ICT 4 SIDS
Small Islands and Developing States

Smart Collaborating Hubs for Rapid Implementation of Sustainable Development Goals

Special Theme: Computer Aided Planning, Engineering & Management for SIDS and LDCs

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United Nations ICT4SIDS Partnership (www.ict4sids.com) White Paper (October 2017)

About the ICT4SIDS Partnership (*www.isct4sids.com*): The ICT4SIDS Partnership (Registered UN Partnership No: 8005) was formed in Samoa in 2014, under the UN-OHRLLS guidance, to utilize the latest digital innovations for rapid implementations of SDGs for SIDS and LDCs.

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Executive Summary

Information Communication Technologies (ICTs) and digital innovations are widely recognized as the key tools for supporting progress towards the SDGs [3, 8, 16]. The ICT4SIDS Partnership (Registered UN Partnership No: 8005), formed in Samoa, is primarily focusing on the following innovative solution approaches under the UN-OHRLLS guidance:

- Smart Hubs that focus on implementation of low cost but high impact SDG services
- A Network of Smart Hubs that collaborate with each other for regional and global growth
- An SDG Advisor that helps the countries to assess their SDG indicators quickly and select appropriate courses of action for rapid implementations, typically within an hour
- A Computer Aided Planner that generates location specific solutions for all countries within a day
- A Decision Support Dashboard for monitoring and managing the smart hubs remotely
- An Implementation Methodology that combines all of the above with capacity building for the youth

Specifically, the smart hubs can operate over weak networks and are supported by powerful portals that provide highly specialized region and population specific services for SDGs. This fully supports the vision of widely distributed information hubs as specified in the Samoa Pathway Declaration (Para h, Section 109) [6]. These smart hubs have the ability to learn and adjust based on the situation and are designed to collaborate with each other for rapid regional growth even in the face of low financial support [17]. Based on our work with SIDS (Small Islands and Developing States) and LDCs (Least Developing Countries), we feel that our approach of using smart hubs and the associated computer aided toolkit can ameliorate the digital divide and significantly accelerate the progress towards the SDGs. We intend to expand our pilot projects to offer first rate training and decision support services in 2017+.

Contents

Exhibit 1: Frequently Used Acronyms in This Document

- ICT: Information and Communication Technologies
- IoT: Internet of Things
- HU: Harrisburg University of Science and Technologies
- LDCs: Least Developed Countries
- POC: Point of Contact
- SDGs: Sustainable Development Goals (a United Nations Initiative)
- SIDS: Small Islands and Developing States

Overall Objective and Vision

The basic objective of the ICT4SIDS Partnership is to accelerate the adoption of SDGs through innovative smart hubs that collaborate with each other at local, regional and national levels. Instead of focusing on large scale smart cities, we are developing smart hubs located in small islands, small towns and isolated communities to provide most appropriate location specific services that are of high value to the rural populations. All smart hubs, as displayed in Figure1, must:

- Provide highly specialized region and population specific low cost and high impact SDG services in health, education, public safety and public welfare (for example provide a hypertension telemedicine clinic in areas with high incidents of hypertension and offer adult job training and micro-entrepreneurship training in areas with high unemployment)
- Collaborate with each other, as specified by the Samoa Pathway, for a region wide impact through information exchange and cooperation between various smart hubs (for example, a hypertension hub located in one area collaborates with another specializing in diabetes)
- Be aware of the local information technology and energy constraints and be customized accordingly (for example, do not offer cloud-based services to small islands that do not have access to the cloud)
- Be supported by a powerful portal that has prefabricated plug-ins for collaboration, business intelligence, decision support, and security so that a smart hub located in the remotest possible locations can equally participate in the government decision making and citizen engagement processes
- Provide a pathway to add cognitive services as local capacities of populations improve accordingly
- Support a computer aided methodology, discussed later, that significantly reduces the time and the cost of implementing SDGs and thus partially addresses the LDC and SIDS financial crisis [17].

