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Accelerating Practical Digital Development in the Solomon Islands

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Digital Development Department
East Asia and Pacific Region

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Contents

List of Acronyms

ATS	Automated Transfer System
BMCL	Bemobile Company Limited
CBSI	Central Bank of Solomon Islands
CSD	Central Securities Depository
DFAT	Department of Foreign Affairs and Trade
FXBC DATEC	Datec Solomon Island Limited
MCA	Ministry of Communication & Aviation
MCILI	Ministry of Commerce, Industry, Labour and Immigration
MEHRD	Ministry of Education and Human Resources
MFAET	Ministry of Foreign Affairs & External Trade
MHMS	Ministry of Health and Medical Service
MoFT	Ministry of Finance and Treasury
MPS	Ministry of Public Service
OAG	Office of the Attorney General
PMO	Prime Minister's Office
SISCC	Solomon Submarine Cable company
SIVB	Solomon Islands Visitor Bureau
SP	Solomon Post
STCL	Solomon Telekom Company Limited
TCSI	Telecommunications Commission of the Solomon Islands

EXECUTIVE SUMMARY

There is broad consensus within the Solomon Islands Government (SIG), the Solomon Islands business community, and among its development partners regarding the potential contribution of digital technologies (information and communication technologies/ICT) to the Solomon Islands' social and economic development. The recent approval of the National ICT Policy, in close alignment with the National Development Strategy, confirms that consensus and provides a clear statement of strategic intent with respect to the nationwide deployment and management of ICT.

The SIG, with support from the Government of Australia, has invested US$136 million[1] in a new submarine cable system connecting Honiara to Sydney and four islands in the archipelago to Honiara; the Coral Sea Cable (CS2) was declared ready for service on February 1, 2020. The new cable is expected to be a key catalyst and accelerator for the contribution of digital technologies to the Solomon Islands' development when domestic connectivity beyond the cable landing is available. The *expectation* is that this investment will deliver faster and cheaper internet services over current service and enable for the first time Internet to the large rural population, creating new opportunities for the country with vastly improved access to the internet. The new access will further enable businesses across the islands to access global markets and participate in global supply chains. It will enable new business models and digitization of current operations. Citizens will be able to complete government procedures (registrations, licenses, taxes, etc.) from their homes or their phones. Healthcare providers will be able to get remote support from specialists and order medicines and supplies online. Students will be able to complete online courses and access the worldwide body of knowledge. Citizens will also have access to a wide range of entertainment and social media activities, further expanding their domestic and international awareness and quality of life.

But a great deal needs to happen before these opportunities can be realized for the Solomon Islands. High-speed access to the internet from a handful of points across the country is just the beginning. Access needs to be distributed out to 'the last kilometer'. Digital government systems need to be developed and implemented. New laws governing electronic transactions and related issues need to be written and existing laws updated. Processes and operations of both businesses and government need to be changed to accommodate and leverage the global mesh of interconnected digital processes and resources. People need to develop digital awareness and skills.

This endeavor will require substantial investment. It is also going to require collaboration, coordination, and the concerted effort of organizations and individuals across the entire spectrum.

This report provides an overview of the current situation and a set of recommendations to accelerate digital development in the Solomon Islands, based on a review of available data and consultations with key stakeholders. It aims to identify priority policy/regulatory requirements, recommended actions, and possible investment/support opportunities. The scope covers:

[1] SSC presentation to World Bank team, November 2018.

- Digital economy, defined herein as the broad range of business and economic activities that arise from ICT and use digitized processes and information as factors of production
- Digital government and the delivery of public services

The 'digital economy' in the broader sense includes digital government. However, the respective natures of public sector ICT deployment versus the broader use of ICT in an economy call for them to be addressed separately while recognizing what is common between them. The assessment and recommendations are organized according to the framework shown in Figure 1 on page 2. The framework was developed based on good practice digital economy and digital government maturity assessment tools, as well as extensive global experience. Within the context of the prevailing macroeconomic and political environment, it calls for a focus first on key enabling factors for both digital economy and digital government.

This report first describes the value to be derived from an increasingly digital economy in the Solomon Islands and examples of how other countries are doing the same. The tourism, agriculture, and fisheries sectors are examined in detail. It then presents an assessment of the digital government program elements and the extent to which they contribute to delivering effective and efficient, digitally enhanced government operations and services. Finally, and most importantly, it presents an assessment of the status and issues of the foundational enablers of a digital economy.

The outcomes of the assessment indicated that while continued attention and action are required on digital government program elements, the SIG needs to focus mainly on strengthening the enabling environment for both digital government and the digital economy. Recent developments suggest good progress, (i.e. the National ICT Policy, the submarine cables, cybersecurity committee and planning), but several of the enablers require investment, effort, and action.

Table ES1 summarizes the key findings of the assessment and outlines the recommended actions. The key stakeholders with responsibility for implementing the recommendations are also shown. In addition to the findings and recommendations for the overall enabling environment, the SIG has an opportunity to build on the strong work being done by the ICT Support Unit (ICTSU) in the Ministry of Finance and Treasury (MoFT) and strengthen key elements of the digital government development program. The findings and recommendations for that dimension are shown in Table ES2.

Additional recommended efforts have been described in the "Perspectives for Future Growth/Enhancement" sections throughout the report. They should be supported and encouraged. The Office of the Prime Minister and Cabinet has proposed the establishment of a new governance and management structure for ICT policy implementation. The National Cybersecurity Framework is being developed by the Royal Solomon Islands Police (RSIP) and a separate cybersecurity working group has been established by the Ministry of Communications and Aviation (MCA). The national payments system bill has been developed by the Central Bank with WB technical support and is pending before parliament. The SIG, with its membership in the Better than Cash Alliance (BTCA) has pledged to convert 80 percent of its payments to digital channels by 2020. While there is no unique national digital ID, there is a biometric voter registration system that issues voter ID cards and a functioning civil registration system.

Discussions around integration of these systems is ongoing. There are operational applications and systems in agencies across the government that are supporting operations and service delivery. These agencies already receive technical support and funding from development partners for regular upgrades and enhancements to the systems. As mentioned in the recommendations, the focus of any new assistance should be on establishing standards for architecture, procurement, and horizontal process and data integration.

The results of this assessment, and the breadth of the resulting recommendations, are further evidence of the degree of effort needed to accelerate the establishment of a digital economy and a digital government in the Solomon Islands—beyond simply the provision of faster, cheaper internet access. However, this assessment also exposes an already-substantial level of sophistication, continuing progress on key areas of focus, and a strong political will to invest additional resources and effort. The Prime Minister signaled his strong support in the Solomon Islands Digital Economy Workshop held in early November 2019 (see Annex 2). The arrival of the submarine cable, together with the recommended actions from the workshop and those provided herein, will no doubt accelerate the realization of the vision of "A peaceful, united and progressive Solomon Islands communicating and informed by technologies open to all".[2]

The global COVID-19 pandemic has further underscored the importance of accelerating digital development, particularly in the Pacific Islands region. Since March 2020 this region has been particularly isolated by travel restrictions, and severe disruptions across all economic sectors. The issues described in this report remain highly relevant, particularly with regard to the urgency of improving digital infrastructure (connectivity), enabling digital payments, boosting digital skills, and enacting legislation to protect digital transactions and safeguard privacy.

[2] Solomon Islands National ICT Policy

TABLE 1 – ESTABLISHING FOUNDATIONAL DIGITAL ECONOMY ENABLERS

Enabler	Key Findings	Action	Key Stakeholders
Regulatory Environment	There are currently no laws in place to support a digital economy. Key gaps include an e-transaction law, a cybercrime law, and data privacy and protection laws.	1. Prepare a new legal and regulatory framework for digital economy development, in particular on: digital transactions and electronic signatures, cybersecurity, data protection and data privacy.	CBSI, MCA, MCILI, MoFT, MoJLA
Policy, Planning & Institutional Environment	The National ICT Policy provides an overall strategy and set of high-level objectives for ICT development but does not include a realistic, actionable plan for achieving the objectives. Responsibility for implementation of the strategy is assigned to the MCA, but in practice institutional ownership for the digital agenda is fragmented among a variety of public sector entities due to its broad scope. This poses coordination challenges and contention regarding program ownership. Most development projects involving sector transformation do not involve aspects of digital transformation or e-commerce, constituting lost opportunities to integrate these digital economy aspects in high potential sectors.	2. Based on the current National ICT Policy, develop a National ICT Strategy & Plan consisting of detailed, time-bound, sequenced, and costed implementation plans for each of the policy objectives. 3. Rationalize and define the focus, scope, and specific responsibilities of each institution involved in the implementation of the strategy, including any advisory functions provided by development partners. 4. Ensure, with development partner support, that sector development initiatives involving value chain transformation and market-side dimensions integrate aspects of digital transformation and e-commerce respectively.	PMO, MCA, MoFT, MPS, TCSI, ICTSU
ICT Infrastructure, Access & Connectivity	Telecommunications sector liberalization has reduced mobile voice rates and increased penetration, but broadband costs remain high. Sole reliance on satellite internet is unsustainable. Impending submarine cable landings can revolutionize internet-led growth, but last-mile connectivity, as well as fair-play management of the wholesale market will be critical success factors.	5. Establish the legal, commercial, institutional, and operational environment for managing the new submarine cables' operations and wholesale bandwidth sales. 6. Develop, in collaboration with the operators, a viable approach for funding and deploying the broadband network domestically and providing last-mile access to rural and remote communities in the provinces.	PMO, MCA, MoFT, MPS, TCSI, ICTSU, SISCC, BMCL, STCL, SATSOL
Cybersecurity	Cybersecurity capabilities are currently very low posing significant risks. The National Cybersecurity	7. Develop a national cybersecurity strategy covering required elements of standards (with the National	MCA, Royal Solomon

Enabler	Key Findings	Action	Key Stakeholders
	Framework is being developed by the RSIP and a separate cybersecurity working group has been established by the MCA.	Cybersecurity Framework), education, operational monitoring, risk management, security culture, security risk mitigation, and a comprehensive risk assessment/ audit program.	Islands Police
Digital skills and awareness	Overall digital awareness within the economy and society is very low, which inhibits demand for digital products and services. ICT skills development at the tertiary level is weak and certificate-level training is non-existent. Government support and options for digital business entrepreneurship development are also limited, inhibiting the growth of a viable ICT support value chain as well as ICT startups.	8. Conduct a comprehensive review of the IT and digital skills environment from both demand and supply perspectives and identify required curriculum changes at all levels as well as potential avenues for professional certification. 9. Institute a preferred suppliers program for software firms (similar to the existing program for hardware firms) as a means to develop a local market or competent firms. 10. Design and launch a digital economy awareness program to be delivered across a variety of channels to citizens and businesses. 11. Strengthen overall coordination for digital economy skills development issues by instituting a coherent feedback loop between policymakers, skills providers, and the private sector. 12. Support the development of certificate-level course providers/individual consultants in IT through train-the-trainer programs.	MERHD, MCILI, Universities
Digital Identity	In the absence of a national ID system, a biometric based voter registry and driving license system, as well as a civil registration system, function as identification mechanisms. However, their coverage is not universal, lending importance to deliberating on a national ID system.	13. Undertake an ID4D Diagnostic study to identify strengths and weaknesses of the current identity systems in place, and make recommendations regarding a future national ID system.	MOJLA, SI Electoral Commission, IRD, MPNS, PMO

Enabler	Key Findings	Action	Key Stakeholders
Digital Payments	Overall the payments system ecosystem is moderately well developed for mobile banking/mobile money and is immature for card-based systems. Cash on delivery is the predominant payment mechanism currently in the country. Debit cards exist but are not used widely. The National Payments Systems Bill is currently pending before parliament for deliberation, and the delays on passage are inhibiting deployment of payments and fintech solutions. A positive step has been in the form of a regulatory nod for a shared money agent network which may assist with liquidity issues and agent training and standardization.	14. Deliberate upon the pending payments systems bill in parliament and pass into legislation. 15. Pending passage of the new NationalPayments Systems Bill, develop a switching network that will allow automated clearing operations to allow inter-bank transfers through the switching network, rather than manually as is currently the case. The CBSI is currently implementing an Automated Transfer System (ATS) and a Central Securities Depository (CSD) to allow the digital clearing and settlement of payment and securities—to be completed by end 2021 16. Review proposals for enabling regulated non-banks including mobile network operators (MNO)s to issue mobile wallets, and issue regulations if feasible. The Payments Systems bill includes this provision, with regulations to be issued after approval.	CBSI

TABLE 2 – STRENGTHENING THE DIGITAL GOVERNMENT DEVELOPMENT PROGRAM

Element	Key Findings	Action	Key Stakeholders
Strategy & Planning	The National ICT Policy includes high-level objectives for "e-government" and other public services (i.e. law enforcement, health, education). However, as mentioned above, it does not include specific activities, timelines, or costs. The draft SIG ICT Strategy for the period 2018-2022 represents the beginnings of an overall e-government strategy, but was developed by ICTSU without broad stakeholder consultation. Nor does it yet include the detailed analysis and planning content needed to serve as the roadmap for the Solomon Islands' digital government development.	17. Building on the ICTSU's ICT Strategy, develop the Solomon Islands National Digital Government Strategic Plan (DGSP), in collaboration with the broader government stakeholder community.	MCA. ICTSU, PMO
Governance & Management	Although the ICTSU has a mandate for whole-of-government ICT deployment and support, the ICT Policy assigns that responsibility to the MCA. This apparent contradiction needs to be resolved, however, there is currently no top-level governance structure, nor a government CIO. The ICTSU has included an outline governance structure for government ICT in its draft ICT Strategy but that has yet to be approved. No single agency has been mandated for shepherding progress in the area of overall digital economy, leading to some contention of ownership on ICT-plus areas such as e-trade/e-commerce. This is preventing the development of a coherent policy consensus.	18. Design and establish an agreed governance and management structure, within the overall national ICT institutional structure, to lead, manage, and support the development of Solomon Islands' digital government, as well as the broader digital economy.	MCA. ICTSU, PMO

Element	Key Findings	Action	Key Stakeholders
Architecture, Processes, and Standards	The SIG business applications have been developed and are operating in the absence of an overall enterprise architecture, interoperability framework, data sharing policy, or data standards. There are no government-wide ICT procurement guidelines in place. This situation creates integration, sustainability, and efficiency issues, increasing the SIG overall risk profile.	19. Develop, in order of priority: a. Government Enterprise Architecture b. Government Interoperability Framework c. Information Systems and Data Sharing Policy d. Standardized IT Procurement Policy	MCA. ICTSU, MoFT, PMO
Government ICT Infrastructure	The government network, SIG-Connect, is based on a combination of fiber access and WiMAX access connecting Honiara-based government entities in a private network, with an Internet Gateway provided by Telekom and a second connection through SatSol. Connectivity in rural and remote areas is still a problem. Most of the agency applications are now hosted within a FlexPOD (data center platform) environment. There are also several applications hosted offshore today in New Zealand and Australia. Most public-facing websites are hosted offshore. A new FlexPOD has recently been commissioned in a new data center at the ICTSU's new facility. Migration of the applications and operations from the old data center is nearing completion.	20. Develop a National Data Center Consolidation and Communications Plan, which would include: a. Cloud Computing b. Disaster Recovery and Continuity of Operations c. Secure Government Network	MCA. ICTSU

I. A FRAMEWORK FOR DIGITAL DEVELOPMENT ASSESSMENT

A. Introduction

1. The purpose of this report is to identify ways to leverage anticipated improvements in connectivity (broadband internet access) for digital government and digital economy development in Solomon Islands. Assessment of the current state and providing recommendations must be done in an organized and structured manner. Although there are several frameworks available for use, both from commercial sources and international organizations, a tailored framework for the current digital development assessment was defined and applied.

2. For governments, Gartner's stages in digital government evolution, the UN e-government survey and readiness index, university-developed frameworks from WASEDA and INSEAD, and others are available. The World Economic Forum (WEF) has a Networked Readiness Index as an indicator of digital maturity, as well as a model for global digital adoption. The World Bank itself is currently working on an overall digital economy maturity framework. The currently available frameworks were reviewed and considered in the Solomon Islands context. For this analysis both *digital economy* (the broad range of business and economic activities that arise from digital technologies and use digitized processes and information as factors of production) and *digital government* (the application of digital technologies to improve and develop new ways of delivering of public services) are being assessed at a reasonably granular level. As such, it was decided that a specific framework should be defined including key elements of both dimensions. The framework is shown in Figure 1 below, followed by brief descriptions of each element.

3. The logic of the framework is as follows: Within the context of the prevailing factors, the government must ensure the enablers are in place to support the private sector to achieve the digital economy strategic outcomes, and must effectively define and manage digital government program elements to achieve the digital government strategic outcomes.

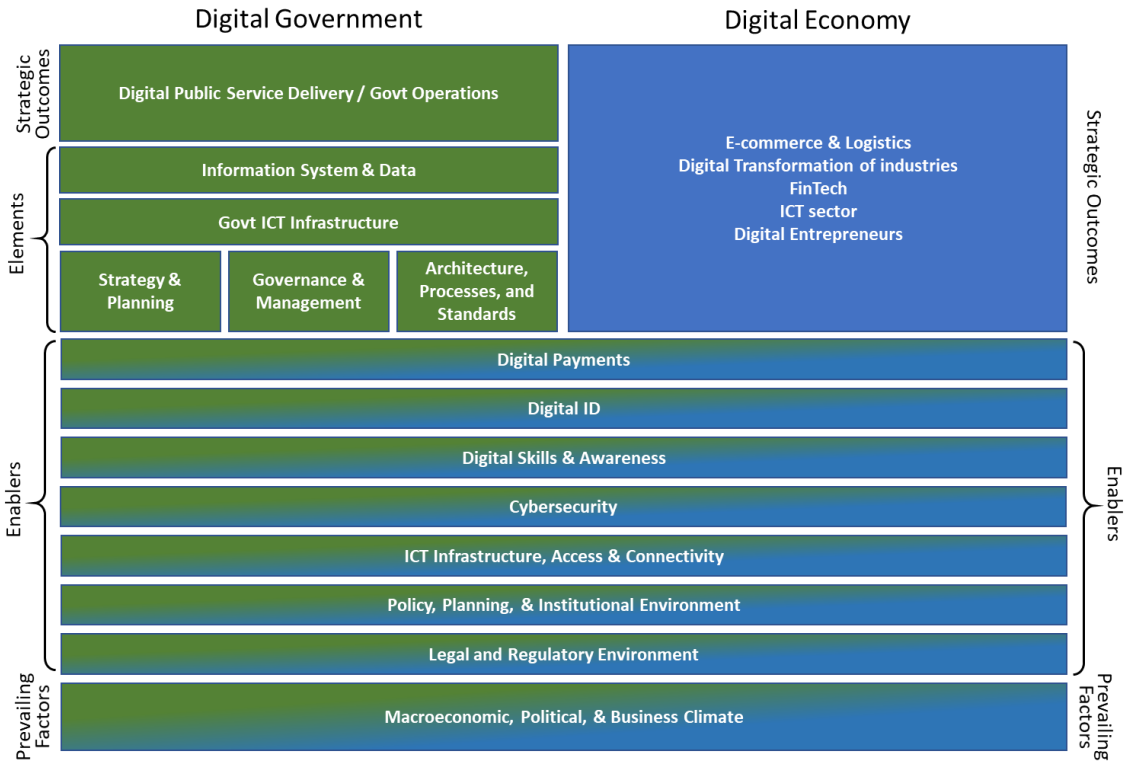


Figure 1: Digital Development Assessment Framework

B. Description of Framework Components

1. Prevailing Factors

4. The 'Prevailing Factors' are the overall macroeconomic, political, and business climate within which the digital economy and/or government operates. These represent topics that impact and are impacted by digital transformation, but that are driven by factors beyond the control of the digital program planning and policy making.

2. Enablers

a) **Legal and Regulatory Environment** – A robust regulatory framework that forms the fundamental legal basis of transactions taking place within a country's digital economy, as well as protection of the interests of the parties to those transactions.

b) **Policy, Planning & Institutional Environment** – A fully articulated and approved policy framework for national ICT/digital development and deployment, supported by a detailed, feasible action plan to implement the policies, and distributed across a rationalized institutional structure with clear assignment of responsibilities, capabilities, and accountability.

c) **Digital Infrastructure, Access & Connectivity** – A resilient voice and data communications network that provides high-speed broadband availability (through both mobile and fixed-line internet), and supporting solutions, data centers, compute and storage resources, and operational support systems.

d) **Cybersecurity** – A combination of principles, policies, procedures, and technology infrastructure that ensures the security and integrity of the country's and the government's systems, data, and critical infrastructure.

e) **Digital Skills & Awareness** – A broad awareness and capability within both the public and private sectors to develop and participate in a digital economy and to innovate, create, deliver, and access both private and public services across digital channels.

f) **Digital ID** – The capability to securely and correctly identify and authenticate individuals and organizations across digital channels through a unique identifier issued by a duly authorized entity or entities.

g) **Digital Payments** – A national system for secure digital financial transactions that enables payments between any two parties and intermediary institutions across digital channels.

