Draft (February 1, 2011)

Computer Aided Strategic Planning to Transform the Developing Countries

Conceptual Overview

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Abstract

Most developing countries are re-inventing the wheel in their efforts to launch egovernment initiatives. This document introduces the Computer Aided Strategic Planner, part of the MDG (Millennium Development Goals) eNabler Project, that helps the developing countries launch new initiatives to accelerate MDGs without duplication of effort. The Planner quickly produces very detailed and highly customized plans based on the type of service as well as the region and the country/region. In particular, the Planner offers extensive capabilities for services in the areas of healthcare, education, economic development, supply chains for food distribution, and emergency response units based on best practices and standards. The Planner, available through the UN-GAID eNabler Project, can be used very effectively to educate as well as assist the government officials of developing countries to accelerate progress towards MDGs.

1. Overview and Motivation

The use of information and communications technologies (ICT) to advance the core MDG priority areas is an effective tool to speed up and strengthen development efforts. However, an official involved in launching an eservices to advance the MDGs faces many questions: "how do I understand the basic issues, policies, and approaches", "how do I develop a customized plan that is specific to my country", "how do I successfully execute the developed plan", "how do I monitor and evaluate the progress being made", and "how do I do everything without re-inventing the wheel - what tools and solutions are available out there that I could use?" The official wonders if there is a "one-stop shop" where one could find answers to all such questions.

We are building such a "one-stop shop" that will answer the aforementioned questions. Specifically, we are constructing a comprehensive MDGs eNabler as a vital resource for the governments of developing countries and for all development practitioners. The eNabler *at present* consists of the following three broad components (see [1] for additional details about the eNabler):

- **The MDG Matrix** for the beginners who are interested in understanding the role of ICT in advancing MDGs
- **The Repositories** for the explorers interested in learning the case studies, examples, best practices, ICT tools, and monitoring/control techniques for advancing MDGs
- **The Strategic Planner** for the specialists who need to actually plan, implement, and manage the needed ICT initiatives quickly and effectively by using the best practices

Computer-Aided Strategic Planner (Planner), illustrated in Figure 1 and the focus of this document, serves as an instrument to help the developing countries. *Simply stated, the Planner is a set of intelligent apps that are integrated around common resources.* As shown in Figure 1, the Planner uses eNabler resources (the Matrix, the Repositories) and produces highly customized plans -- the customization is based on best practices for the type of service as well as the region and the country/region. In its present form, the Planner generates plans for over 20 services that include potentially high impact services such as the following:

- Healthcare, especially mobile health clinics that are proving to be very effective in combating HIV, infant mortality and maternal health
- Economic development, especially entrepreneurship networks between startups and financiers
- Document/information exchange networks between different government and business agencies for rapid industrial growth
- Emergency response systems that require real time support from various agencies
- Supply chains for food distribution in developing countries

The planner covers five phases (P0 to P4), shown in Figure 1. The first two phases (P0 and P1) capture country and service specific information. Phase 2 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. As shown in Exhibit 1, the Planner generates extensive reports that include project plans, requirements documents, technical specifications, and RFPs (Request for Proposals). These reports 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.

