Abstract

This document presents a technical overview of the Planner and illustrates the methodology used by the Planner through screenshots and graphical representations. The objective is to provide some insights into the operations of the Planner for optimal use. This document is intended for individuals who intend to use this tool to plan, acquire and manage ICT services by using the Planner.

CONTENTS

1. Introduction

Figure 1 shows a conceptual view of the Computer Aided Strategic Planner and shows how it systematically guides the users through different phases of a planning process. The first two phases (P0 and P1) capture country and service specific information. Phase P2 generates a customized plan based on P0 and P1. P3 supports execution of the plan and phase P4 supports monitoring and control with heavy emphasis on project management and quality controls. We will take a closer look at the different phases of the Planner.

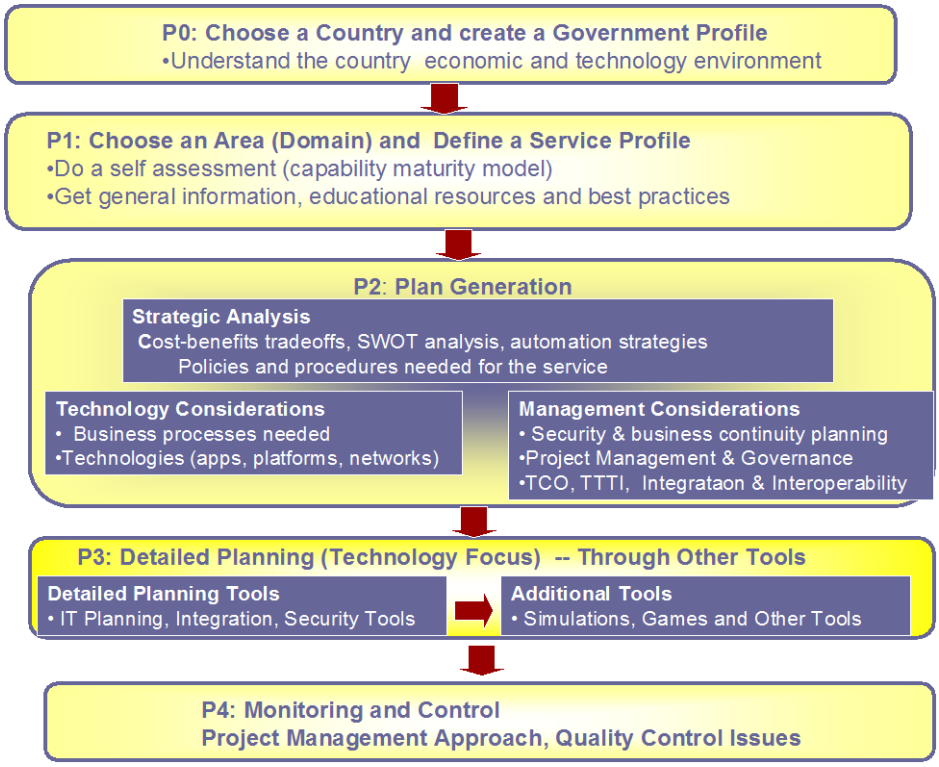

Figure 1: Computer Aided Strategic Planner -- Key Components and Flow

The Strategic Planner uses a wide range of tools, techniques and standards in all phases, as shown in Table 1. The main phases of the planner (P0, P1, P2, P3, P4) are displayed in column 1, the main activities (steps) in each phase are shown in column 2, and the main tools, techniques, and standards used in each step are listed in column 3.

Table 1: Computer Aided Strategic Planner – A Closer Look

Planning Phases	Activities Performed	Tools, Techniques & Standards Used
P0 (Government Modeler) Choose a Country and create	S1: Define the country Profile and specify the level of use for the ICT	Fetch and use various indicators from sources such as World Economic Forum, UNPAN, ITU

a Government Pattern	S2: Create a government pattern for the chosen country	Use the Patterns Repository to fetch and display a generic government pattern
	S3: Customize the pattern based on user inputs	Defaults for the patterns are based on external data sources
P1 (Initializer): Choose an Area (Domain) and Do Information Gathering	S1; Define a service in different areas that support the MDGs (e.g., healthcare, education, economic development)	The services are based on the government pattern and use the ITIL (IT Infrastructure Library: www.itil-officialsite.com
	S2: Get general information, educational resources and best practices	Extensive literature from diverse sources is accessed and displayed.
	S3: Do a self assessment of the PMO (present method of operation) and FMO (Future Method of Operation)	Uses the Capability Maturity Model (CMM) measures (0 to 5) for assessment.
P2 (Strategic Planning): High Level Planning (Management Focus)	Cost-benefits tradeoffs	Uses the McFarland Model
	Strategic analysis (buy, rent, outsource)	Uses an intuitive decision model based on time, in-house expertise,
	Policies and procedures needed for the service	Policies from different sources are fetched and displayed. Oracle Policy Automation
	Business processes needed	The Open Group Architecture Framework (TOGAF), Zackman model and US-FEA (Federal Enterprise Architecture)
	Technologies (apps, platforms, networks)	OAG (Open Application Group) Website: www.oag.org, TOGAF, W3C (www.w3c,org), Cisco guidelines
	Security & business continuity planning	SSI (System Security Institute), and ISO 9000 (for quality mgmt)
	Project Management & Governance	PMBOK (Project Management Book of Knowledge) by Proj Mgmt In.(PMI) COBIT (Control Objectives for Information), CMMI (Capability Maturity Model Integration)
	Interoperability and Integration Considerations	SOA, SPOCS(large European initiative for interoperability – http://www.eu-spocs.eu/)
P3 (Detailed Planner): (Technology Focus) -- Through Simulations	Consolidated Report that shows: - Summary of the interactions - Requirements (RFP) format - Standards used (with explanations)	Requirements document is based on IIBA (International Institute of Business Analysis) Website: www.theiiba.org
	Detailed Planning & Implementation Tools	Games, simulations, planning tools,
P4: Monitoring and Control (Quality Focus)	Detailed project management for monitoring and controls with quality focus	PMBOK (Project Management Book of Knowledge) by Proj Mgmt In.(PMI) COBIT (Control Objectives for Information), CMMI (Capability Maturity Model Integration)

2. P0 Phase –Initialization and Government Information Gathering

In the P0 phase, the user (government agency) chooses a country (e.g., Venezuela) and creates a profile for that country. A profile basically represents a scenario that a user wants to create and experiment with. Figure 2 shows a sample screen that shows the existing profiles that have been created already by the user. A user can create new profiles or reuse/extend existing ones.

Figure 1: Government and Service Profiles

The P0 phase consists of three major steps:

S1: Define the country profile and specify the level of use for the ICT

S2: Create a government pattern for the chosen country

S3: Customize the pattern based on user inputs

Figures 3, 4 and 5 display screenshots of how a user creates a new country profile (Figure 3), creates a government pattern that is fetched from a pattern repository (Figure 4) and then customizes it by defining which one of the government services are centralized and decentralized (Figure 5). Figure 6 shows a very high level summary of the information gathered in this phase.

A few points about the overall user inputs and screen design:

- The user session, after signing in, is guided through a control panel.
- The system automatically determines which phase/step you can invoke and this is indicated by a red arrow.

- Each phase/step, when invoked, produces a model and then returns control to the control panel.
- Each screen provides help and short tutorials/explains, indicated by "?", about the subject matter. For example, Figure 3 shows several explanations on different aspects of the screen.
- As shown in Figure 3, the bottom toolbar provides buttons for access to several other related tools such as a meta portal, simulations, solutions repository, etc. .

