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MZ:2014:04

# Reform and Modernisation of Statistical Production Processes with Focus on ICT at INE

Report from a mission to the National Statistical Institute of  
Mozambique, Maputo, Mozambique

02 – 20 May, 2014

*within the frame work of the*

***AGREEMENT ON CONSULTING ON  
INSTITUTIONAL CAPACITY BUILDING,  
ECONOMIC STATISTICS AND RELATED AREAS***

between

**INE and Scanstat**

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## List of Abbreviations

BA	Business Analyst
BPR	Business Process Reengineering
DBA	Database Administrator
GSBPM	Generic Statistical Business Process Model
INE	Instituto Nacional de Estatística, Mozambique
IS	Information System
MZM	Mozambique Meticaïs
Scanstat	Consortium between Statistics Denmark, Statistics Norway and Statistics Sweden



INE is an organisation that evolved from a strictly manual environment to an organisation that uses IT tools, some developed internally and some acquired externally, **without holistic mapping between the needs/processes of the organisation, and the implemented solutions**. While the progress from a manual environment to the current situation is substantial, many shortcomings still exist. Indeed, it has attained the limits of what can be achieved using a piece-meal approach. Integrating ICT into the fabric of the organisation will require a substantial reform throughout all levels of the organisation.

Today, INE – and especially upper management – is an organisation that understands the value of ICT, and recognises that ICT has to play a more strategic role. Still, INE's main challenge is to integrate ICT in its day-to-day operations.

The **modernisation of ICT inexorably leads to a wider reform** that requires rethinking the central role of ICT in relation to operations. In turn, **reengineering the business processes and practices** becomes unavoidable: Processes and practices have to be properly supported by the systems and databases, the latter have to be modernised, competences and expertise in the utilisation (for users) and maintenance (for DISI's staff) of IT solutions have to be massively increased, and a culture of utilisation of IT in day-to-day operations amongst users has to be developed.

In line with this background, the *Coordination Group for the Reform and Modernization of Statistical Production Processes with focus on the ICT* has been setup. This group is tasked with the implementation of the reform. In the last 10 months, the group has conducted the following activities:

- Raise awareness throughout INE about the modernisation and the ICT. This has been done through meetings, workshops and communications;
- Merged the C2D Plan of Action into the overall INE plan, with an associated budget;
- Circulated weekly updates to all stakeholders;
- Mobilised the appropriate consultants to start the implementation itself (which is the object of the current document).

Consequently, **the next step is to start implementing the modernisation activities**.

This document presents a path to achieve this. The mission in Maputo took place from 02 June, 2014 to 20 June, 2014. The main focus of the mission was to follow-up on the 2012 C2D Services<sup>1</sup> Plan for Modernisation and conduct activities leading to its implementation. The detailed terms of references of the assignment are presented in Annex L.

The 2012 Plan for Modernisation was comprehensive and ambitious. One of its challenges was precisely its scope and the fact it touched upon many areas of the organization: Processes, ICT, subject matter expertise and management. Consequently, the present plan has been tailored in such a way that smaller steps have been carved out from the main Plan for Modernisation, steps that can be implemented by INE in the short term, hence achieving quick wins and generating a momentum towards modernization.

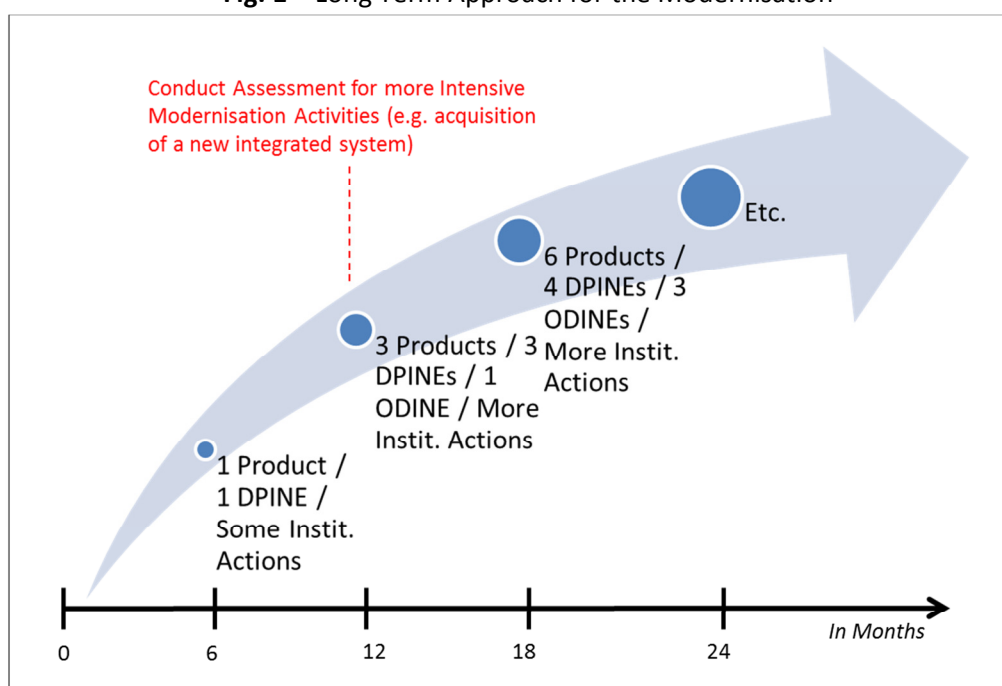
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<sup>1</sup> C2D Services Inc., Technical Assistance for the National Statistics Institute of Mozambique, Consultancy Report – Final, September 2012.

One of the fundamental objectives of this assignment is to **avoid having yet another report**. It is agreed by all parties that **INE needs – and is willing and committed – to modernise**. Many reports have already been drafted that come to this conclusion. Rather, the objective is to have **a plan with concrete actions that INE can activate easily, and produce concrete and measurable results**. Ultimately, the results must yield processes that generate data of better quality, available quicker, at a lower cost.

When looking at INE's readiness conditions, **a gradual - but coordinated and comprehensive - strategy** is more adequate. This would **allow INE to build capacity gradually**, accelerate the modernisation effort, and ultimately move into more drastic modernisation components such as a fully integrated system/database. Hence, the modernisation has to be viewed in the long term with some activities unfolding in the very short term. The following picture depicts the overall approach.

**Fig. 1 – Long Term Approach for the Modernisation**



The approach is such that each 4 to 6 months see a new modernisation exercise take place. Each modernisation exercise includes the modernisation of products and DPINES. Institutional actions are also put into motion at each cycle. As things progress, ODINES become part of the modernisation effort as well.

The speed at which the modernisation can unfold is proportionate to INE's capacity to mobilise the appropriate resources, mainly the Business Analysts (internal advisor-type, see below for more details). If INE has the appropriate resources, it is possible to envisage a modernisation plan with several products and DPINES being modernised in the first cycle.

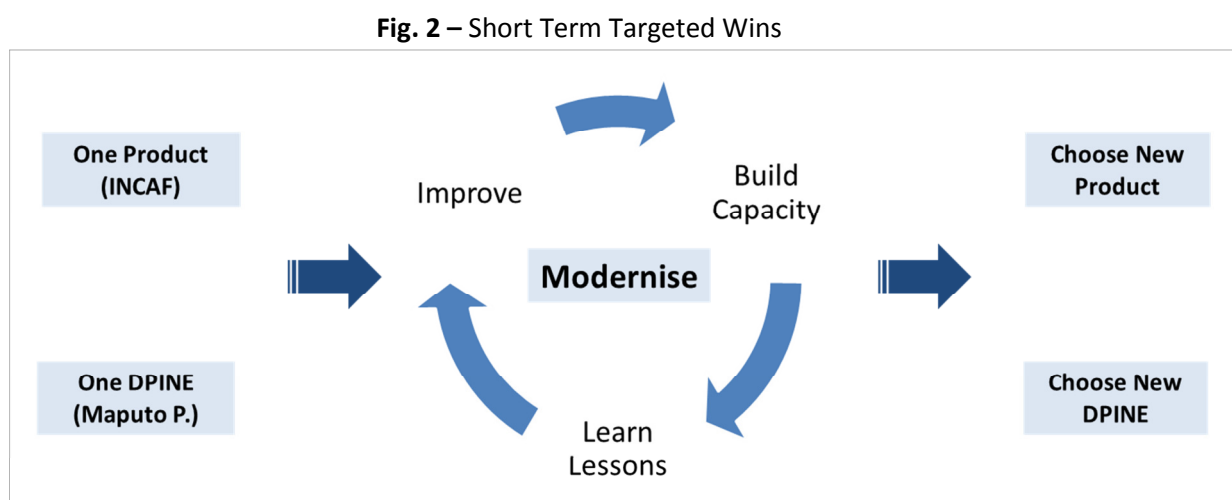
As things pick up pace, a critical mass of modernised products/DPINES/ODINES/Institutional actions will be reached. At this stage, it becomes possible for INE to consider more drastic modernisation activities such as the acquisition of an integrated system. This stage could be reached within 12 months, although again, this is dependent on INE's capacity to mobilise the appropriate resources.

Each of the cycle (bullet) of the figure above is divided into two main components:

- a. **Product and DPINE Short Term Targeted Wins.** The goal is to start modernisation activities in the very short term, demonstrate that positive results can be achieved, while building internal capacity and knowledge.

The key for quick wins is to be focused on a targeted scope. Therefore, it is proposed that one product – **INCAF** – and one DPINE – **Maputo Province** – be the pilot sites for this component of the project. Once a cycle of modernisation has been conducted, this can be replicated for other products and DPINES.

The following picture depicts the approach.



The benefits of such a strategy are:

- Avoid both the *status quo* or a situation where everything has to be modernised simultaneously
- Improvements can be achieved with limited resources
- Improvements can be achieved in localised areas without disturbing the entire organisation
- Lessons can be learnt internally in order to improve the next cycle of improvements
- Internal capacity can be built gradually for more substantial modernisation efforts
- Improvements will lead to a positive attitude towards other new modernisation efforts

- b. **Long Term Institutional Actions.** The goal is to lay the foundation of longer term modernisation activities. These will take many months, sometime years, to achieve. Therefore, it is important to start progressing as soon as possible. For example, including the GSBPM into ENE’s curricula might require several months to achieve. Training all INE’s staff on it might take up to an additional 2 years.