3. Digital Economy Strategic Outcomes

5. The strategic outcomes of a mature digital economy are innovative and thriving ICT-based business and economic activities, and the ubiquitous use of digital technologies to achieve business outcomes. For this assessment, the following specific areas have been defined:

    a) E-commerce & Logistics
    b) Digital transformation of industries
    c) Financial technologies (FinTech)
    d) ICT sector
    e) Digital Entrepreneurs

6. Although there are ways to encourage or accelerate the emergence of these elements, they are driven primarily by private sector investment and initiative, and not through a centrally planned and managed effort. As such, there are no 'program elements' as exists for digital government.

4. Digital Government Elements

a) **Strategy & Planning** – A comprehensive, coherent strategy for developing and deploying digital technologies within the government, supported by a feasible, funded program of projects and activities with achievable goals and objectives, measurable outcomes and results, and realistic timelines.

b) **Governance & Management** – A formal, statutory governance and management structure, within the overall national ICT institutional structure, to lead, manage, and support the development of the country's digital government.

c) **Architecture, Processes, and Standards** – An integrated set of technical and operational standards that ensure the interoperability and integration of government data and processes and an effective return on ICT spend, with which all ICT investment and development must comply.

d) **Government ICT Infrastructure** – Robust, resilient government-owned and outsourced data and voice communication networks, data centers, and operating systems supporting government operations, applications, and data.

e) **Information Systems & Data** – An integrated architecture of business solutions, platforms, databases, and data portals providing effective support for digitalized government operations and for delivery of public services across digital channels.

5. Strategic Digital Government Outcomes

7. The strategic outcome of a digital government program is a government enabled by new digital technologies, creating new ways of delivering services and involving citizens, enterprises, and other stakeholders in solving problems and creating public value—and as a government based on an ICT platform that supports integrating and sharing government and external data, applications, and operations, and enables seamless delivery of services to the public.

8. The following section details the assessment of each of these elements for the Solomon Islands. For each element the assessment includes a description of the current situation and recent developments, and perspectives for future growth or enhancement. Where relevant, specific recommendations are made as part of those perspectives.

II. REALIZING VALUE FROM A DIGITAL ECONOMY IN THE SOLOMON ISLANDS

A. Best Practices from Beyond the Borders: How Countries Drive Growth from the Digital Economy

1. No silver bullet exists for building the digital economy; indeed, the diversity of technical and thematic areas in the digital economy necessitates a multipronged approach aligned with the country's context, as well as the capacity of its institutions and private sector to absorb the various technologies.

2. However, patterns emerge in terms of best practices and frameworks implemented by countries that can be studied and incorporated as necessary in the case of Solomon Islands. The following is a list of broad steps that countries have deliberated on and incorporated to incrementally develop the national digital economy.

3. Upgrade policies and regulation, and ensure strong institutional support: A wide range of policy instruments that foster development of the overall digital economy at the national level include strategies in (but not limited to) the following areas: ICT, broadband, e-commerce, investment, skills and innovation, and SME strategies. Digital economy is increasingly being featured as part of the umbrella national development strategy, which typically guides the overall direction of the country. ICT and the digital economy are increasingly recognized as tightly coupled areas. In recognition of the ICT-plus nature of the digital economy, Thailand has established a Ministry of Digital Economy and Society, and developed an associated plan called National Digital Economy and Society Development Plan, focusing on leveraging ICT for improved business competitiveness, equal opportunities, improved human capital, and e-government.

   Institutional coordination and ownership is also important. Typically, a single ministry is tasked with the mandate of ICT and the overall digital economy, although there is no existing one-size-fits-all strategy. The key is to ensure that all relevant ministries and agencies are informed and involved in policy making, but there should be no confusion regarding where the accountability and lead responsibility lie. As noted below, steering committees and taskforce type mechanisms should be utilized to ensure a broad range of public and private institutions are involved in overall policymaking.

4. Integrate 'digitalization' aspect in sector development projects: A key method of ensuring diffusion of technology is to ensure that existing sector development projects (driven by the government or donors) pinpoint processes within the sector value chain which can benefit from digitalization, and identify suitable technologies that could be brought to bear. The strategic plan of action/roadmap that follows from the initial due diligence, as well as the implementation of various activities, should result in the integration of these technologies.

5. Establish taskforces and feedback mechanisms: The digital economy is a fast moving target for policymakers who often struggle to understand the developments and requirements within the overall ecosystem. An effective tool has been the formulation of established taskforces and public-private consultative groups through which policymakers, regulators,

skills providers, private sector and other key stakeholders can maintain a dialogue on the evolving needs of the ecosystem. This is essential for mitigating skills-mismatch issues as well as understanding fast-changing technology. A good example is the system of "5G Strategy Promotion Committees" established in South Korea, which are public-private consultative groups with telecom and industry leaders from automotive, healthcare, education, and other sectors, to study the implications and thereafter develop effective policies for 5G. Singapore created a Future Economy Council (FEC) which discusses issues at the intersection of technology, skills, and private-sector needs from a future-needs perspective. Costa Rica has established an Internet Advisory Board comprised of members of various economic sectors in addition to the public sector and regulators, to determine the path forward for internet access and use in the country. This is a common theme across many countries.

6. Shore up telecommunications infrastructure including where necessary via collaboration with global private sector leaders through PPP: No progress on digital economy issues can be made without reliable, affordable, and relatively fast internet broadband access, either fixed or mobile. A key priority therefore for countries has been to find ways to speed up submarine cable or terrestial cable access (with redundancy, if possible). Cable landings should then be accompanied by the deployment of a fair-play market structure expected to bring in investors (operators), introduce value added services (through ISPs and other service providers), and lead to deployment of last-mile connectivity. Mixed results have been observed globally, but this is the aspired end-result.

   To resolve entrenched infrastructure challenges in terms of last-mile connectivity, governments have also started collaborating on country-wide infrastructure development projects with Fortune 100 firms active in the overall digital economy sphere. Submarine cables and associated deployments are of course common. Google (with associated partners such as c-squared) has designed and implemented shared metro fiber infrastructure in African cities such as Kampala and Accra, with another project active in Monrovia. Another example lies in the 'What-3-words' tool, which is being tested by postal systems (with advice from the Universal Postal Union/UPU) in the Pacific to navigate around the physical addressing problem in these countries.

7. Universal access policies and related funds: One of the major problems facing small islands developing states is the level of digital exclusion from lack of access to mobile/internet coverage. Telecommunications coverage is the base requirement for the digital economy. Universal access funds are designed to take in a percentage of operator gross profits and fund telecommunications projects. There is typically broad agreement between regulators and telecommunications operators that some level of cooperation between operators should exist to increase coverage and reduce digital exclusion, an especially challenging proposition in island states. However, there is less consensus on what type and levels of contributions these operators should make. Forced contribution of operator profits into a universal access fund can reduce investor profitability and constrain further investments. Some regulators, including in SI, prefer to observe the market dynamics to assess what shape a middle-ground model could take. Success stories include that of Columbia, while Universal Service Funds (USF)s in Brazil and the Philippines have been notable underperformers. Key challenges

involve poor due diligence in terms of setting the levies rate, political manipulation and lack of transparency, poorly conceived underlying regulatory framework, and improper disbursement. The Global System for Mobile Communications Association (GSMA) and the International Telecommunications Union (ITU) estimate that almost half of global USFs are under-performing.

As an alternate to USF, the GSMA advises *promoting private network sharing and public-private partnerships, or introducing service obligations into new spectrum license awards. Governments should consider incentives that facilitate market-based solutions and help by stimulating demand, developing the supporting infrastructure and reducing the private cost of coverage by easing the operators' burden with respect to taxation and spectrum fees*.[3] Countries should still consider developing universal access strategies to develop a coherent vision and strategic goals that will guide implementation.

8. Identify anchor sectors and firms to test and scale successful technologies: It is challenging to deploy innovative technologies regardless of the demonstrated potential in other countries if sectors and enterprises do not have the absorptive capacity to effectively utilize the technology. For instance, 3D printing and conventional packaging technologies can greatly enhance the value addition of agricultural products (for example). However, if the domestic market cannot afford the premium and the companies do not possess the supply-side capacities to effectively penetrate international markets, investment in this technology will yield inadequate results. Success stories have typically involved identifying the sectors with high readiness levels, selecting lead firms within the sectors, and testing out the technologies with them over a sustained period. If they are successful, other high potential firms may follow their example. This can ensure absorption and uptake of the technology over the long term.

   An important concept is that of subcontract exchanges aimed at facilitating market access for small ICT firms. The model involves lead firms bidding for medium to large projects subcontract specific components to the smaller firms (thus allowing the smaller firms to become suppliers to the larger firm). Sector associations are often involved in implementing this to train and vet the suppliers.

9. Anchor new technology introductions in key developmental concerns facing the country: Climate change, health, and education are three key areas where governments are typically keen to introduce innovation and solutions. In the case of SI, all of these areas are prime candidates for introducing new technologies ranging from drone-based mapping to electronic medical records digitized software systems.

10. Foster entrepreneurship via incubators and accelerators: In countries such as SI, where there is a near-complete lack of ICT support firms (apart from hardware) and generally a strong startup environment, firms in productive sectors such as agriculture and tourism face significant challenges in sourcing services such as website design, cloud hosting etc. In these

[3] https://www.gsma.com/mobilefordevelopment/country/global/universal-service-funds-effective-way-achieve-universal-access/

cases, structured support through train-the-trainer programs can help to build a base of competent software service providers, which can grow over time. The World Bank has a well-established model for fostering digital incubation, accelerators, and facilitating early stage funding, which include mLab and NaiLab, incubators that have fostered a vibrant digital entrepreneurship ecosystem in Kenya, along with the pioneering community organization, iHub. mLab has imparted skills training to 5,000+ developers and entrepreneurs. Its resident startups have introduced 140+ mobile applications to the market. Another example lies in Nepal where since 2010, through a mobile hub supported by the World Bank Group in Nepal, skilled mobile app developers have formed a strong local community that has created a dozen successful startups focusing on local and commercial use cases. The innovation labs developed by UNICEF in many developing countries are also excellent examples of spurring grassroots technological innovation.

11. Enterprise training and incentives: A related aspect is training enterprises on developing in-house competencies or at least sensitivities towards various aspects of digitalization, through coaching and training and making self-teach material available, regardless of the sector. The coaching can range from basic data-entry skills to training on complex tools, to usage of existing online tools such as email and dropbox to market research and in-market business development; the overall goal is to ensure that enterprises have access to coaching on aspects of digitization when they need it. In some countries, initiatives have focused on training trainers who go on to offer paid coaching services to enterprises, thus resulting in a sustainable model. Sector associations are typically a very good base for anchoring training courses, because this can become a source of revenue for them, thus improving their own sustainability.

    Incentives are also key. Incentives to invest in research and development for firms may be associated with increased adoption of software and online tools that can increase productivity. A variety of SME support schemes in several developing countries, such as India and Mauritius, can be leveraged by companies to increase their understanding and procurement/utilization of technology within their business. Countries also deploy support infrastructure in terms of TVET, tailored SME financing incentives, industrial extension programs, technology transfer initiatives, technology-oriented business services, research institutions, and knowledge and expertise exchanges.

12. Government as the market: The government often has to serve as a market for the ICT sector, especially in a context such as SI, where local demand for such products is very low. Low-value contracts can be specifically reserved for SMEs and awarded via a competitive bidding process, or a preferred suppliers program can be created through which bidding for important government projects is open only to a group of vetted suppliers. This can spur activity within the ICT software and support sector until such time that a domestic market emerges. In many countries, an e-procurement platform is developed featuring set-asides/competitive bidding for low-value projects which are contended only by SMES.

Australia's ICT procurement strategy is a good example as it has consistently employed good principles, such as: encouraging competition; being innovative; enabling SMEs to compete; focused outcomes; open standards and cloud first; minimizing cybersecurity risk; and not duplicating platforms that have been built by other agencies.

13. Utilize open-source technologies where applicable: To ensure promulgation of technologies in a cost-effective manner, governments are increasingly turning to open-source technologies, which allow applications to be developed on a free platform and are as such universally available. For instance, eHealth Nigeria leverages electronic and mobile health systems developed on OpenMRS (Open Medical Record System), a collaborative open-source project aimed at developing software to support efficient health care in Nigeria and other developing countries.

14. Strengthen ICT education at all levels of the school system, in addition to the broader population:
    a. The Chilean 'enlaces program' is a good case study for connecting ICT with national education at all levels, involving students, parents, and other stakeholders throughout the primary and secondary schooling system. The model has now been replicated across other countries. Another example is the CanCode program in Canada aimed at supporting coding and digital skills development for Canadian youth from kindergarten to grade 12 (K-12).
    b. The Uruguay Digital 2020 program is a highly ambitious program to expand the overall population's adoption of digital skills and technologies. The multi-component model involves provision of laptops with internet to low-income retirees, training rural populations on ICT and digital skills, and imparting programming skills to students while upgrading university curricula throughout the country.
    c. Sri Lanka has established Telecentres (nanasalas) with country-wide coverage to serve farmers, students, MSMEs, and other stakeholders with access to internet or other services. These centers act as multi-service ICT centers providing a range of services and training classes. Distance and e-learning centers are also part of the model.

15. Build and leverage e-government:
    a. Estonia is a leader in designing and implementing "'Government as a Service" programs and digital public services, including the provision of electronic identities (e-IDs), which enable citizens to access many state services online, such as paying bills, filing taxes, and accessing medical records. The country has also opened its digital infrastructure to foreigners through its e-residency program.
    b. Bangladesh serves as a best in class example of how a national digital backbone was created in the form of a national end-to-end e-government network. Through

a system of Union Digital Centers (UDCs)[4], not only e-government services can be provisioned, but customers/companies are also able to offer their products on an e-commerce aggregator called Ek-shop, which brings together all e-commerce platforms and logistical services providers. This has effectively served to enhance urban-rural e-commerce, as well as reduce the urban-rural digital and government services divide.

c. Aadhaar, India's biometric digital identity scheme, is widely used by the private sector as well, including verification firms in business services, banks, and telecommunications companies. Aadhaar also provides authentication for the Unified Payments Interface (UPI), created by the National Payment Corporation of India.[5]

16. Leverage expanding mobile penetration rates for commerce, and social good via m-apps:

d. The PFIP program is leading the way for financial inclusion including via mobile applications in the Pacific countries, especially relevant for Pacific Island States.

e. In Guatemala, through *Tulasalud*, community facilitators focusing on maternal and child health use cell phones to carry out consultations, send information related to the cases they attend to, receive continuous training, and help in the promotion of community health through distance-learning sessions.

f. M-Pesa is a recognized best in class case study as a money transfer service using cheap mobile phones and an extensive agent network. It is used in bill payments (including airtime top-ups) and person-to-person (P2P) domestic remittances, among many other use cases. The model has been replicated in many countries, and holds special significance for Pacific Island countries.

B. Digital Economy Maturity and Development Opportunities in the Solomon Islands

17. A number of use cases for the digital economy have been identified for Solomon Islands, which can be further assessed and implemented once the telecommunications infrastructure and supporting business environment are upgraded to a reasonable degree of maturity. This section delineates the opportunities and segments them along the digital economy strategic outcomes defined earlier.

18. The following table reviews key elements of the digital economy ecosystem and provides an assessment of the potential for each component in the context of SI's current political, economic, socio-economic, and technological base.

[4] One-stop shop centers spread throughout the country, providing last-mile coverage throughout the hinterland for e-government services, manned by entrepreneurs (1 man and 1 woman).
[5] https://uidai.gov.in/

Table 1: Potential for development of SI's Digital Economy components

	Digital economy segment	Current activity	Development timeframe			Comments for future growth
			ST	MT	LT	
1	Hardware manufacturing	Does not exist. The manufacturing sector, small scale or otherwise is extremely small in SI, and most of the consumer and capital equipment goods are imported.				Long term perspective for growth is there but it is unlikely (based on the current development agenda outlook) that SI will make significant investments in hardware manufacturing.
2	Information services	Limited, due to the high costs of internet access and slow speeds, as well as limited demand.				Expected to ramp up as business activity (digital and non-digital) ramps up.
3	Software and IT consulting	Select hardware firms (deployment and support) but no IT firms/software consultants. Most software professionals are internationals from Southeast Asia and other regional locations.				This will grow as a function of demand-pull from economic sectors such as tourism, however, in all likelihood, the government would need to play a strong part initially functioning as a market to facilitate momentum. The preferred suppliers program (currently only focusing on hardware) could be extended to include software. Expected high engagement of this model once other sectors such as e-commerce start picking up. Initial activity will remain limited to software support to the government or companies in various sectors, rather than independent software development.
4	Telecommunications	Relatively well developed				The telecommunications sector has made remarkable progress in terms of expanding 3G services, however, the key prerequisite for further expansion would be the arrival of the submarine cable and associated regulatory and market structure deployments which are expected to increase coverage and speeds, and reduce latency and costs. This will spur activity for consumers and firms alike.
5	fintech	Limited to mobile banking at the current time				Related to the telecommunications and digital services areas, mobile-based fintech holds great potential for SI given its geography and disperse population, problems in movement of cash etc. Close partnerships with Australian banks who can deploy proven fintech solutions are an advantage. Growth will depend on the passage of the payments systems bill pending before parliament.
5	Digital services	Mostly government related				E-government initiatives are in the process of implementation, and are extremely important due to: a) the highly dispersed population and a geographically fragmented topography that makes physical G2X services challenging, and b) consumers and firms become more confident via use of online services, making adoption of future services more viable.

	Digital economy segment	Current activity	Development timeframe			Comments for future growth
			ST	MT	LT	
6	Platform economy	Limited, due to the high costs of internet access and slow speeds, as well as limited demand.				High potential for this segment once overall internet access and quality improves. Particularly high potential for use of 'websites of websites model' in e-commerce applications, given that companies would not be able to develop e-commerce applications on their own, and the IT support supply chain is still weak.
7	Sharing economy	Limited				NA
8	Gig economy	Limited, due to the high costs of internet access and slow speeds, as well as limited demand.				The gig economy will pick up swiftly once internet quality improves and consumer internet activity increases, which will drive lead firms to establish online activity. Local content will also rise further spurring consumer activity. In the absence of established software development companies (and other supporting actors), independent professionals will likely pick up the slack and cater to the demand.
9	e-commerce	Limited, due to weak capabilities of SMEs overall, as well as slow speeds and high costs of internet access.				Tourism and cocoa are two areas with high potential for e-commerce growth. Initial e-commerce activity will start out with food/grocery delivery and courier type services. Other sectors with potential include semi-processed/processed items in the agricultural and fisheries sectors, as well as wood products (such as handicrafts and furniture parts).
10	Industry 4.0	Does not exist currently.				Long-term potential may be there, but would require significant scale-up in terms of economic activities in productive sectors, so that investments in new technologies can be justified. Government/development partner led activity can also commence in the climate change, fisheries, logging, and disaster response areas through piloting of drone technologies. Monitoring technologies within the mining sector may also constitute an application.
11	Precision agriculture	Does not exist currently.				Potential to deploy crop monitoring systems, RFID, irrigation technologies etc, once lead firms in the sector are established through which such technologies can be piloted/ anchored.
12	Algorithmic economy	Does not exist currently.				Long-term potential, but challenging to predict growth pattern due to the low base of overall current activity in the digital economy.

Source: Authors' Assessment; ST, MT, LT = short-term, medium-term, long-term

19. In addition to the strategic outcomes, three sectors (agriculture, fisheries, and tourism) are discussed from both perspectives of e-commerce and digital transformation, the latter primarily focusing on inflow/import of digital technologies for efficiency gains and diversification.

20. An important observation is that the current low base of the private sector overall will necessitate a high degree of 'hand-holding' (financial, technical, or otherwise) over the short-medium term. Firms -SMEs and larger firms alike - are not well placed for procuring (via digital technology import) or adopting new technologies or frameworks organically, although there is room for such technology to flow in through joint ventures and related investment activity.

Box 1: Where are the digital economy opportunities?

1. Among the priority sectors identified via Solomon Islands' national development agenda, tourism and agriculture (in particular cocoa) are well positioned for e-commerce growth. In terms of the broader digital transformation agenda, the value proposition for mining and fishery-processing (both enclave sectors with limited SME participation) is unclear and potentially lower than agriculture and tourism.
2. Comprehensive value chain analysis of the agriculture, tourism, and fisheries value chain is required to pinpoint entry points for digitalization.
3. Health, education, and environmental protection and climate change are three cross-functional areas which have high potential for digital transformation. Proven technologies exist which can be imported to Solomon Islands for these thematic areas as well as for the agriculture and tourism sectors. However, these firms likely do not possess the absorptive capacity for integrating new technologies and sustainability models. Their existing operating efficiencies and support structures (such as ICT support) are extremely weak.
4. The cocoa and tourism sectors possess the relatively highest potential for joint venture (JV) activity which could bring in new technologies.
5. Except within the tourism and cocoa sectors, there are many lead firms that can function as anchors for any development initiative.
6. It is likely that the government would need to serve as the premier testbed for new technologies, by absorbing them in development activities or within the day-to-day workflow of public sector agencies.