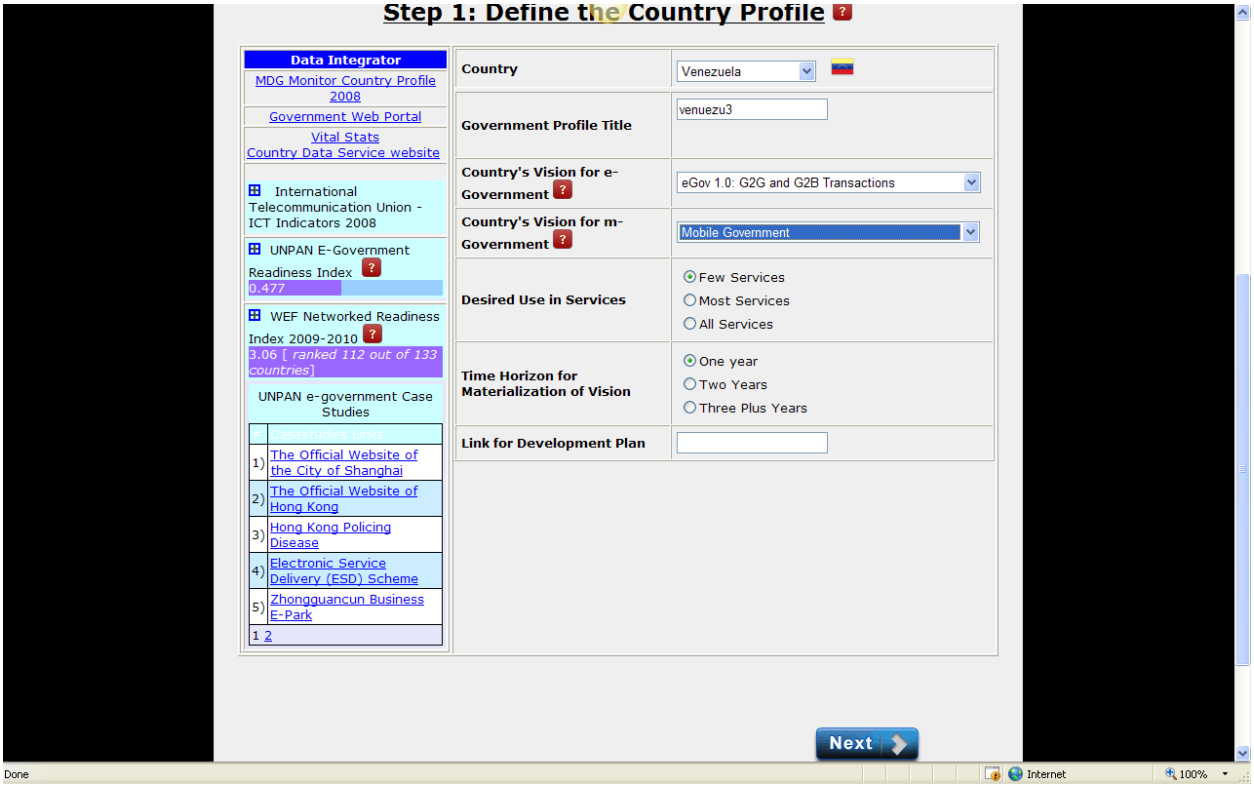

Figure 2: Initial Interview to Create a Government Profile

Figure 3 shows the interview to create a government profile:

- Name of country: Pick a name from the list
- Government Profile Title: To start, you can create a profile ("model") of your country or use an existing profile. The profile captures essence of an enterprise and is populated as a result of interviews to be conducted as we proceed. You can use any name to create a profile. The profile is saved for future use. When you logon again, all profiles created by you are shown. You can create a new profile to model a new situation or use an existing one.
- Web Usage Desired: shows the different stages of web usage, from no usage to enterprise 2.0 and digital corp.
- Mobility Usage Desired: shows the different stages of mobility and wireless communication usage, from no usage to mobile corporations.

- Desired Use in Services: shows how many services will be digitized ranging from few services to all services.
- Time Horizon for Materialization of Vision: shows when is the expected digitization expected to take place (one year, two years, three plus years)

Figure 3 also shows a data integrator that accesses pertinent pieces of information about Venezuela from a wide range of information sources such as the MDG Monitor, ITU, UN, and World Economic Forum. This information is used to help make decisions in the planning process.

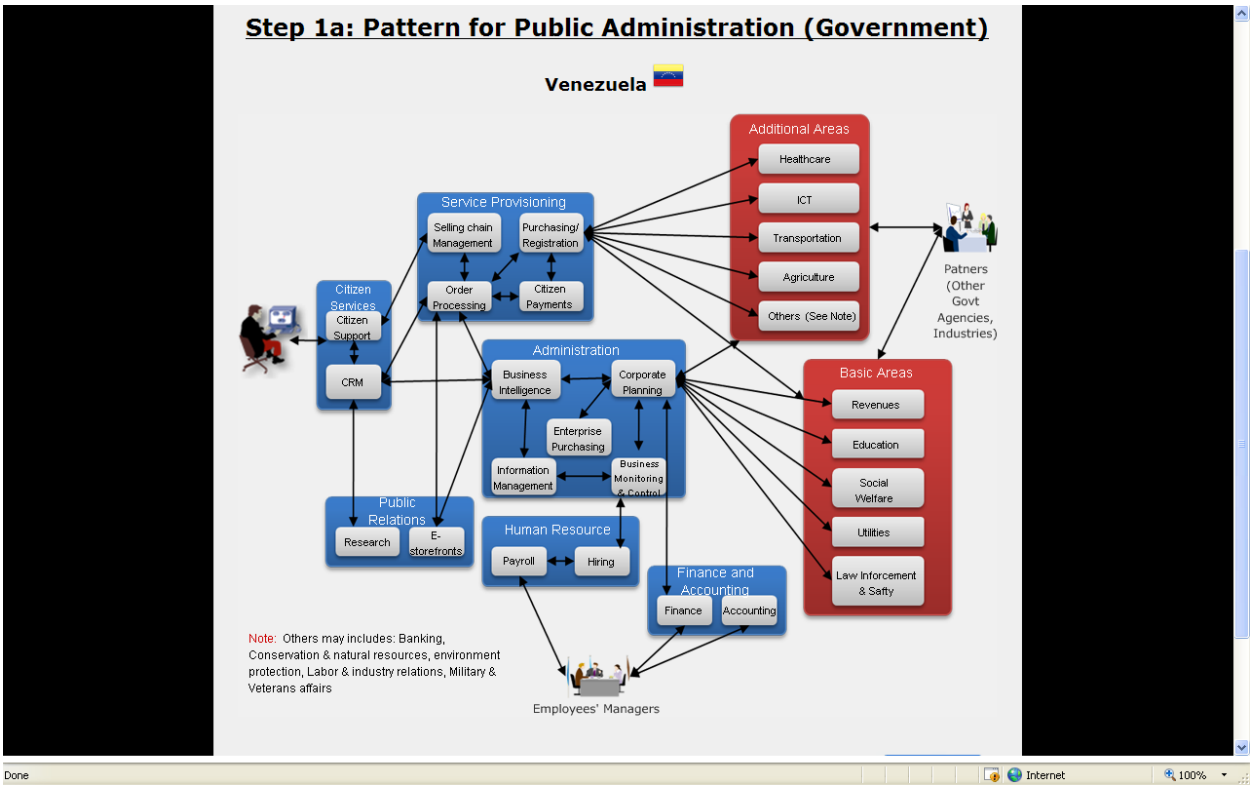

Figure 3: Sample Government Pattern

Figure 4 shows a general "pattern" of government services. Patterns are a well-known format for capturing knowledge and best practices. In essence a pattern represents core knowledge that can be specialized for different situations. The pattern represented in Figure 4 represents the core services provided by a government and can be specialized and customized based on user inputs. For example, a user customizes this pattern for Venezuela as the user proceeds with the next step shown in Figure 5. The modified pattern is used to make later decisions. Exhibit1 gives a quick overview of patterns.

Exhibit 1: Patterns – A Quick Overview

A pattern T is represented by T(p, s, e) where p is the problem to be solved, s is the solution (what works in practice), and e is an example. Additional information such as diagrams, context, benefits, consequences, and limitations can also be added to a pattern to help the designer. In addition, each pattern is assigned a name. The main value of a pattern is the solution s that represents the best practice and what works in real life situations. The solution s is provided to a designer as a generic solution -- a sketch -- that can be refined and specialized based on the situation, additional inputs, or inferences from other patterns. Solutions in a pattern can depend on previous choices represented by other patterns.