The modernisation activities and benefits under this component are presented in the following table.

**Fig. 3 – Short Term Targeted Wins**

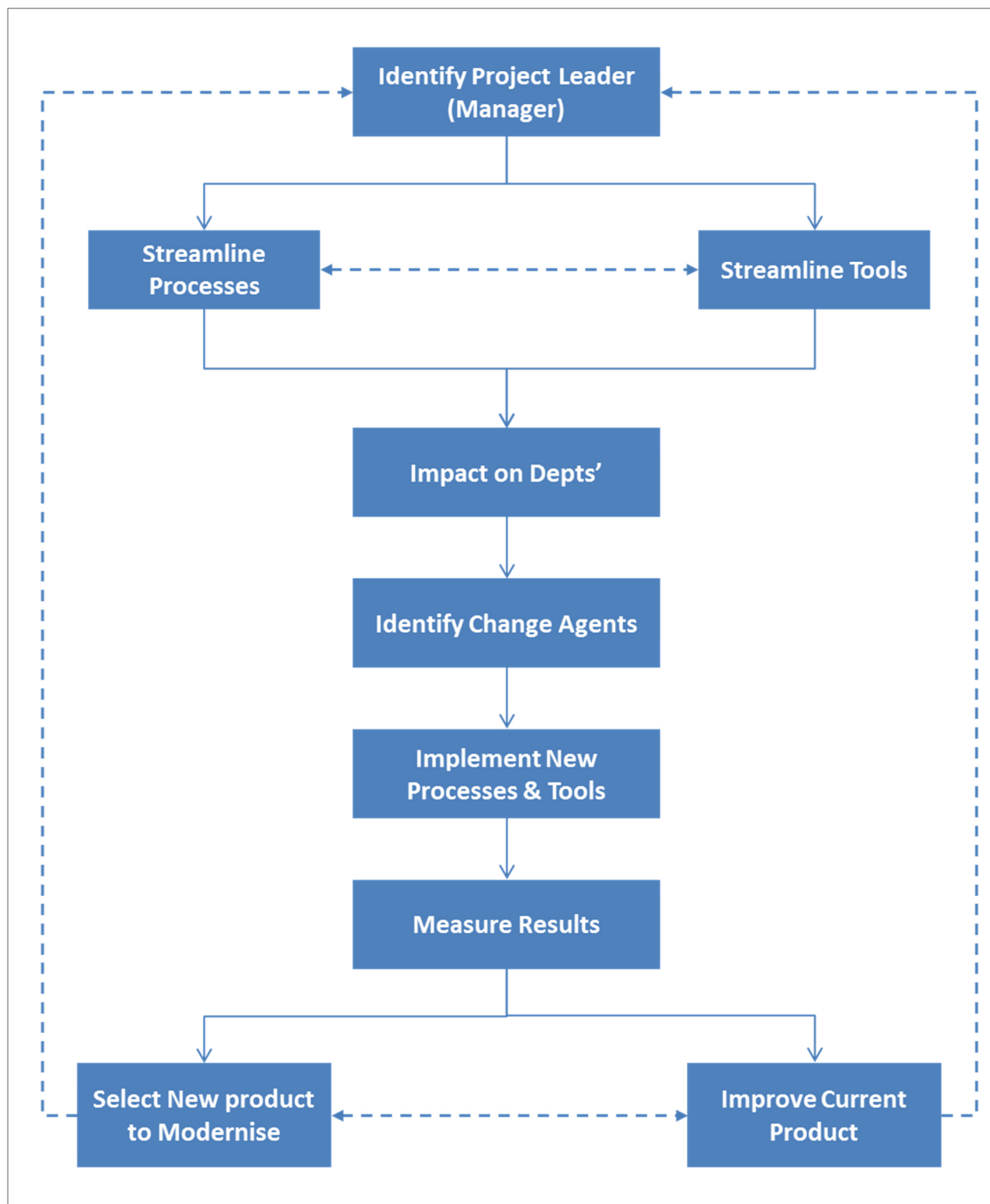
Modernisation Activities	Justification
Implement the Reform Unit	Formal structure recognised by upper management and tasked with the modernisation of INE. New positions and resources can be mobilised through this unit. Gives a point of reference to all departments when engaged in modernisation exercises.
Identify Business Analysts	Business Analysts (BA) act as internal advisors to the organisation. They bridge the gap between statistical processes and IT systems; between Subject Matter Experts and ICT



	<p>staff. BAs design processes and systems, assess the business model and its integration with technology. They act as a liaison among stakeholders in order to understand the structure, policies, and operations of an organization, and to recommend solutions that enable the organization to achieve its goals. The role of a BA can be defined as a bridge between the business problems and the technology solutions. Business problems can be anything about business systems, for example the model, process, or method. The technology solutions can be the use of technology architecture, tools, or software application. So BAs are required to analyze, transform and ultimately resolve the business problems with the help of technology. BAs are also recognised as <i>Functional Analysts, Process Experts</i>. Within INE, they could be recognised as <i>Statistical Process Analysts</i>. In any modernisation project, BAs are the backbone of the modernisation effort. It is planned that they lead the current proposed modernisation plan (first component). <b>They usually act as internal advisor rather than having formal authority</b>, hence BAs are never managers and remain impartial. In Mozambique, the Tax Department and the Customs Department both have entire teams of permanent BAs involved in their respective modernisation projects.</p>
Train Business Analysts	Will depend on who is recruited by INE as BA. The objective of this activity is to have BAs that are fully capable to participate into the modernisation if INE. The training will complement whatever skills and expertise those recruited already have.
Conduct Internal Survey on ICT Perception	The perception of ICT amongst the various users varies greatly. It is important to start modifying these perceptions to a wider adoption of ICT in day-to-day operations. The internal survey is only one among many activities that will have to be conducted. It is proposed to do a survey on ICT in the next 1-2 months in order to feed an internal change management plan.
Review ENE's curricula with regards to ICT/Business Analysis-GSBPM/Management	The understanding of the GSBPM model for statistical processes and the role of ICT in these processes varies greatly amongst users. From a structural perspective, it is important that ENE's curricula be adjusted to reflect modern practices, framework and tools. This also entails that the current trainers of ENE have to be trained, followed by the users of INEs, and finally any new student graduating from ENE. This is likely to take several years and hence it is crucial that the first steps are taken soon.
Draft a Governance Structure	Clarify how decisions to modernise are taken, what products, what DPINE, or ODINE are prioritised, what external expertise is acquired and why. There is currently a Coordination group for the modernisation. In the near future, a Reform unit is also supposed to be created, under DICRE. In both cases, the line of authority needs to be clarified. It is crucial to avoid confusion in the organisation.
IT Strategic Plan & IT Security Policy	The ICT is currently having difficulties (web site, domain name, etc.). The main reason stems from an absence of strategic plan that can be followed. This is all the more important as ICT will become even more present in day-to day statistical operations. An IT Strategy is likely to require external expertise. Consequently, it is likely that a sourcing process be needed. This will require time.
Business Continuity Strategy	As investments are done in ICT and as systems become more present in day-to-day operations, business continuity becomes more important. Business continuity is technical redundancy aiming at avoiding system downtime. This is likely to require external expertise. Consequently, it is likely that a sourcing process be needed. This will require time.
Change Management and Internal Communication Strategy	As modernisation processes unfold, change management and internal communications become more important. The survey on ICT (see above) is one such change management activity aiming at changing perceptions and habits. Multiple habits and processes will have to change. Resistance to change is a human reflex and this needs to be addressed subtly in order to transform this into a vector of change.

## STREAMLINING A PRODUCT

Fig. 4 - High Level Process of the Streamlining of a Product



### Legend for column 'General Type of Skill Sets':

- N/A → Not Applicable
- Bus. Analyst – Process → Business analyst profile with a focus on processes
- Bus. Analyst – IT → Business analyst profile with a focus on IT
- Bus. Analyst – Org. → Business analyst profile with a focus on organisational matters
- Organisational (Org.) → Profile specialised in organisational matters and transformation of organisations

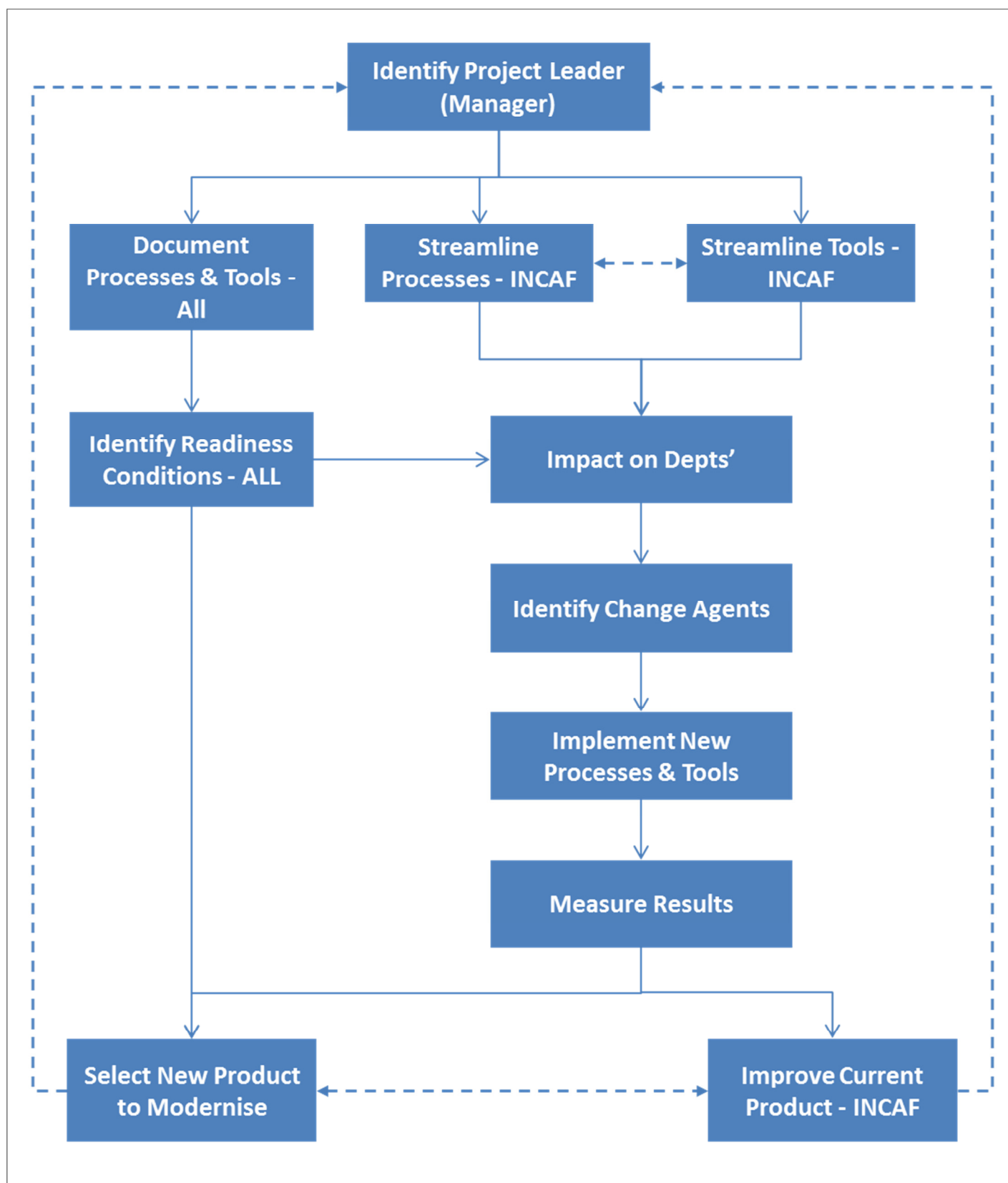
**Fig. 5 – Plan for the Streamlining of a Product**