1. Digital Transformation of Industries

The business case

21. The *medium-long term* business case for digital transformation, both industry-led and government-led, is strong. The challenges that Solomon Islands' geography imparts to business supply chains serves to strengthen the business case for testing technologies and integrating digital transformation. The implementation of the government's ambitious pledge to digitize 80 percent of its payments by 2020 may offer lessons and also have a knock-on effect on the private sector in terms of digitizing workflows. The country is in urgent need of technological support to mitigate climate change, and disaster-related risks., and improve response quality and coverage of education, health, and G2X services.

Box 2: Describing digital transformation

While digital transformation is the usual umbrella term used for interventions related to the digital economy, it may be useful to consider activity levels along digitization and digitalization as well, given the nascent state of maturity of the overall digital economy in SI. Digitization refers to the conversion of analog information to digital (such as storing information in a database or an online document instead of paper), reflecting a relatively basic degree of complexity. One level up in terms of complexity is digitalization, which refers to mapping to manual processes to a digital workflow, a more sophisticated and complex set of operations than digitization. Digital transformation refers to the overall impact of a wide range of digitalization activities on a particular supply chain/value chain. These terms are used interchangeably here.

22. Digital transformation for Solomon Islands would necessarily involve the 'import' of digital technologies for realizing efficiency gains in individual company supply chains and sector value chains, among applications in health, education, climate change and other development sectors.

Current situation and recent developments

23. Digitalization efforts are still at an early stage in the Solomon Islands private sector. There are no lead firms that can currently serve as case studies for integrating digitalization within their supply chains. Companies have not made these investments, partly due to the considerable challenges with internet speed and reliability, and partly because the value proposition is not readily understood by the private sector. Government and development support for the digital economy is only just emerging. Deployed technology solutions for functional areas including climate change are also missing.

24. The absorptive capacity of the market and businesses to adopt complex digital transformation initiatives is weak. However, there is significant potential for companies to start with the base form of digital transformation – to undertake small-scale digitization and digitalization of their processes.

Short/medium term priorities

25. Digital transformation in the SI private sector will likely be in the medium-long term, and will require the following:

    a) Successful case studies/experiences by lead firms that can be emulated by other companies. A comprehensive coaching and mentoring program is recommended which can involve companies that have a high degree of readiness and willingness to integrate digital technologies across their supply chains. Apart from the benefits to the firms, this can have a demonstration effect on other companies as well.

    b) Parallel growth of the national ICT ecosystem, including improvements in bandwidth, and existence of a reliable IT hardware and software supplier base for assisting the private sector in deploying IT solutions.

    c) Strong advocacy by private sector associations such as the Solomon Islands Chamber of Commerce and Industry (SICCI) in favor of digital transformation.

    d) Continued push by the government to develop the legal and regulatory framework for e-transactions and develop digital government applications with which the private sector can interface to conduct its business-government activities, such as online registrations, filing of official documentation, and tax payments etc.

    e) Development partners engaged in any sector should review opportunities for digital transformation as part of a value chain enhancement exercise.

26. The following table offers selected and proven technologies that can be 'imported' to Solomon Islands. The scope of this review is on the priority sectors (agriculture, tourism, fisheries), and cross-functional areas (climate change, e-health, e-education).

Table 2: Select technologies and their application in various sectors

S.No.	Problem space	Description
1	Logistics – physical addressing	'What three words' geo-mapping software interpolating GPS coordinates onto simplified three-word addresses. Ongoing pilot by UPU in nine Pacific Island countries (in collaboration with national postal systems) to deploy the system and raise demand-side (postal service users) awareness. In aid of resolving lack of physical addressing especially in development countries and in the challenging geographical context of Pacific Island economies. This constrains movement of post/goods, data collection (surveys), as well as provision of citizen services. https://what3words.com/about/
2	Agriculture	Sensors and IoT apparatus in fields with image recognition technology to help with remote crop monitoring and relaying essential data to farmers.
3	Agriculture	Drone-based technology for crop monitoring. Multiple use cases include soil quality, spraying, drought prediction, assisting with seeds planting, and yield mapping/projections and harvest documentation.
4	Agriculture	Utilizing RFID for farm-to-store food tracking.
5	Agriculture	Establishing and connecting network of stakeholders across the value chain, fostering linkages between farmers, associations, middlemen, and buyers.
6	Agriculture	(Evolving) IoT-connected technologies for driving communication between devices in the firm (eg. sensor-sensor, sensor-drone) etc.
7	Agriculture	Bluenumber Digital ID, involved in enhancing traceability, and transparency within palm oil supply chains and assisting government organizations and companies to improve farmers' practice in palm oil industries. https://www.bluenumber.com/en
8	Agriculture	Mlouma: virtual platform accessible via website or phone in Senegal provides farmers and investors real time information on prices, location, and availability of produce.
9	Health	Drone-based transport of medicines, vaccines, and blood between remote population centers and central laboratory locations. Active in Rwanda and Ghana. https://flyzipline.com/impact/
10	Health	Neopenda: IoT and mobile wearable technology to monitor the vital signs of critically ill infants (in Uganda) in low-resource areas (high patients/clinicians ratio, electricity deprived areas) https://www.neopenda.com/
11	Health	Airtel 321 in Malawi provides maternal health and child nutrition information over mobile phone in the local language.
12	Health	SMS-based health registration systems (Tanzania +multiple countries).
13	Health	Electronic Health Records (EHR) systems are increasingly being used to digitize individual patient records and digitalize the overall workflow, for efficiency gains and data security.
14	Health	Mobile health applications are widely prevalent now in many countries for providing medical advice to case workers as well as individuals. Maternal and child health is an important application.
15	Education	Dot Learn: Video-based e-learning platform optimized for low-speed connections, as low as 2G and small screens, which allow five-hour video downloads for the cost of a text message in Ghana and Nigeria. https://innovation.mit.edu/pathway-post/dot-learn/
16	Tourism	Digital platforms for accommodation exchanges: Booking.com (226 countries), Airbnb (191 countries), HomeAway (190 countries), Tripadvisor rentals (200 countries), Tujia (China), 9flats (140 countries), homestay.com (160 countries), OYO rooms (India), Onefinestay (US, EU, Australia), and Xiaozhu (China).[6]

[6] List from http://documents.worldbank.org/curated/en/161471537537641836/Tourism-and-the-Sharing-Economy-Policy-Potential-of-Sustainable-Peer-to-Peer-Accommodation

S.No.	Problem space	Description
17	Fisheries	RFID-based smart boxes/crates allow for complete traceability. For example, French fishing ports are fitting such devices along the value chain from boat to market.
18	Fisheries	Drone-based mapping of coastal resources, including fish stock assessments, providing cheaper services than oceanographic vessels. Deployed by multiple countries.
19	Fisheries	USAID Oceans promotes a transparent and financially sustainable electronic Catch Documentation and Traceability system to help ensure that fisheries resources from Southeast Asia are legally caught and properly labeled.
20	Logging	Drone-based technology for mapping timber resources, as a means of preventing over-logging.
21	Gig economy	'Trade in tasks' model involving freelance networks such as upworks and fiverr, which allow a fluid supply of talent and opportunities to connect. This may help a market develop in Solomon Islands for ICT talent.
22	Packaging	Conventional packaging technologies will be extremely important once production activity in individual sectors starts picking up, given that packaging adds overall value and, in certain premium markets, also constitutes a mandatory entry requirement. 3D printing can also have applications in the long term.

Source: Desk research across multiple sources

2. E-Commerce and Logistics

The business case

27. SIG is actively seeking to drive development in productive sectors such as agriculture, tourism, and fisheries to position them as a ballast against uncertainty in the logging and mining sectors, and e-commerce can be an essential growth driver, especially for reaching international clients. While the domestic market will be key in the short-medium term, SI's small population (~600,000) with low purchasing capacity has implications on how much the domestic markets can sustain growth. Without trade, the ceiling for the productive sectors will be low. However, international market penetration would most certainly require online presence for individual companies, in addition to an overall sophistication in terms of communicating and dealing with potential clients online. Order placement and related functionalities will also become essential.

28. E-commerce offers a route for diversifying the economic focus on productive sectors. This is because market development cannot follow a SIG or donor-led hand-holding approach sustainably in the long run. Companies have to find and build their own relationships with international buyers/suppliers and over the long term, the survivability of export relationships will improve or decline based on how competitive firms are.

29. Within the informal domestic economy, entrepreneurs are making ready use of technology at their disposal to inform buyers via online platforms and drive sales (albeit offline). This bodes well for eventual e-commerce adoption. Facebook, along with other social media platforms, is playing an important role in bridging the buyer-seller gap, and activity is ramping up at a rapid pace. There are a number of buy/sell Facebook groups with 1,000-plus members including overseas diaspora populations who use the groups to advertise, meet, negotiate, and sell a wide range of products, including land and property. The key advantage is fast turnaround time. While the bulk of the products are second-hand goods, there is some retail activity as well. Challenges with such platforms, such as the Honiara buy and sell

group on Facebook, is that they do not offer protection in the form of ratings or creditworthiness checks, nor do they easily support tax documentation and accounting audit – but this has not played any significant role in constraining growth.

30. Pending successful implementation of the coral sea cable project, it is anticipated that improvements in internet bandwidth will be accompanied by related cost reductions and subsequently greater online activity from companies and consumers alike, which will bode well for e-commerce. Subsequent activity is expected in the following areas: 1) Increased usage of mobile-internet by consumers and a gradual shift from feature phones to smartphones; 2) increased local content traffic along a broad range of areas; and 3) increased digital entrepreneurship activity levels, including demand for website programmers and other IT professionals. Part of this growth may include increased website-driven business activity in the food/grocery delivery or tourism niche areas, such as in the case of Bulk Shop (http://www.bulksolomons.com). Classifieds-based websites may also take root.

31. A strong business case exists for small-scale e-commerce operations to start, based on real business needs in the capital and beyond. For instance, the challenging road-traffic conditions may make it appealing for consumers to order groceries and other necessary items online. Indeed, delivery services will likely emerge as an early candidate, following trends in other countries.

32. E-commerce growth in SI will likely start small, with lead firms emerging in areas such as food delivery, courier services, and employment/job websites, among other forms of classifieds. The growth curve will not be steep, but rather gradual. As activity increases and the operating space becomes crowded, it is likely leaders will move to other areas and diversify operations, leaving follower firms to take their place. Lead firms will emerge either organically or through supported means (i.e. via structure incubation programs) to inspire a second wave of entrepreneurship activity. Activity levels in the short-medium term will likely remain focused on the domestic market, and be cash-on-delivery oriented.

Current situation and recent developments

33. The current extent of e-commerce is quite limited in Solomon Islands. Apart from the accommodation sector, there is virtually no pure e-commerce involving the online promotion, online order placement, and online payment within order-fulfillment process flows. Even within the accommodation sector, the bulk of booking activity primarily takes place through third-party computer reservation systems and global distribution systems, such as Galileo, supporting consumer websites such as booking.com or hotels.com.

34. In other developing country contexts, micro and small/medium enterprises (MSMEs) are able to reach a middle ground between offline commerce and pure-online commerce by developing an online presence through websites allowing consumers to order online while accepting payments through cash on delivery. In Solomon Islands, the private sector has been slow to develop online presence in general (in particular due to the internet speed and cost challenges), instead relying on the social media route. This is not necessarily all bad, as younger generations with greater access to technology and connectivity will continue to

evolve in their use of electronic media and resources in a different way to the current business environment.

35. As noted earlier, a high degree of activity has been occurring in the informal sector, leveraging the social media route for implementing use cases such as online classifieds, informing buyers of local market times. A compelling example is of community-based fish markets, which can only be set up once the fishing fleet returns to the shore, sometimes after several days at sea. Facebook has served as the medium of choice for announcing times and locations of such markets.

36. Several reasons can be attributed to the slow pace of e-commerce businesses growth:

    First, the mainstay/traditional sectors of the economy – logging, mining, commercial fisheries – are not readily applicable in their primary format for e-business entrepreneurship. Productive sectors such as tourism and agriculture - where scope for e-business entrepreneurship is much higher -are just now emerging as priority sectors.

    Second, the risk/rewards profile for entrepreneurs to venture into the digital businesses space is limited, especially given that the social media driven buyer-seller interfacing is so popular.

    Third, the remoteness of Solomon Islands has an impact on business ideas, reaching them slightly later than other developing countries. This is why, for instance, promising business ideas such as online food delivery services have not taken root.

    Fourth, even if entrepreneurs attempt to develop an online presence, finding website developers to assist them will be a tricky proposition. For instance, during the recent eT Readiness Assessment exercise (February-August 2018) undertaken by UNCTAD, anecdotal evidence was collected indicating that there are only 8-10 reasonably well-run IT companies operating in Honiara, and at least 8 were involved in the hardware space (as official providers to the government). No software development firms could be identified, and it was indicated that for most software development work, externally sourced expertise is used, from countries such as Fiji and the Philippines.

    Finally, the usual suspects impacting the broader MSME base, including access to finance, have also constrained e-business entrepreneurship development.

Short/medium term priorities

37. Ensure implementation of submarine cable landing, and associated market and regulatory structure, which should result in decreased costs as well as enhanced internet speeds and access: The key prerequisite for e-commerce development is improved internet connectivity accompanied by low latency, reduced costs, and enhanced provision of value added services by ISPs, which will lead to growth of user activity and increased generation and adoption of local content. Without these elements, it will be quite challenging for any form of e-commerce activity to take root.

38. Mentor and incubate firms with e-commerce potential: A first tier of promising firms with relatively high readiness levels would need to be supported through a structured program. There are select few companies such as Bulk Shop (bulksolomons.com) that could be targeted and supported to develop an e-commerce operation (initially focusing on online order placement, logistics/order fulfillment, payment via cash, and graduating later to online payments via mobile money or cards). In other countries, early services have included food delivery or courier services. Additionally, firms in the agriculture and tourism sectors could be targeted.

39. Integrate e-commerce in the national development agenda: It is essential that any sector development strategies, plans, activities in tourism and agriculture, and which involve a market-side component, also include a focus on e-commerce capability development. The European investment fund's Tier 1 project on Tourism and Strongim Bisnis's initiative, focusing on market systems development for tourism, cocoa, and coconut (while also placing emphasis on building an enabling business environment, youth and disabilities inclusion, and female entrepreneurship development) is one such area. The agriculture and tourism project commissioned by EIF is another. Neither of these projects currently have an associated e-commerce component.

40. Increase supply of affordable smartphones: It is anticipated that mobile phone-based activity will dominate e-commerce. This is due to the very low level of fixed line and fixed broadband penetration, as well as the anticipated rise of smartphones in the country estimated by GSMA to rise to 54 percent (of overall mobile subscribers) in 2020 from 24 percent in 2014. The availability of affordable smartphones will help drive online activity, as amply demonstrated in the context of Southeast Asia.

41. Support development of local content: Prior to the adoption of online activity, consumers would need to feel comfortable navigating online, and local content in the form of news etc. in local languages in addition to English will go a long way in supporting this.

42. Prepare the skills-development infrastructure for emerging needs stemming from the digital economy: While the skills base for e-commerce and the broader digital economy is weak, this supply chain will not be strengthened until market demand requires it. The base of private sector activity within the digital economy is currently too low in SI for skills providers to be able to outlay investments in curricula updates. Nevertheless, it may be prudent to start establishing frameworks for regular feedback between policymakers, skills providers and the private sector, so that skills-mismatch issues can be mitigated at a later time.

43. Pay attention to the development of certificate-level course providers in ICT that are more adept, flexible, and dynamic than universities to cater to the needs of the private sector: In many ways, these providers serve as a barometer for assessing private sector needs. Given that there are no certificate-level course providers in the country, this could eventually become an opportunity area for international course providers, or local companies who would like to enter the space with a development partner and SIG support.

44. Develop the overall Digital Financial Services (DFS) ecosystem: DFS will eventually be essential to the e-commerce ecosystem. Cash movement is in any case challenging between the various islands, and mobile money's business case is very strong. While cash on delivery

will remain the primary choice of payment in the short term, digital transfers, including mobile money/mobile wallets, payments cards and internet-based solutions, e.g. apps, could function as a suitable alternative for consumers.

45. Close regulatory gaps: preparing a new legal and regulatory framework for digital economy development will be particularly important for: digital transactions and electronic signatures, cybersecurity, data protection, and data privacy. While this will gain relevance in the medium term, once suitable levels of online activity are ongoing, the gap will have increasingly important implications in terms of a lack of legal basis for executing or seeking legal recourse related to electronic transactions. The pending passage of the payment systems bill in parliament is another area of urgency.

Box 3: Exploring the link between formalization and digitization

The common theme running through the above factors is that markets are key. If businesses sense market opportunities, and the market/buyer requirements demand or at least encourage formalization, then this will help make the case for informal businesses to become formal. This is true regardless of digitization, however digitalization helps bring markets closer to the businesses, so there is at least a link.

The link between digitization and increased formalization in the economy is not a straightforward one and depends on a host of factors. The relationship between adoption of digitization and tendency for formalization may be hard to prove empirically, but a case can be made for linkages.

Additionally, it is likely that in the case of Solomon Islands, direct efforts to improve formalization, such as simplifying registration processes, will not be enough. Given the strong community-based linkages, associations and community groups will need to be consulted to create a model for formalization that does not impart too much burden on businesses.

If digitization is to play a part, it is likely that the transition from informal to formal business will be a blurred one rather than an abrupt shift. Businesses that are benefiting from the e-commerce model are experiencing efficiency, communications-based improvements in a way that is somewhat levelling the difference between them and formal businesses. This exposure and experience will impart confidence to at least a subset of firms to expand and diversify, and when they see their current informal state as a barrier to scale, the conviction to transition to the formal sector will arise.

Ultimately, actors will assess the incentives vs. the obligations for operating within the formal sector but digitization will at least have an indirect role in promoting formalization.

a. Sector Specific Focus: Tourism

The business case

46. The tourism sector offers one of the strongest value-propositions towards digital business transformation in Solomon Islands. The country offers important natural (water-based and forest), cultural, and historical (especially WW2-specific) tourism assets. The current target markets largely comprise Australia/NZ, USA, Fiji, PNG, China, and other visitors classified as originating from Asia. According to official statistics,[7] 'holiday and vacation' are the main purposes of visiting Solomon Islands, followed by

[7] http://www.statistics.gov.sb/statistics/visitor-arrivals#purpose-of-visit

'visit friends and relatives'. The 'business and conference' category was especially important for Australian visitors, possibly due to activity in the extractive sectors (logging and mining), and official travel for development assistance. SI's successful bid to host the 2023 Pacific Games is expected to drive tourism within the region.

The potential for this sector is in line with trends observed in other developing countries, indicating that countries with natural potential for tourism are typically early adopters of e-commerce, and stand to benefit significantly from digitizing their value chain operations.

47. Inclusion within the primary development agenda of the government, driven by a long-term vision of reducing the dependency of the country on extractive sector receipts.The sector's importance is highlighted by a long-standing government mission that tourism will replace logging receipts in the medium-long term, thus reducing the unsustainable dependency on the country's valuable timber reserves. This is a lofty goal considering that logging receipts are more than five times higher than tourism sector receipts. However, the government's focus over the past decade has been shifting towards increasing support to the Solomon Islands Visitor Bureau (SIVB), and development partners (particularly the EIF and DFAT) have also launched tourism-specific initiatives, lending traction to the overall developmental effort.

Current situation and recent developments

48. In recent years, the value of increasing the country's tourism presence on the internet has led to concerted efforts by SIVB with support from development partners. Staff capacity and online presence have grown, and sector stakeholders are generally willing to collaborate in aid of sector growth.

49. Despite the potential, the sector is currently under-performing, accounting for only 4.5 percent of the GDP in 2017, while the indirect impact was 10.5 percent of GDP, comprising capital investments, government spending in support of the tourism sector, and supply chain effects involving tourism sector purchases from other economic sectors. Travel and tourism accounted for 6,500 jobs in 2017 or 3.5 percent of total employment, from hotels, travel agents, airlines, and other passenger transportation services. Future growth as projected by WTTC is relatively low. As such, these projections are based on current and past performance and bely the potential of digitization.

50. Sector operators are relatively less integrated in online activities than their peers in the region. Most of the major hotels provide bookings through third-party platforms such as Booking.com, and have some online presence, however the bulk of other tourism operators do not have an online presence other than on social media, which inhibits demand-side awareness.