Initial focus of patterns in computing has been on technical areas such as design patterns, architecture patterns, and pattern languages. Considerable attention is now being paid to business patterns, security patterns, integration patterns and the like.

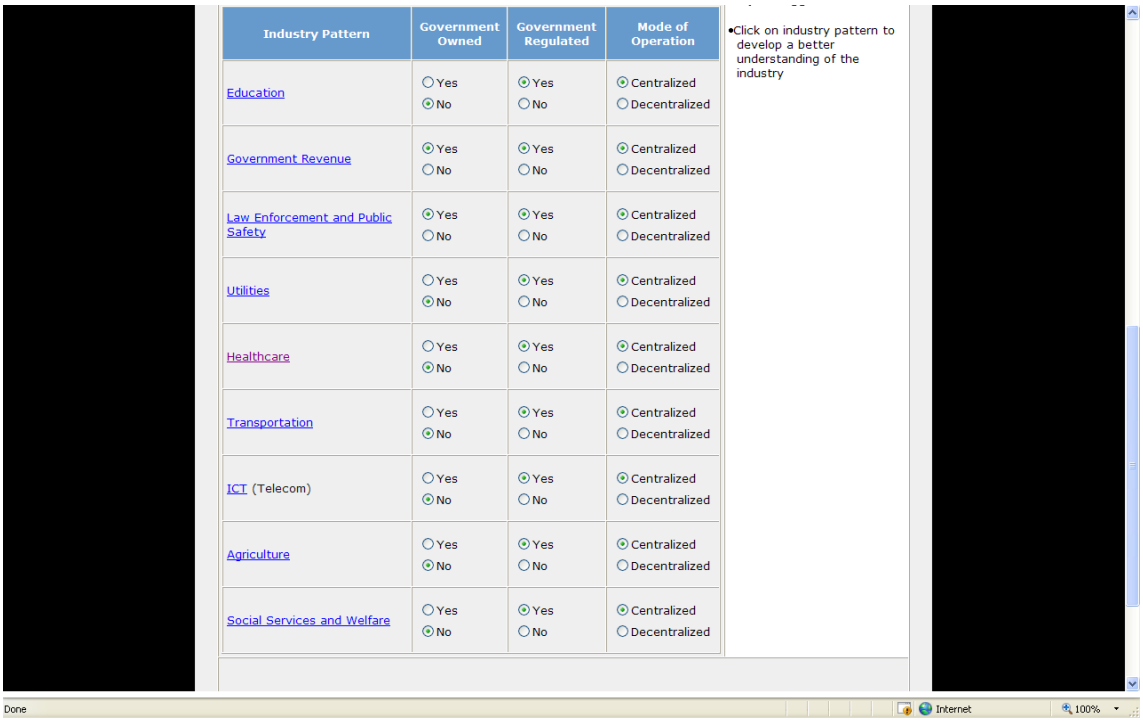

Figure 4: Customization of Govt Pattern

3. P1: Service Initialization Phase

This phase gathers information that is specific to the service that will be offered by the government. The following steps are used in this phase:

S1: Select a service from a list of sectors (e.g., healthcare, education, economic development) and decide how the selected service will be offered.

S2: Get general information, educational resources and best practices needed to support this service.

S3: Do a self assessment of the PMO (present method of operation) and FMO (Future Method of Operation)

Step S1 is the most important. Figures 6a, 6b, and 6c show the main activities of S1. Figure 6a shows the various choices available to the user, Figure 6b show how a user creates a service profile and then selects a service sector (e.g., healthcare, transportation, social services, and transportation) and then a service within the sector. A user can select any service from vertical sectors such as education, healthcare, and economic development or vertical sectors such as ICT infrastructure that support all vertical ,sectors. Figure 6c shows how the service will be offered and will it be smart or not.

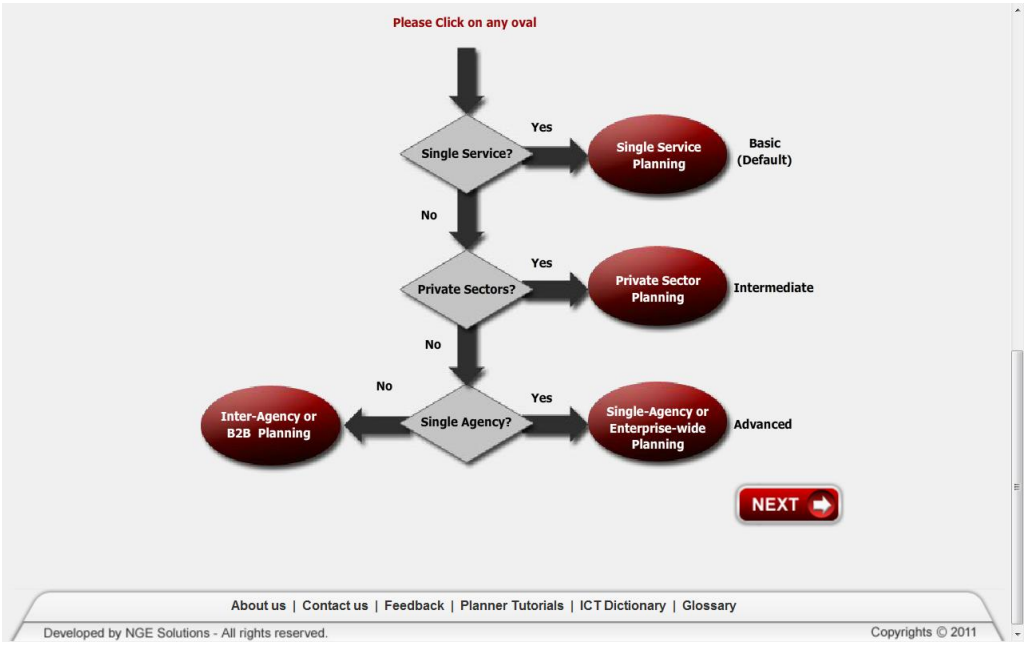

Figure 6a: The choices to be made in P1 (single service, private industry, or composites)