No.	Action Item / Activities to be Performed	Deliverable	Comment	General Type of Skill Sets	Responsible	Toolbox	Require External Help?	Budget (if external; in USD K)	Annual Plan (Ref.)	Timeline						
										Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
<b>a.</b>	<b>Quick Wins</b>															
<b>1</b>	<b>One Product → INCAF</b>															
.1	Identify Project Leader (Manager) for this exercise	N/A	Has to be a person with enough authority and leadership	N/A	Coordination Group	Annex C										
.2	Map current processes	All current processes are mapped with activities, resources and workload	Map processes as is (GSBPM reference)	Bus. Analyst - Process		Annex G & H	Y									
.3	Map Target processes	All 'to-be' processes are mapped with activities, resources and workload	Use the GSBPM as reference	Bus. Analyst - Process		Annex G & H	Y									
.4	Identify used tools (forms, systems, etc.)	All used tools are identified and documented with samples	Include any tool used. This can relate to statistics or management. It can include letters, forms, reports, systems, etc.	Bus. Analyst - IT												
.5	Propose and select options for streamlining tools	Give options to improve tools with budget and timeline		Bus. Analyst - IT		Annex D	Y									
.6	Identify impacted units	For each process and tool, list units	Units can be internal or external (e.g.	Bus. Analyst -												

No.	Action Item / Activities to be Performed	Deliverable	Comment	General Type of Skill Sets	Responsible	Toolbox	Require External Help?	Budget (if external; in USD K)	Annual Plan (Ref.)	Timeline						
										Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
		impacted by the change	DPINE). Should cover both current and targeted processes/tools.	Process/ Org.												
.7	Train all impacted departments on the GSBPM	All staff involved in the modernisation exercise is trained	The objective is to provide everyone with the same framework of reference	Bus. Analyst - Process												
.8	Validate target processes and tool streamlining with stakeholders through workshops	Target processes and proposed tool streamlining are validated and a minimum consensus is reached	Important from the perspective of internal communication and buy-in	Bus. Analyst - Process/ IT / Org.												
.9	Streamline tools	Each tool is streamline according to the option selected	Streamlining could involve for example the merging of several Excel files in a single MS SQL database. Enough time and budget has to be provisioned for this item.	Bus. Analyst - Process/ IT		Annex D	Y									
.10	Identify Agent of Change for each Unit	N/A		Bus. Analyst - Process/ Org.												
.11	Craft Change Mgt Plan of Action (CMAP) for each Unit	Each unit has a CMAP with specific actions to be completed	The Change Agents are involved in their respective CMAPs	Bus. Analyst - Process/ Org.			Y									
.12	Implement CMAP in each unit	New tools are streamlined and tested. New practices and tools are implemented		Bus. Analyst - Process/ Org. / IT			Y									
.13	Review Results and derive lessons learnt	Assessment of the project: Strengths, weaknesses,		N/A	Coordination Group		Y									

No.	Action Item / Activities to be Performed	Deliverable	Comment	General Type of Skill Sets	Responsible	Toolbox	Require External Help?	Budget (if external; in USD K)	Annual Plan (Ref.)	Timeline						
										Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
		deficiencies, lessons learnt, potential improvements are identified														
.14	Craft new improvement exercise based on results and lessons learnt	New Action Plan for improvements for the same product (so it improves furthermore)		N/A	Coordination Group		Y									
.15	Select one or more product and replicate	One or more product are selected to go through the same process	The number of products will depend on the availability of resources and the ease to implement change	N/A	Coordination Group		Y									

Fig. 6 - High Level Process of the Streamlining a DPINE



**Fig. 7 – Plan for the Streamlining a DPINE**

No.	Action Item / Activities to be Performed	Deliverable	Comment	General Type of Skill Sets	Responsible	Toolbox	Require External Help?	Budget (if external; in USD K)	Annual Plan (Ref.)	Timeline						
										Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
<b>2</b>	<b>One DPINE → Maputo Province</b>															
.1	Identify Project Leader (Manager) for this exercise for INE	N/A	Has to be a person with enough authority and leadership.	N/A	Coordination Group	Annex C										
.2	Identify Project Leader (Manager) for this exercise for the DPINE	N/A	Has to be a person with enough authority and leadership	N/A	Coordination Group / DPINE	Annex C										
.3	Document all products for the DPINE with their corresponding parameters	List of products with parameters (frequency, type of data, etc.)	The checklist of parameters will feed the eventual scenario of modernisation	Bus. Analyst - Process			Y									
.4	Map current processes for each product	All current processes, for each product, are mapped with activities, resources and workload	This includes the frequency of data exchange, how data is corrected, etc.	Bus. Analyst - Process		Annex G & H	Y									
.5	Document used tools (forms, systems, etc.) for each product	All used tools, for each product, are identified and documented with samples	Include any tool used. This can relate to statistics or management. It can include letters, forms, reports, systems, etc.	Bus. Analyst - IT			Y									
.6	Conduct Network Diagnostic	Diagnostic identifying any problem relating to the network, the deployment of a WAN, and a solution with a budget	In preparation of the eventual scenario of modernisation	ICT - Network	DISI		Y									
.7	Conduct Hardware Diagnostic	Diagnostic identifying any problem relating	In preparation of the eventual scenario of	ICT - Hardware	DISI		Y									

No.	Action Item / Activities to be Performed	Deliverable	Comment	General Type of Skill Sets	Responsible	Toolbox	Require External Help?	Budget (if external; in USD K)	Annual Plan (Ref.)	Timeline						
										Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
		to the hardware, the acquisition of new hardware, and a solution with a budget	modernisation													
.8	Develop Readiness Conditions for the DPINE	Readiness conditions are documented	These cover the ICT, processes, etc. to be able to move into a modernisation exercise	Bus. Analyst - Process / IT /Org.												
.9	For INCAF specifically (if used), propose and select options for streamlining tools			Bus. Analyst - IT		Annex D										
.10	For INCAF specifically (if used), identify impacted units	For each process and tool, list units impacted by the change	Units can be internal or external (e.g. DPINE). Should cover both current and targeted processes/tools.	Bus. Analyst - Process / Org.												
.11	For INCAF specifically (if used) and Readiness Conditions, validate target processes and tool streamlining with stakeholders through workshops	Target processes, proposed tool streamlining, and Readiness Conditions are validated and a minimum consensus is reached	Important from the perspective of internal communication and buy-in	Bus. Analyst - Process / IT /Org.												
.12	Streamline tools	Each tool is streamline according to the option selected	Streamlining could involve for example the merging of several Excel files in a single MS SQL database. Enough	Bus. Analyst - Process/ IT		Annex D	Y									



No.	Action Item / Activities to be Performed	Deliverable	Comment	General Type of Skill Sets	Responsible	Toolbox	Require External Help?	Budget (if external; in USD K)	Annual Plan (Ref.)	Timeline						
										Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
			time and budget has to be provisioned for this item.													
.13	Identify Agent of Change for each Unit	N/A		Bus. Analyst - Process/ Org.												
.14	Craft Change Mgt Plan of Action (CMAP) for each Unit	Each unit has a CMAP with specific actions to be completed	The Change Agents are involved in their respective CMAPs	Bus. Analyst - Process/ Org.			Y									
.15	Implement CMAP in each unit	New tools are streamlined and tested. New practices and tools are implemented		Bus. Analyst - Process/ Org. / IT			Y									
.16	Review Results and derive lessons learnt, including Readiness Conditions	Assessment of the project: Strengths, weaknesses, deficiencies, lessons learnt, potential improvements are identified	Readiness Conditions are analysed from the perspective of starting a modernisation path for those aspects not relating to INCAF	N/A	Coordination Group		Y									
.17	Craft new improvement exercise based on results and lessons learnt	New Action Plan for improvements for the same product (so it improves furthermore)		N/A	Coordination Group		Y									
.18	Select one or more product and/or DPINE and replicate	One or more product and/or DPINE are selected to go through the same process	The number of products/DPINE depend on the availability of resources	N/A	Coordination Group		Y									