51. Hotel firms such as the Heritage Park are leading the way. It is anticipated that the tourism sector will see a rise in website-driven activity in the near future, aimed at building an online presence for operators. A wave effect is thereafter anticipated, whereby the models employed by lead firms including hotels, tour guide firms, and others is replicated by new firms.

52. The tourism sector growth is expected to benefit the agricultural sector in particular, which already has strong linkages with tourism sector operators. Farmers and farmer groups are actively involved in supplying food (such as fresh fruit and fish) to hotels, tour agencies, and food outlets. Enhanced tourism activity (possibly spurred on by e-commerce) will benefit these linked sectors as well.

53. DFAT's Strongim Bisnis and the EIF's Tier 2 project are the two main development initiatives aimed at the tourism sector. Both initiatives place a strong focus on markets development, which has scope for digitization.

Short/medium term priorities

54. Facilitating joint product development (among sector stakeholders led by SIVB) for tourism offerings involving stakeholders across the value chain - such as hotels (and other accommodation providers), tour guides, independent operators (such as fishing tours), craftsmen, museums, food outlets, training providers, website designers and content managers among others) - which can be booked online, and facilitated in an efficient manner.

55. Facilitating website development for tourism operators to be able to promote their offerings online, especially for international markets.

56. Digital connectivity will be critical, considering that the island chain country is comprised of almost 1,000 islands, of which 300 are inhabited. The importance of the submarine cable and ensuring last-mile connectivity is amplified in this context.

57. Other critical areas of importance include developing standards and enforcement capacity, and addressing critical infrastructure, particularly in transportation, road network, and accommodations, in Honiara as well as in the hinterland.

b. Sector Specific Focus: Agriculture

The business case

58. Certain agricultural sectors –in particular **coconut and cocoa**- have been the focus of policy and development partners' attention in recent years. Both sectors present strong possibilities (with high and growing international demand) for future export in addition to developing mutually benefical linkages with the tourism sector. **Cashew nuts** is the third sector with identified global demand that SI can cater to.

59. To a smaller extent, **taro, cassava, and kava** have also been identified as agricultural products with export potential on a smaller scale. Cassava is one of the products being supported by the EIF's Tier 1 project.

60. There is consensus that these sectors can accommodate MSME involvement with potential for developing e-commerce businesses aimed at exports. However, the tough

entry requirements in premium markets means that significant work in improving supply-side conditions (including quality management) will need to take place so that exporters can meet stringent criteria for quality in high value markets such as Australia, New Zealand, and Europe. This is important given that the volumes from SI will always be relatively low, and do not justify a thrust towards low-value, high-volume markets, such as in Southeast Asia.

Current situation and recent developments

61. The cocoa sector supports 22 percent or 20-25,000 rural households in SI. It is an important cash crop for the country, and in recent years, export earnings have surpassed expectations. 75 percent of export returns are retained by producers, of which 50 percent are women. While the majority of the crop is exported to the bulk-grind markets in Asia, SI has managed to penetrate the premium solar-dried cocoa export market with support from Australia/NZ supported Pacific Horticultural and Agricultural Market Access (PHAMA) Program. Cocoa is also one of the priority sectors of the ongoing Strongim Bisnis initaitive. Overall, this sector has received the most attention within the broad agriculture category. From an e-commerce perspective as well, there is high potential for this sector.

62. Some cocoa-related SI SMEs have been able to make inroads into the international market, in particular Makira Gold (https://makiragold.com/), which is able to sell in Australia directly (through stock maintained in Brisbane), and in Europe via a cocoa distributer.

63. The coconut sector supports 44 percent or 40,000 rural households and one of its derived products, copra (oilcake of coconut), accounts for 2.6 percent of SI's total exports. SI is one of the world's top exporters of copra, however, there is limited value addition capability in the country for developing and exporting high value copra products. Strongim Bisnis is working to address this challenge among others through the value chain. This product requires special expertise in terms of processing, due to its volatility as well as poisoning if not dried properly, and therefore requires significant training and capacity development at a standardized level before the product can be shipped.

64. **Palm oil** is the largest agricultural export from SI, however, due to operations by concessionaires, there are concerns related to habitat preservation that constrain this particular value chain. Palm oil is primarily exported by Guadalcanal Plains Palm Oil (GPPOL), majority-owned by New Britain Palm Oil (owned by Malaysia's Sime Darby). There are no other operators (SME or otherwise), although these may emerge in the medium term. For the time being however, this remains an enclave sector, with a single big operator with a heavy dependence on smallholder farmers.

Short/medium term priorities

65. The following table indicates the product-market combinations with high potential. In itself, the data offers purely quantitative potential and qualitative filters need to be applied to identify realistic markets.

Table 3: Top prospective markets for future diversification – all products (except palm oil) have high M/SME potential

Products	Current exports (US$)	World Import (US$)	Top current/prospective markets offering further penetration/ diversification opportunities	World Imports of markets	Applied Tariff (%)
Palm oil (+ fractions) (HS 1511)	26.3 million	11.1	UK	316.8 Million	0
		7	Netherlands	1.8 Billion	0
		4.5	Switzerland	29 million	0
Cocoa beans, whole or broken, raw or roasted (HS 1801)	15.2 Million	20.9 Billion	Malaysia	791 Million	0
			Indonesia	529 Milliom	5
			Singapore	113 Million	0
Cashew nuts, in shell/shelled HS 080131/32	3/1 Million (2015)	3 Billion /4.7 Billion	India	$1.1 Billion	30
			Vietnam	$725.9 Million (shelled)	5
Oilcake of coconut or copra (HS 230650)	694K	181.7 Million	Korea	90.1 Million	0
			China	14.5 Million	5
			India	19.3 Million	15
Cassava (HS 071410)	22K	1.6 Billion	No data available. Regional markets are likely candidates.		
Taro (HS 071440)	NA	161 million	No data available. Regional markets are likely candidates.		
Kava (HS code NA)	NA	NA			

Source: ITC Trademap

66. Sector development strategies should be undertaken for priority sectors identified as having high export potential such as the ones noted previously, and the market-side component of the strategy should also include an e-commerce dimension in the form of support to MSMEs for developing online presence/helping existing businesses expand into the digital dimension.

67. Existing companies (especially in cocoa) which have managed to make some inroads in international markets could serve as anchors of market-led development projects aimed at developing capacities throughout the value chain, and having an e-commerce dimension.

68. Existing farm management technologies involving multimodal crop monitoring systems (sensors, RFID tags, etc.) could be 'imported' into the country for piloting their applicability in SI.

69. The cocoa sector in particular offers high potential and readiness for joint ventures with international companies through which latest technology and best practices can be

sourced. An additional advantage of selecting the cocoa sector as an anchor is the relatively high organization and competencies of the sector's associations, lending greater impact to development interventions and increasing probability that the supply chain will be sustainable (in terms of consistent and on-time supply).

70. The packaging sector is another area where the digital economy could play a part. Packaging not only adds value in terms of brand value and diversity of options, but is significantly important for meeting quality standards in premium markets. In line with trends observed in other PMCs, the packaging sector is quite weak in Solomon Islands and is largely imported. A capable packaging sector supply chain needs to be nurtured in Solomon Islands, which can provide affordable, high quality, and environmentally friendly packaging to other sectors.

c. Sector Specific Focus: Fisheries

The business case

71. Solomon Islands lies in a region where more than 60 percent of global tuna is caught, imparting significant potential for economic and socio-economic growth if managed sustainably. The current income comes from the major commercial processing center at the Soltuna base in Noro, as well as the commercial licensing fees for foreign vessels to fish in Solomon Islands's EEZs. Most of the canned tuna processed at the Soltuna plant heads to Europe, although fuel prices in Solomon Islands and poor/expensive electricity and water supply result in a high cost operational structure, reflected in the cost of the tuna.

72. A high degree of negotiations (separately and with Pacific Island nations as a group) are taking place with high value markets, such as the EU (in the form of EPAs), at the trade policy level to open markets for Solomon Islands tuna.

Current situation and recent developments

73. There are very few SMEs involved in the processing part of the value chain, where potentially opportunities could be foreseen for e-commerce and/or digital transformation initiatives, in the long term. Only one tuna processing plant exists in the country (Soltuna), so it is not possible to gauge the overall potential for the sector currently.

74. One example of digitization that does exist involves the Ministry of Fisheries and Marine Resources (MFMR) using tablets to collect information from fish markets and fishing vessels (on site) and electronically transfer the information to the Ministry's Integrated Fisheries Information Management System (IFIMS).

Short/medium term priorities

75. The key priority would be to expand the sector participation of SMEs, especially on the processing side. The supplier development model could possibly be applied to the

fisheries sector in Solomon Islands, where identified suppliers to the Soltuna plant or other big companies (that may emerge soon) could be developed and nurtured to the point that they can spin off as exporters. If there are cost incentives that can be adapted so that the large suppliers benefit financially or technically from their participation in this initiative, they may be willing to engage.

76. The policy push on increasing value addition in the sector means that there may be a role for M/SMEs interested in the processing area, something that could have a high export or local market value as well.

3. Trade Logistics and Trade Facilitation

77. The trade logistics and trade facilitation areas are very important from an e-commerce perspective. Given Solomon Islands' rather challenging geography, transportation from and within the country is a significantly challenging proposition. Smooth physical flow of traded goods also requires efficiency and transparency in paperwork and administrative procedures, and this is where the need to align the trade facilitation area to internationally accepted standards is important.

Current situation and recent developments

TRADE LOGISTICS

78. Solomon Islands' geography makes trade logistics extremely difficult. The country's coastline stretches for 1,000 miles and includes almost 1,000 islands, of which 300 are inhabited, resulting in significant challenges for movement of goods and people. Intra-island transportation exists but requires upgrading. Due to the pressure of inward migration in Honiara, the transportation infrastructure in the city has suffered.

79. Transportation from Solomon Islands regionally and internationally is primarily through the air route due to the large distances involved, although the marine transport area has been explored (as yet largely undeveloped) for connecting Solomon Islands to other Pacific Island States. The National Trade Policy Framework document identified a number of challenges with the existing transportation infrastructure.[8]

80. Significant physical addressing challenges make last-mile delivery of packages slow and unreliable. This is unsustainable for e-commerce growth. Anecdotal evidence points to long lead times for packages ordered from e-commerce websites to arrive in the country due to the lack of a recognized postcode system, as well as a national street-addressing system. In fact, for retailers such as Amazon, inbound international orders cannot even be placed without a postcode. This gap has also affected the ability of the Post Office to efficiently sort and plan distribution. To address this challenge, two initiatives are ongoing:

a) The national postal authority (Solomon Post) is leading an innovative pilot that utilizes GPS coordinates transposed on a three-word addressing system called What Three Words (W3W)

[8] Government of Solomon Islands, National Trade Policy Framework, 2016

to effectively provide citizens/businesses with an address at which they can be located by a delivery service provider such as the post office, courier service etc. The supply-side system is ready, but the key challenge is spurring consumer adoption of the system. Indeed, according to Solomon Post, there were only 20 subscribers to this system in November 2018.

b) Every ministry is using its own system of segmenting the country into addressable elements. However, MCA and Solomon Post have taken the lead in developing a postcode matrix and other ministries and agencies are currently reviewing it for possible adoption.

    a. A tripartite agreement exists between Solomon Post – Customs – Quarantine as a mechanism to gain consensus on mutually important issues, including trade. Trade facilitation is a key area of discussion, and discussions are ongoing to add the Ports authority and Solomon Airways to the group.

    b. Solomon Post recently migrated to the IPS.POST System (in mid-2016) which is a single platform used by postal authorities for providing track and trace capability where inward and outward dispatches are bar-coded and can be tracked and traced. This capability is essential for facilitating efficiency gains and transparency in postal delivery services and has a strong e-commerce relevance as well.

    c. The UPU is actively providing support to Solomon Post (including the W3W pilot and the IPS.Post system) and has played a part in Solomon Post emerging as a relatively forward seeking actor that recognizes the necessity of the digital economy for the country. Driven by a strong leadership, UPU is seeking to diversify its own business model to include digital wallet (Ezi Pei) services as well as transforming its network of postal offices to sell value added goods and services.

    d. The key challenges for delivery services providers (according to DHL, which controls 90 percent of the market for overseas packages) are very long customs delays, short working hours of staff and manual transactions.

TRADE FACILITATION

81. Solomon Islands is a member of the WTO as well a signatory to the TFA. A key area of reform has been automation of customs procedures, reduction in processing times, and improved transparency and efficiency of traded goods. The ASYCUDA system was deployed in Solomon Islands in 2015 and has been credited with collecting more than SBD 1 billion. A new Customs Declaration System (CDS) is in the process of being deployed with support from UPU, WCO, and UNCTAD/ASYCUDA. These systems will be fully integrated with the ATS enabling the government to make and receive payments digitally in a safer and more efficient way.

82. The *de minimis* value of two Solomon Island dollars currently in place is inordinately low and imparts burden on both customs and importers. There is a need to discuss this in line with other trade facilitation areas of reforms.

83. In recent years, non-payment of dues to international technical agencies such as the UPU (now resolved) and WCO (not resolved) has become as an important issue. It has emerged that both the private sector and SICED agree to increase this value to reach international

benchmarks, and there is no significant contention or opposition regarding the raise from SBD20 to SBD100. However, the main issue is not monetary but rather raising awareness at key ministries, such as Finance, of the value of making these investments.

Perspectives for future growth/enhancement

84. To develop physical connectivity between SI's populated islands, inter-island transportation is essential for the movement of people, cargo, and cash (essential for maintaining efficacy of the banking network in the hinterland). The current system of transportation needs a comprehensive review and overhaul.

85. Support needs to be provided to the W3W national addressing system. For this system to work, both the supply side (postal offices, delivery services) and the demand side (consumers) will need to start using the system for Solomon Post (and other delivery services) to be able to deliver packages. Building this awareness at national level will be crucial to ensuring the success of the system.

86. Solomon Post's role in fostering inter-agency communication, working with international partners such as the UPU, and innovative approach as pertains to new product development (Ezi Pei, revitalization of the post office network through new service offerings) will be an important ingredient in the trade logistics area. The organization has an open-minded leadership with an eye for innovation and testing new ideas through pilots, and its reputation as an honest broker could be important to gain consensus along various fronts in an otherwise fragmented institutional structure.

87. At the same time, the review and adoption of a postcode matrix, developed by Solomon Post and MCA, and a national system of street-addressing, will be essential for last-mile delivery.

88. A multimodal analysis of developing Solomon Islands' air and marine-based connectivity with international markets will be essential given the country's remote location in the Pacific.

89. The promising work that has started in the area of TFA implementation must continue in order to align Solomon Islands with the Trade Facilitation regimes in other countries and streamline trade.

90. There is an important need to review the *de minimis* regime in the country through a public-private sector consultation.

91. International support through development partners such as the UPU and WCO is essential, and as such, the membership brings forth access to international best practices, trainings etc. It will thus be important to ensure that these international memberships continue.

92. Inter-agency collaboration will be key and to this effect, the tripartite group established by Solomon Post, customs, and quarantine must continue, with further expansion of Solomon Airlines and the Port Authority, if possible.

93. The new CDS is yet another milestone in terms of streamlining trade facilitation procedures in SI, and the ongoing deployment and training will need to be completed successfully.

94. UNESCAP's Paperless Trade surveys offer important e-government based recommendations that will assist in developing the digital economy, by driving efficiency in trade facilitation areas. In the 'paperless trade' performance area, the survey highlights several e-government initiatives that have been planned but not yet implemented, including E-Single window, E-Application and Issuance of import and export permit, E-Air Cargo Manifests, E-Preferential Certificate of Origin, E-Payment of duties and E-Application for Customs refunds.

4. Financial Technologies (fintech)

Current situation and recent developments

95. Fintech is an emerging area of discussion and activity in Solomon Islands, as well as the broader Pacific Islands states. Efforts have ramped up in recent years to plug in fintech with the country's wide-ranging strategy on financial inclusion. The government is currently updating its guidance note on mobile money usage and is expected to include broader use cases where fintech solutions can be leveraged.

96. The current evolution in the sector is limited to mobile wallets and mobile banking solutions that have been deployed by banks. More sophisticated solutions such as micro-loans are not yet operational due to regulatory gaps and also because banks and other providers seek to develop a better understanding of the profitability of introducing fintech solutions in Solomon Islands.

97. PFIP's micro pension project is notable in developing digital payment channels and last-mile distribution partnerships aimed at reaching remote and underserved areas and populations. Private commercial banks, investment funds, microfinance institutions, savings groups, post offices, and fintech service providers as well as the respective Central Banks and Governments are all partners in this initiative where PFIP/UNCDF technical and grant support is leveraging both private and public sector.[9]

98. Fintech is a necessity for Solomon Islands given the logistical challenges that the country's remote location and significant geographical disparity presents. In its basic form, fintech will allow consumers to access financial services with reduced physical dependence on travel to Honiara or provincial capitals. Additionally, the government has recently included a climate change resiliency aspect to its financial inclusion strategy. i.e. it recognizes the vulnerabilities of the country from climate change and would like to utilize financial solutions to help communities cope with natural disasters using mobile-based savings, credit, and insurance products. This serves as a further use-case for fintech solutions. The current iteration of the National Financial Inclusion Strategy (NFIS II) already places a central focus on mobile money. The NFIS notes the following key thrusts for fintech:

    a) Permit adequately regulated non-banks, including MNOs, to issue mobile wallets.

    b) Implement interoperability across mobile platforms for customers, including a fully interoperable payment system.

[9] See http://www.uncdf.org/article/2609/uncdfexpertschat-with-krishnan-narasimhan-rethinking-pension-inclusion-in-the-pacific

c) Promote digital payment channels in all government transactions, including by SOEs.

d) Promote digital payments among large private sector employers and associations reaching smaller employers, and in business-to-business payments.

99. From a technical perspective, the technology and tools exist given that advanced commercial banks are already present in the country. They are, however, waiting for the go-ahead from CBSI to deploy products in the local market.

100. Several learning events have been undertaken on fintech issues over the last two years. These include:

- A regional workshop of senior officials from central banks, money-lending firms and commercial banks in Samoa in November 2018, co-hosted by the Central Bank of Samoa, ADB, and the IMF. The workshop covered areas including fintech solutions for financial inclusion, cutting-edge fintech for cross-border remittance transfers, crypto assets and their regulation, and prospects of Central Bank digital currencies.
- A World Bank Group and Toronto Center workshop in Samoa September 2019 on *Enhancing the Safety and Efficiency of the National Payments System: The Role of the Overseer*.
- A World Bank Group learning event in PNG in February 2020 on training the various Payment Systems Departments of the central banks in the region.

Perspectives for future growth/enhancement

101. The following recommendations apply for promoting growth in the fintech sector.

a) Conduct joint exploration of ideas through the national financial inclusion taskforce in collaboration with financial institutions on how the fintech solutions providers can best leverage the improved connectivity from the undersea cable. Additionally, consider the adoption of a regulatory sandbox approach to balance innovation and oversight in the nascent fintech sector.

b) Provide support to the Central Bank in covering important regulatory gaps that currently constrain growth of fintech solutions. These include the passage of the e-payment law which, when passed, will drive inflow of fintech solutions by commercial banks and non-bank financial actors.

c) To improve adoption, implement strategies for enhancing demand-side trust in fintech solutions, especially in unbanked rural areas where consumers may be hesitant to create digital identities due to security concerns. On the supply side, know your customer (KYC) requirements should be streamlined to ensure essential consumer information is recorded with the minimum burden possible on the consumer.

d) Identify key areas of excellence where promising fintech activity is occurring, such as Ezi Pei wallet system (which may be in early stages of deployment but is backed by a reliable partner in the form of Solomon Post). In parallel, encourage development partners and

initiatives such as *Strongem Bisnis* to integrate fintech activities across their sector development activities.

5. ICT Sector

Current situation and recent developments

102. The ICT sector in Solomon Islands is currently at a very low level of maturity. There are very limited/no software development firms operating and most of the existing IT firms are oriented towards provision of hardware and IT software support for the government through a preferred supplier development program. The government does not procure any software support services as the bulk of their requirements are fulfilled by ICTSU. Without the government as a viable market, and in the absence of any e-commerce/digital-based activity, the software sector has not evolved. There are currently no incubators or provisions to assist startups. Given the challenges with internet speed and reliability, segments such as cloud computing, website development, and local content (online) development have not grown. Even if they did, the demand would not be sufficient given that data costs are still high and out of the reach of ordinary Solomon Islanders.

103. Even in the hardware sector, there are only a handful of companies in the entire country that sell computers and related equipment. Market leaders, such as IBM and Microsoft, use their Australian offices to cater to the demand for products in Solomon Islands.

