Trends in Design and Implementation of
Financial Management Information Systems (FMIS)

Cem Dener

Treasury Management Seminar
Lima, Peru
15-16 April 2010
Presentation

• What if FMIS?
• FMIS Implementation Approach
• Design & Implementation of FMIS Solutions
• Treasury Single Account
• FMIS Technical (ICT) Solutions
• FMIS Timeline
• Treasury/FMIS Projects (1984-2010)
• Monitoring and Knowledge Sharing
• Challenges and Conclusions
What is FMIS?

**FMIS: F = B + T (+ O)**

- Budget Preparation
- Public Investments
- Mgmt of Budget Authorizations
- Commitment of Funds
- Procurement/Purchasing
- Tax and Customs
- Asset/Inventory Mgmt
- Payroll Calcs HR Mgmt
- Cash Management
- Payments and Receipts Mgmt
- Debt and Aid Management
- Publishing Web Portal
- Fiscal Reports & Budget Review
- Audit and Evaluation
- Treasury System (Budget Execution)

Policy Development and Review

**FMIS DB**
Approach

1. Identify PFM reform needs (What? Why?)
   - Assess Readiness + Define Strategy ➔ Conceptual Design
   - Identify “Priorities” and “Sequencing” of PFM Reforms

2. Develop necessary solutions (How? Where? When?)
   - Functionality + Tech Architecture + Specs ➔ System Design
   - Identify “FMIS Prerequisites”

3. Project management (Who?)
   - Implement + Monitor + Evaluate + Coord ➔ FMIS Implementation
   - Strengthen “Institutional Capacity” for Procurement, FM, ICT
Integrated FMIS Development Phases

Integrated FIMS Development: years 0 1 2 3 4 5 6 7 8 9 10

1. Identify PFM reform needs
   - Assess existing capacity & practices
   - Develop PFM Reform Strategy
   - Advisory support for PFM reforms
   - Conceptual Design
   - Coordination with donors / other projects
   - Assistance in PFM capacity building

2. Develop necessary solutions
   - Assess existing ICT skills and resources
   - Develop ICT/e-Gov Strategy
   - System Design
   - Technical Specifications [ICB docs]
   - Coordination with e-Gov / other ICT prj
   - Assistance in technical capacity building

3. Project management
   - Project Management Group (PMG)
   - Administration of Trust Funds (if any)
   - Procurement of ICT solutions [ICB]
   - Establishment of a countrywide network
   - System implementation, test, acceptance
   - Monitoring & Evaluation
   - Capacity building & Change Management

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FMIS design + implem may take at least 6-7 years, despite advances in technology.
### FMIS Functionality / Implementation Options

#### FMIS Functions
- Macroeconomic Forecasting
- Budget Preparation
- **Core Treasury System**
  - Expenditure Management
  - Revenue Management
  - Accounting (General Ledger)
  - Cash / Fund Management
  - Commitments / Purchasing
  - Financial Reports
- Operational Support for SUs
- Internal Debt Management
- External Debt and Aid Mgmt.
- Asset / Inventory Management
- Personnel Database / Payroll
- Support for Auditing
- Web Publishing (Web Portal)
- Decision Support Tools (MIS)

#### Common Implementation Options
- LDSW / Existing Models
- LDSW / COTS
- COTS (customized)
- + Interface w banking system (TSA)
- + Interface w revenue collection
- + Interface w banking system (TSA)
- + Interface w procurement agency
- LDSW for Spending Units (via Web Portal)
- LDSW / Interface with Debt Mgmt System
- Interface with Debt Mgmt System
- LDSW / COTS
- LDSW / COTS
- Custom developed reports
- LDSW
- COTS / LDSW

Centralized TSA Model

- **MoF Central Treasury**
- **Central Bank**
- **ACH RTGS**
- **Secure VPN**

1. Payment Order and Invoice submitted
2. Approved Payment Request
3. Payment Instructions
4. Payment Message
5. Direct payment to beneficiary account
6. TSA Statements
7. Automatic Reconciliation