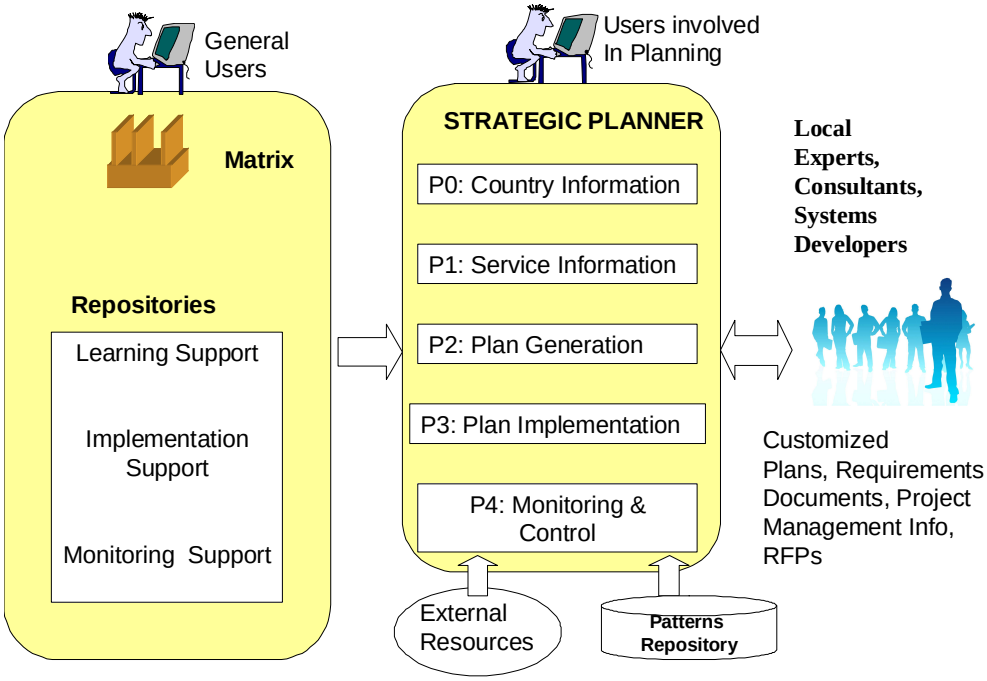

Figure 1: Strategic Planner Conceptual View

A working prototype of this planning tool has been developed and demonstrated in UN conferences in Geneva (May 2010), Riyadh (July 2010), Bahrain (August 2010), New York (September 2010) and Abu Dhabi (December 2010) with strong support from more than 70 countries and international organizations

such as the World Bank, World Health Organization (WHO), Red Cross, UNESCO, Microsoft and WITSA (Worldwide IT Services Alliance) . The key components of the Planner are introduced in Section 2 and explained in Section 3. Specialized capabilities to build larger and more complex services are explained in Section 4 and standards/techniques used are examined in Section 5. Section 5 concludes this document by outlining next steps.

Exhibit 1: Information Contained in the Reports Generated by the Planner

- Executive summaries
- Requirements
- Project management and control information
- Standards and best practices used
- Country/ region specific information
- Service specific (healthcare versus manufacturing) information
- Situation specific (national vs international) information

This information is contained in a comprehensive Consolidated Report and is also produced in an RFP/(Request for Proposal) Guide that shows how to develop an RFP from the Consolidated Report.

2. Computer Aided Strategic Planner – Key Components

Figure 2 shows a conceptual view of the Computer Aided Strategic Planner – it systematically guides the government officials and system implementers through different phases of a planning process for given eservices. This planning tool is based on the premise that it is not enough just to inform the government officials – they need to be systematically guided through the maze of decisions in different planning phases to make a difference on the ground. Figure 2 shows a high level view of the Strategic Planner and illustrates how the planning phases P0 (initialization), P1 (information gathering), P2 (strategic planning), P3 (detailed planning), and P4 (monitoring and control). The first two phases (P0 and P1) capture country and service specific information. Phase 2 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.

Strategic planning, as shown in Figure 2, is a crucial task for the public as well as private sectors. Given a strategic project (or an initiative), a strategic planning process identifies the main alternatives, the key business/technical issues involved in each alternative, and helps in evaluation and selection of the most viable alternatives *before* initiating the project. Computer aided planning, as compared to the manual planning process, offers many benefits especially to the developing countries because it can:

- hide technical details and thus can be used by people with different backgrounds
- introduce and enforce the same standards and best practices quickly and uniformly across all users
- be accessed by people living anywhere and thus level the playing field between developed and developing countries
- be used as a training and educational tool