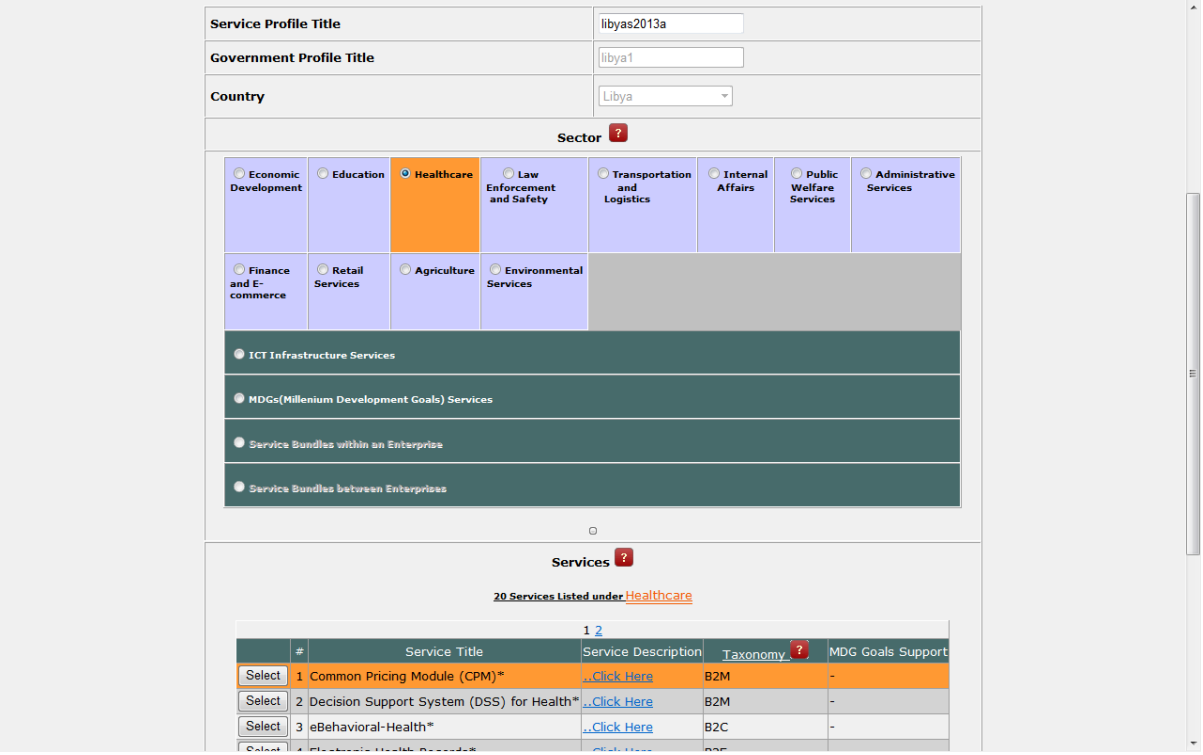

Figure6b: Sector and Service Selection: sectors selection (top) and service selection (bottom)

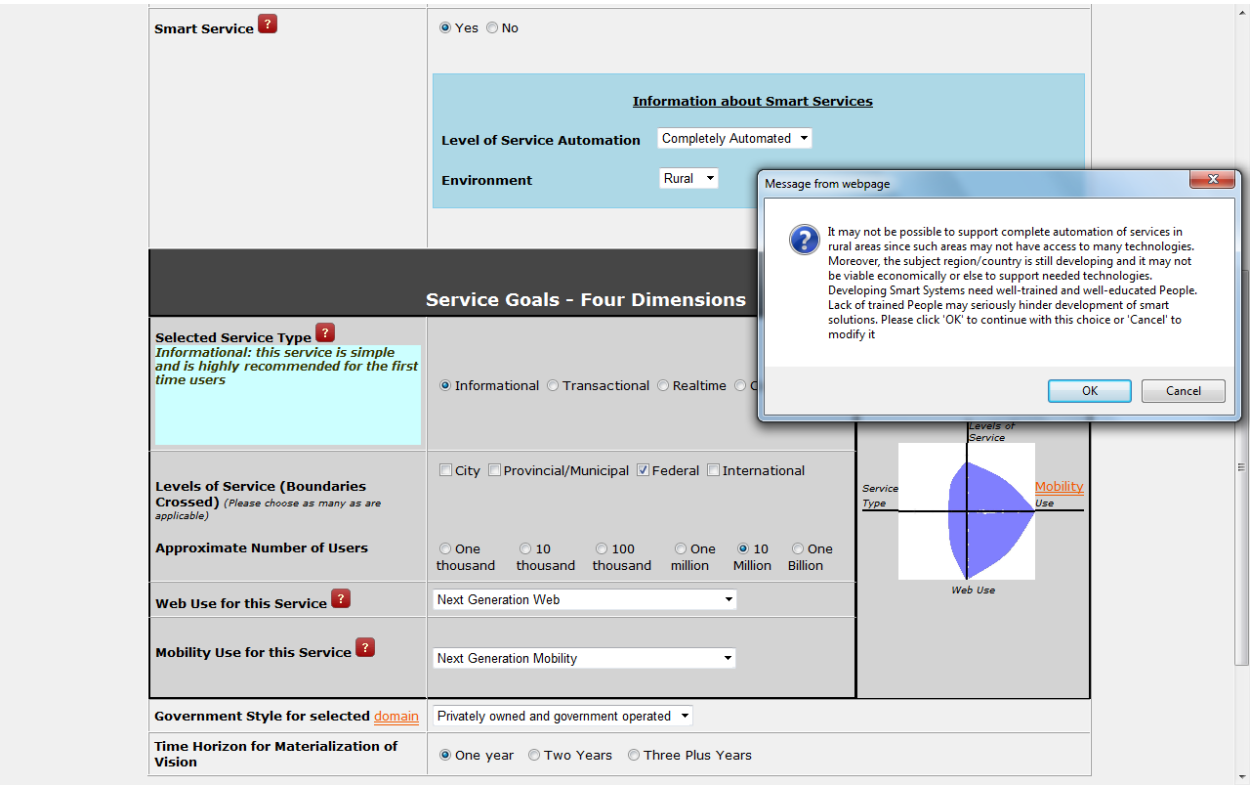

Figure 6C: Selecting a Service Type (four dimensions, Smart Option) and an Early Warning

A given service can be offered at different levels and through different delivery mechanisms. The view presented in Figure 1 illustrates the main idea in terms of four dimensions:

- **Service Type**: a service can be informational only (e.g., provide guidance on how to start a business), transactional (e.g., offer loans to startups), real-time (e.g., detect and respond to fire and storms), and composites (combination of multiple services from multiple agencies). Each service type introduces unique considerations in planning.
- **Levels (Boundaries Crossed)**: a service can be offered locally within a city, in a region/province, in a country, or internationally (across countries). Each boundary level also has its own unique challenges.
- **Web Reliance**: The services may not use Web to offer services, use simple websites based on static content or dynamic sites with Web 2.0+ features. Higher Web reliance supports more sophisticated services but also introduces more complex technical and management issues.
- **Mobility Reliance**: The services may not use mobile devices or may employ simple text messages or sophisticated location-based devices and sensor networks. Increased mobility reliance also enables more powerful services but requires more complex infrastructure.

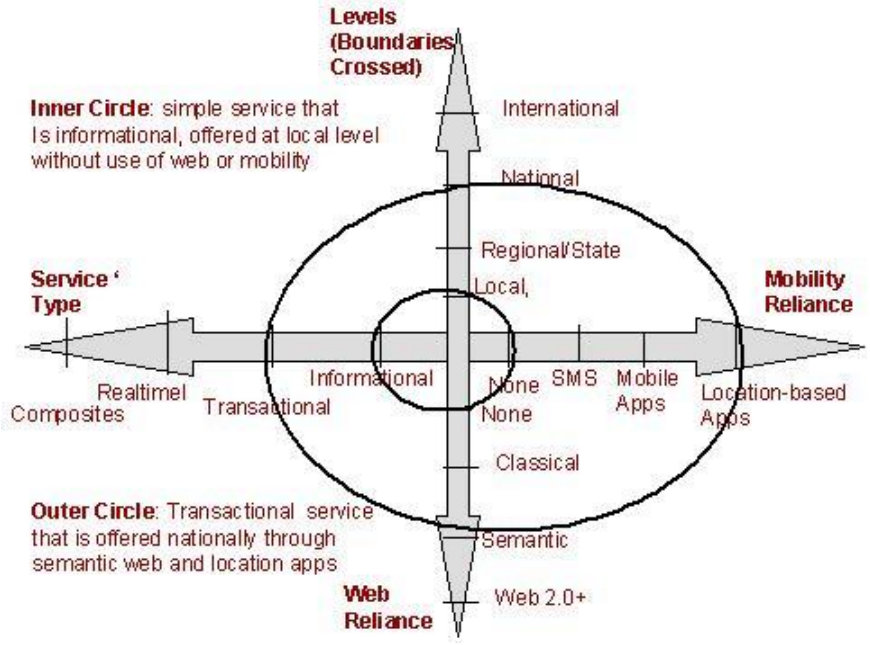

Figure 7: Conceptual View of the Services Covered by the Planner

An entrepreneurship service, for example, can be offered by a government at informational, transactional or composite level for a local, national or international agency by using different types of web and wireless technologies. The circles in Figure 1 depict two sample service offerings. As illustrated in the diagram, some services may be very simple (depicted as inner circle) or more sophisticated (outer circle). The outermost circle, not shown, would represent extremely powerful international services.