**Treasury Network**

- Headquarters Commercial Bank #1
- Headquarters Commercial Bank #X
- Commercial Bank #1 Branch Offices
- Commercial Bank #X Branch Offices

**Spending Units**

- Details of all Payments (and Revenues) received from the Central Bank daily

**Document/info flow**

- Financial transactions

**Highlights**

- All TDO local bank accounts closed
- NO local transit accounts
- CT has only one integrated TSA account
- NO Extra Budgetary Funds
Core Treasury Operations
(Stochastic Process)

Main source of deviations from fiscal discipline

Modes of TSA Operation:
- Client Account
- Correspondent Account
• Modern integrated FMIS systems are designed and implemented as centralized web-based applications, supporting decentralized operations

• Implementation of the FMIS includes the following ICT components:


  [2] Development of web-based Application Software (ASW) as a combination of customized COTS package + locally developed software (hybrid solution).

  [3] Installation of central servers (database & application servers) and data storage units (fiber disk arrays) at the Main System Center & Business Continuity Center.

  [4] Installation of standard field hardware (domain servers, user workstations and peripherals) in central and field offices.

  [5] Installation of network equipment, system security and user management tools and engineering support solutions.
A typical 3-tier web-based implementation and [ICT] components

1. Database Server(s)
2. Application Servers
3. Central Servers
4. Field Hardware
5. Network Equipment

FMIS Technology Architecture

MSC: Main System Center
BCC: Business Continuity Center
Web-based FMIS Model

Integrated FMIS DB

1. Database Server
2. Application Servers
3. Web Server
4. User Terminals

FMIS
- Customized COTS
- FMIS modules
- Core Treasury System
- LDSW
- Locally Developed Software modules
- Interfaces
  - Internal / External

LDSW : Locally Developed Software
COTS : Commercial-off-the-Shelf SW

VPN

PFM Organizations
(MoF Units, Treasury Offices, Line Ministries)

Internet

Internal Access

External Access

Spending Units, Local Finance Directorates, Local Public Authorities, Municipalities, etc.
FMIS in Brazil

Policy Development and Review

Budget Preparation

Public Investments

Mgmt of Budget Authorizations

Commitment of Funds

Procurement/Purchasing

Payments and Receipts Mgmt

Asset/Inventory Mgmt

Cash Management

Debt and Aid Management

Publication Web Portal

Fiscal Reports & Budget Review

Audit and Evaluation

FMIS DB

TPM + MF

SISAC

TCU

SIAFI (F)

SISTN (S+M)

CEF

STN/MF

CODIP/COGEV/CODIV

SID

SIAPE

SRH/MP

STN/MF

SIAFI

SPI/MP

SEGES/MP

SIEG

SIORG

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BACEN

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SRH/MP

STN/MF

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SRH/MP

STN/MF

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SIAPE

SRH/MP
The review of WB funded FMIS projects was initiated by Dorotinsky (SM, ECSP4) in Sep 2009, to revise/update the FMIS Report drafted in 2002 with contributions from Watkins, Rozeira, Arizti, Bellver, Arrobbio, Ossio, Howard and Dener, as well as other interested specialists.
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### Timeline of FMIS Projects - II

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### Project Status:
- C = Closed
- A = Active
- P = Pipeline

### Total Duration in years

### Treasury/FMIS Status:
- 1 = Operational
- 2 = Oper. (Pilot)
- 3 = In progress
- 4 = Pipeline
- 0 = Not implemented
## Latin America & Caribbean: 25 WB funded T/F projects completed in 12 countries

**Sistema Integrado de Administracion Financiera (SIAF)**

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</tbody>
</table>

**Notes:**
- Above timelines denote the operational period of T/F systems developed through Bank funded projects.
- In some countries, several consecutive projects were implemented to expand or upgrade existing T/F.
- Dashed lines denote the transition to full scale operations.
**Type of FMIS Projects**