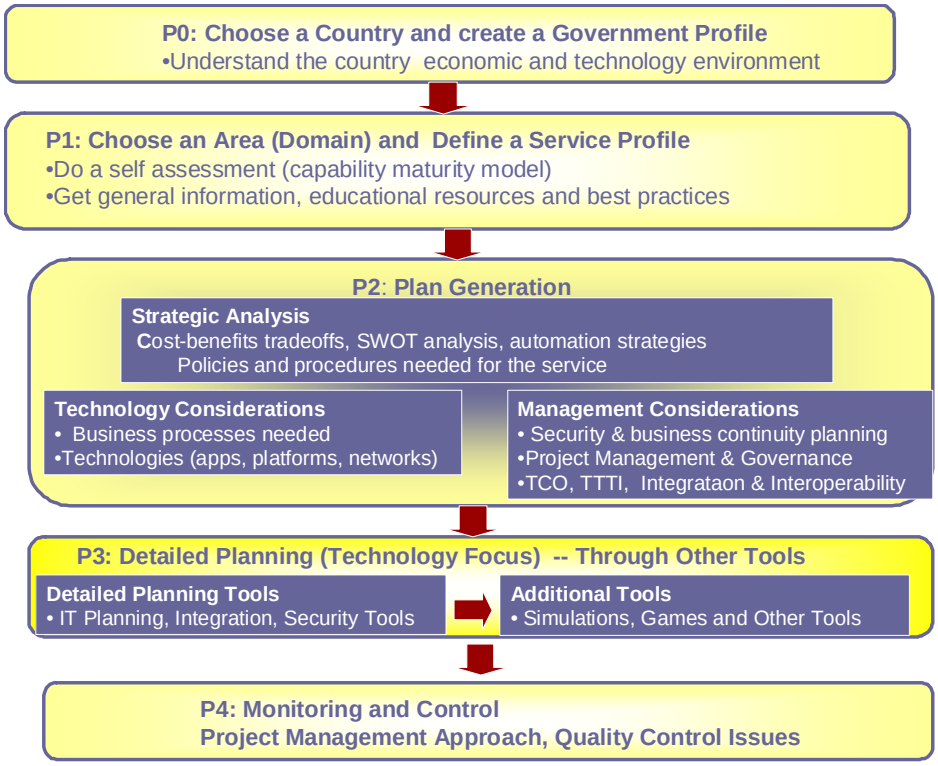

Figure 2: Computer Aided Strategic Planner -- Key Components and Flow

How can the Computer Aided Strategic Planner be used in practice. The following example illustrates the overall flow of the Planner to introduce broadband access as a service in a developing country. The purpose here is to help the governments widely provide broadband access services (through wired or wireless means) to its constituents. The following description shows the flow of the Planner, as displayed in Figure 2:

- In the P0 phase, the user (government agency) chooses a country (e.g., Nigeria).
- In the P1 phase, the user selects a service to be deployed (broadband). It then goes through a self assessment (based on the capability maturity model) and gets access to general information, educational resources and best practices (e.g., reports from UN, other links, university courses etc.) on broadband access.
- In the P2 phase, the government agency is led through strategic analysis (buy, rent, outsource) and cost-benefits tradeoffs associated with the broadband service. It also is guided through policies and procedures needed for the broadband service. It is very likely that the government agency will choose the strategy of "outsource", i.e., the actual development and deployment of broadband will be done by the third parties (e.g., telecom providers). Thus:
    - The focus of Service Provider (SP) part of phase P2 will be on how to manage the third parties through good project management practices.
    - For Service Consumers (SCs), this advisor will suggest simple solutions (e.g., DSL or cable modem) for individuals but for organizational units (e.g., businesses) it will provide general advice on developing a detailed IT plan and hooking the network to the broadband.

- In the P3 Phase, the detailed planning environment can be developed through an extensive IT planning, integration, security and administration (PISA) tool. Detailed IT plans can be developed easily by PISA for around 18 business types such as healthcare, manufacturing, education, telecommunications, retail, finance and many other industry segments. The user may choose other simulations, games and decision support tools for detailed planning.
- In the P4 Phase, the progress of the project is monitored and controlled through project management techniques. In this phase, the quality of the results produced is evaluated by using the best practices in quality control.

