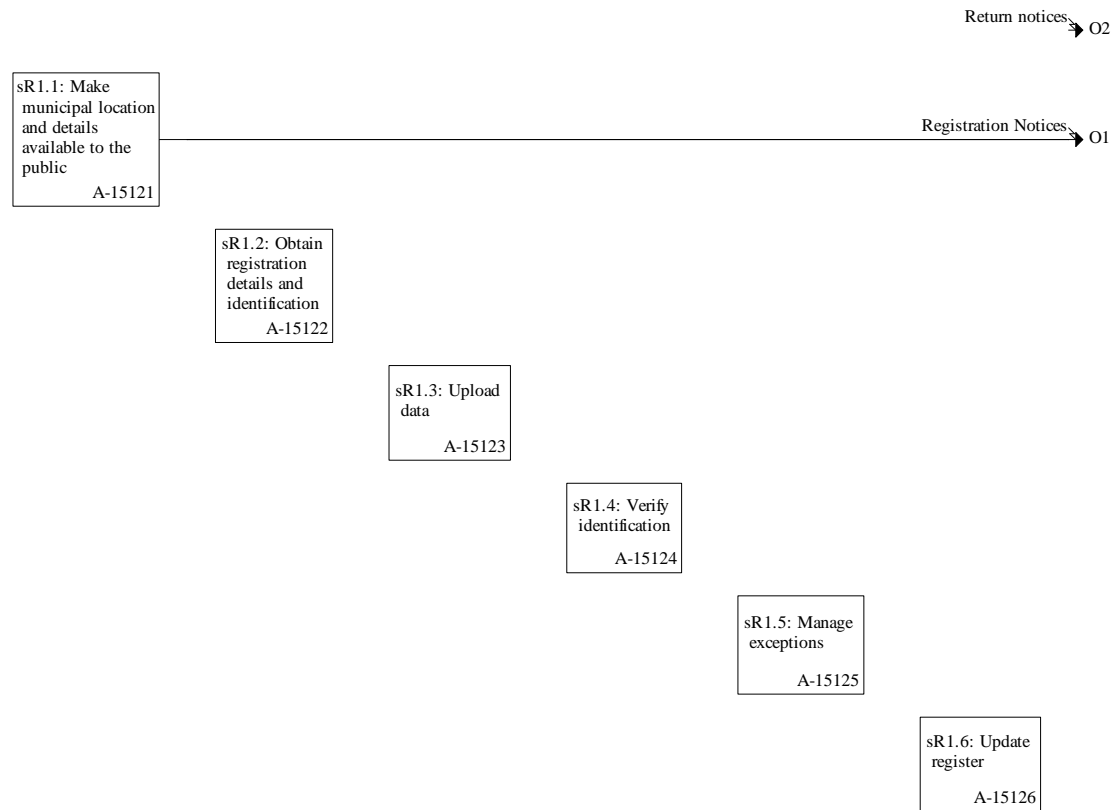
Title:A-151: sRE REGISTER



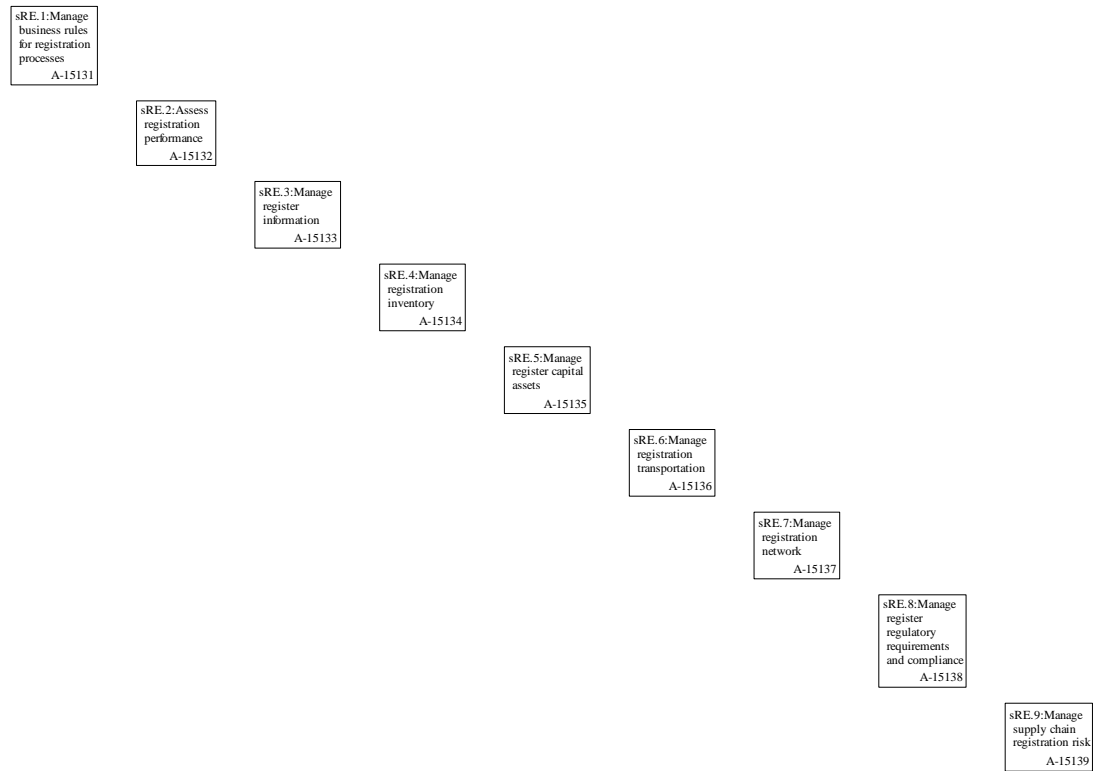
Title:A-1511: sR1 Scheduled Registration