**Type of Completed Treasury/FMIS (54 prj)**
- T/F New System, 31
- Expand existing T/F, 13
- Not Impl, 6
- Emergency T/F, 2
- Exp exist Emer T/F, 2
- T/F other, 0

**Type of Active Treasury/FMIS (29 prj)**
- T/F New System, 13
- Expand existing T/F, 13
- Emergency T/F, 1
- Exp exist Emer T/F, 1
- T/F other, 1

**Type of Comp+Active Treasury/FMIS (83 prj)**
- T/F New System, 44
- Expand existing T/F, 26
- Emergency T/F, 3
- Exp exist Emer T/F, 3
- T/F other, 1
- Not Impl, 6

**LCR: 13 new (5 T + 8 F)**
Trends in FMIS Design and Implementation

**Status of FMIS Projects**

- **Completed + Active (83)**
  - Completed Treasury (20) vs. Completed FMIS (34)
  - Active Treasury (9) vs. Active FMIS (20)

- **Completed (54)**
  - 89% of T/F ICT systems (48/54) are operational (29 full + 19 pilot)

- **Active (29)**
  - 11% of T/F ICT systems (6/54) were not implemented

- **Trends**
  - **Operational** 89%
  - **Not Impl.** 11%

---

*Images and diagrams illustrating the status of FMIS projects in different regions (AFR, EAP, ECA, LCR, MNA, SAR) with details on completed, active, and not implemented projects.*
Weight of Treasury/FMIS Activities in Projects

Completed (54)

Active (29)

Scope of Treasury/FMIS Projects

Operational (48)

Active (29)
**FMIS Projects (1984-2010)**

**Treasury/FMIS Application Software Solutions**

- **T/F ASW Solutions in Completed Projects (48 / 54)**
- **T/F ASW Solutions in Active Projects (29)**
- **T/F ASW Solutions in Comp+Actv Projects (77 / 83)**

**Duration of T/F Procurement**
- Avg: 28 months (48 / 54 projects)

**Duration of T/F Contracts**
- Avg: 30 months (48 / 54 projects)

**T/F Application Software Solutions (Completed)**

<table>
<thead>
<tr>
<th>Region</th>
<th># C</th>
<th>COTS</th>
<th>Other</th>
<th>LDSW</th>
<th>?</th>
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<tr>
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<td>48</td>
<td>21</td>
<td>4</td>
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**T/F Application Software Solutions (Active)**

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<tr>
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<th>Other</th>
<th>LDSW</th>
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<tr>
<td>LAC</td>
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<tr>
<td>MNA</td>
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<tr>
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<tr>
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<td>29</td>
<td>21</td>
<td>2</td>
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**T/F Application Software Solutions (Comp+Active)**

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<th>Other</th>
<th>LDSW</th>
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<tr>
<td>SAR</td>
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<tr>
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<td>77</td>
<td>42</td>
<td>6</td>
<td>30</td>
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</table>

**Client Server vs. Web-Based Solutions**
- Completed Projects: 67% Client Server + 33% Web-Based (32 Client Server + 16 Web-Based)
- Active Projects: 7% Client Server + 93% Web-Based (2 Client Server + 27 Web-Based)
- Comp+Actv Projects: 44% Client Server + 56% Web-Based (34 Client Server + 43 Web-Based)
### Cost of FMIS Projects

#### Completed Treasury/FMIS projects (54)

<table>
<thead>
<tr>
<th>Estimated ($ m)</th>
<th>Actual ($ m)</th>
<th>%</th>
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<tbody>
<tr>
<td>Project cost</td>
<td>1,353</td>
<td>1,366</td>
</tr>
<tr>
<td>WB funding</td>
<td>1,064</td>
<td>1,015</td>
</tr>
<tr>
<td>Total ICT spending</td>
<td>614</td>
<td>45%</td>
</tr>
<tr>
<td>Total T/F ICT systems</td>
<td>312</td>
<td>23%</td>
</tr>
</tbody>
</table>

- Project cost: 1,353 ($ m) estimated vs. 1,366 ($ m) actual, 1% variance.
- WB funding: 1,064 ($ m) estimated vs. 1,015 ($ m) actual, 74% funded by the WB.
- Total ICT spending 614 ($ m), 45% spent on ICT.
- Total T/F ICT systems 312, 23% for T/F in 48 projects.