This short example highlights the main flow of the planning environment. At the end of each phase, extensive documentation is provided to support the next phases. For example, at the end of P3, extensive documentation is made available to the users to support the later phases of implementation and monitoring/control.

Best practices are being used in all phases of the Planner to introduce ICT services quickly and effectively in developing countries. Our goal is to go beyond the websites that contain marketing materials or portals that serve as document repositories with search capabilities. Instead, we aim to provide a comprehensive planning environment with the following distinguishing features:

- Portal of a Portal (meta portal) that serves as yellow page to a wide range of existing valuable portals
- Step-by-step planning guidance based on best practices and standards
- Automation of the planning steps through a family of intelligent tools
- Recommendation of solutions based on best practices as patterns (core knowledge that can be specialized and customized)
- A set of intelligent decision support tools that are integrated around a common knowledgebase, instead of yet another standalone and fragmented tool
- Games and simulations for experimentations and what-if analysis
- Remote planning support (anyone from anywhere can use this system)
- Solution of important but complex problems (e.g., strategic planning, system integration, disaster recovery) through a family of advisors

3. Computer Aided Planning -- A Closer Look

The Big Picture

The Strategic Planner described previously is a key player in the MDG eNabler and also can interwork with other planning tools and environments. In fact, the Strategic Planner is part of a comprehensive planning environment shown in Figure 3. The planning environment shown in Figure 3 is a more detailed and complete view of the Strategic Planner and the key components it interacts with. Specifically:

- The users (government agencies, NGOs, or other organizations) develop strategic plans by interacting with the *Computer Aided Strategic Planner (STRAP)* – a new system currently under development.
- STRAP leverages the capabilities available in the eNabler such as the Portal of Portals for needed information, Simulations and Games to support plan implementations, and Project Management for monitoring and control.
- STRAP integrates and aggregates 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 .
- STRAP also uses a Detailed Planning Environment, already operational, that may help the government agencies and constituents in detailed IT planning, integration, security, administration, entrepreneurship, and industry analysis.

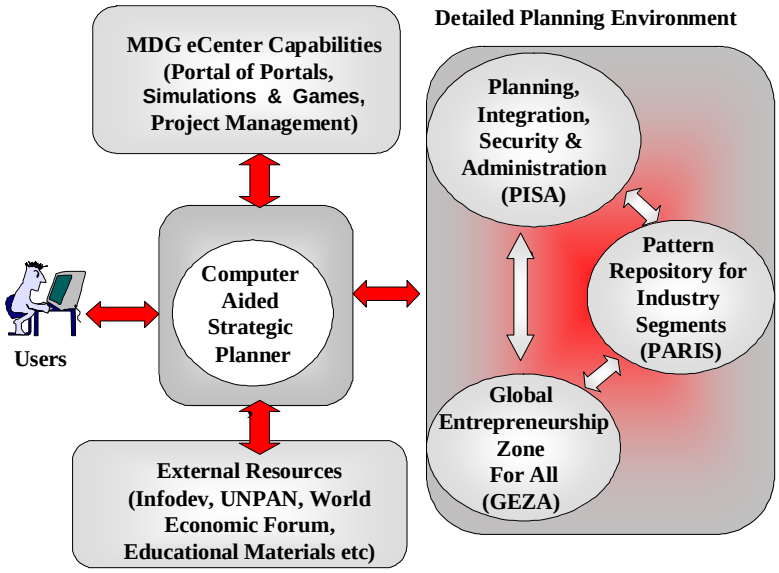

Figure3: Computer Aided Planning– The Big Picture

The computer aided planning environment, shown in Figure 3, is a toolkit that provides a set of integrated planning tools. Specifically, the Computer Aided Strategic Planner concentrates on strategic planning that is supported by the MDG eNabler capabilities, external resources, and a detailed planning environment. By using this environment, constituents in a developing country should have access to the same quality of ICT services as in a developed country. The key components of this overall planning environment are discussed below.