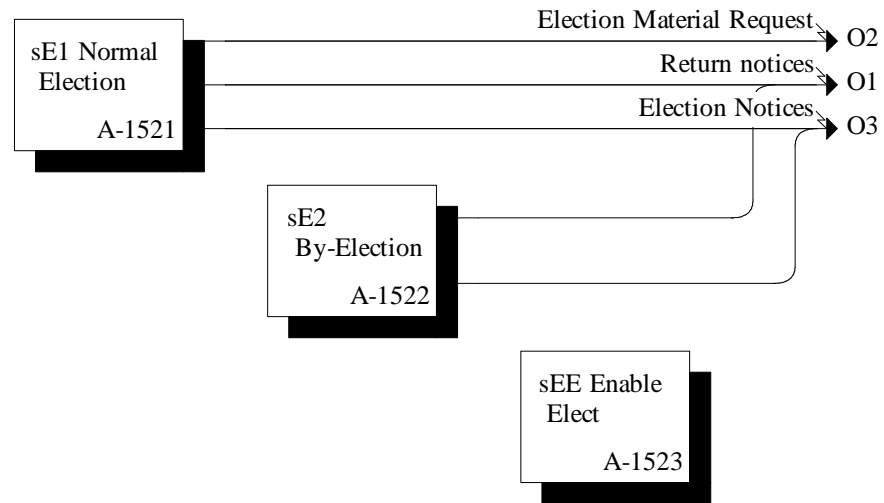
Title:A-1512: sR2 Update Registration



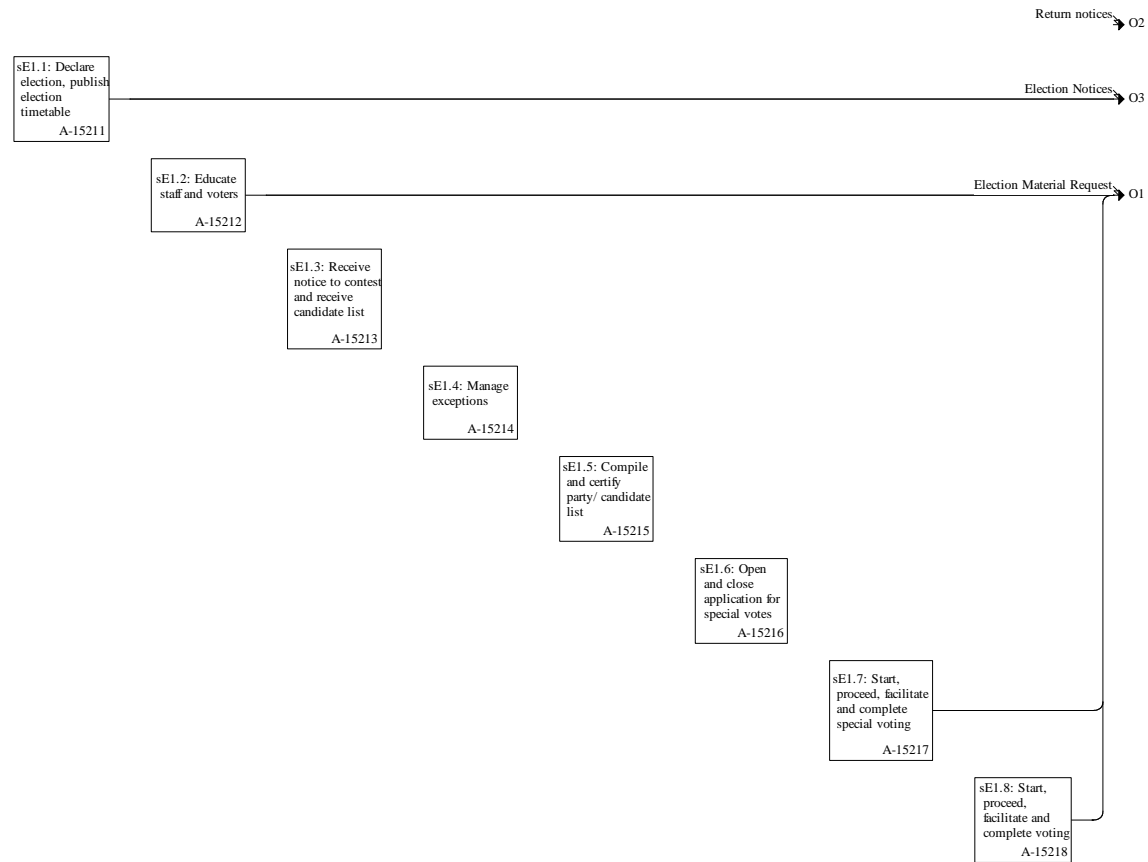
Title:A-1513: sRE Enable Register