Exhibit 2: Service – A Quick Overview

A service, from a business/government point of view, is something that is delivered to the customer. It is something of value offered to customers – it may involve many internal processes that are not exposed to the consumer. A standard definition of service is:

Definition: "Service is a way to deliver value to customers" (from ITIL Standard, www.itil.org)

Examples:

Dry cleaning is a business service. The processes that support this service are taking the order, sending the clothes for cleaning, etc

Online purchasing is a service. The processes that support this service are verifying the customer, checking inventory, and notifying a customer.

4. P2: Strategic Plan Generation

This phase uses the information captured in the previous two phases and generates a strategic plan. The generated plan suggests the following policy, technology and management information:

- Cost-benefits tradeoffs and SWOT (strength, weakness, opportunities and threat) analysis
- Related case studies and examples
- Best practices, policies and procedures needed for the chosen service
- Business processes and the technologies (apps, computing platforms, networks) needed to support the chosen service
- Security & business continuity planning and interoperability/integration considerations
- Requirements to be used for acquiring the needed services

This information is the main output of the Strategic planner. The main steps of Plan Generator are:

Step 1: Strategic Analysis that involve cost/benefit analysis of the service to be developed, and determination of the most appropriate strategy to be used to deploy this service (e.g., buy from another supplier, rent it from another supplier, outsource it from another supplier, do it yourself through a government agency, or extend an existing service). In addition, the policies and procedures needed to deploy and support this service are evaluated and analyzed.

Step 2: Generate the technical plan needed to support the chosen service. The technical plan is based on a standard-based IT architectural view shown in Figure 8. Specifically the generated plan shows:

- The business processes needed to deploy and support the service
- The application software needed for the service
- The computer and communication platforms support (middleware services, and wired/wireless networks) to support the service.

Step 3: Suggest a business continuity plan that can be used to recover from disasters and failures of networks, computers and other ICT components.

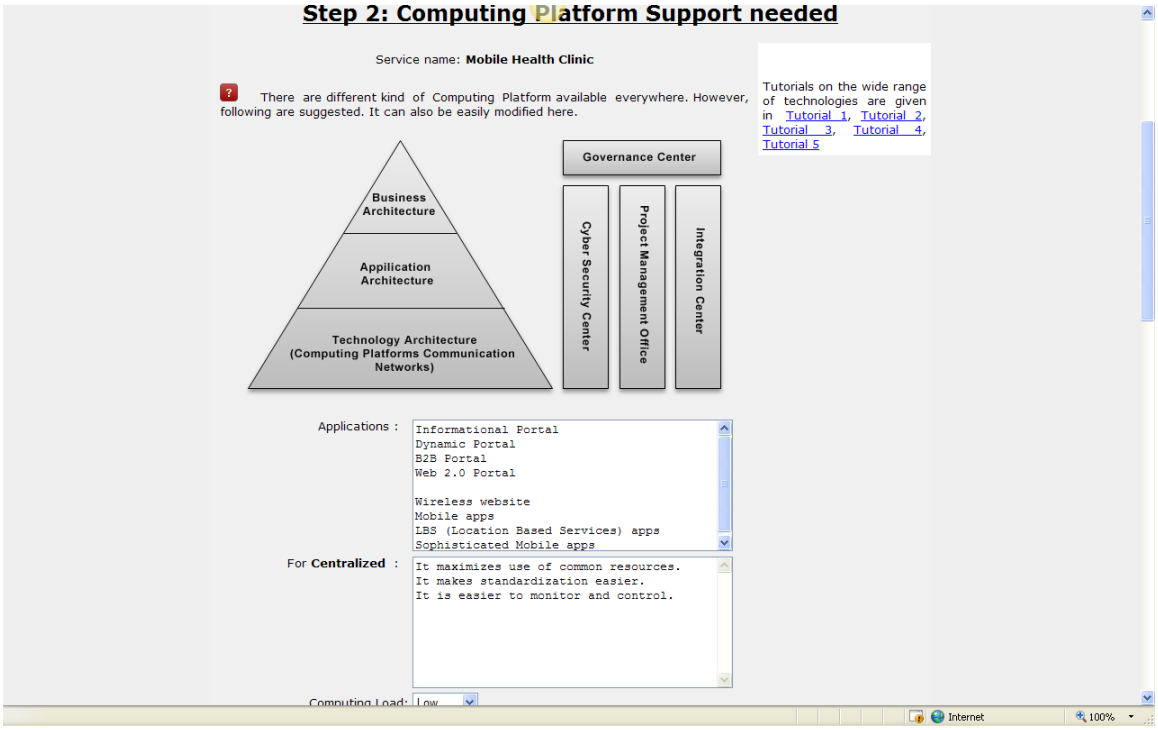

Figure 8: Overview of an IT Architecture Needed

The Planner utilizes a complicated algorithm to generate the plans based on the information gathered in P0 and P1. Consider, for example, a country that wants to develop a highly successful "tourism" service. The generated plan consists of:

1. Examples and case studies of some good tourism websites
2. Best practices in building good websites (tourism or not), i.e., how to design a good website (e.g., based on user centered design principles)
3. Policies and procedures needed
4. Technologies needed
5. Cost and time estimates

The tourism site can be informational only (i.e., advertisements), transactional (i.e., users can buy tickets), composite (it can combine hotels deals, etc). The logic needed depends on the types of services:

Informational Services: These services mainly display the information such as guidelines, instructions, maps, etc. The plans generated are simpler and are generated in a few basic steps.

Transactional Services: These services are typically complex websites (or portals) that handle payments, inventory management, and other such activities. Online purchasing, online payment, and general e-commerce (buying and selling over the net) are well known examples of transactional services. The plans generated for transactional services are more complex and require more steps because the needed policies, technologies and disaster recovery plans are more complex.

Comprehensive Services: These services combine the informational and transactional features.

Service types (informational, transactional, composites, etc) only represent one dimension of the four dimensional service model shown in Figure 9. As shown in this figure, a given service can be offered at different levels and through different delivery mechanisms. The four dimensional view presented below illustrates the main options in terms of the following:

Service Type: a service can be informational only (e.g., provide guidance on how to start a business), transactional (e.g., offer loans to startups), real-time (e.g., detect and respond to fire and storms), and composites (combination of multiple services from multiple agencies).

Levels (Boundaries Crossed): a service can be offered locally within a city, in a region/province, in a country, or internationally (across countries).

Web Reliance: a service may not use Web to offer services, use simple websites based on static content or dynamic sites with Web 2.0+ features.

Mobility Reliance: a service may not use mobile devices or may employ simple text messages or sophisticated location-based devices and sensor networks.

The algorithms used in P2 attempt to determine how the values represented in Figure 9 influence the outputs produced in P2. These algorithms are result of active research activities and are always evolving. Detailed discussion of the algorithms is beyond the scope of this document.