Perspectives for future growth/enhancement

104. The current low base of the ICT sector is not necessarily an indicator of future growth potential because the underlying root-cause of the weak ICT sector – internet costs, speed, and reliability – may change in the short-medium term pending the arrival of the submarine cable and last-mile connectivity. The increased competition is expected to depress data costs which may spur consumer-side activity. Charting an anticipated sequence to the growth trajectory of the sector is not easy, however, there is potential that once the consumer demand for online local content and services picks up, the supply side can evolve swiftly to cater to this demand and the lead firms will be followed by others. Cloud-based products may also see increased demand as a result. The ICT sector is expected to benefit from the expected drive towards digital transformation – as individual sectors start their drive towards incorporating aspects of digitization into their value chains, there will be an increased demand for ICT support services. This overall growth trajectory will need to be accompanied by a sea-change in the ICT skills infrastructure especially at the certificate-level IT skills providers (which are typically more agile and adaptive to the changing requirements of the market).

105. Develop a preferred suppliers development program for the software development sector to provide software support services to the government (possibly contracted and managed by ICTSU).

106. A dedicated medium-term roadmap for the ICT sector is required. This can be in the form of the seven-year master-plan that is derived by MCA from the 2016 ICT development strategy.

107. Develop incubation facilities and programs for fostering incubation of ICT firms.

108. Develop apprenticeship programs for ICT students to receive structured on-the-job training at local ICT firms (when there is a reasonable sample size of such firms available).

109. Develop a feedback loop in the form of a trilateral discussion forum where ICT sector firms, relevant public sector bodies, and academia can develop a common understanding on challenges such as skills-mismatch etc.

110. Foster strong linkages between IT suppliers and sectors that have a high degree of readiness to absorb ICT products such as hotels and resorts. Link local companies to hotel supply chains, creating e-commerce applications for local communities to advertise and sell tourist -related services and making greater use of digital technologies such as online marketing and smartphone apps.

6. Digital Entrepreneurs

Current situation and recent developments

111. Digital entrepreneurship is a nascent sector in Solomon Islands, primarily constrained by the overall weak entrepreneurship climate and the same internet connectivity challenges that have stemmed other segments of the digital economy. In absolute terms, there is little to no activity currently in terms of digital entrepreneurship in the country. This includes e-commerce shops to freelancers (with an online presence) to any kind of entrepreneurship activity conducted online.

112. As in the case of other segments in the digital economy, the current state is not a reliable predictor of the short-medium term projects, because the expected infrastructural improvements in the overall digital economy ecosystem may lead to a quick ramp-up of digital entrepreneurship activity whether it be news websites, online freelancing work, or e-commerce startups. There are some essential prerequisites for enabling growth as noted below.

Perspectives for future growth/enhancement

113. Emergence of lead firms and digital businesses entrepreneurship development is a must. There are currently no lead firms in terms of digital startups. These firms are important given that they follow a path for a second wave of businesses to follow. In this regard, entrepreneurship development for digital businesses will be essential to break through the current inertia of inactivity. Technical/financial support to existing businesses who wish to transform to online operations, or a hybrid online/brick-and-mortar operations model, could help spur activity.

114. Brief courses aimed at coaching entrepreneurs on the fundamentals of digital entrepreneurship could also be a useful activity if on a regular basis and anchored in a reputed institution. Trainers could be certified, allowing them to forge consulting/coaching relationships with firms.

115. Business incubation has also not yet found roots in Solomon Islands. There is a near-complete lack of incubator/accelerator activity that would involve a financing aspect for selected firms. Support programs are required in this regard to drive startup activity.

III. DIGITAL GOVERNMENT – DELIVERING PUBLIC VALUE AND STIMULATING DIGITAL ECONOMY DEVELOPMENT

A. Digital Government Strategic Outcomes

116. Digital transformation in government can generate value in several ways. In addition to driving greater efficiency and effectiveness in government operations, it can facilitate and improve interactions between citizens and government, and the delivery of public services. All of which serves to increase public perception of, and trust in, the government. Beyond these forms of direct value, digital transformation in government also stimulates innovation and drives demand from the broader ICT ecosystem for solutions, products, and services.

117. Digital transformation in the SIG has begun to derive value across these categories. It is, however, still in the early stages. The UN E-Government Development Index[10] is used by many countries to measure their progress relative to neighbors and/or competitors. Figure 2 shows Solomon Islands score and ranking against Oceania countries. Solomon Islands is ahead of only Papua New Guinea in the region. It is last among the 'Least Developed Countries' in the region.

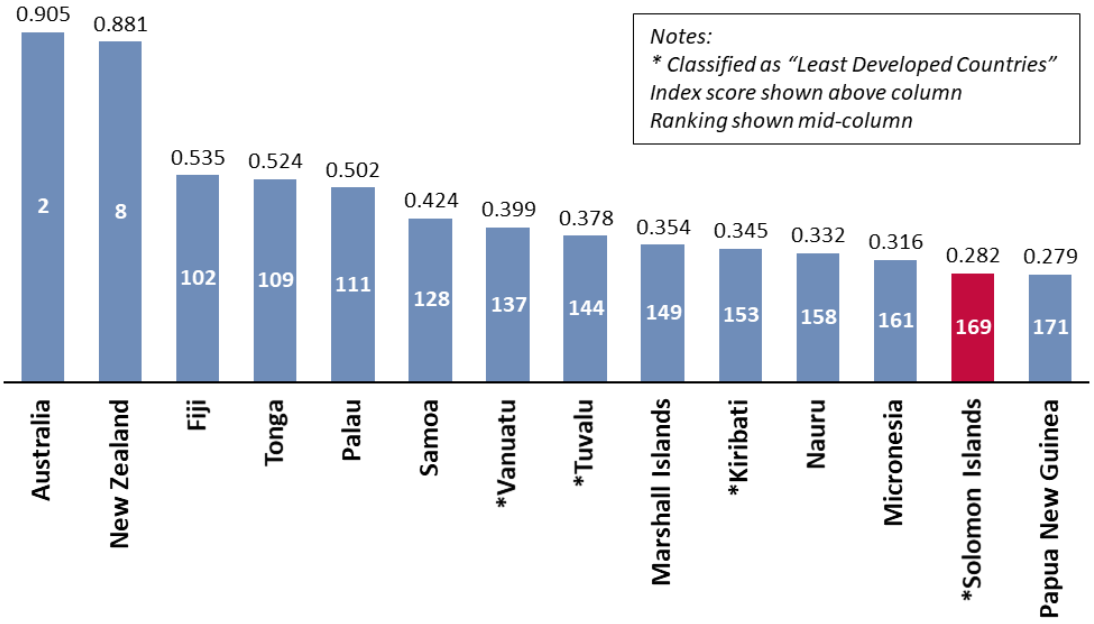


Figure 2: 2018 E-Government Development Index for Oceania Countries

[10] https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2018

118. The UN E-Government Development Index is based on three measurements: Online Services Index, Human Capital Index, and Telecommunications Index, each with its own set of data points that are used to derive the index value. As such, it is a snapshot of a static point in time. To both assess the level of maturity at a point in time and provide guidance for an evolution towards a target state, a broader model is needed. The Gartner Digital Government Maturity Model[11] is widely used for that purpose. The model defines characteristics at five stages across seven dimensions. Each stage represents the progression from basic e-government through to what is labeled 'Smart Government'. Figure 3 shows the characteristics for each dimension at each stage. Based on the rapid assessment, the SIG can be described as being in the initial E-Government stage across all dimensions. The applications in production are largely government operations-centric, designed for compliance with finance/resource management requirements or reporting requirements. New development and/or upgrades to the current systems are performed or procured by SIG or its development partners. Little information and very few services are online. There is virtually no process or data integration across agencies or domains. No open data platform exists for exploitation outside of the government and very little advanced analytics are performed within government. There are no plans in place to move towards a more open or data-centric profile. Current efforts are focused on stabilizing the shared government infrastructure and data centers and on supporting the applications in production.

	E-Government	Open	Data-Centric	Fully Digital	Smart
Maturity Level	1 Initial	2 Developing	3 Defined	4 Managed	5 Optimizing
Value Focus	Compliance	Transparency	Constituent Value	Insight-Driven Transformation	Sustainability
Service Model	Reactive	Intermediated	Proactive	Embedded	Predictive
Platform	IT-Centric	Customer-Centric	Data-Centric	Thing-Centric	Ecosystem-Centric
Ecosystem	Government-Centric	Service Co-creation	Aware	Engaged	Evolving
Leadership	Technology	Data	Business	Information	Innovation
Technology Focus	SOA	API Management	Open Any Data	Modularity	Intelligence
Key Metrics	% Services Online	No. of Open Datasets	% Improvement In Outcomes, KPIs	% New and Retired Services	No. of New Service Delivery Models

Figure 3: Gartner Digital Government Maturity Model

119. The assessment and recommendations that follow highlight opportunities to strengthen the SIG's digital government program elements. From that foundation, the SIG can begin to progress towards a more data- and citizen-centric approach and derive even greater value from its investment and effort.

[11] Gartner, Inc. Introducing the Gartner Digital Government Maturity Model 2.0

B. Digital Government Program Elements

1. Strategy and Planning

Current situation and recent developments

120. As discussed above, the National ICT Policy represents the official statement of overall strategic intent or goals, stated as 'Objectives'. These include specific attention to digital government, although in the policy it is referred to as "e-government".[12] Objective 3, ICT for Good Governance, is directly focused on the deployment of ICT in the public sector:

> *Utilize ICT at all levels of government to promote good governance and facilitate the efficient administration of government and delivery of public services throughout Solomon Islands*

121. Three of the ICT Strategies under Objective 3 are aimed at establishing and strengthening the institutions responsible for leading the ICT Policy implementation and digital government development. A fourth strategy simply calls for ICT to be 'integrated into the work of the government'. The final strategy calls for the development of a National e-Government Strategy.

122. While there is a clear imperative for government leadership and involvement in the achievement of all the objectives in the ICT Policy, two of the objectives and one ICT Strategy within a third objective relate directly to the delivery of key public services: health, education, and law enforcement.

123. Within Objective 4, ICT for Peace and Unity, one of the four ICT Strategies is to:

> *Utilize ICT in support of effective policing and enforcement*

124. Objective 5, ICT for Health, calls for the government to:

> *Improve healthcare and health service delivery throughout Solomon Islands by innovative use of ICTs and promote healthy ICT working conditions and practices*

125. Objective 6, ICT for Learning,

> *Improve the availability and quality of education throughout Solomon Islands by innovative use of ICT and develop ICT know-how in the workforce and public generally*

[12] For the purposes of this report, the e-Government goals and objectives will be interpreted to be focused on establishing e-Government, and ultimately digital government, capabilities as reflected in the Gartner maturity model.

126. The ICT Strategies and Actions under each of these objectives are further elaboration of strategic intent and high-level desired outcomes. They address the application of ICT to the delivery of the services, building capacity within the service delivery agencies, and collection/dissemination of domain-related information. They include very little in the way of specific activities or timelines. Because these all represent key public service domains, it is expected that each would be addressed as part of any national e-government or digital government planning.

127. As mentioned above, the ICT Policy also calls for the development of a national e-government strategy. The ICTSU is in the process of developing and publishing an ICT Strategy for 2019-2023 ("the Strategy"). A draft copy of the strategy was reviewed as part of this assessment. While the strategy focuses primarily on the activities of the ICTSU, it is as close to an overall e-government strategy as is available, particularly since the ICTSU has a SIG-wide support mandate.

128. The Strategy's vision and mission statements are written specifically for the ICTSU:

> *ICTSU Vision: Empowered SIG services to Solomon Islanders through ICTSU's effective design and delivery of ICT*
>
> *ICTSU Mission: To deliver innovative, sustainable, and secure ICT solutions, in an environment that fosters talent and focuses on standards, taking pride in the role of ICTSU in enabling SIG to provide improved services to the public and private sectors*

129. The four goals defined in the Strategy, however, would be appropriate goals for an overall e-government or digital government strategy and plan:

> *Goal 1: Increase efficiency of SIG ICT services through strengthened ICT leadership and workforce*
> *Goal 2: Modern, sustainable, and secure SIG ICT infrastructure and systems*
> *Goal 3: Digitized government services to SIG and citizens*
> *Goal 4: An information driven government fully leveraging existing data*

130. Each goal includes a set of objectives and activities intended to achieve the goal. The Strategy also includes a brief section on the implementation approach, covering the following topics:

a) Leadership & Accountability
b) Governance Structures
c) Governance Layer
d) Management Layer
e) Skills & Capacity
f) Stakeholder Engagement
g) Resources
h) Funding
i) Human Resources
j) Consensus & Buy-in
k) Communication

l) Tactical Work Plans

131. It is evident from a review of the Strategy that considerable effort was made to define the goals and the objectives and activities to support each goal. These require further review and strengthening to confirm priority and focus, identify interdependencies, and ensure appropriate categorization/classification. The implementation approach, however, is extremely brief and needs extensive elaboration in order to serve as an actionable plan going forward.

132. This strategy has also been developed in the absence of the broad stakeholder participation and engagement that is most often required for successful implementation. It will be important for the SIG to develop a broad consensus around the strategy.

Perspectives for future growth/enhancement

133. The work being done by the ICTSU on a broad SIG ICT Strategy for the period 2019-2023 is commendable and is a good foundation upon which to build. But it does not yet include the detailed analysis and planning content needed to serve as the roadmap for the Solomon Islands' digital government development. The SIG needs to build on what the ICTSU has produced to develop the Solomon Islands National Digital Government Strategic Plan (DGSP). As a supporting strategy subordinate to the National Development Strategy and National ICT Policy, the DGSP will focus on building the information systems architecture (enterprise architecture), information sharing/shared services strategy, interoperability framework, open data, and business and citizen services plan. A clear example of good practice in this area is the Government of Canada Information Technology Strategic Plan 2016-2020 (see Figure 4):

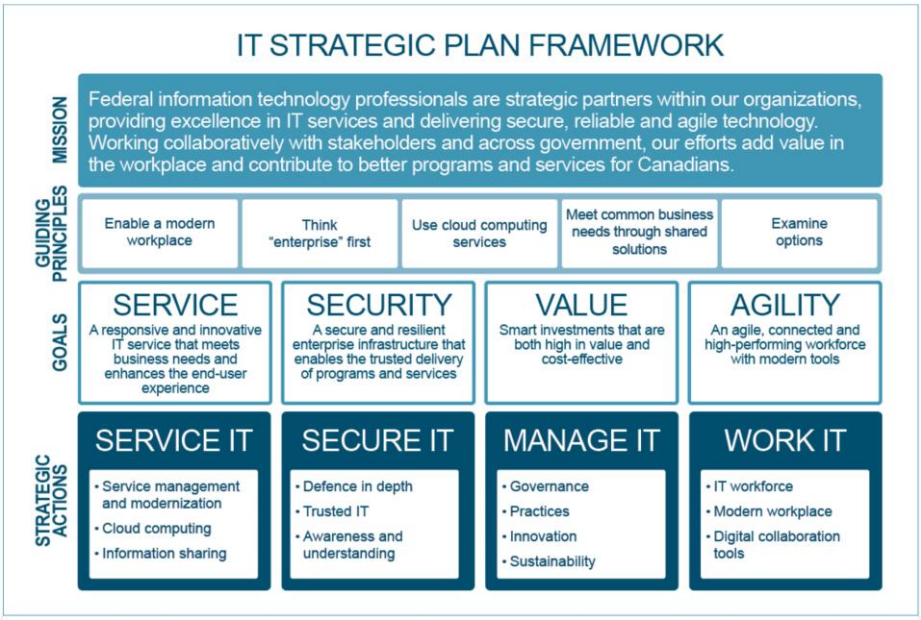


Figure 4: Government of Canada IT Strategic Plan Framework[13]

[13] Treasury Board Secretariat, Government of Canada

134. The plan was later updated to the Strategic Plan for Information Management and Information Technology for the period 2017 to 2021, and again to the Digital Operations Strategic Plan: 2018-2022. In addition to regular review and updating, the program areas defined in the framework are further elaborated into detailed work packages in the responsible agency plans along with milestone dates and performance measures. Most importantly, the required resources are allocated in agency operational budgets.

135. The government may choose to request support of international organizations or governments to assist developing the strategy and supporting standards, frameworks, and policies. The knowledge and skills needed to develop and implement an effective digital government strategy will require additional professional training in governance, risk, service delivery, enterprise architecture, and cybersecurity. This is also needed to ensure the Digital Government Strategic Plan and supporting frameworks and policies are continuously reviewed, updated, and changed based on government, business, and technology triggers which may either render obsolete or require changes to existing directives.

2. Governance and Management

Current situation and recent developments

136. Until the adoption of the National ICT Policy, and even now as the implementation arrangements are being decided, centralized governance and management of ICT within the SIG has been carried out by the ICT Support Unit within the MoFT.[14] The Australian-led Regional Assistance Mission to Solomon Islands (RAMSI) established the ICTSU initially to support the development and establishment of the Solomon Islands Government (SIG) Connect Network – a WiMAX Metropolitan Area Network (MAN) that was deemed necessary to facilitate government communications and improved governance in the post-conflict environment. Since that time, the mandate of the ICTSU has been extended to overall whole-of-government ICT deployment and support. ICTSU is recognized for discharging its mandate involving significant scale with a fair degree of efficiency, especially in terms of connecting government offices in Honiara with the main inhabited islands across the country.

137. Three of the five ICT Strategies under the ICT for Good Governance objective are focused on institutions. The first calls for the establishment of national-level Solomon Islands Government (SIG) ICT Policy Committee. This topic has been addressed above. The second calls for further strengthening of the ICTSU. The third calls for strengthening the Communications Department of the MCA and assigning to it the responsibility for ICT development across all ministries. It also calls for relocating the ICTSU from the MoFT to the MCA. To date, little progress has been made on strengthening the Communications Department. Given the solid performance of the ICTSU within the current structure and processes, the intention to shift management responsibility for government-wide ICT deployment and support to the Communications Department and moving the ICTSU to the MCA as a purely 'technical' support group has not been very well-received. The situation has created a somewhat contentious climate impacting cooperation on key issues related to the

[14] ICTSU was established in 2011, mandated by a cabinet decision to enable provision of whole-of-government ICT services. The three core functions are ICT strategic advice and innovation, ICT business process and management, and ICT operational support.

ICT infrastructure and e-government areas. Shortfalls exist in developing and publishing standards, strategies, and policies to guide information systems and ICT design and implementation.

138. Notwithstanding the changes mandated by the ICT Policy, the ICTSU has included an outline governance structure for government ICT in its draft ICT Strategy (see Figure 5 below[15]).

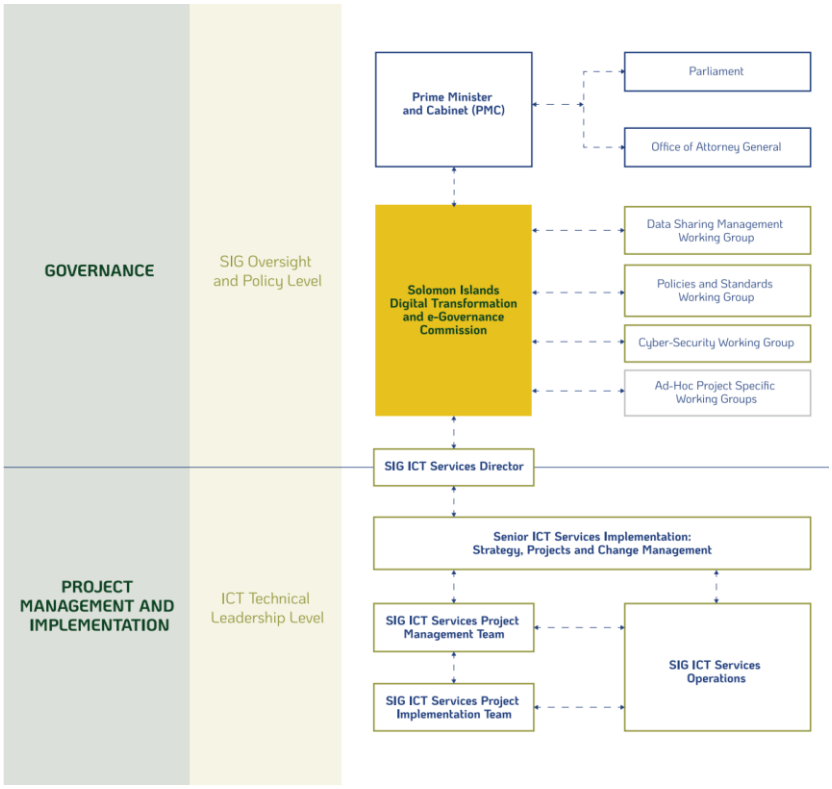


Figure 5: ICT Governance Structure from ICTSU's ICT Strategy

139. The Strategy stipulates that the Permanent Secretary of the MoFT and the Permanent Secretary of the MCA co-Chair the E-Government and Data Sharing Committee, and that representatives from all the other ministries are members. The ICT Governance Leadership Level would be chaired by the Director of the ICTSU. Although additional detail needs to be defined, the outline structure indicates careful consideration of the SIG's ICT governance requirements.