## INSTITUTIONAL ACTIONS

**Fig. 8 – Plan for Institutional Actions**

No.	Action Item / Activities to be Performed	Deliverable	Comment	General Type of Skill Sets	Responsible	Toolbox	Require External Help?	Budget (if external; in USD K)	Annual Plan (Ref.)	Timeline						
										Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
<b>b.</b>	<b>Institutional</b>															
<b>1</b>	<b>Implement the Reform Unit</b>		Currently multiple structures exist: Commission for Modernisation, future Reform Unit, Planning unit under DICRE. A certain rationalisation has to occur and clear lines of reporting established		Coordination Group		Y									
.1	Finalise structure and position in INE			Organisational												
.2	Get approval from top management			Organisational												
.3	Devise and finalise job descriptions for positions and get approval			Organisational - HR												
.4	Publicise job descriptions and recruit new personnel			HR												
.5	Deploy new unit and integrate new staff			Organisational												
<b>2</b>	<b>Draft a Governance Structure</b>		Crucial for decision-making process. For example, distribution of roles and responsibilities between a DPINE and headquarters.		Coordination Group											
.1	Devise modernisation governance structure			Org.												
.2	Get approval from top management			N/A												
.3	Implement governance structure			N/A												
<b>3</b>	<b>Identify Business Analysts</b>		Are the backbone of the		Coordination	Annex A ;										

No.	Action Item / Activities to be Performed	Deliverable	Comment	General Type of Skill Sets	Responsible	Toolbox	Require External Help?	Budget (if external; in USD K)	Annual Plan (Ref.)	Timeline						
										Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
			modernisation. They are independent from any product and are attached directly to the modernisation group. This is a full-time position and at least 3 to 5 business analysts should be dedicated.		Group	Annex I										
.1	Finalise and get approval for BA job description			Organisational - HR												
.2	Publicise job descriptions and recruit new personnel			HR												
.3	Integrate BAs in the current modernisation projects			Organisational												
<b>4</b>	<b>Train Business Analysts</b>		BAs need the development of whatever missing skills they may have. It could also prove beneficial that all INE's BAs get the same training.		Coordination Group	Annex E	Y									
.1	Identify skills to be developed			Trainer in Business Analysis - Org.												
.2	Develop training program			Trainer in Business Analysis - Org.												
.3	Train BAs			Trainer in Business Analysis												
<b>5</b>	<b>IT Strategic Plan &amp; IT Security Policy</b>		Excludes the business requirement definition of the software, since it is too early to define them now. The main objective is to focus on the hardware, network, security, expertise of DISI.			Annex B	Y	90								
.1	Devise Terms of Reference			Expertise in IT Strategic Planning												
.2	Recruit expert or firm			Expertise in IT Strategic Planning												
.3	Conduct IT Strategic Plan &			Expertise in IT												

No.	Action Item / Activities to be Performed	Deliverable	Comment	General Type of Skill Sets	Responsible	Toolbox	Require External Help?	Budget (if external; in USD K)	Annual Plan (Ref.)	Timeline						
										Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
	IT Security Policy			Strategic Planning												
6	<b>Change Management and Internal Communication Strategy</b>		Crucial to mitigate resistance and support the sustainable implementation of new practices and tools.				Y									
.1	Devise Terms of Reference			Expertise in Change Mgt./Com. Can be different from the firm that will execute the project or not.												
.2	Recruit expert or firm			N/A												
.3	Deploy Change Management and Internal Com. (ongoing)			Expertise in Change Mgt./Com												
7	<b>Conduct Internal Survey on ICT Perception</b>		One of the internal communication activities that can be conducted in the short term as well at regular intervals to monitor the change in perception. This could be part of the mandate under Item 6- Change Mgt' and Internal Communication		Coordination Group											
.1	Get approval from top management			N/A												
.2	Devise and conduct survey			Bus. Analyst - Process / IT /Org.												
.3	Publish results			Upper Mgt												
8	<b>Review ENE's curricula with regards to ICT/Business Analysis-GSBPM/Management</b>		There is currently an opportunity to introduce these elements into ENE's curricula as the latter is under review. This opportunity should be seized immediately.			Annex F	Y									
.1	Identify curricula to modify			Professional Training Specialist												

No.	Action Item / Activities to be Performed	Deliverable	Comment	General Type of Skill Sets	Responsible	Toolbox	Require External Help?	Budget (if external; in USD K)	Annual Plan (Ref.)	Timeline						
										Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
.2	Develop training material			Specialist in the various corresponding fields												
.3	Integrate training material			Specialist in the various corresponding fields												
.4	Evaluate quality/impact of new training			Professional Training Specialist												
9	<b>Business Continuity Strategy</b>		Various dimensions behind this: Security for hardware, access to network, software, data and data dissemination. Business continuity should not be done until the IT Strategy is completed.													
.1	Devise Terms of Reference			Expertise in IT Strategic Planning. Can be different from the firm that will execute the project or not.			Y	90								
.2	Recruit expert or firm			N/A												
.3	Conduct Business Continuity Project			Expertise in IT Strategic Planning												

## IMPLEMENTATION TRACKING SHEET

The following table presents a tracking sheet applied to the GSBPM. Its intention is to take each and single process and sub-process of the GSBPM and apply the various activities identified in the plan to it. This tracking sheet will evolve as the modernisation activities take place. Note also that this table is to be used in conjunction with Annexes G and H.

The fourth column presents the main person within INCAF or DICRE who has the knowledge relevant to the sub-process. These people are the main Subject Matter Experts that will provide the detailed information to the Business Analysts. Additionally, Zenobio Arramuge will act as an operational contact point within INCAF to facilitate any exchange or meetings with the Subject Matter Experts. He will be seconded by Antonio Adriano, and finally by Arao Balate.

**Fig. 9 – Implementation Tracking Sheet**

No.	Process	Sub-Process	Responsible	Current Process Mapped?	Target Process Drawn?	Tools Identified?	Tools Streamlining Identified?	Impacted Units Identified?	New Process/Solution Validated?	Tools Streamlined?	Change Agent Identified?
<b>1</b>	<b>Specify Needs</b>		Arao Balate								
1.1		Identify Needs									
1.2		Consult & Confirm Needs									
1.3		Establish Output Objectives									
1.4		Identify Concepts									
1.5		Check Data Availability									
1.6		Prepare Business Case									
<b>2</b>	<b>Design</b>										
2.1		Design Outputs	Firmino Cassiano								
2.2		Design Variable Descriptions	Firmino Cassiano								
2.3		Design Collection	Cristovao								

No.	Process	Sub-Process	Responsible	Current Process Mapped?	Target Process Drawn?	Tools Identified?	Tools Streamlining Identified?	Impacted Units Identified?	New Process/Solution Validated?	Tools Streamlined?	Change Agent Identified?
2.4		Design Frame & Sample	Cristovao								
2.5		Design Processing & Analysis	Eugenio Matavel (processing) Firmino/Cassiano (analysing)								
2.6		Design Production Systems & Workflow	Arao Balate								
3	<b>Build</b>										
3.1		Build Collection Instruments	Cristovao (paper) Eugenio Matavel (tablet)								
3.2		Build or Enhance Process Components	Ramiro Mouzinho Eugenio Matavel								
3.3		Build or Enhance Dissemination Components	Firmino Cassiano								
3.4		Configure Workflows	Firmino Cassiano Arao Balate								
3.5		Test Production System	Firmino Cassiano Arao Balate								
3.6		Test Statistical Business Process	N/A								
3.7		Finalise Production System	Firmino Cassiano Arao Balate								
4	<b>Collect</b>										
4.1		Create Frame & Select Sample	Basilio								
4.2		Set up Collection	Basilio								

No.	Process	Sub-Process	Responsible	Current Process Mapped?	Target Process Drawn?	Tools Identified?	Tools Streamlining Identified?	Impacted Units Identified?	New Process/Solution Validated?	Tools Streamlined?	Change Agent Identified?
4.3		Run Collection	Cristovao								
4.4		Finalise Collection	Basilio								
5	<b>Process</b>										
5.1		Integrate Data	Eugenio Matavel								
5.2		Classify & Code	Marta								
5.3		Review & Validate	Firmino Xadrequé								
5.4		Edit & Input	Xadrequé								
5.5		Derive New Variables & Units	Firmino Cassiano								
5.6		Calculate Weights	Basilio								
5.7		Calculate Aggregates	Basilio								
5.8		Finalise Data Files	Firmino Cassiano								
6	<b>Analyse</b>		Firmino (expenditure) Cassiano (labor) Azarias (tourism; core welfare)								
6.1		Prepare Draft Outputs									
6.2		Validate Outputs									
6.3		Interpret & Explain Outputs									
6.4		Apply Disclosure Control									
6.5		Finalise Outputs									
7	<b>Disseminate</b>		Cirilo Tembe								
7.1		Update Output Systems									



No.	Process	Sub-Process	Responsible	Current Process Mapped?	Target Process Drawn?	Tools Identified?	Tools Streamlining Identified?	Impacted Units Identified?	New Process/Solution Validated?	Tools Streamlined?	Change Agent Identified?
7.2		Produce Dissemination Products									
7.3		Manage Release of Dissemination Products									
7.4		Promote Dissemination Products									
7.5		Manage User Support									
8	<b>Evaluate</b>		Arao Balate Cirilo Tembe								
8.1		Gather Evaluation Inputs									
8.2		Conduct Evaluation									
8.3		Agree on Action Plan									

The following table presents an updated version of the training program proposed in the C2D Services<sup>2</sup> report. The following notes are the main differences and caveats applicable:

- Addition of 3 categories of trainees on management-related courses: Managers, Subject Matter Experts, and Change Agent;
- While several existing courses have been adjusted, **new courses are highlighted in red**;
- While specific technical courses are presented, it is suggested to wait until the IT Strategy is completed to ensure these courses are in line with the recommendations for specific technical tools;
- The training program is based on the organisational structure of the Reform and Modernisation Unit as presented in the 2012 C2D Services report. If a different structure is implemented, then this program might have to be adjusted accordingly.

Note that the detailed job description of the Business Analyst's position is presented in Annex A, its corresponding training program in Annex E, and a matrix to facilitate the interviews of candidates in Annex I. The development of internal capacity in business Analysis can be achieved by the sustained coaching of a team of internal Business Analysts by external seasoned ones.