Computer Aided Strategic Planner (STRAP)

STRAP, introduced in Section 2, will serve as an entry point to an extensive decision support environment that captures the key findings and best practices of services in education, health, job creation and economic development. STRAP will provide an integrated view for users ranging from policy makers to general public in developing countries. At the core of STRAP is an extensive knowledgebase (KB) that contains best practices, patterns, and rules needed to address various areas of interest in education, healthcare, and economy.

STRAP produces a strategic management plan that is customized for the country involved, the service needed, and the chosen strategy. Specifically, the generated plan includes policies, procedures, business activities, security risk analysis, business continuity planning, and project management recommendations. STRAP also has the ability to handle the situations where decisions depend on each other and thus require customization and assembly of best practices to recommend solutions. This component will also include social networking features, business games and scenario simulations for what-if analysis

Access to MDG eNabler Resources

The resources available in the MDGs eNabler fully support the Strategic Planner (STRAP). Specifically:

- Yellow Pages (Portal of Portals): Many existing portals are somewhat self-centered – they only show resources developed by the portal owners or business partners. Thus a user interested in best practices in, say, managing ICTD projects has to search many portals. The eNabler Portal of Portals provides links to many other portals that support the MDGs.

- Business Simulations and Games: These resources enhance the capabilities of the Strategic Planner and go beyond the reports and point to a wide range of available tools of potential value for governments and development practitioners in their work towards the achievement of the MDGs.
- Monitoring and Control Capabilities: These capabilities are based on the best practices in monitoring and controls as established by the Project Management Institute (www.pmi.org) and the Control Objectives for Information and related Technology (COBIT) organization (www.isaca.org).

External Resources

A collection of additional websites, papers, presentations, demos and training sessions on different aspects of ICT will be used by the Strategic Planner by use of a Data Integrator (DI). The DI aggregates and presents the needed data to STRAP from sources such as the following:

- United Nations Public Administration Network (www.unpan.org)
- UN-GAID website (www.un-gaid.org).
- WorldBank Infodev (www.infodev.org)
- World Economic Form (WEF) Network Readiness Index reports
- WSIS and ICTD conference materials
- Others as needed

Detailed Planning Support

STRAP can also leverage existing computer aided planning tools where available. In particular, STRAP has been successfully integrated with a comprehensive detailed planning environment. This environment is based on research in using computer aided planning for best practices [16-21]. This is important because effective planners regularly use best practices and play dual roles of problem solvers as well as educators. The main output of this research is a set of detailed planning tools, displayed in Figure 3. Currently these tools consist of:

- **A detailed planning system 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 is based on the best research thinking [6-15] and uses a set of automated consultants ("advisors") that collaborate with each other to develop an IT plan, thus working with PISA is like working with a team of experts. PISA produces completely documented IT plans based on best practices that include application plans, network plans, platform plans, security plans, business continuity plans, and project plans. 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 yellowbook 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. Instead of several disconnected tools that address parts of the problem, the detailed planning environment captures the complex interdependencies between the business and technology building blocks of real life situations. The users can directly invoke the needed tools or access them through business games and simulations supported by textbooks and course materials.

4. Composites: Building Larger and Complex Services

In addition to individual services in domains such as healthcare and economic development, the Planner can be used to represent large and more complex services that include multiple agencies and organizations. The Planner provides a "Composer" that takes different scenarios and services and composes them into larger and more complex services such as the following (see Figure 1):

- A document exchange between different government agencies
- A B2B marketplace with numerous buyers and sellers
- A supply chain system consisting of several consumers and suppliers
- A government/business network such as a health information network (HIN)

The Planner treats each service developed in a session as an individual service (a reusable component) and composes large and complex services from these components by using SOA (Service Oriented Architectures). It then suggests approximate configurations with details about the infrastructure components needed. The type of configurations and infrastructure components needed depend on the organizational composition and other parameters such as the number of participants (organization units), volume of transaction handled by the composition, value of transactions handled, security and trust level between the partners, etc. For example, the collaboration between partners in a supply chain require higher security than units of a large organization.