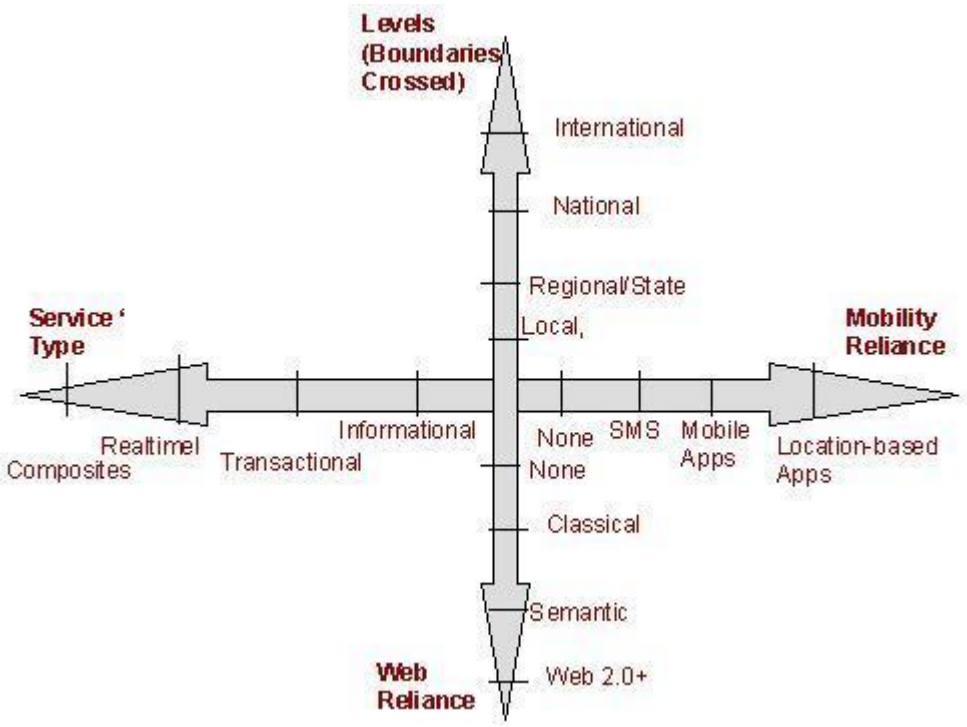

Figure 9: Four Dimensional Model for Offering Services ed

5. P3: Implementation (Acquisition/Implementation) Phase

After the P2 phase, a strategic plan is generated. The generated plan can be used as an input to a wide range of acquisition (procurement) approaches that implement the plan by using the most appropriate BRODE (Buy, Rent, Outsource, Develop, Extend) strategies.

The acquisition (procurement) process typically results in an RFP (Request for Proposal). The following tools are provided for help:

- **Acquisition Advisor** for help in developing the most appropriate BRODE (Buy, Rent, Outsource, Develop, Extend) strategy for acquisition for different blocks. Figure 10 shows snapshot of the Advisor.
- **Portal of Portals** displays the content of several major portals of value to MDGs. It also provides "Yellow Pages" type capabilities for quickly finding important portals.
- **Entrepreneurial portal** Guiding tool to educate, find opportunities for new business, and explain your existing businesses.
- **Simulation, Games and Other Tools** to gain insights into different aspects of the plan before implementation.

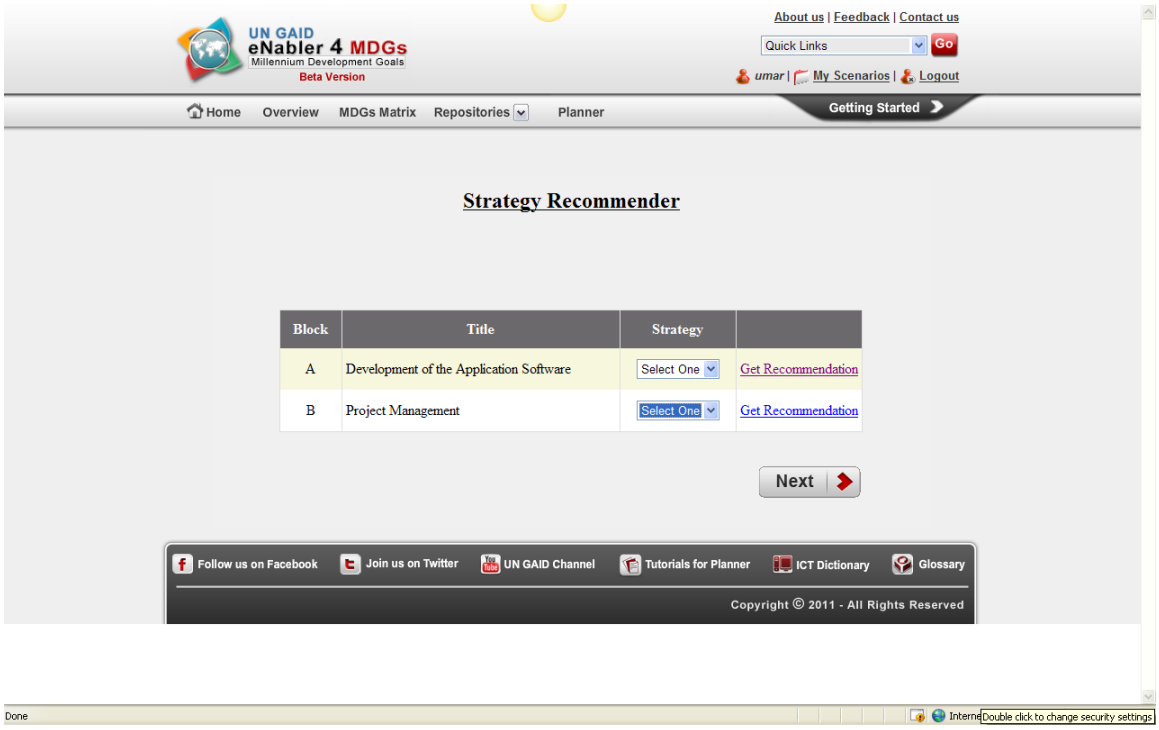

Figure 10: Conceptual View of the Acquisition Advisor

6. P4: Project Management, Monitoring and Controls Phase

This phase concentrates on three different aspects of project management:

- Basic project management that concentrates on the PMI (Project Management Institute) guidelines and best practices as a basis for project management. PMI uses the Project Management Book of Knowledge (PMBOK) as best practices that specify the project initiation, planning, execution, monitoring and control, and closing activities (see
- ICT governance and ICT quality controls issues. ICT governance concentrates on IT systems management with focus on performance and risk management and quality controls is concerned with achieving the quality goals established.
- Advanced project management that deals with management of large and complex projects such as large scale integration projects, interagency document exchange projects and the like.