Perspectives for future growth/enhancement

140. It has already been mentioned above that further effort needs to be made to rationalize the institutional environment for National ICT Policy implementation. Like the program planning process, the distinction between the national ICT agenda and the digital government agenda applies to the institutional context as well. The institutional structure and capabilities needed

[15] Draft Solomon Islands Five-Year ICT Strategic Plan

to ensure effective governance and management of ICT within the SIG are key elements of the national ICT institutional landscape but are not the same thing.

141. During the Solomon Islands Digital Economy Workshop in November 2019, the Office of the Prime Minister presented elements of a proposed institutional framework led by the Solomon Islands Digital Transformation Authority. The ICTSU is proposed to lead the implementation of ICT within the SIG and report to the authority. While the conceptual basis of the structure proposed in the ICTSU's Strategy is consistent with the framework proposed by the OPMC, the two need to be reconciled.

142. International practice indicates that top-level governance structures are required to achieve both national ICT objectives and digital government objectives, and that these need to be separate and distinct from one another. Further, international experience suggests that dedicated digital government program management organizations, independent of line ministries, are needed to oversee programs across government. An excellent example of an effective governance and management structure is Singapore's Smart Nation and Digital Government Group (see Figure 6).

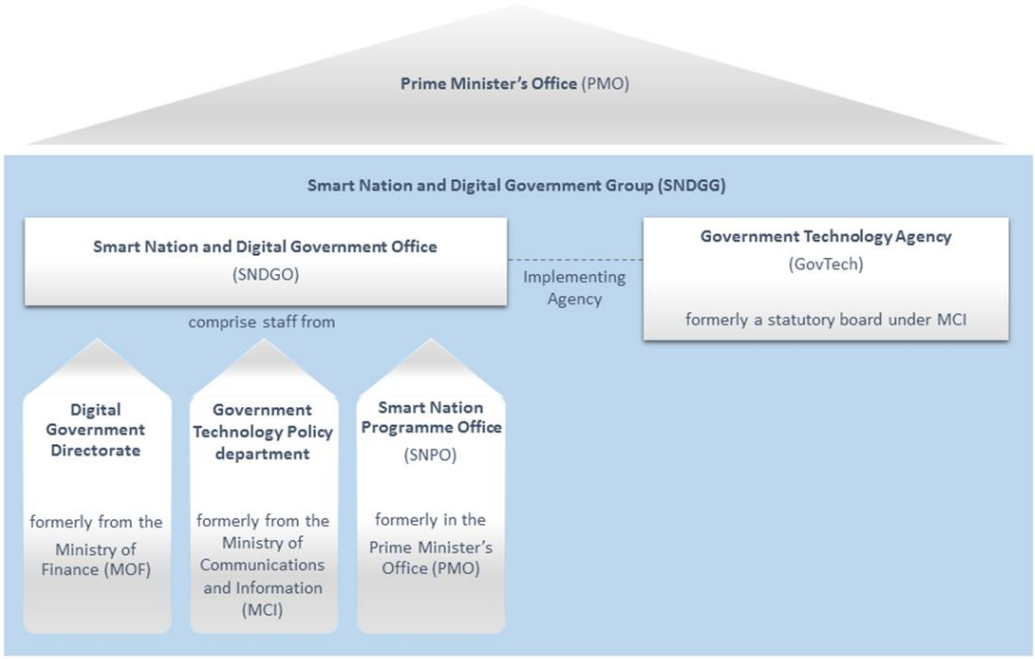


Figure 6: Singapore Smart Nation and Digital Government Group

143. There is a need for a collaborative process between the relevant government agencies to design and establish an agreed governance and management structure, within the overall national ICT institutional structure, to lead, manage, and support the development of Solomon Islands' digital government. This should ideally be done as part of the development and adoption of the DGSP.

144. It is also noted that the SIG has no CIO position. The CIO would be valuable in preparing the requirements and managing the development of an architectural framework for government information systems.

145. Again, like the program planning process, a good starting point would be the work already done by the ICTSU as part of its strategic planning process, cited above. The design of the dedicated digital government program management organization should build on ICTSU's success. Undisputedly, ICTSU has played an essential part in implementing a whole-of-government approach to connecting government agencies while ensuring that the requirements analysis for the individual agencies follows a bottom-up approach. Notwithstanding the contention surrounding the 'placement' of ICTSU, it has proven to be an efficient leader in terms of deploying e-government systems. That success should be considered as part of any institutional design initiative.

3. Architecture, Processes, and Standards

Current situation and recent developments

146. The ICTSU, ministries, and agencies (through external assistance programs) have developed and are operating a number of fairly sophisticated business applications that are providing substantial value. However, they have been developed in the absence of an overall enterprise architecture, interoperability framework, data sharing policy, or data standards. Moreover, there are no government-wide ICT procurement guidelines in place. This situation creates integration, sustainability, and efficiency issues, increasing the SIG's overall risk profile.

147. A Government Enterprise Architecture (GEA) is normally an objective or requirement within the National ICT Plan or National ICT Policy. The GEA should provide a government-wide, or holistic, view of how information systems are structured, interact, and comply with standards and processes.

148. ICT Objective 3 within the ICT Policy establishes the requirement "Utilize ICT at all levels of government to promote good governance and facilitate the efficient administration of government and delivery of public services throughout Solomon Islands." Specific tasks within Objective 3 include reinforcing and further defining the ICT administration and governance structure of ICT within the government, specifically reorganizing the ICTSU within MCA, centralization of ICT within MCA, and developing a National e-Government Strategy.

149. Fulfilling, or making progress on achieving the requirements of Objective 3 will provide the government with a set of achievable tasks needed to develop a strong digital government capability. As strategy is assumed an iterative process, task achievement will establish a continuous improvement in information systems, governance, and capability maturity. When combined with other external factors, such as the availability of qualified human resources, improvements technology, emerging technology triggers, and improved ICT infrastructure, the strategy will be updated or adapted to the current conditions, allowing creation of new goals and objectives as appropriate.

150. Standards and processes are necessary for achieving GEA or digital government strategic goals and objectives. Standards and frameworks establish a common set of principles and processes for achieving information systems' security, efficiency, and integrity. Developing standards is a complex task, however, there are many international standards available for reference or

adoption for most government systems. MCA will have the opportunity to either adopt or consider international standards and best practices for development in support of the e-Government Framework.

Perspectives for future growth/enhancement

151. With the rapid pace of technological change, the technical, functional, and commercial complexity of government applications is likely to increase as technology triggers and political changes occur. In order to manage that complexity, it will be important for the SIG to establish and enforce compliance with a range of architecture, technology, and procurement standards. This includes ensuring international organizations comply with the national standards or allow open systems interfaces and interconnections to support data sharing and applications integration.

152. In addition to publishing and adopting national ICT standards, frameworks, and policies, it is also important to ensure a continuing professional and technical education process is implemented across government, in ICT operations, end user, and management (decision-maker) positions. This will enhance the government's ability to remain agile and improve the value ICT investments contribute to government operations.

153. The following structure is recommended for the government in order of priority.
    a) Government Enterprise Architecture
    b) Government Interoperability Framework
    c) Information Systems and Data Sharing Policy
    d) Standardized IT Procurement Policy

154. While the documents recommended appear to be overwhelming for a small government with limited professional ICT resources, most items are readily available using examples in use by other governments around the world. Those may include Government Enterprise Architecture Frameworks such as the New Zealand Government Enterprise Architecture Framework (NZ-GEA), Australian series of Interoperability Frameworks, US Government Federal Enterprise Architecture Framework (FEAF), California Enterprise Architecture Framework (CEAF), or the generic international standard ISO 42010. The Solomon Islands Government, and MCA, can take those examples and adapt policies or frameworks suitable for implementation. Figure 7 provides a common architectural model for designing government information systems.

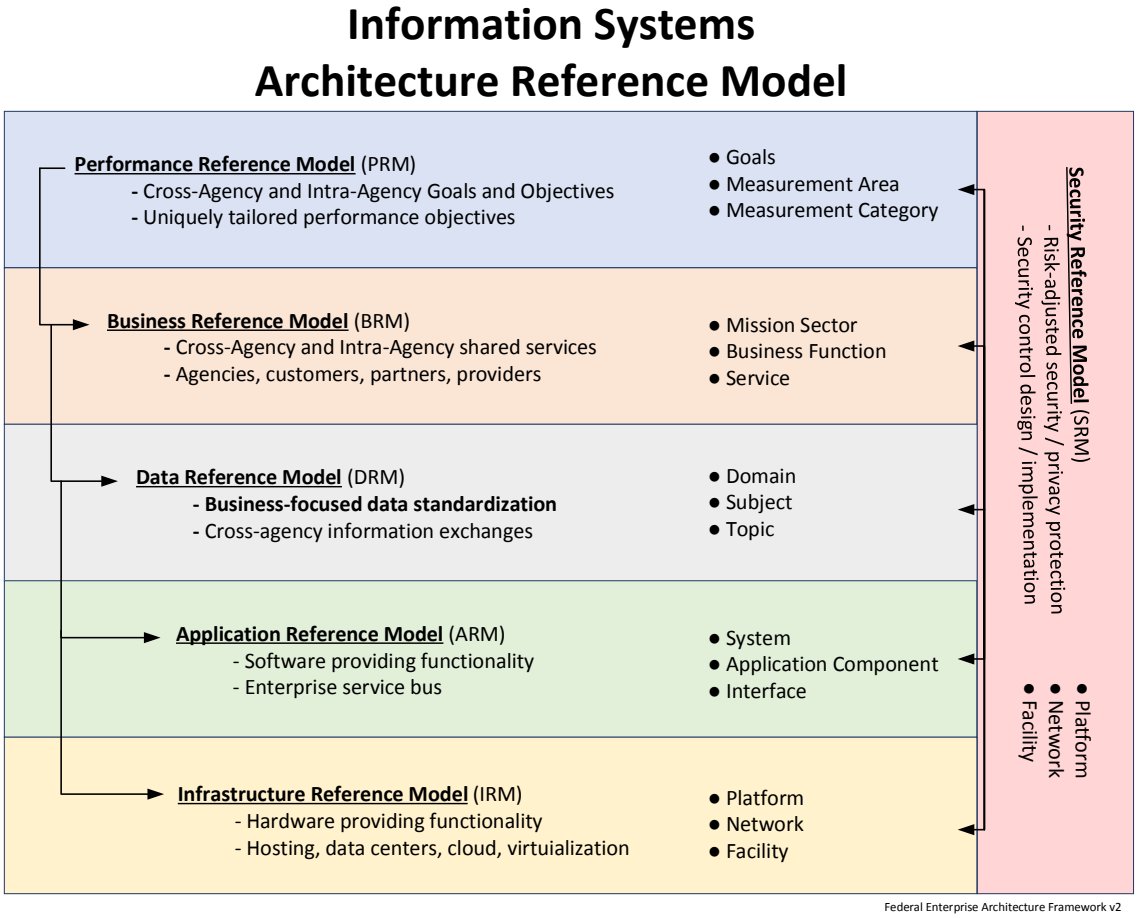


Figure 7: Enterprise Architecture main components

4. Technology Infrastructure

Current situation and recent developments

GOVERNMENT NETWORK

155. SIG-Connect is a government access network based on a combination of fiber access and WiMAX access creating an independent network connecting Honiara-based government entities in a private network, with an Internet Gateway provided by Telekom (110mbps), with a second connection through SatSol (90mbps). Within Honiara, ICTSU indicated that SIG-Connect has 105 connected nodes, with 6,000 users and 4,000 end devices. There are 10 sites connected to the SIG-Connect environment outside Honiara.

156. While most of the agency applications are now hosted within the FlexPOD (data center platform) environment, SIG-Connect provides an essential link between end users and the hosting environment. However, there are also several applications hosted offshore in New

Zealand (Data Torque – specializing in customs, revenue, and transport systems) and Australia (Orion). Most public-facing websites are hosted offshore.

157. Connectivity in rural and remote areas is still a problem. For example, the Ministry of Education identifies more than 600 schools without power, telecommunications, or any level of access to the Education Management Information System. Another example is the Ministry of Health. Although nine provincial health centers are connected to SIG-Connect, most rural centers are not, and any record keeping is manual. The number of records that have typically been entered into into the health management system is on average one month. Accuracy can also suffer due to the manual process of record creation and transfer.

DATA CENTER

The World Bank team visited two data center facilities on its initial mission in November 2018. The first was a room under construction in the new ICTSU building, and the second an existing server room in the old ICTSU building. Since that time, the new server room has been completed and a new FlexPOD unit was procured through DFAT funding. At the time of writing, most of the SIG applications and data hosted in the old environment have been migrated to the new one. The FlexPOD is backed up in a container-based server room with a 5-hour Recovery Time Objective (RTO) for critical systems recovery. Information on recovery point objectives (frequency of backups) was not available during the mission. The old FlexPOD environment will eventually be moved to the new data center facilities and configured as a training and development environment.

158. It is strongly recommended the new server room undergo a Level 5 commissioning test. That is a full systems integration test checking backup generator power, electrical power distribution (including uninterruptible power supply (UPS)), building management (alarms and status, monitoring), and potentially FlexPOD operational integrity.

159. Six agencies continue to host their own servers within their own LAN/building, notably Parliament and the Electoral Commission. There is no plan or schedule to migrate those environments to FlexPOD or the ICTSU data center. Our Telekom also indicated availability of data center capacity in their main central office, adequate for up to five cabinets. Three IT equipment cabinets are currently available. Note that FlexPOD is only using one cabinet at the ICTSU server room. Our Telekom could potentially be considered an option as either a short-term or long-term disaster recovery resource.

160. FlexPOD is a proprietary virtualization platform developed by Cisco Systems and NetApp. As the SIG continues to develop the National ICT Policy and Digital Government Strategy, data integration and standardization will drive information systems architecture and underlying technologies' modernization.

Perspectives for future growth/enhancement

161. The government requires additional SIG-Connect capacity and footprint extension to other unconnected island population centers to support government. In addition, the government needs to work with communications companies and TCSI to further develop citizen access to communications resources and internet access to unserved segments of the population. This will require incentives and subsidy, as the cost of providing commercial resources in small population centers is prohibitive based on normal subscriber revenues.

162. A feasibility study should be conducted to consider data center options. Those options will include continued operation of the new data center in the ICTSU building, or consideration of outsourcing and partnership with private industry. As planned submarine fiber optic cable systems become operational, backup and disaster recovery alternatives outside of Honiara are possible – potentially including external cloud hosting in Australia. The data center industry has produced several standards, including American ANSI Standards BICSI 002-2014, TIA-942B, and European CENELEC standards within the CENELEC 50600 series. Supplemental operations sustainability guidance is provided by the Uptime Institute, which focuses on power and environmental issues. Figure 8 depicts a standard data center layout providing both operational functionality and security. Note that data center layouts and design are not prescriptive, but rather built to provide guidance for organizations, including government, based on security, operational requirements, policies, continuity plans, and operational scale.

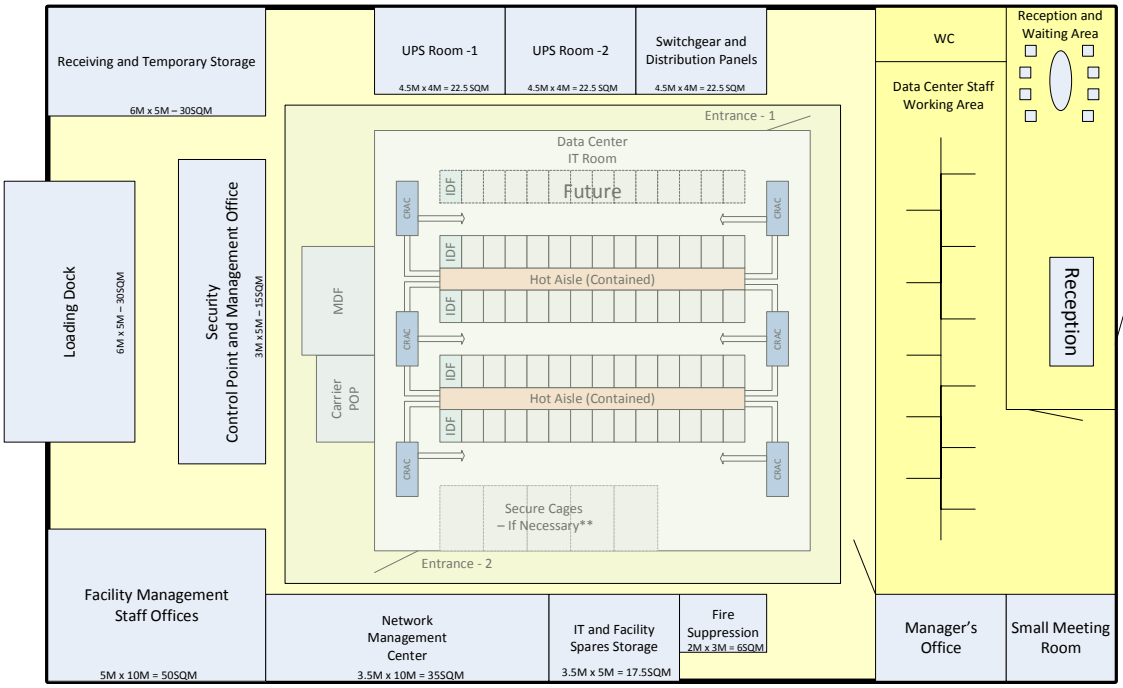


Figure 8: Data Center layout example

163. All the above actions should be part of an overall National Data Center Consolidation and Communications Plan, which would include:

a) Cloud Computing
b) Disaster Recovery and Continuity of Operations
c) Secure Government Network

5. Information Systems and Data

Current situation and recent developments

164. There is substantial use, and ongoing development of, ICT systems, tools, and capabilities across the SIG. The Ministries of Finance, Public Services, Justice, Home Affairs, Health, and Education all operate systems in support of their operations, data management, and reporting. These agencies and their systems receive support from the ICTSU, which also hosts the applications and data in a consolidated data center. The ICTSU also provides an email system and a central point of access to the internet for government ministries.

165. The e-government footprint in Solomon Islands is growing amid recognition that such initiatives will help speed up the various regulatory and infrastructure-related components of the digital economy ecosystem, in addition to encouraging consumer adoption of online transactions. For a country with 600,000 citizens, along with a remote geography with dispersed population, Solomon Islands has made significant achievements on digitizing its internal workflow as well as the services provided to citizens and businesses.

a) An online tax payment system is planned.
b) Automated transfer system (ATS) and Central Securities Depository (CSD) are being implemented in the financial sector.
c) A centralized Accounting, Financial Management and HR system deployed by ICTSU has been cited as one of the most efficient tools against corruption that can be implemented. An upgrade to this system, including online authorization for spending units, is currently in process.
d) The Biometric Voter Registration System launched prior to the 2014 election was responsible for registering 80 percent of the voting population through biometric registration and informing the electorate on relevant matters including candidates and polling station locations.
e) The Ministry of Education and Human Resources Development (MEHRD) utilizes the Solomon Islands Education Management Information System (SIEMIS) to record essential data on schools, and uses the data for refining policies and improving service delivery.
f) The Ministry of Health and Medical Services (MHMS) uses a tool called mSupply for managing pharmaceutical inventories. The national referral hospital uses a radiology system for sharing x-ray reports with doctors and is also working on deploying an integrated patient information system that will maintain a link with hospitals across provinces.
g) The Ministry of Fisheries and Marine Resources (MFMR) uses tablets to collect information from fish markets and fishing vessels (on site) and electronically transfer the information to the Ministry's Integrated Fisheries Information Management System (IFIMS).

166. While the above initiatives are in varying levels of deployment and delivering public value to varying degrees, the diversity of initiatives indicates the government's vision of digitizing its operations. The ICTSU has also recently proposed the establishment of Rural Digital Service Infrastructure Hubs in the provinces to act as one-stop shops for digital government services.

167. A Customs Declaration System (CDS) is being deployed with support from UPU, WCO and UNCTAD/ASYCUDA. The system will allow exporters to apply for exports' pre-shipment clearance, which is essential for e-commerce firms that need to ensure efficient order facilitation and timely delivery to international clients. Similarly, importers will benefit from efficient processing of their imported goods. The system is expected to be scaled up to interface with ASYCUDA and other WCO systems in place. The system also allows for interoperability and cooperation between the three key institutions constituting Solomon Post, Customs, and Biosecurity (quarantine). CDS trainings are expected to start for all these institutions.

168. Other agencies, such as the Ministry of Justice, have some minimal data sharing with other agencies. This is a manual process, rather than an automated integration of data sources. In some cases, agencies that need to access justice-related data are provided remote access with individual user accounts.

169. There is very little data analytics capability. Those systems with an analytics capability normally use reporting or analytics provided with the system, rather than developing custom reporting locally.