#### Active Treasury/FMIS projects (29)

<table>
<thead>
<tr>
<th>Estimated ($ m)</th>
<th>Actual ($ m)</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Project cost</td>
<td>1,822</td>
<td>1,984</td>
</tr>
<tr>
<td>WB funding</td>
<td>998</td>
<td>391</td>
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<tr>
<td>Total ICT spending</td>
<td>1,110</td>
<td>56%</td>
</tr>
<tr>
<td>Total T/F ICT systems</td>
<td>578</td>
<td>29%</td>
</tr>
</tbody>
</table>

- Project cost: 1,822 ($ m) estimated vs. 1,984 ($ m) actual, 9% variance.
- WB funding: 998 ($ m) estimated vs. 391 ($ m) actual, 55% WB disbursement to date.
- Total ICT spending 1,110, 56% estimated spending on ICT.
- Total T/F ICT systems 578, 29% estimated spending on T/F.

#### Completed+Active Treasury/FMIS projects (83)

<table>
<thead>
<tr>
<th>Estimated ($ m)</th>
<th>Actual ($ m)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project cost</td>
<td>3,175</td>
<td>3,350</td>
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<tr>
<td>WB funding</td>
<td>2,062</td>
<td>1,406</td>
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<tr>
<td>Total ICT spending</td>
<td>1,725</td>
<td>51%</td>
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<tr>
<td>Total T/F ICT systems</td>
<td>890</td>
<td>27%</td>
</tr>
</tbody>
</table>

- Project cost: 3,175 ($ m) estimated vs. 3,350 ($ m) actual, 6% variance.
- WB funding: 2,062 ($ m) estimated vs. 1,406 ($ m) actual, 42% estimated WB funding.
- Total ICT spending 1,725, 51% actual and estimated spending on ICT.
- Total T/F ICT systems 890, 27% actual and estimated spending on T/F.
### Regional Distribution of FMIS Project Costs

#### Total vs ICT Cost of Completed Treasury/FMIS projects (54)

<table>
<thead>
<tr>
<th>Region</th>
<th># Prj</th>
<th>Prj Total ($ m)</th>
<th>ICT Cost ($ m)</th>
<th>T/F ICT ($ m)</th>
<th>% Tot</th>
<th>Cost ($m)/Prj</th>
<th># C</th>
<th>T/F Core</th>
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<td>13</td>
<td>409.2</td>
<td>156.8</td>
<td>52.6</td>
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<tr>
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<td>3</td>
<td>105.8</td>
<td>66.7</td>
<td>16.3</td>
<td>15%</td>
<td>5.4</td>
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<tr>
<td>ECA</td>
<td>7</td>
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<td>125.4</td>
<td>70.0</td>
<td>44%</td>
<td>10.0</td>
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<tr>
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<td>7.0</td>
<td>1.8</td>
<td>0.0</td>
<td>0%</td>
<td>0.0</td>
<td>0</td>
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<tr>
<td>SAR</td>
<td>5</td>
<td>93.9</td>
<td>47.9</td>
<td>41.6</td>
<td>44%</td>
<td>8.3</td>
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<tr>
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<td>54</td>
<td>1,365.6</td>
<td>614.4</td>
<td>311.8</td>
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#### Estimated/Actual Total vs ICT Cost of Active Treasury/FMIS projects (29)