**Fig. 10 – Training Program – Updated**

Courses / Positions	Management			Planning & Coord.		Applicative & BPR				Hardware / Network			Help Desk				Year / Sequence	Comment
	Managers	Subject Matter Experts	Change Agent	Project Manager	Liaison Officer	Business Analyst	Trainer	Programmer	Analyst	Application Administrator	DBA	System Administrator	Network Administrator	Technical Support Analyst	Functional Support Analyst	Statistics Support Analyst		
Microsoft Access 1	x	x				x		x			x						1	
Microsoft Access 2								x			x						1	

<sup>2</sup> C2D Services Inc., Technical Assistance for the National Statistics Institute of Mozambique, Consultancy Report – Final, September 2012.

Courses / Positions	Management			Planning & Coord.		Applicative & BPR				Hardware / Network			Help Desk				Year / Sequence	Comment
	Managers	Subject Matter Experts	Change Agent	Project Manager	Liaison Officer	Business Analyst	Trainer	Programmer	Analyst	Application Administrator	DBA	System Administrator	Network Administrator	Technical Support Analyst	Functional Support Analyst	Statistics Support Analyst		
Microsoft Access 3								X			X						1	These courses are aimed at reinforcing skills relating to platforms and tools currently in use. Hence, these training are to be conducted in priority over the rest.
Programming with VBA								X									1	
Writing Queries using SQL Server 2008 Transact-SQL								X			X						2	
Developing Web Applications with Microsoft Visual Studio 2010								X									2	
Developing Data Access Solutions with Microsoft Visual Studio 2010								X									2	
Introduction to Web Development with Microsoft Visual Studio 2010 (.net)								X									3	These trainings would be determined by the type of platform used by the new application INE would develop or procure, in replacement of current databases and systems. Consequently, it is not possible at this stage to determine exactly the type of training that would be required. This training would not take place before 2 to 3 years’ time.
Java SE 7 Programming								X									3	
Object-Oriented Analysis and Design Using UML						X		X									3	
Java Performance Tuning and Optimization								X									3	
Java SE 7: Develop Rich Client Applications								X									3	
COBIT Awareness				X	X	X	X	X	X	X	X	X	X	X	X	X	1	These training are recommended to all those involved in ICT. COBIT is basically an ICT governance framework.
COBIT Foundation				X	X	X	X	X	X	X	X	X	X	X	X	X	1	
Project Management Fundamentals				X													1	
Project Management of ICT projects				X		X											1	Previous course is a prerequisite. This course contains specific techniques relative to ICT projects.
MS Project				X		X											1	

Courses / Positions	Management			Planning & Coord.		Applicative & BPR				Hardware / Network			Help Desk			Year / Sequence	Comment	
	Managers	Subject Matter Experts	Change Agent	Project Manager	Liaison Officer	Business Analyst	Trainer	Programmer	Analyst	Application Administrator	DBA	System Administrator	Network Administrator	Technical Support Analyst	Functional Support Analyst			Statistics Support Analyst
Risk Management				x	x												2	In relation with project management, especially in the context of a major modernisation project.
Leadership	x		x	x		x											1-2	Courses mainly for functional staff involved in the modernisation effort. This should be viewed as an almost continuous training program. Some aspects of it should be considered to be part of ENE’s curricula.
Results-Based Management	x	x	x	x		x											1-2	
Change Management	x		x	x	x	x											1-2	
Presentation and other visual media for communication				x	x	X											1	
Communication fundamentals	x		x	x	x	X											1	This course aims at developing skills on how to interact with other stakeholders, what channels of communication to use, etc.
Organisation and logistical planning fundamentals				x	x	X											1	This course is aimed at developing basic skills on how to organise activities such as a workshop, a training group, etc.
BPR fundamentals	x		x	x	x	X	x										1	
BPR techniques: Mapping, streamlining, etc.						x											2	
Fundamentals in system Integration	x		x	x		x			x								1	Considers a BPR exercise from the perspective of the integration of a system into the organisation.
Train the trainer techniques						x	x	x	x	x	x	x					2	Should include coaching techniques. If the course does not contain coaching techniques, then an additional course will be necessary.
Techniques in developing training material						x	x										2	If an eLearning platform is used within INE (for the ‘Centre of Excellency’ unit), then this course should include the development of training material on an eLearning platform.
Implementing a Microsoft SQL Server 2008 Database											x						2	These courses are aimed at reinforcing skills relating to platforms and tools currently in use. Hence, these training are to be

Courses / Positions	Management			Planning & Coord.		Applicative & BPR				Hardware / Network			Help Desk			Year / Sequence	Comment
	Managers	Subject Matter Experts	Change Agent	Project Manager	Liaison Officer	Business Analyst	Trainer	Programmer Analyst	Application Administrator	DBA	System Administrator	Network Administrator	Technical Support Analyst	Functional Support Analyst	Statistics Support Analyst		
Maintaining a Microsoft SQL Server 2008 Database										x						2	conducted in priority over the rest.
Designing and Optimizing Database Solutions with Microsoft SQL Server 2008										x						2	
Oracle Database Introduction to SQL										x						3	These courses would be necessary if the platform of the new applications developed or procured by INE would run on Oracle. If not, then the training on SQL Server would have to be developed further.
Oracle Database: PL-SQL fundamentals										x						3	
Oracle Database: Administration Workshop I										x						3	
Oracle Database: Administration Workshop II										x						3	
Cisco Works LAN Management System Course												x				1	
Deploying Windows Server											x					1	
Fundamentals of Windows Server Network and Applications Infrastructure											x					2	
Configuring and Troubleshooting a Windows Server Network Infrastructure											x					2	
Configuring and Troubleshooting Windows Server Active Directory Domain Services											x					2	
A specific course on disk management must also be delivered to this position											x					1	

Courses / Positions	Management			Planning & Coord.		Applicative & BPR				Hardware / Network			Help Desk			Year / Sequence	Comment	
	Managers	Subject Matter Experts	Change Agent	Project Manager	Liaison Officer	Business Analyst	Trainer	Programmer	Analyst	Application Administrator	DBA	System Administrator	Network Administrator	Technical Support Analyst	Functional Support Analyst			Statistics Support Analyst
Configuring, Managing and Troubleshooting Microsoft Exchange Server											x	x	x				1	
Application Management Centric Course I										x							1	Depends on the new application INE would develop or procure, in replacement of its current databases and systems.
Application Management Centric Course II										x							2	
Training on the help desk software														x	x	x	1	
Training on escalation procedures for help desk														x	x	x	1	
Training on various tools supporting the help desk (e.g. FAQ)														x	x	x	1	
Customer-Service fundamentals					x	x								x	x	x	1	
Techniques on troubleshooting a case														x	x	x	1	This course aims at developing the skills of the support analysts in testing, documenting tests, devising and documenting a solution, etc.
Continuous training on the various applications, databases, tools to be supported, as well as the processes, and the statistical methodologies	x	x	X	x	x	x	x	x	x	x	x	x	x	x	x	x	Continuous	<p>This training is not only specific to ICT staff. It should be viewed as a continuous program aiming at increasing the level of skill and experience of the various tools, platforms, methodologies, systems and databases currently (and to be) used at INE. This program should cover ALL employees, including SMEs, according to the tools, platforms, methodologies, systems or databases they use or have to support.</p> <p>The level of mastery for each type of employee (e.g. SME versus Functional Support Analyst) would be determined by the job description.</p> <p>For applications, the training should include simultaneous training</p>

Courses / Positions	Management			Planning & Coord.		Applicative & BPR				Hardware / Network			Help Desk			Year / Sequence	Comment
	Managers	Subject Matter Experts	Change Agent	Project Manager	Liaison Officer	Business Analyst	Trainer	Programmer Analyst	Application Administrator	DBA	System Administrator	Network Administrator	Technical Support Analyst	Functional Support Analyst	Statistics Support Analyst		
																	on the underlying processes. This training program can be (and should be) given internally.

## ANNEX A – BUSINESS ANALYST JOB DESCRIPTION



**General:**

- University degree in Operations Management, Statistics, Project Management, MIS or equivalent
- Proficiency in basic office software (MS Suite)
- Ability to conduct training and deliver presentation to transfer knowledge to end users
- Experience in acting as a coach or experience in an advisory capacity (acting as internal consultant to INE)
- Ability to learn new information, new business processes, etc.
- Good knowledge of the political environment of the SEN would be an asset
- Overall understanding of the various issues of INE

**Organisational:**

- Conduct organisational assessment and design based on process analysis
- Change management skills
- Internal communication skills
- Knowledge of organisation transformational techniques

**Business Analysis:**

- Knowledge of the legislative framework of INE
- Mastery of the various business processes of INE
- Statistic background would be an asset
- Ability to establish a business case, make recommendations and decisions
- Experience in conducting process mapping and gap analysis
- Experience in identifying business requirements and translating them into functional specifications for a system

**IT:**

- Experience in implementation of integrated systems, preferably acquired in the public sector. Active participation in the implementation of an integrated management system for a statistics agency would be an asset
- Understanding of technical aspects and their interaction such as hardware versus software versus network
- Ability to test a system (Quality Assurance, User Acceptance Tests, scenario scripting, etc.) to ensure it corresponds to the business requirements