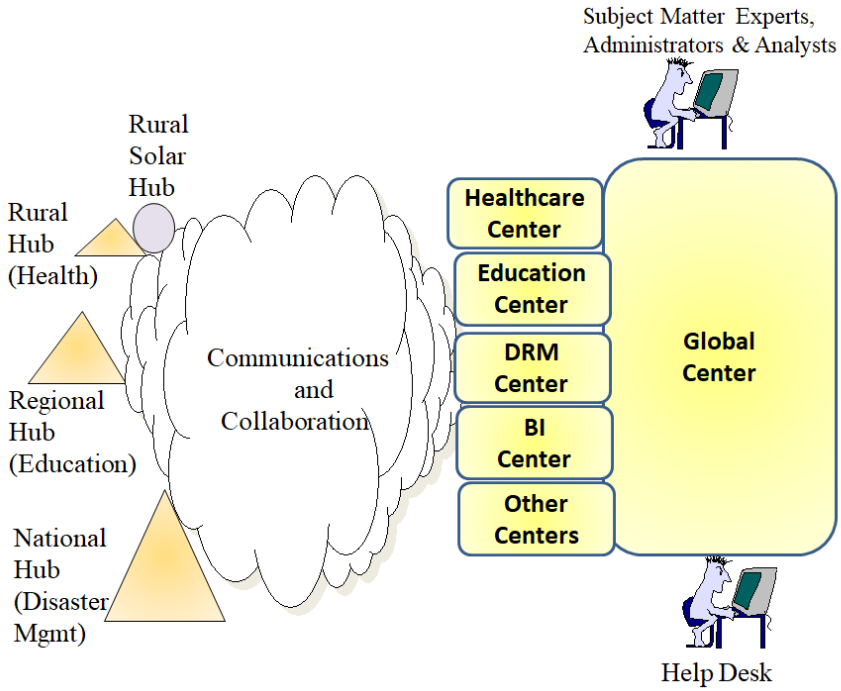


Figure 1: Overall architectural vision for smart hubs and the Global Decision Support Center

Due to the experience with smart hubs in about dozen countries (half of them are SIDS, the rest are mostly LDCs), we strongly believe that this *distributed collaboration* approach -- also advocated by UN ESCAP "systems thinking" based SDG planning [15] -- is very effective for rapid SDG implementation. Specifically, we have developed the architectural vision, displayed in Figure 1, that shows:

- All Smart Hubs fully support the UN initiatives such as the UN SDGs (Sustainable Development Goals) that address poverty reduction, hunger, health, education, gender equality, disaster recovery, economic development and other vital issues.
- The collaborating Smart Hubs are specialized to support different SDGs at different locations for local, regional and national needs and are managed by a Global Center, as shown in Figure1.
- The Global Decision Support Center is located at Harrisburg University and resides on an IBM donated machine. The Decision Support Center, as shown in Figure 1, houses large databases and coordination centers. It also includes planning, administrative, analytics, help desk and training tools that provide central support for the smart hubs at rural, regional and national levels. These capabilities, explained later, serve as the central decision support dashboard.

Exhibit 1: No One Left Behind -- Example of a Typical Rural "Smart Hub" in an LDC

- A physical site (a small building around a bus stop, gas station or rented rooms in a high school) that are close enough to the Internet Backbone (about 30-50 miles).
- A solar powered micro grid for supplying power and communication capabilities through a satellite link with remote users
- Basic capabilities to support Skype and Microsoft Office
- A "Computer Room" with a small LAN of 10-12 Laptops/Desktops for access to health, education, agriculture and other vital information systems
- Provision of smart phones and tablets (Android, Microsoft, iOS devices) for employing Mobile Apps
- A manager of the hub, usually a high school teacher who works on a part-time basis

Implementation Strategy for Maximum Benefits and Key Results

We are implementing our vision through almost a dozen pilot projects that have deployed smart hubs in more than 10 countries which span several SIDS (Small Islands and Developing States), Africa, Asia, South America and the United States. A snapshot of our implementation plan is displayed in Table 1 that shows the different hubs (columns) that are being implemented in different countries (rows). A computer aided methodology, explained later, is being used to implement this plan by employing local youth as Point of Contacts (POCs) who are given tangible educational and entrepreneurship opportunities in different rural and urban areas around the globe. For example, young nursing school graduates in Tanzania are being given opportunities to run Hypertension Telemedicine Centers as "Hub Masters". We have learned the following key lessons by observing different aspects of Table 1:

- The objective of the pilot projects (about 3 months) is to quickly learn what really works and provide educational and entrepreneurship opportunities for the youth
- In Tanzania, we launched an educational hub for educating high school teachers in ICT (a highly valued skill in extremely short supply). This hub exceeded our expectations by becoming financially independent in just 2 months because of much higher than expected enrollments (we were expecting 30 students, we enrolled 120 students). This hub has now started collaborating with nursing education that is supporting telemedicine hubs.
- Seat Pleasant, a small town in Maryland (USA), is actively partnering with us for "Smart Seat Pleasant" project with very high initial interest in Hypertension Hub and later collaboration on entrepreneurship and smart government services such as law enforcement and department of public works.
- A UN official from Solomon Islands has gone back and launched a very aggressive "Smart Solomons" project that includes about 7 smart hubs at the capital (Honiara) plus far flung populations in the Solomons Island chain. (Solomons has about 900 islands).
- A Harrisburg University graduate from Jamaica who specialized in Analytics has formed a Business Intelligence (BI) hub in Jamaica to support Jamaica and other countries in the Caribbean Communities Network (www.caricom.org).