Perspectives for future growth/enhancement

170. With the exception of transitioning most ministries to ICTSU's FlexPOD environment, most ministries and agencies continue to use single purpose applications within their agency. Very little consideration, if any, has been given to developing a "whole-of-government" information systems environment, standards (including cybersecurity), or potential interconnection of data systems to support integration of processes or decision support.

171. A National Enterprise Architecture Framework (GEAF) and supporting guidance to include data sharing (interoperability), common applications, and disaster management/continuity of operations will improve the integrity of reporting and reduce the cost of information systems.

172. Many of the information systems used in the SIG are provided by international organizations and are specific to the agency being supported. To ensure those applications or systems do not inhibit data sharing and systems integration, all new projects should go through a review process via an ICT Architectural Review Board, overseen by the National ICT Committee.

173. The Architectural Review Board (ARB), when implemented, will strive to ensure all systems under consideration will comply with the basic principles of:
    a) Architectural compliance
    b) Standards – where defined
    c) Interoperability
    d) Portability
    e) Security

f) Disaster Recovery and Continuity of Operations, and
g) Open data

174. The intent of this direction is to ensure any information system that either collects information/data, or produces an output used by citizens or other government agencies, is not locked into a proprietary, non-interoperable system.

175. The expected outcome of the adoption of an ARB process is better positioning for future integration of information systems as each system improves systems maturity.

176. Agencies with a need-to-know, or data collected that is considered open, may provide valuable reporting and decision support resources through implementation of data analytics, including predictive analytics.

177. This will also open non-controlled data to citizens and private industry for further development as both commercial and public information.

IV. FOUNDATIONAL ENABLERS OF DIGITAL ECONOMY AND DIGITAL GOVERNMENT: STATUS AND ISSUES

178. As mentioned earlier, there are key enablers that must be in place to derive any value from the measures suggested above and to achieve the digital economy and digital government strategic objectives:

a) Legal and Regulatory Environment
b) Policy, Planning & Institutional Environment
c) ICT Infrastructure, Access & Connectivity
d) Cybersecurity
e) Digital Skills & Awareness
f) Digital ID
g) Digital Payments

This section provides an assessment of the maturity of each of the enablers, as well as recommendations for accelerating their establishment.

A. Legal and Regulatory Environment

179. Digital economy and digital government development require supporting laws and regulations covering e-transactions, consumer protection, cybersecurity, data protection, and data privacy. Such legislation is largely non-existent in Solomon Islands and is an important gap that needs to be addressed to build trust in online transactions.

Current situation and recent developments

180. There is currently no data protection or privacy-related legislation in the Solomon Islands.

181. Article 9, Chapter II of the Constitution of Solomon Islands[16] provides a broad constitutional right to privacy regarding a person's property. It states that "except with his own consent, no person shall be subjected to the search of his person or his property or the entry by others on his premises." It may be implied that personal data lies within the definition of personal property.

182. The only legislation that specifically addresses data privacy is the Telecommunications Act 2009. Section 72 of the Telecommunications Act 2009[17] states that a service provider must:

a. obtain consumer's consent in order to collect, use, maintain, or disclose information about a user;
b. apply appropriate security safeguards for the collection, use, and maintenance of client information;

[16] Constitution of Solomon Islands

[17] Telecommunications Act 2009

c. ensure the accuracy of the information it discloses or retains concerning a consumer;
d. permit a consumer to correct or remove incorrect information; and
e. disclose to consumers the purpose of requesting or collecting any user information and must not use the information for undisclosed purposes.

183. A service provider is permitted to disclose name, address, and telephone number in a printed or electronic telephone directory. This does appear to require consent from the customer. Section 73 requires that service providers take all reasonable steps to ensure the confidentiality of consumer communications.

184. The National ICT Policy recognizes the need for data privacy legislation to prevent misuse of ICT in the country. In the next legislative steps, it proposes that the government should[18]:

i. enact data security and data privacy laws; and
ii. update the Consumer Protection Act to protect online transactions, especially the privacy of purchaser's information.

185. However, there is no mention of developing data privacy laws in the country's National Development Strategy 2016-2035.[19]

186. There is currently no existing or in-process e-transaction law. This is a major gap in terms of legal recognition for electronic communications, electronic signatures, and electronically formed contracts. This also has a ripple effect on consumer protection, as there is no point in consumer protection for digital transactions without having a legally recognized contract through which the transaction has taken place.

187. There is an existing consumer protection law dated 1996, but it is not tailored to e-transactions. As an interim measure, the National ICT Policy advocates for an approach where existing safeguards of the Consumer Protection Act are applied to online transactions, and where Solomon Islands suppliers who invite consumers to enter into online transactions must disclose certain minimum required information. The policy further recommends the development of a code of practice by online vendors to encourage consumer confidence, especially important in the tourism sector. The following areas are essential to review (as noted in the ICT policy):

a) Correct information on the identity of the vendor, nature of the goods and services, terms and conditions, and pricing
b) Consumers access to affordable, effective, and timely means for resolving disputes with vendors
c) Spam and advertising

188. There is no cybersecurity legislation in place right now, although some activities related to training police officers (cybercrime related) have taken place. The Telecommunications Act (2009) and the Criminal Procedure Code contain some provisions on cybercrime.

[18] National ICT Policy

[19] Solomon Islands Government, National Development Strategy (2016-2035) (2016)

Perspectives for future growth/enhancement

189. The Solomon Islands requires a robust legal and regulatory environment to leverage the opportunities of digital transformation, while protecting against the downside risks. If executed correctly, this will create an environment that fosters home-grown innovation and attracts inbound investment. The key areas that require attention are set out below.

a. Data privacy protection, through the establishment of a national cross-sectoral law that adopts best international practice, and a data protection authority. This will need to take into account a potential national/digital ID, as well as being sufficiently flexible to enable future development.

b. Financial sector laws and regulations, to ensure their coverage adequately reflects the types of expected payment, stored value, credit, insurance and investment services, as well as open API standards to foster innovation and minimize systemic weakness and arbitrage opportunities. While the Financial Institutions Act 1998, Companies Act 2009, and Exchange Control Act 1976 are already in place, the regime should be updated, especially to provide stronger coverage of payment and credit-related products and services, as well as virtual assets.

c. Cybercrime laws, to reflect international safeguard standards, especially in anticipation of the completion of the Coral Sea Cable System.

d. Electronic record, transaction and signature legal recognition, to ensure that contracts can be executed, information provided, and evidence potentially submitted in proceedings, in electronic format. Currently, the Secured Transactions Act 2008 is in place, which recognizes security agreements in electronic forms and allows electronic filings of notices of security interests. In addition, section 91 of the Evidence Act 2009 allows "evidence that was produced wholly or partly by a machine, device, or technical process", which implies that electronic forms of contracts may be admissible in proceedings. However, more comprehensive laws need to be enforced. Fiji has referred to the United Nations Convention on the Use of Electronic Communications in International Contracts in enacting its Electronic Transactions Act 2008, and Solomon Islands may consider taking a similar approach.

e. Consumer protection legislation, including competition/anti-trust requirements. The Solomon Islands National ICT Policy has recognized correctly that a comprehensive consumer protection legal framework needs to be in place to address issues relating to online transactions, such as fraudulent vendor identity, misleading terms and conditions, consumer data privacy, and channels for dispute/complaint resolution.

f. AML/CFT rules, to ensure that the latest recommendations of APG and FATF are adopted. These are especially important to ensure that the Solomon Islands and its institutions are able to maintain their international links, particularly in relation to correspondent banking, payments, and other arrangements. Solomon Islands may also refer to regional experiments in low-cost eKYC/digital ID systems, as well

as the FATF draft Guidance on Digital Identity, to consider adopting appropriate digital ID systems for AML/CFT practices.

190. A number of regulatory initiatives are already under way to prepare for a stronger digital economy, including a Payment Systems Bill and guidelines for mobile money operators. These guidelines will be replaced by a regulation issued by the CBSI after the approval of the bill Certain laws also already cater to recognizing electronic contracts, such as the Secured Transactions Act 2008. The Telecommunications Act 2009 also contains multiple provisions relevant to digital arrangements, including customer confidentiality obligations.

191. However, it will be important to review existing legislation to ensure:

a. a harmonised set of "digital" principles are formed;

b. laws are consistent and properly reflect actual/emerging risks;

c. unintended barriers, such as laws or regulatory rules that relate to paper-based systems, are removed such as through ensuring legislation is technology-neutral where applicable;

d. thematic legislation such as labor standards are considered for “digital readiness”, given the likelihood of a change in commerce and labor opportunities/vulnerabilities; and

e. innovative initiatives such as digital identity and even blockchain transactions are appropriately addressed, including in taxation legislation.

192. Drafting new and reviewing existing laws will require a combination of legislative drafting, regulator formation/bolstering and multi-stakeholder consultation. It may be beneficial, but is not essential, to accede to any international treaties for this purpose. In any event, international engagement should not delay the implementation of appropriate laws and regulatory standards.

193. The drafting process will require extensive inter-ministerial coordination, as each area of legislation has multiple stakeholders. For example, e-commerce legislation could be sponsored by MoFT, the Ministry of Commerce, MCA, or even the Office of the Attorney General AG). During the early stages of consideration of the bills the work can be undertaken by a committee, working group, or central authority. But at later stages (perhaps consultation), and for shepherding the legislation through parliament, there will need to be a single responsible ministry. That leads to the second issue, which is one of institutional coordination during the drafting and consultation stages. For example, a Cyber Working Group (consisting of MCA, AG, MoFT, CBSI, TCSI, and PMO) is in the planning stage. An Issues Paper on the formation of the CWG will soon be considered by Cabinet. The specific responsibilities on cybersecurity and cybercrime, as well as the remit of the CWG over areas beyond cybercrime/cybersecurity (i.e., data protection and e-commerce), will need to be clarified (and perhaps its membership expanded to reflect stakeholder interest in these areas).

194. Relevant government contracts should also be drafted or reviewed, to the extent necessary. In particular, a review of contracts relating to existing network-related arrangements is

recommended. Further contracts must also be consistent with the planned roll-out of the network and seek to avoid potential pitfalls such as inappropriate IP arrangements and/or vendor lock-in.

195. Finally, it will be important to move towards ensuring that the law and administration of justice itself takes advantage of technology solutions. This includes making available legal information in a readily accessible format online, as well as moving towards online tools that assist with contract creation and dispute resolution.

B. Policy, Planning, and Institutional Environment

Current situation and recent developments

Policy Framework

196. The **National Development Strategy (2016-2035)** establishes a long-term vision for the sustainable development for Solomon Islands (aligned with the SDGs) and achieving the long-term vision of improving the social and economic livelihoods of all Solomon Islanders. It proposes a whole-of-government approach to ensure coherence within public sector entities in support of national economic and socio-economic development. The focus on diversifying the economy away from dependence on the timber and mining sectors is strong, and the strategy proposes the development of productive sectors including tourism, agriculture, fisheries, forestry, energy, and related sectors. E-commerce is not noted specifically as a focus area in the strategy, but instead the strategy discusses leveraging the benefits of ICT through the following stated goals compiled across sector development plans such as education and health.

197. The **National ICT Policy** is closely aligned with the NDS and focuses on leveraging ICT towards the fulfillment of national goals as stated in the NDS. The ICT Policy was approved, endorsed, and adopted by the national government in 2017 and has the following vision: 'A peaceful, united, and progressive Solomon Islands communicating and informed by technologies open to all'. Its mission is "To make information and communication technologies available, affordable, and accessible to all in Solomon Islands; to enable equal participation by all in the social, cultural, economic, and political life of Solomon Islands."

198. The ICT Policy outlines nine objectives, with 'ICT Strategies' and 'Actions' defined for each one. The nine objectives are:

a) Accessible ICT
b) Legal Environment for ICT
c) ICT for Good Governance
d) ICT for Peace and Unity
e) ICT for Health
f) ICT for Learning
g) ICT for Business
h) ICT for the Environment
i) ICT for Equity

199. Specifically relating to ICT for Business, the policy aims to 'promote the availability, affordability, and use of ICT to support economic growth, private sector development, and employment creation in Solomon Islands'. Similar to the NDS, the policy does not address e-commerce directly, but does note the importance of establishing regulations in areas such as consumer protection and cybercrime that will assist in e-commerce growth.

200. Despite the absence of a defined overall ICT program, there are ongoing activities that will ultimately contribute to the achievement of the nine ICT Policy objectives. Several line ministries are operating and continue to develop domain-specific information systems, often with the support and involvement of the ICTSU. The ICTSU has recently moved into new facilities and is developing and upgrading centralized services (data center, email services, shared document storage, etc.). The two telecom operators continue to offer voice and data product options.

201. The **National Trade Policy Framework** provides the trade policy perspective and reiterates the focus of the NDS on productive sectors, particularly tourism, agriculture, and fisheries. It also notes the long-term potential of the forestry products sector. It delineates the market access strategy that the country has set for the private sector with the ultimate aim of developing a conducive business environment for Solomon Island businesses seeking to expand into the domestic as well as international markets.

Institutional Environment for Policy Implementation

202. The ICT Policy stipulates that the responsibility for implementation of the entire policy be vested with the MCA and support for the implementation be provided by the MCA Department of Communications, the TCSI, and the ICTSU in the MoFT. In practice, the institutional ownership for the digital agenda is fragmented among a variety of public sector entities due to its broad scope. This poses coordination challenges as well as contention regarding ownership (as has emerged with the case of the MCA recently vis-à-vis the ICTSU, and the e-commerce 'role' ownership). Table 4 shows the institutional landscape for ICT Policy implementation.

Table 4: ICT-related policies and institutions

COMPONENT	INSTITUTIONS
POLICY MAKING AND COORDINATION	MCA, MFAET, SBSI, MoFT, MCILI, ITSSI, SICED, Solomon Islands Postal Corporation, *Working Groups*: Working group on MSME, Digital Finance Working Group, Cyber Working Group, NTDC
ICT INFRASTRUCTURE AND SERVICES	TCSI, MCA, MCILI, MoFT/ICTSU, MoID
TRADE LOGISTICS AND TRADE FACILITATION	MFAET, SICED, Solomon Islands Postal Corporation, MCILI, SIPA,
ACCESS TO FINANCING	CBSI, MoFT, MCILI
PAYMENT SOLUTIONS	CBSI, MoFT, MCILI
LEGAL AND REGULATORY FRAMEWORKS	CBSI, MCA, MCILI, MoFT, MoJLA
E-COMMERCE SKILLS DEVELOPMENT	MEHRD, Ministry of Women, Youth and Children, Universities

COMPONENT	INSTITUTIONS
MARKET DEVELOPMENT	MFAET, MCILI

Source: Adapted/modified based on UNCTAD's eTrade Ready Assessment for Solomon Islands (2018)

203. Three working groups formed through inter-agency partnership and involving relatively robust consultations with the private sector are active – these include the MSME working group, a Cyber Working Group, and the Digital Finance Working Group headed by the Central Bank. The National Trade Development Council (NTDC), which functions as an umbrella group deliberating on trade-based issues, is another coordination platform, however, there is lack of clarity on how active this council is. A gap in the structure is a National Trade Facilitation Committee that would cover the trade facilitation and trade logistics part of the e-commerce segment.

Perspectives for future growth/enhancement

204. The ICT Policy provides a high-level statement of overall strategic intent, goals, and desired outcomes. This needs to be followed up with a detailed implementation roadmap. The policy includes what it refers to as 'Objectives', 'ICT Strategies', and 'Actions'. However, the content of those categories does not follow a consistent hierarchy from a high level to increasing levels of detail or specificity. In particular, the items listed as actions are not specific. For example, under Objective 2, which focuses on the legal environment for ICT, there is an ICT Strategy to: "Ensure regulatory, law enforcement, and judicial personnel have the skills and resources required to administer and enforce ICT laws effectively." The Action under that Strategy is to "Build National capacity to ensure regulation, civil law, and laws against cybercrimes can be effectively administered and enforced". Essentially this is a re-statement of the Strategy. It is not a clear action to be taken by a specific organization or individual. An additional challenge is that the policy only provides a very general timing and sequencing of the strategies. Each strategy is simply classified as either short, medium, or long term.

205. For the National ICT Policy to be effectively implemented and for the nine objectives to be met, a detailed, time-bound and costed implementation plan needs to be developed for each of the objectives. The development of the plan should be led and coordinated by the agency tasked with implementing the entire policy. However, given the breadth and variety of sectors involved, active and sustained engagement of other ministries and agencies will be required. Under Objective 3, which focuses on ICT for good governance, the policy calls for the development of a National e-Government Strategy. While such a strategy and plan are indeed required, they should not be confused with the overall ICT Policy implementation plan. A national e-government plan would be a subset of the overall plan.

206. Similarly, the institutional environment for policy implementation needs to be further clarified and rationalized. Under Objective 3, the ICT Policy calls for the establishment of a SIG ICT Policy Committee. Good international practice suggests that national-level steering committees for ICT development are appropriate fora for overseeing the implementation of national-level policies. The policy further calls for the strengthening of the Communications Department of the MCA, and assigns to it overall responsibility for National ICT Policy implementation, as well as responsibility for ICT development across all ministries. Little

progress has been made on either the establishment of the SIG ICT Policy Committee or on strengthening the Communications Department. Despite agreement around the objectives of the policy, there is an absence of consensus on institutional roles and responsibilities. The OPMC is currently working on a proposed institutional framework with a Solomon Islands Digital Transformation Authority overseeing the ICT agenda and reporting to the Cabinet. Under this framework the MCA would be responsible for the National ICT Policy implementation and the ICTSU would be responsible for SIG ICT implementation and operation. Additional effort is required on defining the focus, scope, and specific responsibilities of each institution involved in the implementation of the policy, including any advisory functions provided by development partners.

C. Digital Infrastructure, Access, and Connectivity

Current situation and recent developments

207. Affordable, reliable, and widely available high-speed internet is a critical success factor for digital economy and digital government development in Solomon Islands. Table 5 illustrates improvements in basic mobile phone coverage since the government liberalized the market in 2010. However, broadband internet access compares unfavorably with regional neighbors, with fixed broadband at less than 1.0 percent of households, and mobile broadband coverage (3G and limited 4G) at less than 20 percent of the population. In Tonga and Samoa, for example, 4G mobile broadband coverage is greater than 95 percent of the population for each. Affordability is also an issue. According to ITU data (see Figure 2) the Solomon Islands has some of the Pacific region's least affordable mobile broadband services. Low mobile broadband utilization, combined with a very low penetration rate of fixed-line internet (0.2 percent of the population), has translated into Solomon Islands having one of the lowest internet user percentages across Pacific Island countries. However recent and ongoing expansion of the 4G networks and availability of the Coral Sea Cable System (CS2) with domestic extension will improve availability and prices and progressive user adoption. The issue for Solomon Islands is to assist the necessary middle Km and BTS upgrades and user access to low cost terminals (phones and tablets).