<table>
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<tr>
<th>Region</th>
<th># Prj</th>
<th>Prj Total ($ m)</th>
<th>ICT Cost ($ m)</th>
<th>T/F ICT ($ m)</th>
<th>% Tot</th>
<th>Cost ($m)/Prj</th>
<th># A</th>
<th>T/F Core</th>
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<td>244.5</td>
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<td>45%</td>
<td>18.3</td>
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<td>16.1</td>
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<td>44.0</td>
<td>19.0</td>
<td>12.6</td>
<td>29%</td>
<td>12.6</td>
<td>1</td>
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</tr>
<tr>
<td>SAR</td>
<td>2</td>
<td>126.4</td>
<td>62.2</td>
<td>28.4</td>
<td>22%</td>
<td>14.2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Totals</td>
<td>29</td>
<td>1,984.3</td>
<td>1,110.4</td>
<td>578.4</td>
<td>12.7</td>
<td>29</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

#### Total vs ICT Cost of Completed+Active Treasury/FMIS projects (83)

<table>
<thead>
<tr>
<th>Region</th>
<th># Prj</th>
<th>Prj Total ($ m)</th>
<th>ICT Cost ($ m)</th>
<th>T/F ICT ($ m)</th>
<th>% Tot</th>
<th>Cost ($m)/Prj</th>
<th># C+A</th>
<th>T/F Core</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFR</td>
<td>22</td>
<td>1,067.3</td>
<td>287.4</td>
<td>129.7</td>
<td>12%</td>
<td>7.2</td>
<td>18</td>
<td>6</td>
</tr>
<tr>
<td>EAP</td>
<td>9</td>
<td>350.3</td>
<td>212.0</td>
<td>126.2</td>
<td>36%</td>
<td>14.0</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>ECA</td>
<td>13</td>
<td>297.0</td>
<td>224.7</td>
<td>166.8</td>
<td>56%</td>
<td>13.9</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>LCR</td>
<td>1</td>
<td>663.0</td>
<td>576.0</td>
<td>221.6</td>
<td>33%</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>MNA</td>
<td>2</td>
<td>51.0</td>
<td>20.8</td>
<td>12.6</td>
<td>25%</td>
<td>12.6</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>SAR</td>
<td>7</td>
<td>220.3</td>
<td>110.1</td>
<td>70.0</td>
<td>32%</td>
<td>10.0</td>
<td>7</td>
<td>7</td>
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<tr>
<td>Totals</td>
<td>83</td>
<td>3,349.9</td>
<td>1,724.8</td>
<td>890.2</td>
<td>8.8</td>
<td>77</td>
<td>47</td>
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</tr>
</tbody>
</table>

*April 2010*

Trends in FMIS Design and Implementation
Main Characteristics

FMIS Projects (1984-2010) - Initial Observations

- Appears to be four distinct regional T/F design & impl approaches:
  1. LAC: Start centrally, expand gradually; first T, then F; mainly LDSW
  2. ECA: Countrywide; first T, then F; hybrid COTS+LDSW; ICT specialist in TTs
  3. AFR, MNA: Mainly for central gov; mostly F; based on COTS
  4. EAP, SAR: Countrywide; mostly T; based on COTS

T/F Design and Implementation - Regional Approach

<table>
<thead>
<tr>
<th>Region</th>
<th># Cnty</th>
<th># Prj</th>
<th>T/F</th>
<th>Scope</th>
<th>ASW</th>
<th>T/F Core</th>
<th>T/F #PP</th>
<th>ICT in TT</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAC</td>
<td>13</td>
<td>29</td>
<td>T &gt;&gt; F</td>
<td>C &gt;&gt; C+L</td>
<td>LDSW</td>
<td>Mixed</td>
<td>&gt; 3</td>
<td>TT+Cons</td>
</tr>
<tr>
<td>ECA</td>
<td>12</td>
<td>14</td>
<td>T &gt;&gt; F</td>
<td>C+L</td>
<td>COTS+LDSW</td>
<td>Yes</td>
<td>&lt;=3</td>
<td>TT</td>
</tr>
<tr>
<td>AFR</td>
<td>14</td>
<td>22</td>
<td>F</td>
<td>C</td>
<td>COTS</td>
<td>No</td>
<td>&gt; 3</td>
<td>Cons</td>
</tr>
<tr>
<td>MNA</td>
<td>2</td>
<td>2</td>
<td>F</td>
<td>C</td>
<td>COTS</td>
<td>No</td>
<td>&gt; 3</td>
<td>Cons</td>
</tr>
<tr>
<td>EAP</td>
<td>7</td>
<td>9</td>
<td>T</td>
<td>C+L</td>
<td>COTS</td>
<td>Mixed</td>
<td>&lt;=3</td>
<td>TT+Cons</td>
</tr>
<tr>
<td>SAR</td>
<td>3</td>
<td>7</td>
<td>T</td>
<td>C+L</td>
<td>COTS</td>
<td>Yes</td>
<td>&lt;=3</td>
<td>Cons</td>
</tr>
<tr>
<td></td>
<td>51</td>
<td>83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 89% of completed T/F operational (29 full + 19 pilot impl)