- The POCs of each hub are *required* to communicate and collaborate with at least 3 other hubs as part of the training program (explained later). They initially exchange educational materials and lessons learned but later start exchanging other vital information such as evacuation procedures in case of a disaster and digital marketing approaches and experiences for cottage industries.
- Even in its formative stages, the collaboration matrix in Table 1 is an extremely interesting playground for horizontal collaborations between different hubs in the same country (e.g., all hubs of the Solomons), vertical collaborations between different countries but on the same topic (e.g., telemedicine hub in Haiti collaborating with the one in Seat Pleasant), and diagonally (e.g., micro-entrepreneurship and micro financing in different countries serving as connector hubs for each other).
- The collaboration matrix in Table 1 supports the spirit of UN Social Cohesion [21]. The matrix is also being used to develop future expansion plans for new hubs, i.e., should we expand horizontally by adding more hubs in a given country, vertically by adding more countries, or a mixture? Our progress has been slow due to lack of funds (this work is being supported by internal funds – we provide about $3K seed money for needy hubs). Additional funding could significantly ramp up our work.

Table 1: Our implementation plan showing operational, in-progress, and planned smart hubs

	Hypertension Telemed	***Education & Capacity Building***	***Entrepreneurship***	***eCommerce for Cottage Industries***	***Business Intelligence***	***Disaster & Mgmt***	***Community Center***
Haiti	Operational						
Jamaica			In-Progress		Operational		Planned
Solomon Island	In-Progress	In-Progress	In-Progress	In-Progress	Operational	In-Progress	In-Progress
Tanzania		Operational	In-Progress				
Rwanda	In-Progress		Operational				
Nepal			In- Progress	Operational		Planned	
Tunisia					In-Progress		
El Salvador	Operational						
Seat Pleasant (USA)	Operational		In-Progress				

Based on the experiences so far, we strongly believe that our *distributed* approach of using different smart hubs is more economically effective than the centralized large smart city approach. The Harrisburg University (HU) graduate program in information systems (1500 students from 72 countries) is a very strong population of well-educated POCs who could serve as catalysts for change in their originating countries. In fact, the Tanzania and Jamaica POCs mentioned above are graduates of HU.

Global Decision Support Center for Monitoring and Administration

Figure 2 shows the Global Decision Support Center that supports the vision presented in Figure 1 and the implementation plan shown in Table 1. This site, developed by the ICT4SIDS Partnership, serves as a Center for Collaboration and Control between all hubs, and provides the following capabilities:

- *Collaboration Matrix (Table 1)* that supports various collaboration scenarios between different hubs and global centers. For example, telemedicine centers in Samoa and Solomon Islands can exchange information with each other and also with a nursing education center located in Aruba.
- *World Hypertension Center* located in Harrisburg can be used to store hypertension data from Haiti, Jamaica, El Salvador, Peru, Tanzania, and other countries for across-country analysis and advice to populations in these islands. This center is currently operated by the World Hypertension League, part of the World Health Organization (WHO), and a partner healthcare NGO (Colleagues in Care) addressing non communicable diseases world-wide [24].
- *Education Center* is available as the central repository of education and training for capacity building of different regions. We are currently working with Tanzania to educate local teachers for effective use of computers in classrooms.
- *Business Intelligence Center* is a new capability that will be used by any of the hubs for analytics so that even the remotest villages can also participate and benefit from simple analytics to promote local economic activities in the global marketplace
- *Smart SIDS* is a new initiative that is using the SDG Advisor and Computer Aided Planning to develop smarter SIDS. We are currently working with Solomon Islands on a Smart Samoa Pilot Project. This concept is also being expanded to smart towns and isolated communities.
- *Entrepreneurship Portal* is a new initiative that is primarily focusing on micro-entrepreneurship through microfinancing. This portal is providing resources for education, social networking, digital marketing and e-commerce as the basic tools for young entrepreneurs.
- *Smart Agriculture Portal* is a new initiative that is extensively based on using IoTs and embedded systems for monitoring the growth of crops and food security as the key areas of focus at present.
- *Disaster Recovery Center* is currently not operational but is in design to reduce risk from disaster situations such as climate change and earthquakes, and to accelerate recoveries of economic activities thereby reducing risks to public and private sector investors
- Additional centers on food safety, micro-grids, AI applications, and Internet of Things (IoT) solutions are also under investigation at present.