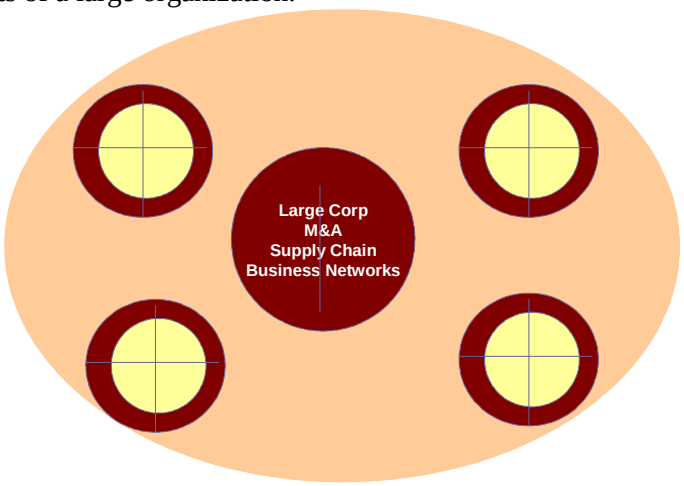

Figure 1: Building a Large Service from Smaller Ones

5. Tools, Techniques and Standards Used

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 a Government Pattern	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
	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)

6. Concluding Comments and Next Steps

We are in the process of developing a powerful instrument to achieve the MDGs quickly, universally and effectively. The components of the instrument will be designed to advance the MDGs (e.g., economic development, healthcare, education, etc.). Table 2 shows how exactly the capabilities needed (columns) will be supported by the various components of the proposed planning instrument (rows). A basic demo version of this planning instrument is already operational and has been demonstrated in UN-GAID conferences in Geneva and Riyadh. A production version (Release 1) will be available for general users in early 2011. Based on field use and feedback for one year, an improved system (Release II) for global use will be available in Fall 2011.

Our long range goal is to make the Computer Aided Strategic Planner a very powerful tool that can play a crucial role in advancing the MDGs. Some of the future directions for research and development are:

- Provide deeper and broader knowledge support by expanding the capabilities of the patterns repository
- Expand the intelligence capabilities of the inference engine by improving the reasoning and learning features through use of recent developments in machine learning, fuzzy logic and case-based reasoning
- Support more complex services that span multiple agencies (e.g., multiple government agencies at the provincial and city levels)
- Allow composition of larger systems from smaller systems by tying them into a government/business network (e.g., a health information network)

Table 2: Support Provided by the Planning Environment to MDGs Matrix

	Economic Development	**Education**	**Healthcare**	**eGovernment**
Strategic Planner (STRAP)	Access to Best Practices	Strategic Planning for eLearning	Strategic Planning for Healthcare	Strategic Planning for eGovernment
Portal of Portal (Yellow Pages)	Access to Other Relevant Portals and Best Practices in Economic Development	Access to ICT Leadership Courses and Programs from Selected Universities	Access to Other Portals usch as WHO (World Health Organization)	UN eGovernment site(UNPAN), World Bank Infodev, and Other Portals
Detailed Planner (PISA)	IT Planning for SMBs	PISA Tutorials & Detailed Planning for eLearning	Detailed Planning for Healthcare	Detailed Planning for eGovernment
Entrepreneurship Planning (GEZA)	Entrepreneurship Support	Entrepreneurship Education Section		
Industry Analysis (PARIS)	Industry segment knowledge	Education Industry Segment Knowledge	Healthcare Industry Segment Knowledge	eGovernment Industry Segment Knowledge

Acknowledgments

The computer aided planning environment is being developed solely by the NGE Solutions team (Kamran Khalid, Nauman Javed, Adnan Javed, Abdul Qadir, and Hannan Dawood). Background research is being aided by graduate students at the University of Pennsylvania and Harrisburg University, and consulting help is being provided by practitioners such as Frank Marchese and Adalberto Zordan.

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