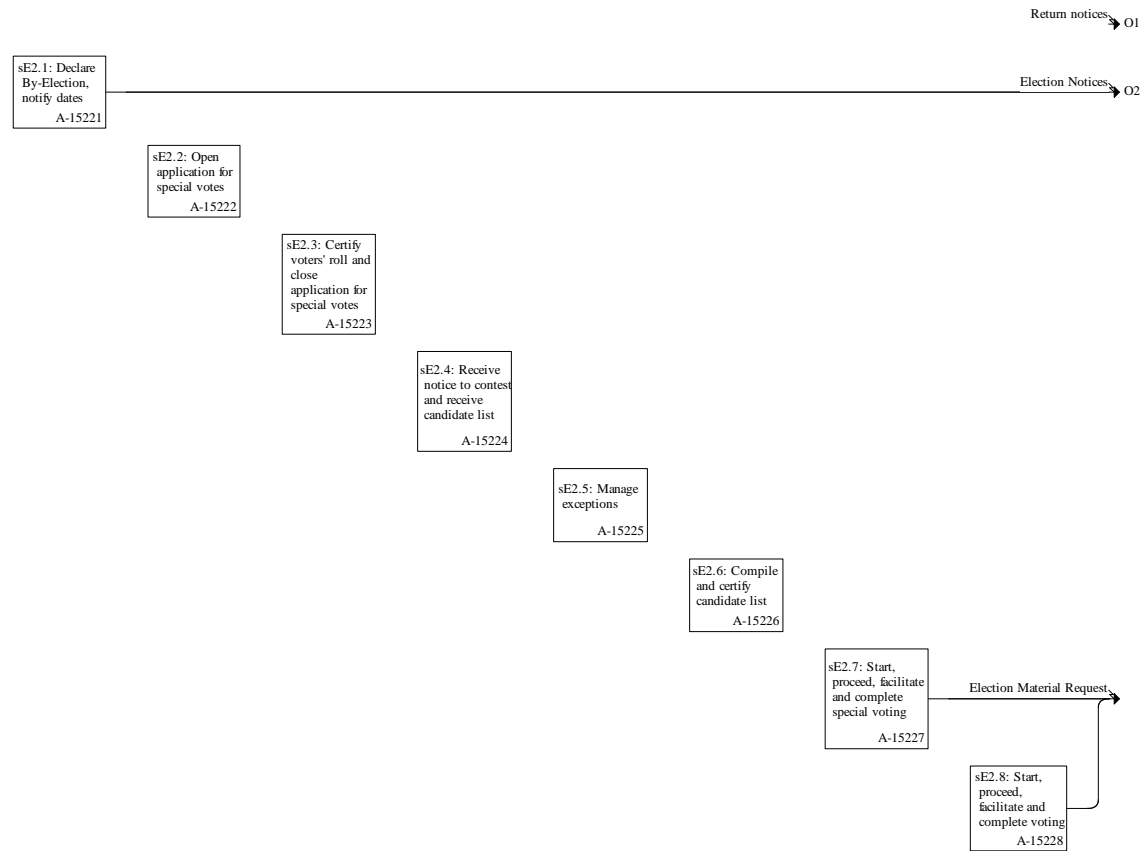
Title:A-152: sE ELECT



Title:A-1521: sE1 Normal Election



Title:A-1522: sE2 By-Election



Title:A-1523: sEE Enable Elect