In addition, the following tools and a computer-aided methodology support the Global Center:

- *SDG Advisor* is available to all hubs and the Global Center users for quickly checking the SDG indicator for their regions/countries, receiving recommendations for the services that can improve the needed status, and even launch the needed services through the Computer Aided Planner.
- *Computer Aided Planner* is a sophisticated toolset, called SPACE that conduct detailed feasibility studies and produces a strategic plan, plus a highly customized working portal for a proposed hub within hours. Benefits include lower development costs and lower risk to potential donors/investors. Additional information about the SPACE environment can be found at [7, 9, 10]

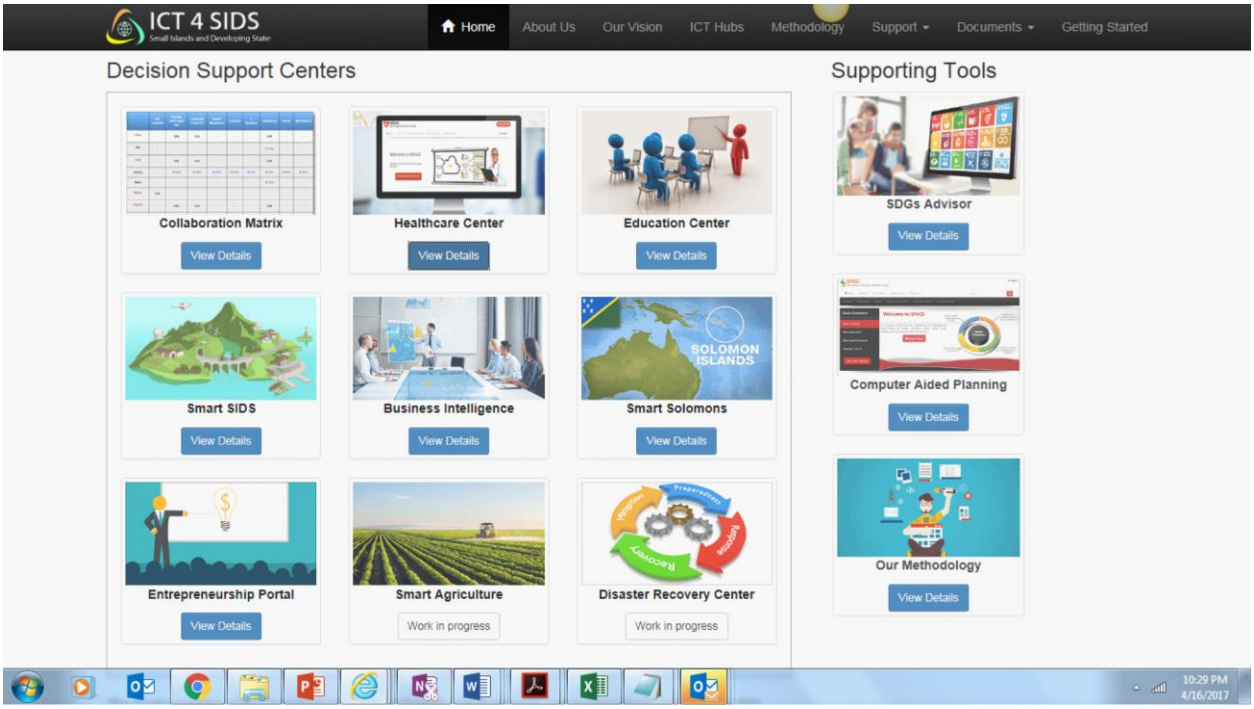


*Figure 2: Screenshot of the Global Decision Support Center for SDGs (*watch the video clip on https://youtu.be/EqHeozRcuGA *)*

Computer Aided Implementation Methodology for Launching Pilot Projects

The vision presented so far is promising, but implementing this vision at a massive scale is a non-trivial task due to the technical, management and logistical challenges summarized in Figure 3. These are serious barriers that must be addressed systematically. Unfortunately, many ICT projects are not carefully addressing these challenges and are experiencing a failure rate of 60-85% due to expensive retries, especially in developing countries. Smart hub projects are no exception. In response, we have developed a careful methodology, discussed below, that is supported by the integrated set of tools shown in Figure 2 to do more (provide more services to more customers) with less (time, money, trained staff and risk). This methodology and the associated tools have been improved and enriched successively through the hands-on experience and practical insights gained through more than a dozen pilot projects.

Important Note: The computer aided implementation methodology, briefly described here, is further illustrated in Appendix A through an example. The computer aided environment used in this methodology has been published widely [9, 10, 11, 12, 13, 14] and has been used extensively in computer aided consulting assignments and in graduate level courses on computer aided planning and integration at the University of Pennsylvania and Harrisburg University of Science and Technology. This environment is being expanded and enriched through hands-on experiments with the overall goal of using latest digital innovations for long range solutions for the underserved populations. In addition, we are taking advantage of industry developments (e.g., [1, 2, 4, 21, 22]) and UN publications (e.g., [15, 16, 17, 18. 19. 20]).