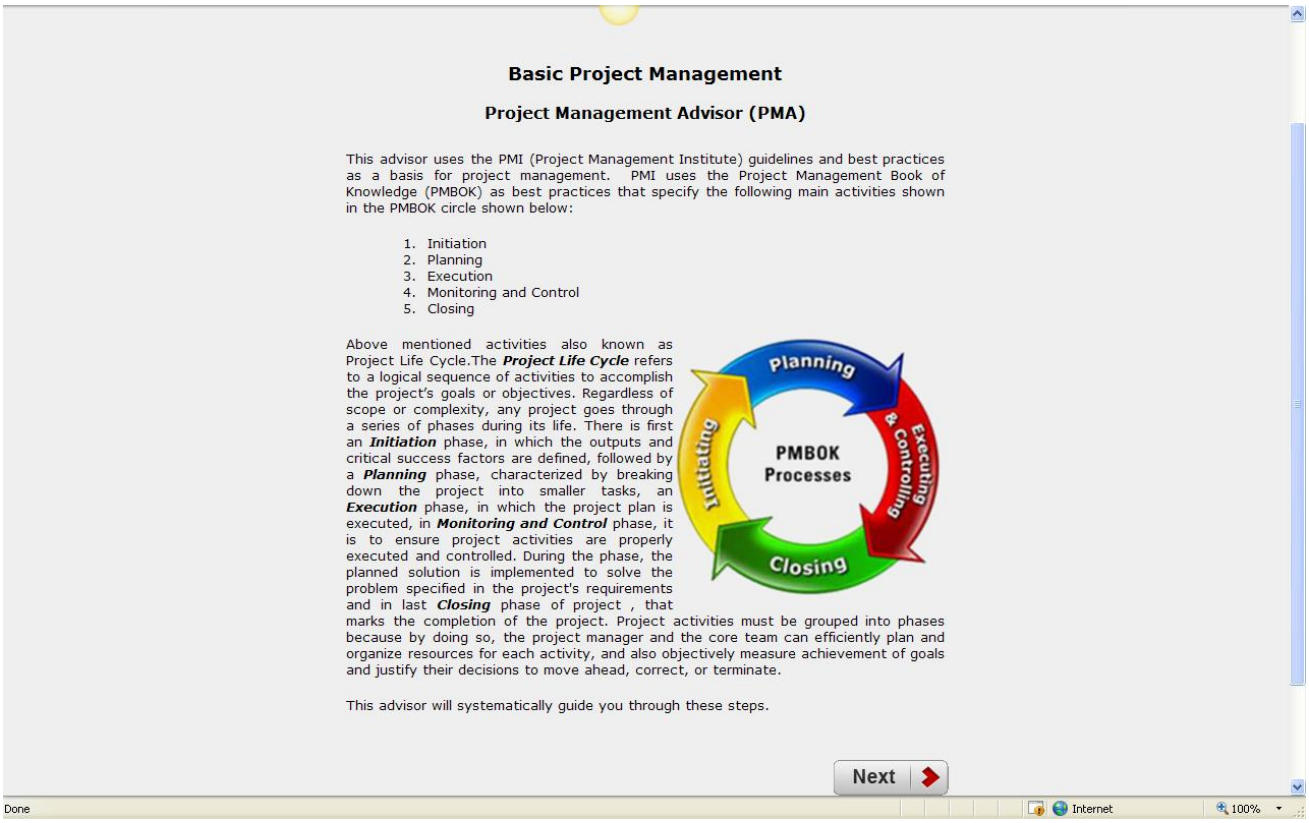

Figure 11: Basic Project Management Tasks

7. Report Generation and Planner Conclusion

In this phase, the Planner generates extensive outputs that are housed in a Business Intelligence Center (BIC). The BIC includes project plans, requirements documents, technical specifications, sample prototypes, and RFPs (Request for Proposals). The BIC, explained in Exhibit 3, contain a mixture: of generic and customized information. The generic information captures common best practices (e.g., security), the country/ region specific information is customized by using the factors published by the World Economic Forum (www.weforum.org), and service specific information by using business patterns. The Planner also provides an RFP Center that can be used to develop an RFP very quickly by using the generated reports.

Exhibit 3: Information Contained in the Business Intelligence Center (BIC)

A user of the SPACE Environment selects a service (e.g., mobile health clinic) for a given country (e.g., Nepal) and generates the following outputs:

Strategic Planning Report that shows the overall vision and architecture with business/technical justification
Requirements documents for system development
Business plans that can be used to obtaining funding
Standardized RFPs (Requests for Proposals) that can be used to attract vendors for bidding
Project management, policies and procedures, disaster recovery and needed governance guidelines
Education, training and public awareness campaigns needed for success
Enterprise architecture (EA) views for overall governance
Suggested standards and best practices

These outputs, displayed graphically below in the BIC circle, cover the entire Learn-Plan-Do-Check cycle, are produced in less than an hour (it takes almost a year to produce similar outputs manually). The information contained in these reports can serve as a massive checklist that can help the users to succeed. Contents of the main reports are shown below.

Figure: The Business Intelligence Center (BIC).Circle

Support Documents Available

view

High Level Strategic Plan and Solution Architecture

- Generic information (common best practices, e.g., security) that enforces uniform standards and practices.
- Service specific (e.g., healthcare versus education) information to address the unique problems for the type of service.
- Situation specific (large versus small system, simple versus complex system) recommendations of technologies and management.
- Country/Region specific (e.g., Belgium vs. Brazil) suggestions based on country/region specific factors supplied by World Economic Forum (WEF) and United Nations (UN).

view

Business and Integration Requirements Document

- Functional requirements
- Security requirements
- Interface and integration requirements
- Logical architectures
- Vendor considerations
- Information models (use cases, flow diagrams)

view

Business Plan

- Template for business plan
- Business and company information
- Service specific Information needed

view

RFP (Request for Proposals) Corner

- Organization information
- Bid submission procedures
- Detailed technical specification of the service
- Qualifications needed

view

Audit List

- Policies checklists
- Procedures checklist
- Security checklist
- Technology checklist

view

Administrative (Governance) Guidelines

- Public awareness and marketing activities needed
- Possible funding sources
- Training and capacity building needed
- Ethical guidelines to be followed
- Failure risks and how to minimize and manage them
- Governance guidelines and appropriate standards

Standards Used

- Best Practices used (e.g., SOA, TOGAF, PMBOK, CMM)
- International Standards Used (e.g., ISO 9000, ITIL, NIEM)

view

APPENDIX A: SPACE Environment – An Architectural View for a Closer Look

Figure 12 shows an overall architectural view of the SPACE Environment. It shows the key components of SPACE and its interactions with external components. Specifically, SPACE supports public (government) as well as private industry sectors by interacting with a wide range of components.

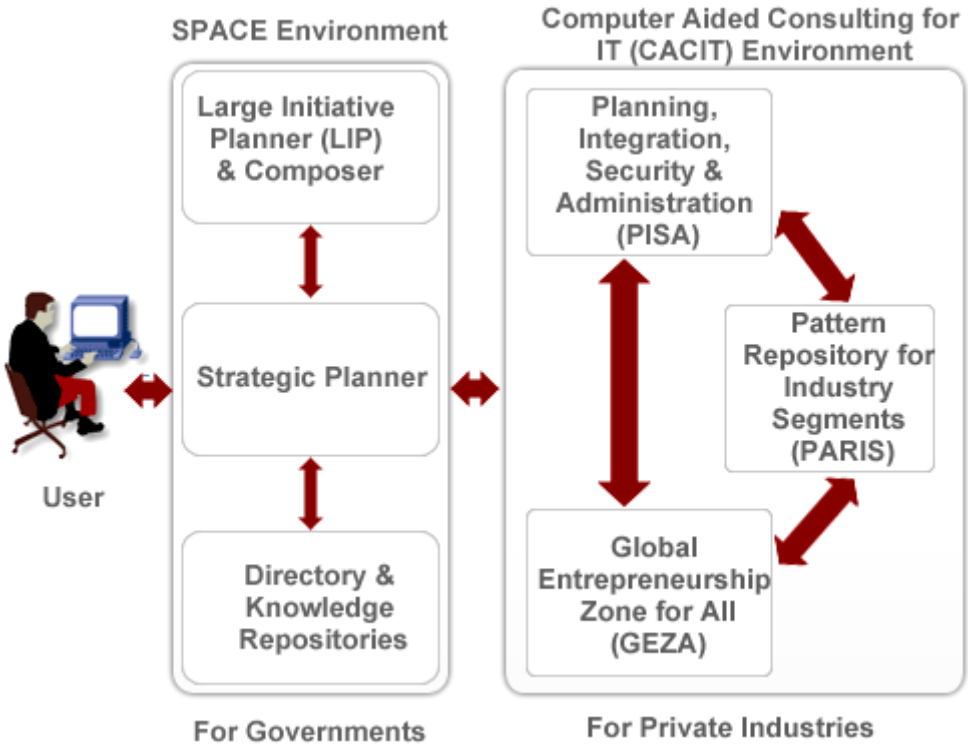

Figure 12: SPACE Environment – The Big Picture

As shown in Figure 12, the users (government agencies, NGOs, or other organizations) develop strategic plans, RFPs and project management plans by interacting with the SPACE Environment, a new system primarily intended to support government services. SPACE provides these services by using the Planner. The Planner uses the following capabilities to handle user requests:

- SPACE resources (Directory and Knowledge Repositories) as described in this document.
- Specialized modules such as Large Initiative Planner (LIP) to handle initiatives such as MDGs and digital cities, and Composer for developing composites and interagency services. These capabilities have been discussed previously.

- Integration and aggregation of the external information already available in portals such as the United Nations Public Administration Network (www.unpan.org) and the UN-GAID website (www.un-gaid.org). In addition, we will provide access to useful educational and training materials.