## ANNEX B – HIGH-LEVEL TERMS OF REFERENCE FOR IT STRATEGIC PLAN & IT SECURITY POLICY

Dimension	Objective
a. High-level IT Strategy and IT Policy for the next 5 years	<p>Provide a strategic plan for the overhaul of the IT function over the next 5 years. This includes:</p> <ul style="list-style-type: none"> <li>i) Diagnostic of the current situation: <ul style="list-style-type: none"> <li>- An inventory and an assessment of the existing systems and IT infrastructure (hardware, network and telecoms), including INE and the DPINs</li> <li>- An analysis of existing IT skills and the identification of skill gaps</li> </ul> </li> <li>ii) Develop a strategy that contains: <ul style="list-style-type: none"> <li>- Recommend targets to close the skill gap</li> <li>- Recommend targets to reduce the gaps to contribute towards a more effective IT service</li> <li>- Provide targets for the acquisition and utilisation of an appropriate IT structure</li> <li>- Document the boundary partners to INE and state the nature of data interchange and information sharing and dissemination</li> <li>- Provide specifications and standards for the hardware, networking and technological stack of the software (if possible) acquisitions</li> <li>- Recommend a strategy for integrating the IT infrastructure and software systems</li> <li>- Provide an IT Security policy for the IT services</li> <li>- Prepare capital and operating budgets for the development, implementation, and operation of the target technological environment</li> <li>- Design a transitional plan to facilitate the movement from the current technology base to any proposed new platform, including what will be needed for the implementation of the IT policy</li> <li>- Produce a comprehensive report that fully addresses the above requirements and that is acceptable to INE</li> </ul> </li> </ul> <p><b>Note:</b> This IT Strategy excludes system business requirement definition as INE is not yet ready to conduct this exercise. Hence, the primary objective of the IT Strategy is to focus on the technical aspects rather than the functionality of an eventual system. The system business requirement definition can come at a later stage when some modernisation cycles have been conducted and the needs are becoming clearer.</p>
b. Solutions for current and acute problems and how to resolve them	<p>Based on the diagnostic conducted in point a-i) above, the Consultant will:</p> <ul style="list-style-type: none"> <li>i) Provide specific, detailed and documented solutions to resolve them. The objective is to resolve these hurdles in the short term and in the most cost-efficient way. The solutions must be validated and accepted by INE.</li> <li>ii) Ensure that the solutions proposed are part of the budget and the transitional plan documented in a-ii)</li> </ul>
c. Support the implementation of the short-term solutions	<p>Based on the short term solutions recommended in point b) and accepted by INE, the Consultant will:</p> <ul style="list-style-type: none"> <li>i) Provide onsite and remote support to the implementation of these short term solutions</li> <li>ii) Provide recommendations and adjustments as these are needed during the implementation</li> <li>iii) Provide on-the-job coaching and training on the tools being implemented</li> </ul> <p><b>Note:</b> This deliverable is optional as support to the implementation of the IT Strategic Plan and IT Security Policy can be more or less intensive, with more or less onsite support. Acquisition of equipment and/or software that could be needed as part of the short term solutions is out of the scope and budget of the IT Strategic Plan and IT Security Policy.</p>

## ANNEX C – TERMS OF REFERENCE OF PROJECT LEADER (MANAGER)

The Project Leader is a senior manager who is responsible to INE for the success of the project. The leader has a number of interfaces and responsibilities for the project:

- Provides leadership on culture and values
- Owns the business case
- Keeps project aligned with INE's strategy and direction
- Governs project risk
- Works with other leaders
- Focuses on realisation of improvements/benefits
- Recommends opportunities to optimise cost/benefits
- Ensures continuity of leadership
- Provides assurance
- Provides feedback and lessons learnt

The governance activities that take place between the leader and the Modernisation Group are:

- Provides timely decisions
- Clarifies decision making framework
- Clarifies priorities and strategy
- Communicates issues
- Provides resources
- Engenders trust
- Manages relationships
- Supports the project managers role
- Promotes ethical working

In addition to these activities the following activities take place between the leader and other stakeholders:

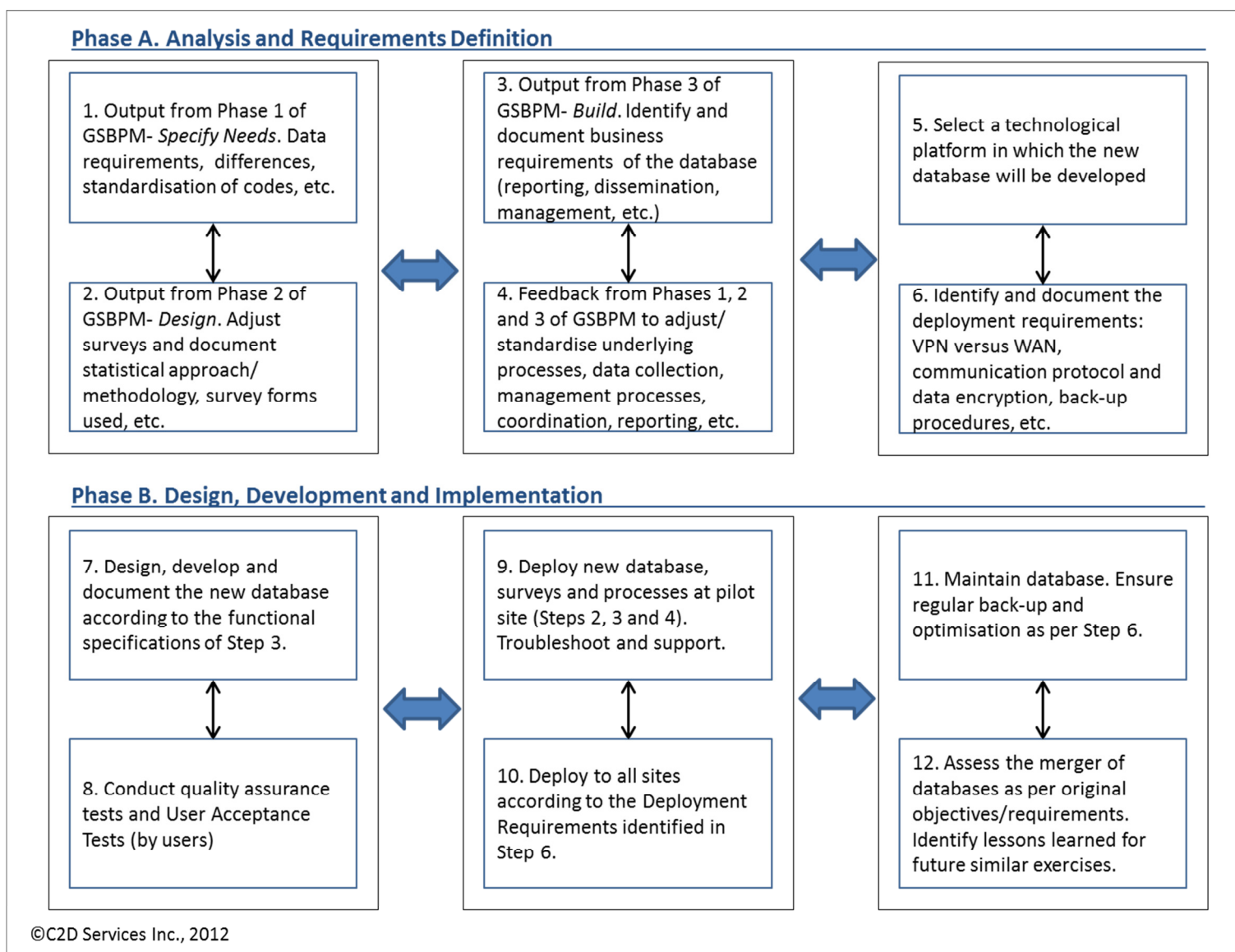
- Engages stakeholders
- Governs stakeholder communications
- Directs governance of users
- Arbitrates between stakeholders

Due to the problem solving needs of the role, the leader often needs to be able to exert pressure within the organisation to overcome resistance to the project. For this reason a successful leader will ideally be a person with five personal attributes - understanding, competence, credibility, commitment and engagement.

## ANNEX D – CONCEPTUAL EXAMPLE OF MODERNISING AN IT SYSTEM<sup>3</sup>

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<sup>3</sup> C2D Services Inc., Technical Assistance for the National Statistics Institute of Mozambique, Consultancy Report – Final, September 2012.



## ANNEX E – HIGH-LEVEL TRAINING CURRICULA FOR BUSINESS ANALYSTS



Course	Objective
a. General Principles and Practices	<ul style="list-style-type: none"> <li>- Client Service Oriented organisation: <ul style="list-style-type: none"> <li>▪ What is a Client Service Charter?</li> <li>▪ What is a service level?</li> </ul> </li> <li>- Organisational Structure: <ul style="list-style-type: none"> <li>▪ The various types of organisation structure</li> <li>▪ An organisation oriented towards customer service</li> <li>▪ Impact on the physical layout of the organisation</li> </ul> </li> <li>- Operational System: <ul style="list-style-type: none"> <li>▪ What is a process?</li> <li>▪ The role of an Information System in support of processes</li> <li>▪ Reengineering business processes by leveraging the Information System</li> <li>▪ The impact (or the lack of availability) of competencies and skills on the operational system</li> </ul> </li> <li>- Performance Based Organisation: <ul style="list-style-type: none"> <li>▪ How to link processes with Key Performance Indicators (KPI)?</li> <li>▪ Types of KPIs</li> <li>▪ Monitoring and Interpreting KPIs</li> </ul> </li> </ul>
b. Basics for Business Process Reengineering	<ul style="list-style-type: none"> <li>- What is a process: Inputs, outputs, resources, cycle-time, elapsed-time, workload</li> <li>- How to identify a deficient process: redundancy, constraints, etc.</li> <li>- How to reengineer a process</li> <li>- How to document a process: Mapping and Instruction sheet</li> <li>- Practical workshops on actual processes, supervised by an Instructor (<b>Note:</b> this could go as far as on-the-job coaching)</li> </ul>
c. Basics for Business Analysis	<ul style="list-style-type: none"> <li>- Holistic thinking: How a change to a component affects the system as a whole</li> <li>- Tools used in business analysis: Decision-making, decision-escalation, problem tracking, follow-up, minutes, etc.</li> <li>- How to build a business case: Functional decomposition, Use Case, SWOT analysis, options, recommendations and problem-solving</li> <li>- Basics in communication skills: oral and written</li> <li>- Basics in facilitation and negotiation: Focus group, interviews, etc.</li> <li>- Basics in coaching and training</li> <li>- Practical workshops on actual processes, supervised by an instructor (<b>Note:</b> this could go as far as on-the-job coaching)</li> </ul>
d. Basics of the GSBPM	<ul style="list-style-type: none"> <li>- Understanding the legal background of INE</li> <li>- GSBPM: key components of the statistical business process</li> <li>- Best practices and tools used in the GSBPM in other countries</li> </ul>

## ANNEX F – HIGH-LEVEL TRAINING CURRICULA ON IT FOR USERS

**Note:** These courses should be included into ENE's curricula.

**a. Fundamentals:**

- MS Office suite and its utilisation in day-to-day operations (Word, Excel, PowerPoint)
- Advanced Excel course

**b. Specific Courses for Statisticians (current):**

- Course on tabulation and analysis using INE's selected software (SPSS, Stata)
- Basics of utilisation of MS Access

**c. Specific Courses for Statisticians (future):**

- Basics for any software implemented by INE (e.g. Dissemination system)