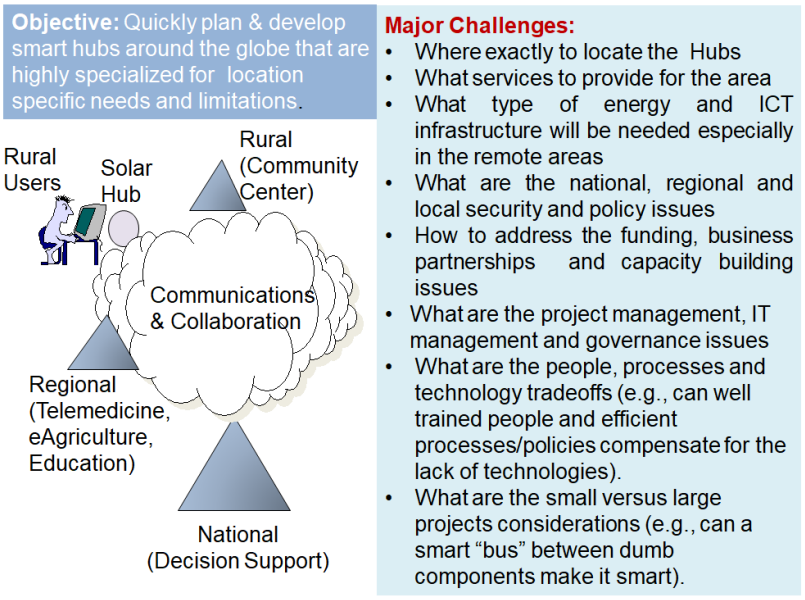


Figure 3: Summary of challenges facing large scale planning and deployment of smart hubs

Figure 4 shows our systematic computer aided planning methodology that addresses these challenges. This methodology relies heavily on a powerful computer aided planning and decision support environment, called SPACE (Strategic Planning, Architecture, Controls and Education) and other tools. The SPACE environment (www.space4ict.com) addresses the challenges faced in Figure 3 and produces a highly customized portal to support different smart hub configurations within hours. Most importantly, SPACE supports individual services that can be combined into complex "*service bundles*" to represent offices, community centers, corporations and even cities. This allows us to plan and architect very simple to very large and complex scenarios for smart hubs. This methodology is based on the insights gained by implementing the pilot projects shown in Table 1 and will be further refined and used in the future. The methodology consists of the following phases (see Appendix A for a quick tour of the methodology):

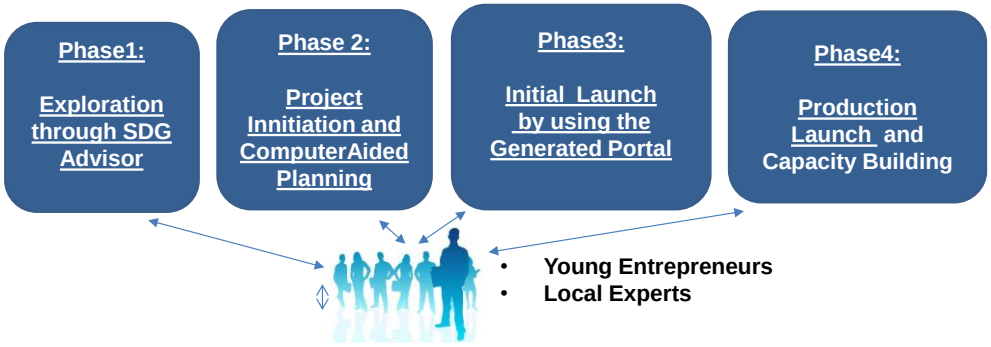


Figure 4: Computer Aided Implementation Methodology for Launching Pilot Projects

- Phase 1: We invite potential users to join a smart pilot project that implements smart hubs to support health, education, public safety, public welfare, and other SDGs for the community. We ask the interested users to use the SDG Advisor tool (part of SPACE) to help them assess their needs and determine which SDGs should be addressed in the pilot project. Appendix A gives a detailed example of how the SDG Advisor supports Phase 1 of our methodology.
- Phase 2: A hub vision is proposed and a pilot project is initiated by a user and a *Point of Contact (POC)* is appointed by the target community. The POC is trained to use the SPACE computer aided planning tool to conduct an extensive feasibility study and produce a strategic plan, a funding proposal and a

working prototype of the selected smart hub(s) – all within a day. Appendix A provides additional details.

- Phase 3: The results of the feasibility study are analyzed/revised and a final smart hub is created in collaboration with the POC and local experts. The final hub is "registered" in the Collaboration Matrix and also in the appropriate Global Center (e.g., a hypertension hub is registered in the World Hypertension Center). The POC goes through an intensive training and is responsible for refining and expanding the hub based on local needs.
- Phase 4: The produced portal is refined for a production version as a repeatable asset. The results are published in the Donor Portal for attracting funding sources, business partners and system builders. Funding models accessible by this process include, public, private, or even "crowd sourcing" which allows individuals to contribute to specific projects. The Donor Portal also serves as a connector hub for micro financing. A production version of the hub portal is launched at the end of this phase.