SPACE also supports the private sector by leveraging an existing Computer Aided Consulting Environment that primarily concentrates on the private sector. Specifically, SPACE has been successfully integrated with a comprehensive environment that supports private sectors. This environment is based on research in using computer aided planning for best practices [16-21] and consists of. detailed planning tools, displayed in Figure 12. Currently these tools consist of:

- **A detailed planning system for private sectors called PISA** that can be used to quickly build real life business scenarios and then guides the user through IT planning, integration, security and administration tasks by using best practices. PISA supports 18 industry segments that include many within the scope of public administration (e.g., education, energy, health, and transportation) and provides basic capabilities for composing larger and more complex scenarios that include multi-region offices, supply chains, mergers, acquisitions and business networks. This comprehensive tool also provides extensive capabilities for integrating different systems by using SOA (service oriented architecture) and supports open interfaces so that gaming and simulation tools can be easily plugged in.
- **A knowledge portal for entrepreneurship, called GEZA**, that provides a set of knowledge services ranging from starting a business to international partnership and outsourcing opportunities. GEZA capabilities include business solutions for developing and implementing business strategies, a comprehensive yellow book directory of SMB portals, an outsourcing center for service providers and consumers, an international center for doing business internationally, an education center for entrepreneurs, and links to PISA for IT solutions and to PARIS for industry patterns.
- **An industry pattern repository called PARIS** that houses business patterns for more than 20 industry segments including education, healthcare, transportation, telecom, and manufacturing. PARIS provides overviews, examples, specializations and sources of information for each industry segment; examples and best practices of how ICT is being used effectively in different industry segments; business process patterns, requirement patterns and information model patterns in UML; and interfaces to support PISA advisors and GEZA services.

PISA, GEZA and PARIS collectively can be and have been used for educational as well as consulting services. The users can directly invoke the needed tools or access them through business games and simulations supported by textbooks and course materials. Since PISA plays a vital role in SPACE, it is reviewed in Appendix B

APPENDIX B: PISA Overview

PISA (Planning, Integration, Security, and Administration) is an intelligent decision support environment that helps businesses plan, integrate and secure their IT (information technology) systems. At present, PISA is intended for small to medium businesses (SMBs) but can also be used for offices and divisions of larger businesses.

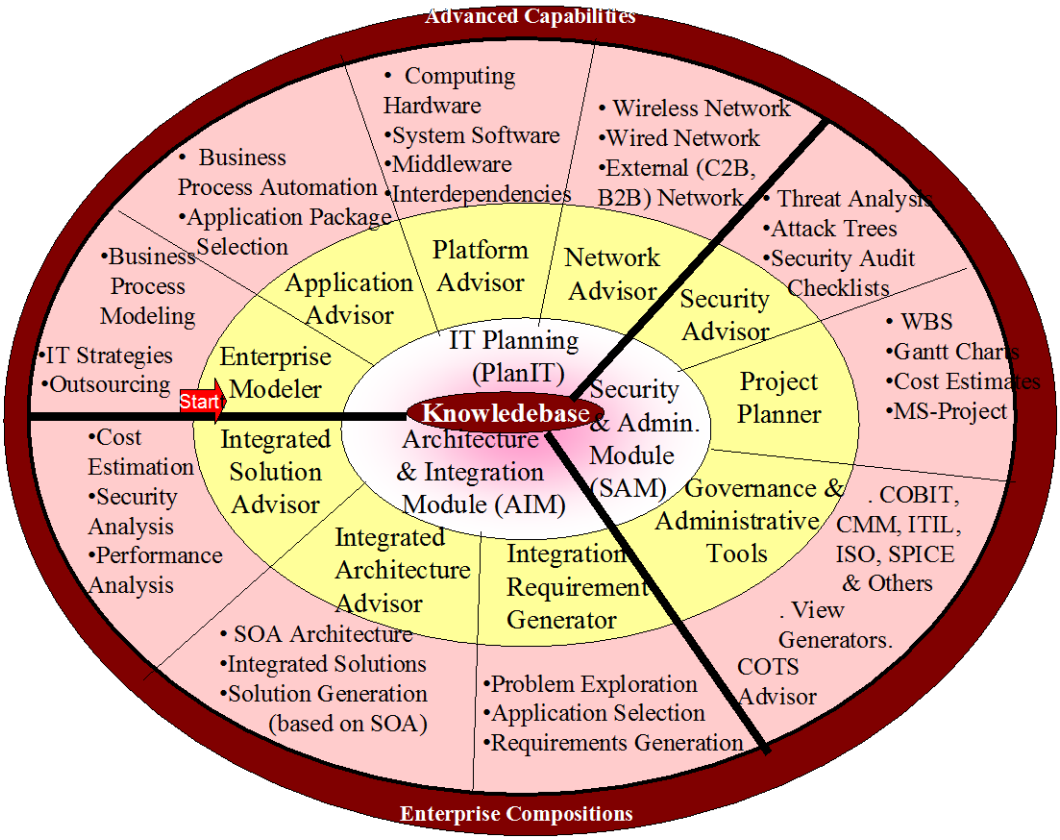

Figure 15: Conceptual Model of PISA

The PISA environment, conceptually shown in Figure 13, provides a family of automated consultants ("advisors") that support all stages of IT planning, integration and security projects (e.g., enterprise modeling, application planning, network planning, security planning, project planning, architecture analysis, solution evaluation). At the heart of PISA, as shown in Figure 3, is the knowledgebase (KB) that contains an extensive patterns repository. The KB is used by the PISA advisors which are segmented into three modules (see Figure 13):

- **PlanIT (Planner for IT)** concentrates on IT planning projects and develops a plan at the enterprise level
- **SAM (Security and Administration Module)** provides guidance for security, project management and governance issues
- **Architecture and Integration Module (AIM)** focuses on how SOA (Service Oriented Architecture) can be used to architect and integrate the various components to form a functioning system

Each PISA advisor, as shown in the outer circle of , supports a specific stage and collaborates with other advisors to produce plans. For example, the Network Advisor supports the network planning stage and collaborates with the Security Advisor to develop a security plan that secures a network. The outermost circle ("the PISA crust") represents the **Advanced Capabilities Module (ACM)** that accepts the outputs produced by the PISA advisors and then helps the users to invoke detailed simulation and analysis tools.

To understand the sequence in which these advisors are invoked, start from the Enterprise Modeler ("Start" arrow in Figure 13) and follow the circle clockwise. Specifically, the PlanIT advisors do the following: the Enterprise Modeler develops a model of an enterprise, the Application Advisor develops an Application plan, the Platform Advisor develops a computing platform plan, and the Network Advisor builds a network plan. The SAM advisors develop a security plan, a project plan, and provide other administrative services. The AIM advisors develop an integrated architecture plan based on SOA. The advisors are not strictly sequential – different advisors can be invoked in different sequences to fit the type of project you are working on. However, some things have to be done in sequence. For example, you cannot secure a network before developing a network plan (naturally!). The PISA Control Panel guides the user through what can be invoked when.

The PISA website (www.ngepisa.com) provides a great deal of information about this system. Exhibit4 displays the PISA documents that are available online.

Exhibit 4: PISA Documents on www.ngepisa.com site

(Follow the "Learn More" link)

PISA Quick Start:

- **PISA Executive Summary**, a three slide executive summary.
- **PISA at a Glance**, a one page flier on PISA.
- **PISA Overview** gives a quick overview of the system (this document)

PISA Details:

- **PISA User Guide** gives details about how to use the system, illustrated through an example
- **SOA Planning Through PISA-AIM** shows how PISA can be used to develop an SOA-based architecture.
- **CASE STUDY: IT Infrastructure Planning Through PISA-PlanIT** describes how PISA-PlanIT was used to develop a complete IT plan for a manufacturing-retail company.
- **CASE STUDY: SOA Planning Through PISA-AIM** describes how PISA-AIM was used to develop a complete SOA plan for a retail company.
- **PISA Demo Example** illustrates a demo of using PISA through extensive screenshots.
- **PISA Patterns Repository** gives an overview of the patterns that are contained in the pattern repository.

PISA in Classroom:

- **PISA Instructor's Guide** shows how to use PISA in online or on-site courses
- **Course "Architectures for Globally Integrated Enterprises"** describes a course that is heavily supported through PISA.

Sample Reports Generated by PISA:

- **Complete IT Plan**, generated by PISA-PlanIT
- **Security Audit Report** generated by PISA Security Advisor
- **Application Requirement Document**, generated by PISA-AIM
- **Application Architecture Document**, generated by PISA-AIM