**ANNEX G – GSBPM – VERSION 5.0 DECEMBER 2013**

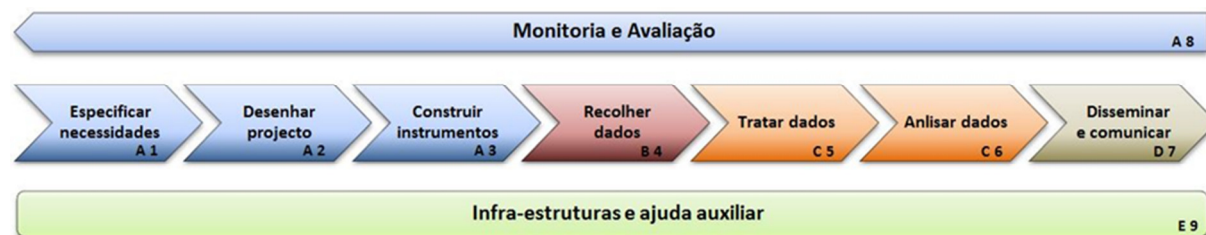
Quality Management / Metadata Management							
Specify Needs	Design	Build	Collect	Process	Analyse	Disseminate	Evaluate
1.1 Identify needs	2.1 Design outputs	3.1 Build collection instrument	4.1 Create frame & select sample	5.1 Integrate data	6.1 Prepare draft outputs	7.1 Update output systems	8.1 Gather evaluation inputs
1.2 Consult & confirm needs	2.2 Design variable descriptions	3.2 Build or enhance process components	4.2 Set up collection	5.2 Classify & code	6.2 Validate outputs	7.2 Produce dissemination products	8.2 Conduct evaluation
1.3 Establish output objectives	2.3 Design collection	3.3 Build or enhance dissemination components	4.3 Run collection	5.3 Review & validate	6.3 Interpret & explain outputs	7.3 Manage release of dissemination products	8.3 Agree an action plan
1.4 Identify concepts	2.4 Design frame & sample	3.4 Configure workflows	4.4 Finalise collection	5.4 Edit & impute	6.4 Apply disclosure control	7.4 Promote dissemination products	
1.5 Check data availability	2.5 Design processing & analysis	3.5 Test production system		5.5 Derive new variables & units	6.5 Finalise outputs	7.5 Manage user support	
1.6 Prepare business case	2.6 Design production systems & workflow	3.6 Test statistical business process		5.6 Calculate weights			
		3.7 Finalise production system		5.7 Calculate aggregates			
				5.8 Finalise data files			

## ANNEX H – EXAMPLE OF A GUIDELINE TO REENGINEERING A STATISTICAL PROCESS

## 1. Introduction, Purpose

The following is an illustration of how to use the GSBPM in the context of reengineering a statistical process. It is not meant to be all inclusive. This guideline has to be used in conjunction with other Business Process Reengineering tools such as process mapping.

The GSBPM has been formally described in several documents and INE has access to them. Some of them have also been translated to Portuguese. The picture below shows an overview of the GSBPM.



However, there is a lack of information on how to use the GSBPM for documenting, evaluating and proposing improvements to existing products.

This sample serves as an example of mapping a limited part of the process for a traditional survey, showing in a summarized way how GSBPM can be used to map parts of the phases 4 “Collect” and 5 “Process”. The limitation will be for phase 4 to sub-processes 4.3 “Run collection” and 4.4 “Finalise collection”, and for phase 5 to sub-process 5.3 “Review and validate” and sub-process 5.4 “Edit and Impute”. The example will include both a mapping of a thought “as is” situation for the sub-processes and ways to arrive at a proposed “to be” situation.

## 2 Phases 1 – 3

Phases 1 – 3 deal with the design and construction of the sub-processes of phases 4 – 7. Phase 1 deals with specifying what is going to be produced. This is further specified in phase 2 into variables to collect and tables and other output to be produced as well as the ways to produce them. In turn, this is the basic input for phase 3 where the production system is built.

For INCAF the activities relating to relevant sub-processes belonging to phases 1 - 3 should be described, as well as the roles of the organizational units involved.

For the second step, to identify improvements, try to assess weaknesses and strengths in the specification of needs.

### 2.1 Phase 1

Critical questions: Which main users were involved in specifying the needs for the INCAF in general and particularly the IOF. Comment on possibilities to use other sources for data. The report from the pilot identifies problems encountered. One such is the question of quantities for items (primarily food) bought. Problems to collect a certain item is often an indicator of poor quality in data collected for this item. Could collection of only price paid from the households and separate collection of price data have been an alternative?

Weaknesses during this phase can take the form of user criticism when dissemination of results has been made under phase 7.

Which lessons can be learned concerning the “Specify needs” phase can be of value for the planning of next module for INCAF.

## **2.2 Phases 2 – 3**

The activities under the sub-components of phases 2 – 3 should be described for the organizational units involved. The main weaknesses can have two types of effects: a) that the design and build processes have been unnecessary slow or resource-consuming or b) that they result in problems in the execution of processes for phases 4 – 7. The latter type will become apparent as problems occurring when actual production work is carried out through activities under the sub-processes of phases 4 – 7, while the first type of effect should be considered in the assessment of the activities carried out. Software choices are made during phase 3, both concerning software for development and software to be used in carrying out activities under phases 4 – 7.

## **3 Phases 4 – 5**

Phases 4 – 5 deal with the sub-processes dealing with data collection and covers activities relating to collection, editing, corrections leading to cleaned micro-data.

### **3.1 “As is” mapping**

#### **3.1.1 Sub-process 4.3 “Run collection”**

Sub-process 4.3 has as input:

- the outputs of sub-process 3.1 “Build collection instruments”. In this example, a prepared and tested questionnaire (paper questionnaire) with associated instructions
- the outputs of 4.2 “Set up collection”. In this example, trained collection staff, division of workload among interviewers, time plan and logistics for interviewers finalized, questionnaires printed and distributed or

The activities of sub-process 4.3 will include

- For each interviewer to visit assigned enterprises, conduct the interviews and fill in the questionnaire, if necessary also reminders and follow-up activities.

Output from sub-process 4.3 will be:

- records of status for response from each enterprise (not responded, partial response etc.)
- filled in questionnaires for participating enterprises.

#### **3.1.2 Sub-process 4.4 “Finalise collection”**

Sub-process 4.4 has as input:

- Filled in questionnaires for participating enterprises

Activities of sub-process 4.4 are:

- Capture of data from questionnaires into electronic media
- Archiving of recorded questionnaires



Output from the sub-process:

- Raw questionnaire data in electronic format
- Archived questionnaires

### **3.1.3 Sub-process 5.3 “Review and validate”**

Sub-process 5.3 has as input:

- Questionnaire data in electronic format for the enterprises
- Editing rules based on priorities on quality aspects made by subject matter specialists, previous experience from the survey, resources available for the data clean-up etc.

Activities in this sub-process are:

- Assignment of different kinds of flags by the editing program on the different variables of the records of the enterprises. These flags indicate the character of action that needs to be taken (as manual or automated corrections)

Output of the sub-process:

- Signals for necessary actions

### **3.1.4 Sub-process 5.4 “Edit and Impute”**

Sub-process 5.4 has as input:

- Data from the questionnaires with signals for actions to be taken

Activities in this sub-process:

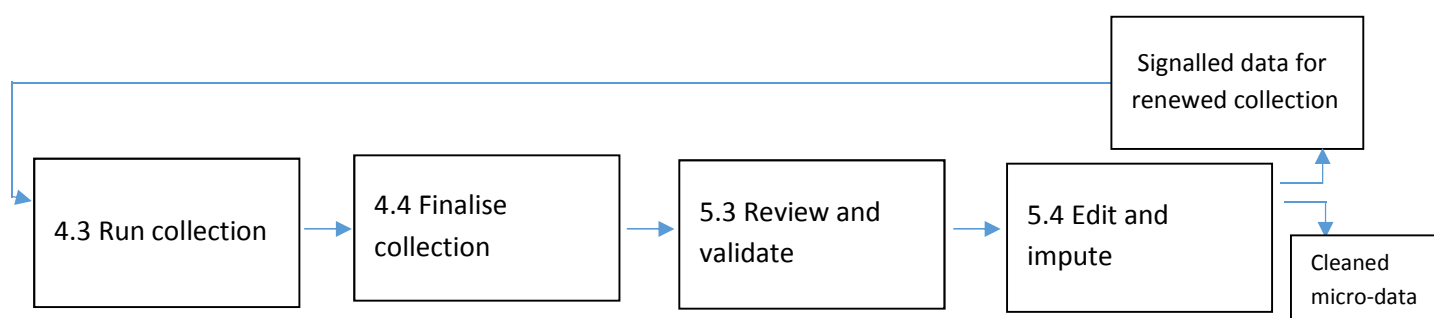
- Imputations of some of the missing data and automatic corrections of some of signaled errors will be made by the imputation program
- For serious errors or missing data (e.g. large enterprises contributing to large degrees in their branches of industry), new contacts need to be taken with the enterprises. This means an iteration going back to sub-process 4.3 (“Run collection”) and the sequent sub-processes.

Output from this sub-process:

- Questionnaire data which have passed the edit test or which have been corrected in 5.4 (“Cleansed micro-data”)
- Signals of errors or missing data requiring renewed collection

### **3.1.5 Overview of the sub-processes and comments**

The different sub-processes are shown below:



Two observations relating to these sub-processes:

- a) One of the most important measures of the production system of a statistical product is the time lag between the reference time (time point or period referred to in the questionnaire) and the time of publication. The time to get micro-data cleansed is usually a substantial part of that time lag. Resource consumption is another important measure. Both time and resources used increase as the proportion of renewed collection increases. Efforts to decrease the volume of renewed collection (and also by other means reduce the time and resources needed for these sub-processes) are therefore important.
- b) These are the sub-processes where the quality of data – and the resulting quality of the statistical product – are affected most. All experience indicates that the earlier in the process – the closer to the time of interviews – one can detect and correct data or ensure completeness of data, the better the possibility to obtain good quality results.

For these two reasons different approaches have come to be used to include as much as possible of the editing in the collection by the use of automated data collection devices.