Results So Far and Future Directions

Under the umbrella of UN ICT4SIDS Partnership, a small team of 5 people in a startup, with help from advisors from IBM, World Hypertension League, and the UN, has launched more than a dozen pilot projects that involve more than 10 countries. We have learned that our methodology can save $50K to $70K per pilot project and significantly reduce retries, errors and failures. Our approach improves decision-making, harnesses innovation to improve outcomes, and engages young entrepreneurs to meet evolving needs. Based on the insights gained through the pilot projects, we feel that the SDGs can be rapidly implemented in an integrated manner through a set of collaborative smart hubs which facilitate specific SDGs at local levels for health, education, public safety, public welfare and other vital sectors.

We have also learned many practical lessons about how this project can be scaled for larger undertakings and the potential roadblocks. The main lesson learned is that the first 3 phases of our methodology have more than 80% success rate -- the main problems are in phase 4 primarily due to the lack of funding (this problem has been also been emphasized by a recent UN-OHRLS Report [17]). We are planning to spend more time on exploring funding sources for phase 4 so that these successful pilot projects can result in highly effective large scale implementations that make significant difference on the ground. Specifically, we are pursuing the following future directions:

- Stay focused on low cost but high impact services, such as hypertension and educating the school teachers on ICT, to have high impact without significant financial resources.
- Continue refining and expanding our computer aided implementation methodology based on lessons learned with particular focus on cost reduction to reduce the funding challenges highlighted by a recent UN-OHRLS Report [17].
- Encourage young entrepreneurs from diverse regions to become "smart hub masters" and help them start their own businesses.
- Expand the number of participants and collaborating scenarios where small smart hubs collaborate with larger hubs for economic development and improved public service.
- Gradually support more SDGs, such as the ones related to Disaster Resilience and Management (DRM), for higher value for SIDS.
- Expand the training and capacity-building capabilities of our computer-aided toolset for young entrepreneurs and government officials because it allows hands-on planning and decision support experiments.
- Heavily focus on exploring funding sources and innovative uses of microfinancing to overcome the stumbling blocks in phase 4 of our methodology.

We strongly feel that local smart hubs create new sources of economic development and growth as they graduate from micro financing models to more substantial capital infusion models, creating more

substantial long-term investment opportunities. We also feel that the vision of collaborating smart hubs is a highly practical approach to support the UN ESCAP "systems thinking" based SDG planning [15] and Samoa Pathway Guidelines [6].

APPENDIX A: Quick Tour of Computer Aided Implementation Methodology

PHASE 1: Using the SDG Advisor to Get Started

Phase 1 of our methodology conducts a quick feasibility study by using the SDG Advisor and then helps a user to select and launch low cost but high impact pilot projects. The overall objective of the SDG Advisor is to accelerate the implementation of UN Sustainable Development Goals (SDGs) through ICT at local, regional and national levels. Specifically, the SDG Advisor initiates our methodology by answering the following questions:

- What is the status of my country/region as calculated by the SDG indicator (good/bad)
- What type of services could improve the needed status
- What are the costs versus benefits of launching a service and how exactly can a service be launched quickly and inexpensively within the local context

The SDG Advisor, shown in Figure 5, is a working prototype that begins to answer these questions by systematically walking the users through a three-step process displayed in Figure 5. These steps are described in more detail below.

Figure 5: Conceptual overview of the SDG Advisor

STEP 1: Select a country/region and initiate the process

The user selects a country/region and the SDG Advisor fetches all open information about the location from sources such as the World Bank, UN Department of Statistics, World Economic Forum, and others.

STEP 2: Select an SDG for status and service recommendations

The user selects an SDG[18]and the SDG Advisor shows how well the country/region is doing based on SDG indicators. Figure 6 displays a screenshot of the SDG Advisor that shows the following:

- The user selected SDG3 (Health) for Jamaica as a country.
- The Advisor shows status of Jamaica based on UN-specified SDG indicators for healthcare such as number of physicians and hospitals per 1000 people.

- The status is indicated as red, yellow and green to show if the status is below, OK, or above the desired levels. As shown in Figure 6, Jamaica needs to improve its status in terms of the number of physicians and hospitals per 1000 people while life expectancy at birth for male as well as female is quite good.
- The Advisor also recommends a number of ICT-based services that could improve the status. This recommender feature is based on our knowledgebase of business patterns and heavily utilizes analysis performed by well known studies such as the ITU-CISCO, Columbia-Erickson, and others. We are constantly updating our database.
- The user can select any of the displayed services and perform basic cost-benefit analysis to make an initial judgement if the service is worth pursuing. Ideally, the users should select the services that are low cost but high benefit and impact.
- If the user believes that the service is worth pursuing, then the user presses the Explore button that is processed in Step 3.