- LCR is the most experienced region in design & implementation of FMIS
Maturity Framework for Treasury/PFMS projects

- A Community of Practice for Treasury Managers was established in June 2006 as part of the Public Expenditure Management-Peer Assisted Learning (PEM-PAL) program (www.pempal.org).

- The Treasury / FMIS Maturity Framework (MF) was developed during the "PEM-PAL Workshop for Treasury Officials" in Ljubljana, Slovenia (June 2006) and updated twice so far (next update planned in May 2010).

- The Maturity Framework was designed to enhance learning and knowledge sharing among Heads of Treasury and related key officials in public expenditure management from 16 ECA countries.

- The Bank prepared a web site to publish the results and to facilitate interactive monitoring and management of proposed indicators (www.pempal.org/pfmstool currently being transferred to Ljubljana).
Trends in FMIS Design and Implementation

Treasury/FMIS Maturity Framework

1. Readiness
   - PFM reform strategy
   - Institutional capacity
   - Countrywide network infrastructure

2. Preparation
   - Legal and institutional frameworks
   - Budget coverage
   - Treasury Single Account (TSA)

3. PFMS Design
   - Definition of system functionality
   - Detailed technical requirements

4. Procurement
   - Large scale ICT systems
   - Technical Assistance and Training

5. Implementation
   - System development & integration
   - Full scale testing and rollout
   - Training and change management

6. Monitoring & Evaluation
   - Monitoring mechanisms
   - Project mgmt capacity

7. Maintenance and Support
   - Budget funds
   - Technical capacity
   - System administration
   - Maintenance

Resources

Maturity Framework for Treasury/PFMS projects
www.pempal.org/pfmstool
interactive monitoring and management of MF indicators

Effectiveness

Time

9 - 18 months
18 - 36 months
9 - 18 months

April 2010
Trends in FMIS Design and Implementation
26
ECA Treasury/ PFMS Development Status

August 2007

ECA - Treasury / PFMS Implementation

- Completed
- In progress
- Started
Challenges

- Government ownership and adequate budget support
- Stability of PFM rules and regulations (frequent legal/policy changes)
- Recruitment and sustainability of ICT specialists in public sector
- Existence of a reliable countrywide network infrastructure
- Realistic ICT cost estimates to reduce procurement risks
- Web based applications & open systems to reduce cost & duration of implementation
- Proper requirements for Records Management, Information/System Security and Digital Signature in design
- Coordination with e-Gov activities (interoperability & resource sharing)
- Strengthening project management, monitoring and evaluation skills
Conclusions

- **Commitment and support**: High level commitment and proper budgetary support is essential for successful implementation and sustainability of FMIS.
- **From Treasury to Integrated FMIS**: Within the last decade, emphasis has been given to the development of integrated FMIS solutions after the initial Treasury development projects, benefiting from the developments in secure web-based PFM systems and open-source applications.
- **Capacity building**: Implementation of integrated FMIS solutions requires capacity building, proper training and professional technical assistance.
- **FMIS vs e-Government**: Integrated FMIS technical solutions need to be designed and implemented as a part of e-Government strategy/program.
- **Financial Management Information System**: Integrated FMIS is not only a tool to improve operational efficiency and accountability, but also a key decision support mechanism for public financial managers.
Gracias