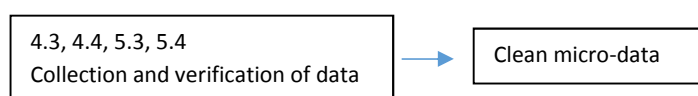
### 3.2 Possible “to be” approaches

#### 3.2.1 *Hand-held devices used by interviewers*

This is the approach selected for INCAF in household interviews. The tablets used by the interviewers contain not only the routines for data entry, but also (all?) validity checks on the variables entered by the interviewers, signaling immediately if control questions should be asked for improbable values entered. If no connections to INE’s central databases are possible, only the locally stored data on the tablets can be used for the checks. By this approach the sub-processes 4.3, 4.4, are integrated as well as (parts of?) the sub-processes 5.3 and 5.4.

#### 3.2.2 *Web-collection*

This is an approach that could be used for larger enterprises. By having them fill in the questionnaire in web format it is possible to include the validation of the data in the collection process. As all centrally stored information is available as basis for checks, all micro-data based checks can be done at data entry:



This is a simplified picture, but even if some details are omitted for sake of clarity, the integration of the processes will greatly streamline the work, facilitate improved quality control and reduce the time required to obtain clean micro-data.

## 4 Phase 6 Analysis

This is the phase where the output for the product is produced, in almost all cases statistical tables, and more or less elaborate explanations, interpretations and deeper analysis. For INCAF the planned analysis to be made by INE should be described as well as the responsible organizational unit.

The amount of output and the degree of analysis that is made should be determined by the needs of the users. The critical questions to ask is if the output produced is sufficiently described, commented and analyzed to fit the different types of use of the statistics that has been the basis for producing it.

## **5 Phase 7 Dissemination**

Activities under this phase intend to make the statistical output (tables, etc.) available to the users. For INCAF the planned dissemination to be made by INE should be described as well as the responsible organizational unit. As for the analysis the critical question to ask is if the dissemination planned fits the needs of the users.

For the phase “Dissemination”, the critical assessment for a certain product is important. Still experience shows that it is the assessment for the national statistical institute as a whole that has pointed to the potential for important improvements. The traditional way for a national statistical institute of doing this has been to produce one publication (or sets of publications for large products) for one product. Statistics covering all statistical products have often been compiled into a Statistical Yearbook. The trend in recent years has been to integrate the dissemination more across products and have common dissemination systems. The statistical output of different statistical output is stored in aggregate form (macro-data) in statistical databases designed to store macro-data and associated descriptions (meta-data). These statistical databases form the basis for different types of dissemination such as via the web-page of the statistical institute, via traditional publications or via statistical output tailor-made for advanced users.

## ANNEX I – INTERVIEW MATRIX FOR BUSINESS ANALYSTS

Name	Department	Job Title	Current Role	General												Organisational			Business Analysis								IT Knowledge		
				Degree in:	MS Office					Ability to Train	Ability to Coach	Ability to Conduct Presentations	Ability to Learn Information, Processes, Systems	Knowledge of Political Environment of INE	Knowledge of Overall Various Issues at INE	Organisational Assessment and Design	Change Management	Organisation Transformational Techniques	Knowledge of INE's Legislative Framework	Understanding of INE's Current Processes	Statistical Background	Ability in Process Mapping Techniques	Ability in Gap Analysis	Build Business Cases & Recommendations	Ability in Business Requirement Definition	Ability in Functional Specifications Development	Experience in Implementation of IS	Understanding of ICT's Fundamentals	Knowledge in System QA, UAT, and Scenario Scripting
					Excel	Word	PowerPoint	Visio	MS Project																				
													</																

## ANNEX J – LIST OF PERSONS MET

The Consultants worked closely together with a group consisting of:

Mr. Cirilo Tembe, Director, DICRE

Mr. Salamão Muinga, Deputy Director, DICRE, Head of modernization group

Mr. Tomás Bernardo, member of modernization group

Mr. Lars Carlsson, Scanstat Consultant, member of modernization group

This group and the Consultants held a series of meetings, as following.

Meetings for selection of a product as pilot for modernization:

Ms. Julia Cravo, Scanstat consultant

Mr. Azarias Nhanzimo Director DESE

Mr. Antonio Adriano Deputy Director DCI

Mr. Arão Balate, Director DCI

Alexandre Marrupe, Cartography

Meeting with National School of Statistics for discussions on training matters:

Ms. Leonette Mabaia, School Director

Ms. Destina Uinge Advisor

Two meetings with Mr Arão Balate, Director, Census and Surveys together with senior INCAF staff and Mr. Lars Lundgren, Scanstat Consultant to INCAF, concerning the selection of INCAF as pilot product and for explaining the requirements on tasks and participation by INCAF staff.

Two meetings with Maputo Province DPINE to discuss the selection of that province as a pilot:

Mr. António Júnior, head of Maputo Province DPINE

Mr. Evaristo Manhente, Head of Department

Mr. Ibraimo Aly, Head of Department

Mr. Buñóda Modlane, Technician

Meetings for discussions on the proposed action plan with:

Mr. Valeriano Levene, Vice President Economic Statistics

Ms. Alda Rocha, Head of Cabinet for International Relations

Two meetings for discussion of and presentation of proposals:

Dr. João Dias Loureiro, President, INE

## ANNEX K – LIST OF LITERATURE



All mission reports from the Scandinavian programme are available online on: [www.dst.dk/mozambique](http://www.dst.dk/mozambique)

For this mission I would also like to refer to the reports:

C2D Services Inc., Technical Assistance for the National Statistics Institute of Mozambique, Consultancy Report – Final, September 2012.

Generic Statistical Business Process Model, GSBPM (Version 5.0, December 2013) , UNECE .  
<http://www1.unece.org/stat/platform/display/GSBPM/GSBPM+v5.0>

## ANNEX L – TERMS OF REFERENCE

## **TERMS OF REFERENCE**

for a short-term mission on

### **Reform and Modernization of Statistical Production Processes with focus on the ICT at INE**

**2 - 20 June, 2014**

within the

AGREEMENT ON CONSULTING IN INSTITUTIONAL CAPACITY BUILDING, ECONOMIC  
STATISTICS AND RELATED AREAS

between INE and Scanstat.

Consultants: Philippe Dadour, C2D Services Inc. and Lars Olsson Management Consulting.

Counterparts: Cirilo Tembe Director of DICRE and the Coordination Group for the Reform and Modernization of Statistical Production Processes with focus on the ICT at INE.

#### **Background**

The Information and Communication Technologies (ICT) are of utmost importance in all processes that comprise the statistical production. Recognizing the rapid dynamics that characterizes the evolution of ICT, the INE, in partnership with the Canadian Cooperation, hired a consultation from the company C2D, aiming to propose a clear strategy for the development of sustainable and contextualized statistical production processes, focusing on ICT.

The consultation resulted in an Action Plan to be implemented over five years, aligned with the main instruments of policy and strategy planning for the SEN. The implementation of the action plan, recommended by the consultancy mission, has its framework already prepared and approved the Action Plan 2013-2017 (to operationalize the Strategic Plan 2013-2017 SEN) resulting in an exercise to be conducted internally by the INE.

It is important to underline that the Action Plan is not limited only to the extent of technological infrastructure, given that it also includes dimensions like (i) Legal context (ii) Organizational structure of ICT (iii) Training, short term and formal (iv) Methodologies and statistical production processes and (v) Interconnection of systems.

To support the modernisation activities a small group has been created. The group reports directly to the President of INE and has the following tasks:

- i. Develop a multi-year budget, covering the five years, aimed at the implementation of the Action Plan proposed by the consultancy mission of C2D;
- ii. Ensure that designed strategies and proposed activities in the reform and modernization of the INE are aligned with already existing policy instruments and strategies;
- iii. Coordinate the operation of operational plans to the context and circumstances of the INE;

- iv. Identify the activities in the course of this ToR that will require the participation of technical assistance external to INE, and;
- v. Monitor, document and report progress to top management of INE.

The composition of the group is the following: Permanent members: Clara Panguana, Firmino Guiliche, Lars Carlsson and Tomas Bernardo. Associated members: Destina Uinge, Lars Olsson e Philippe Dadour.

### **Main reasons for the mission**

The local permanent group has now been working for half a year and the ideas if the modernisation has been presented for all departments at INE. The C2D report has been translated into Portuguese. An initial scheme of training 2013 was set up but not implemented due to financial constraints. This year 2014 the financial situation looks better and it is time to join the whole group to discuss next steps.

### **Objective**

The overall objective of the mission is to assist INE in the implementation of the modernisation plan using existing international experiences.

### **Activities**

The Consultant is responsible for the following activities:

1. Review what have been done until now regarding modernization;
2. Assist INE by giving recommendations for the implementation of the modernization action plan;
3. Share experience on similar activities worldwide;
4. Assist with the tuning of the methodology to use for the deployment of the plan in light of recent findings;
5. The consultants will work closely with DICRE and the Coordination Group for the Reform and Modernization of Statistical Production Processes with focus on the ICT at INE.

### **Expected outputs**

The consultant will prepare a written documentation of the above activities.

### **Beneficiaries of the mission**

The mission will benefit INE and the whole National Statistical System of Mozambique including producers and users of statistical information.

### **Tasks to be done by INE to facilitate the mission**

- Elaborate ToR for the training
- Prepare and supply the consultant with necessary documents and information
- Supply good communication conditions for the consultant.

### **Source of Funding**

Project: MPD-1998-0015 – Coordenação e Integração Estatística  
PAAO14 – 3.2.1 Arquitectura e Gestão de Bases de Dados

**Timing of the mission**

Three weeks, as written above.

**Place**

The premises of INE in Maputo with possible allocations to the provinces.

**Language**

English.

**Report**

The consultant will prepare a short final report to be discussed with INE before ending assignment. Statistics Denmark as Lead Party will publish the final version on [www.dst.dk/mozambique](http://www.dst.dk/mozambique) within 3+ weeks of the end of the mission. The structure of the report should be according to Scanstat format.

Approved by Cirilo Tembe, INE/DICRE

Day / / .....

Confirmed by Leia Macamo, Contract Manager for the INE – Scanstat Contract

Day / / .....

**End of Document**