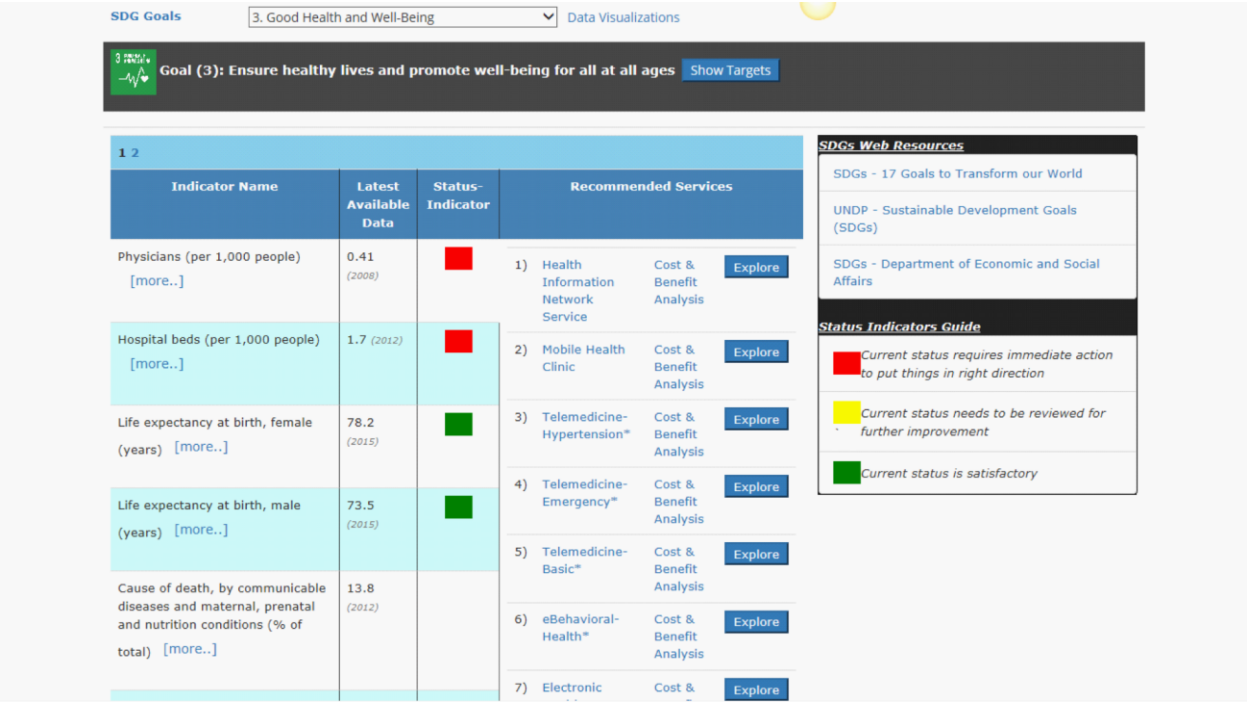


Figure 6: Screenshot of the results produced by step 2 of the SDG Advisor

STEP 3: Exploration and launching/implementing needed services

The SDG Advisor goes beyond recommendations, to enable implementation of the needed ICT-based services through the SPACE computer aided planner. The launched services are Samoa Pathway compliant ICT hubs that directly support SDGs in Health, Education, Public Safety and Public Welfare services through ICT. The SPACE e-Planner conducts a feasibility study and generates extensive reports such as a strategic planning report to show the overall vision and architecture with business/technical justification and standardized RFPs (Requests for Proposals) that can be used to attract vendors for bidding. A very important feature of SPACE is that it automatically generates a sample portal that can be quickly converted to an actual working system. All these outputs and the working portal can be used to initiate a free pilot project with ICT4SIDS Partnership or any other organization to implement the needed services quickly. The following section presents a quick tour of using SPACE to launch a service.

PHASE2: Using the Computer Aided Planner to launch a service

A user of the Planner selects a service (e.g., mobile health clinic) for a given country (e.g., Nigeria) as recommended by the SDG Advisor and quickly generates a working portal for the smart hub plus the following reports (see Exhibit 2 for more details about these reports):

- Business plans that can be used for obtaining funding
- Detailed Planning Reports (DPRs) that show the architecture, the policies needed, and enabling technologies for the chosen service
- Standardized RFPs (Requests for Proposals) that can be used to attract the needed vendors through an open bidding process
- Project management, disaster recovery and governance guidelines for monitoring and controlling the development activities
- Education, training and public awareness campaigns needed for success

Let us briefly review how these outputs are produced by using Figure 7, which shows a more detailed view of the Planner. *Simply stated, the Planner is a set of intelligent apps ("advisors") that are integrated around common resources.* These advisors collaborate with each other to cover five phases (P0 to P4), shown in Figure 7. These advisors invoke the games, patterns, and other resources to generate the outputs shown in Figure 7. These outputs can be customized by local experts and/or end-users. Suppose that a user wants to develop the strategic plan for an e-learning service in Nigeria. P0 helps the user to capture Nigeria specific information and P1 helps in specification of the e-learning service. P2 generates a customized plan based on P0 and P1. P3 generates the information for RFP (Request for Proposal) and requirements & integration. P4 generates outputs to support project management and governance. The outputs can be customized by the users or local experts manually, or by invoking specialized games and simulations. Our goal is to produce the outputs that require less than 30% of local modifications.

Using Big Data: The Planner fetches, uses and customizes extensive big data resources such as a set of knowledge repositories that provide links to a wide range of case studies and educational materials, and external resources such as the UN Public Administration Network (UNPAN), World Economic Forum (WEF), and World Bank Institute initiative on open data [23]. Rules in different phases of the Planner retrieve needed data and use it to produce outputs and/or modify decisions.

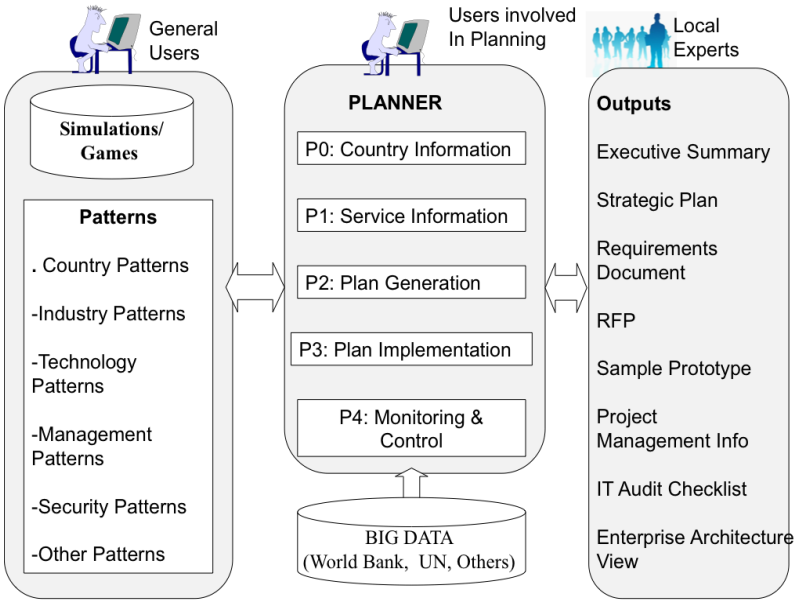


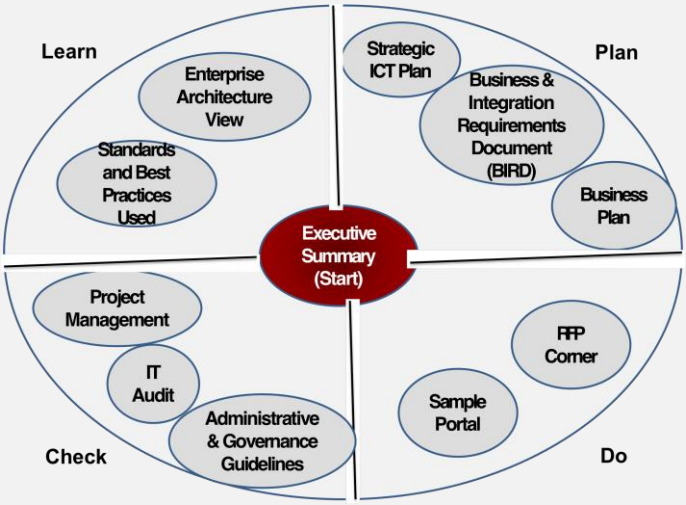
Figure 7: A Conceptual View of SPACE

Exhibit 2: The Outputs Produced by the Planner -- The Checklist

A user of the SPACE Environment selects a service (e.g., mobile health clinic) for a given country (e.g., Nepal) and generates a working portal that supports the smart hub in Nepal. In addition, it generates the following outputs to make the smart hub a success:

- 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, 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).*



PHASE3 and PHASE4: Deployment and Capacity Building

In Phase 3 and Phase4, the results of the feasibility study are analyzed/revised and a final smart hub is created in collaboration with the POCs (typically young entrepreneurs) and local experts. Specifically:

- The final hub is "registered" in the Collaboration Matrix and also in the appropriate Global
- All local stakeholders go goes through an intensive training and refining the hub based on local needs.
- A production version is created as a repeatable asset and the results are published in the Donor Portal for attracting funding sources, business partners and system builders.

Funding models accessible by this process include, public, private, or even "crowd sourcing" which allows individuals to contribute to specific projects. The Donor Portal also serves as a connector hub for micro financing. The Pilot Project concludes when the hub portal is launched for regular use.

Additional Information: Visit www.ictt4sids.com or send an email to A. Umar at umar@amjadumar.com

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