Table 5 Solomon Islands digital connectivity indicators

Indicator	Units	Data
Population	Q12020 ('000)	686,900
..of which rural	%	77
GNI per Capita	Q3 2019 (USD - PPP)	2,350
2G/3G/4G -Q1 2020	% in mix	43/53/4
Smartphone penetration-Q1 2020	%	40
Mobile connections Q1 2020	% population penetration	70.5
# Cellular subscriptions .Q1 2020	Total number('000) of cellular connections	484
...of which Prepaid	Percentage of total cellular subscriptions	94
Unique subscribers (SIMS / unique user =1.4)	Number ('000) unique subscribers	345
Cellular subscriber penetration (unique)	Unique Subscribers/population	50.2%
SIM penetration	% cellular connections of overall population	70.5
Percentage of individuals using the internet	Subscribers per 100 inhabitants (TCSI AR 2019)	18.92
Active mobile-broadband subscriptions	per 100 population (TCSI AR 2019)	18.8
Active mobile-broadband subscriptions	% total cellular subscriptions (TCSI AR 2019)	27.0

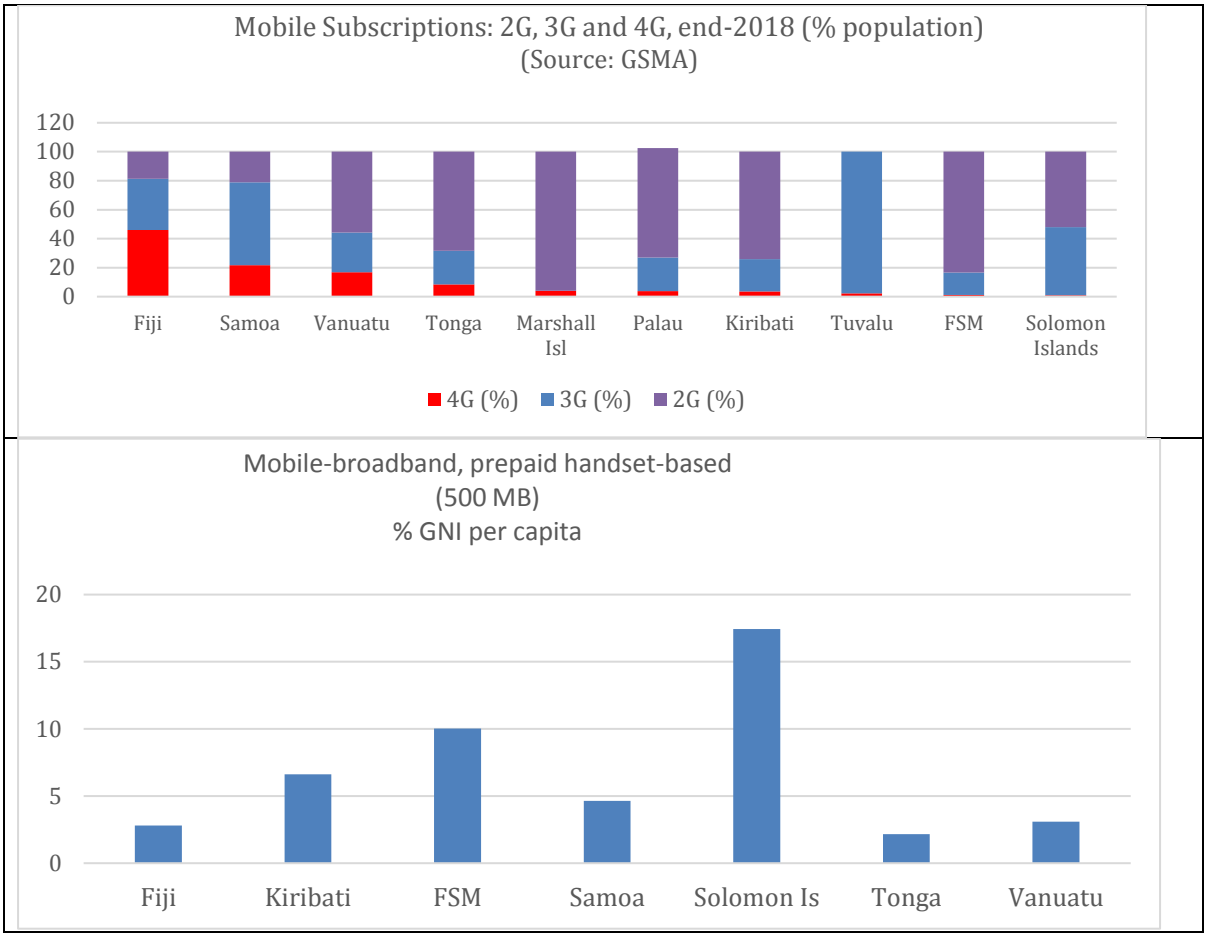
Indicator	Units	Data
Fixed Broadband subscriptions Q1 2020	per 100 inhabitants	0.17
Fixed Internet access-HH Q4 2019	per 100 Households (TCSI AR 2019)	0.98
International internet bandwidth (CS2)	Gbps sold to operators (TCS1)	3.0
Secure servers	per million people (WB database 2018)	42.9
Mobile operators	Number of operators	2
Smartphones	Q1 2020 (% of all connections)	39.6
Feature Phones	Q1 2020 (% of all connections)	3.7
Basic / GSM Phones	Q1 2020 (% of all connections)	43.5
Number of active mobile money accounts per 1000 adults	Number per 1000 adults	55
Value of mobile money transactions during the reference year (% of GDP)	%	2.3
Knowledge Economy projected contribution to GDP (2040, BAU)	constant 2015$ Millions	177.5
Knowledge Economy projected % to GDP (2040, BAU)	%	11.62
Knowledge Economy projected contribution to GDP growth (2040, BAU)	%	15.41
Projected employment generated by Knowledge Economy (2040, BAU)	persons	11,977
Knowledge Economy projected contribution to government revenue (2040, BAU)	constant 2015$ Millions	49.7
ICT projected contribution to government revenue (2040, BAU)	constant 2015$ Millions	49.7
Facebook members (Q4 2019)	'000 members	88
Active social media users (overall/mobile)	% of population	14/12

Sources: multiple sources (national and international)

208. There are two main service providers – Solomon Telecom ('Our Telekom') (owned by the Investment Corporation of the Solomon Islands and Solomon Islands National Provident Fund) and Bemobile (owned by the Government of Papua New Guinea and managed by Vodafone Fiji). Both are expanding services (with some 160 base station towers) and new promotional offerings, and the consumer base is steadily expanding. Performances on availability of service, quality of service, and kinds of service have generally improved. There are also other operators including Satsol (satellite services), and several internet service providers (ISPs) that operate based on a class licensing regime.

209. International connectivity has since February 2020 migrated from satellite to the CS2, but this transfer of services is subject to existing satellite contracts. As the transfer progresses, services will improve in performance (lower latency, consistent quality, and lower prices. The satellite capacity provided by the current mainstay satellite systems (O3B and Kacifica-1) will continue to remain essential for capacity backup and reach into villages where microwave linked to the domestic cable is not practicable. Upon transfer and relegation of satellite to 'backup on demand' and service to most remote localities, the CS2 is expected to contribute strongly to expanded internet usage among consumers. With higher user adoption, businesses will have increased incentive to promote transition to e-commerce to serve demand from consumers. Consumers will look forward to a better browsing experience and likely adoption of streaming services.

Figure 9: Access to and prices of mobile broadband services, Solomon Islands (ITU, 2018)



210. The Coral Sea Cable System (CS2) was 67% funded by the Government of Australia under a DFAT grant, with additional investment from the Investment Corporation of the Solomon Islands (ICSI) and the Solomon Islands National Provident Fund (SINPF). It connects Sydney to Honiara and Port Moresby. A domestic cable extension brings optical fiber capacity to three other points: Taro, Noro, and Auki. The cable has a total capacity of 20 Terabit/s of bandwidth of which about 3Gbps has been sold to operators. CS2 is managed by the Solomon Island Submarine Cable Company Limited (SISCC).

211. The CS2 is expected to boost internet speeds and uptime and greatly reduce latency. This will also support ISPs offering value-added services on the back of the lower costs of the high-speed network. A component of the domestic network capability will be on local content development (development of a reliable internet exchange will also assist promoting local content development). This includes the development of better media studios and more accessible and easier to access local news distribution.

212. However, the impact on service uptake by individuals and businesses, including for e-commerce and e-government, will depend very much on user end facilities (high speed connection, devices such as laptop, tablet or phone, and the means of powering them) and pricing. The wholesale price - which impacts downstream retail pricing—will be a critical factor in terms of the expansion and utilization of such services. This in turn depends on the business model for the SISCC. Equally with this is the rollout of a reliable, high capacity microwave network to deliver broad band service to 4G base stations which provide the final link to the users.

213. The SISCC business model is presently being finalized and preliminary pricing is in place for operators to access the capacity of the SISCC, and as data consumption increases, wholesale prices will decline. The middle (backhaul) and last-kilometer connectivity together with the user end facilities are yet to be addressed. Across all these matters, regulatory issues will be important, in particular open access and fair and non-discriminatory pricing and infrastructure sharing. While the regulatory regime allows for addressing these matters it presently does not drive them.

214. Other undersea cable projects that are proposed are to connect Port Vila, (Vanuatu) to Honiara and separately to connect Honiara (via Taro) to Arawa (Bougainville). Dataco of PNG has also proposed a cable from Arawa directly to Guadalcanal (Naro). Business viability and financing status of these cables is yet to be determined.

215. The geographical nature of Solomon Islands creates particular challenges for domestic backbone roll-out. The country is made up of 992 islands, of which more than 300 are inhabited, with 76 percent of the population living in rural areas.[20] Our Telekom has been investing in its terrestrial backbone in Honiara and has included terrestrial optical fiber linking Base Stations and the network center. In addition, Solpower (the Solomon Islands electricity provider) has plans to expand its fiber network as part of its major IT upgrade, which will tie in with the expansion of the SIG Network (linking centers around Honiara), possibly linking to the SISCC, and providing network resilience for Honiara.

216. Outside Honiara, backbone networks are increasingly microwave networks linked to the cable landing stations of the domestic submarine cable network. In Malaita, backhaul (middle Km) is already a microwave loop linking to the Auki cable landing and a microwave network is extending from the Noro cable landing station to serve the Western Province of New Georgia, Gizo and Munda. While there will be a place for satellite for some localities, a large fraction of the population will be readily services by the combination of cable landings and microwave middle Km. The regulator (TCSI) believes has noted that may be opportunities for small-scale broadband service provider operations in the provinces, possibly through PPPs, and possibly involving Solpower.

Perspectives for future growth/enhancement

217. An Interim Licence was issued to the Solomon Islands Submarine Cable Company (SISCC) in January 2020 and regulatory action is required to complete SISCC becoming fully operational, including determination of the access regime (technical and legal matters) for licensed

[20] World Bank Data 2018

operators to SISCC capacity. Interim commercial terms are presently in place but these need to be clarified as soon as possible. The Domestic cable access arrangements are special conditions to encourage adoption of the domestic cable and assist the sector during the COVID crisis. However these also need to be settled for the long term use of the service.

218. Additional regulatory measures to incentivize development of the middle Km, access network and user facilities will also be needed. For the middle Km these include passive infrastructure, site and site facilities sharing. Although a universal access policy has been considered it would be complex to administer, and global experience has been mixed some support is required for end users to achieve the required end user facilities acquisition that will lead to widespread broadband Internet access and use. It is unclear whether or how such a targeted industry tax or some new innovative measure could provide the necessary stimulus to outer islands' investment, or whether PPP models, cross sector (e.g. SolPower) and other regulatory incentives would be more effective.

D. Cybersecurity

Current situation and recent developments

219. Cybersecurity represents a significant challenge. Currently there is no cybersecurity awareness training, nor is there a formal security audit or monitoring process. As part of an overall National Security Framework, the Royal Solomon Islands Police (RSIP) are developing and publishing a National Cybersecurity Framework, as well as investigating cybercrime. Concurrently, the MCA is establishing a national cybersecurity working group made up of a broad cross-section of government and private sector stakeholders (see further discussion below). A core element of the working group's brief is to organize the development of legislation related to cybersecurity, cybercrime, and data security and privacy. It will be important to ensure the working group's efforts are coordinated with those of the RSIP. ICTSU is considering providing internal security awareness training through an e-learning vendor such as Udemy, which provides lower cost enterprise accounts, and a very large selection of courseware. Other options, such as formal residence training is also being considered for select staff.

220. The following chart depicts a cybersecurity maturity assessment following the CMMI model, as published by the US Department of Homeland Security. In this maturity scale, the World Bank team places the Solomon Islands at Level 1 – Initial. The five-year target is to bring the SIG and private industry, civilians, and education to Level 3. This achievement would greatly reinforce the Solomon Islands overall cybersecurity risk profile.

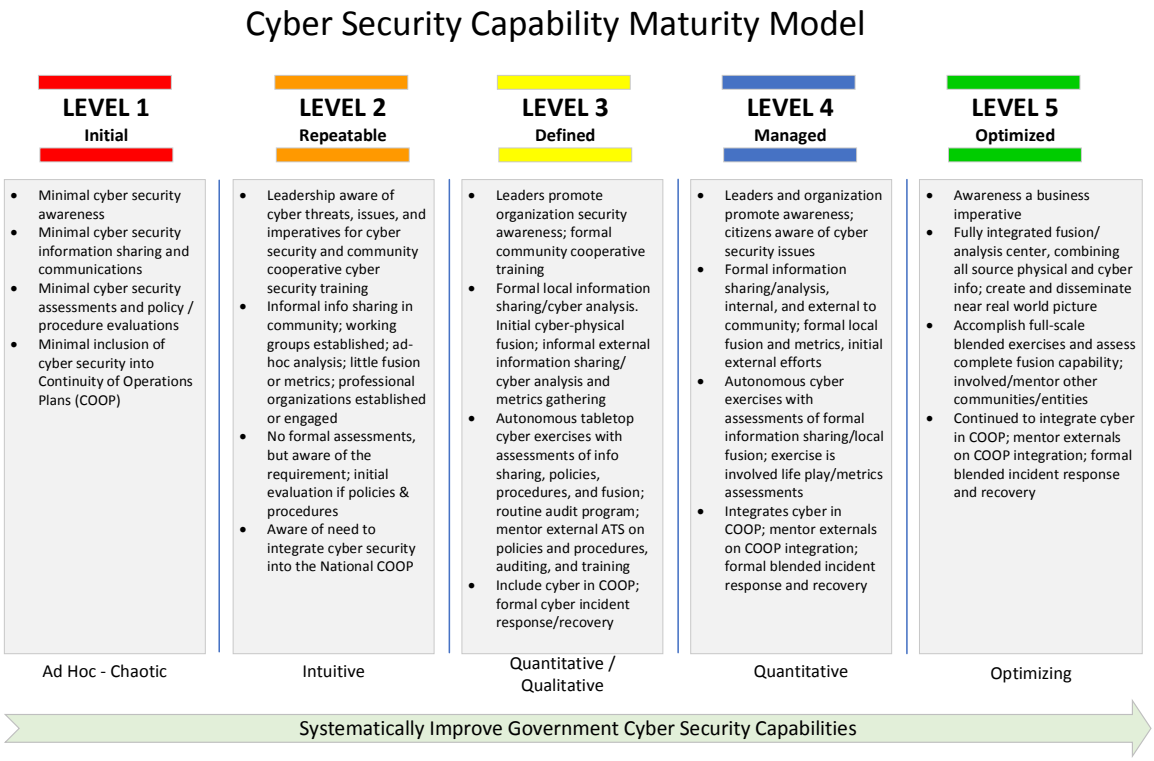


Figure 10: Cybersecurity Capability Maturity Model

Perspectives for future growth/enhancement

221. Discussions with government agencies indicated that cybersecurity is at a very low maturity level. Cybersecurity must not only be administered within the operational environment, but also become an essential part of the culture of government, business, and all citizen users of ICT. Cybersecurity education and skills development is needed at the earliest feasible levels in public education, and continuing throughout academic training, professional careers, and individual use of technology.

222. The National Cybersecurity Framework is a good start and will address the major components of a cybersecurity program (confidentiality, integrity, and availability of ICT resources). However, to address the need for greater skills, awareness, and implementation of cybersecurity programs a National Cybersecurity Strategy with targeted goals and specific enabling objectives is needed to ensure cybersecurity is a top priority for Solomon Islands as ICT and Information Systems continue to diffuse into all aspects of government, business, and citizens' activities.

223. The Cybersecurity Strategy or Strategic Plan should cover standards (with the National Cybersecurity Framework), education, operational monitoring, risk management, security culture, security risk mitigation, and a comprehensive risk assessment/audit program. While development of new standards would be a daunting task, there are many existing ISO security standards available which could be adopted, and government security programs that could

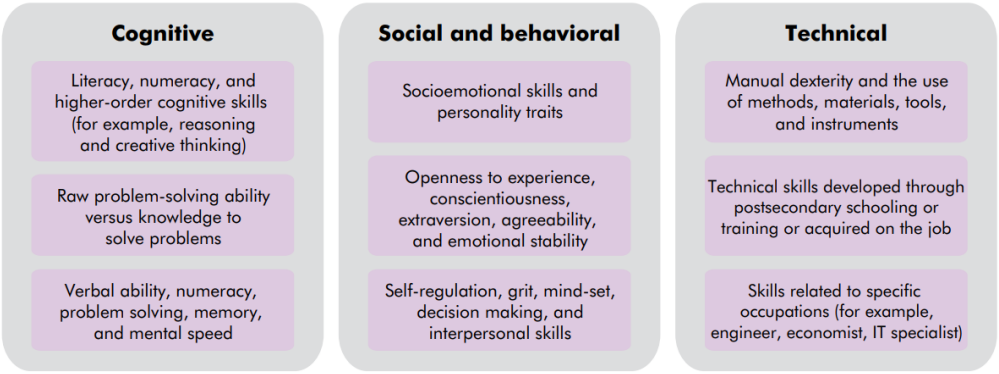
also be used as reference or adopted to accelerate the Solomon Islands Cybersecurity program.

E. Digital Skills and Awareness

224. Digital skills and awareness are a critical element of a country's ability to derive value from digital transformation. Aspects of this element include:

- Overall awareness and capability of both the public and private sectors to participate in a digital economy and deliver and receive public services across digital channels.

Figure 11: The types of skills needed in a modern economy[21]



- The depth and breadth of the digital skills base, involving website design and maintenance, content development, API connectivity (e.g. for digital financial services), mobile apps development etc.

- The adaptability of the skills-providers base comprising universities and technical institutes (as well as on occasion TVET providers) relating to the needs of the private sector vis-à-vis digital skills. In a digital economy, a greater and greater percentage of jobs will include the use of computers and ICT skills will be a prerequisite for getting those jobs (see Figure 11).[22]

- The presence of training courses related to digital businesses entrepreneurship and management.

[21] World Development Report 2016

[22] World Development Report 2016 – Based on World Bank STEP household surveys

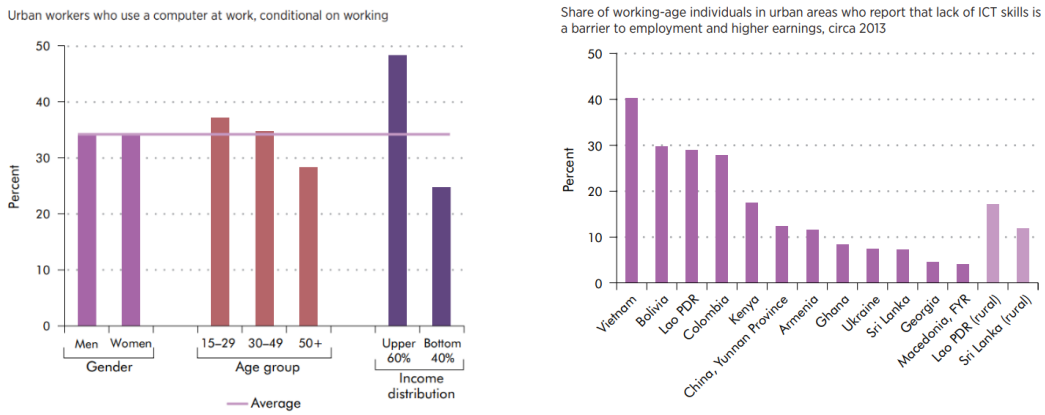


Figure 12: Digital Skills indicators

- The level of coordination between various support institutions spanning policymakers, skills providers, and the private sector.

Current situation and recent developments

225. Overall digital awareness and capability among Solomon Islanders, in both the public and private sectors, is generally quite low. The relatively low broadband and smartphone penetration suggests limited use or awareness of digital services or products. To the extent that the average citizen receives services across digital channels, it is most likely through social media and, on a smaller scale, through services provided by the SIG. From education to taxes to school fees, some SIG systems have been deployed and more are planned. As described below, the private sector has been slow to roll out digital services. The generally low levels of awareness result in low demand for those services.

226. The depth and breadth of the IT skills base is one of the weakest links in the entire digital economy ecosystem. The main policy focus has been on developing ICT skills in primary and secondary schools and leveraging e-learning models for children. At the tertiary level, the ICT skills base is remarkably weak. Higher-level education is provided by Solomon Islands National University (SINU), Open College of University of Papua New Guinea (UPNG) (distance learning), and University of South Pacific (USP), and only USP provides a bachelor's degree. No masters level ICT degrees are offered in the country. All agencies interviewed, including commercial telecommunications carriers, indicated difficulty in attracting and retaining qualified and motivated technical staff. Nearly all technical and professional training is conducted offshore. Although there are several adult education programs available in vocational skills such as automotive repair, construction, and refrigeration, little formal education is available in disciplines related to information systems, technology, or IS/ICT governance.

227. A common outcome of this situation is either complete or partial outsourcing of SIG agency systems or applications. Much of the outsourcing goes directly to ICTSU, both in the form of

hosting as well as applications support. To meet the requirement, the ICTSU has been steadily consolidating technical staff from among the agencies. Other systems, including complete commercial outsourcing of data and applications, are hosted by offshore companies.

228. There are no certificate-level ICT training providers in Solomon Islands. This gap is important because it is essential that training providers have the knowledge and experience needed to be responsive and adaptive to the needs of the market. Locally-based providers can better and more rapidly respond to feedback from the private sector, policymakers etc.

229. Although management courses exist, there are currently no training courses aimed at digital business entrepreneurship, governance, risk management, or other professional skills. Business incubation and mentorship opportunities for businesses involved in the digital economy, especially youth and women-based enterprises, are weak. This gap is understandable given that the overall digital economy has not yet significantly evolved.

230. Coordination is weak among the various support institutions spanning policymakers, skills providers, and the private sector. There is currently no forum that meets regularly to discuss skills alignment and human capacity issues related to the digital economy.

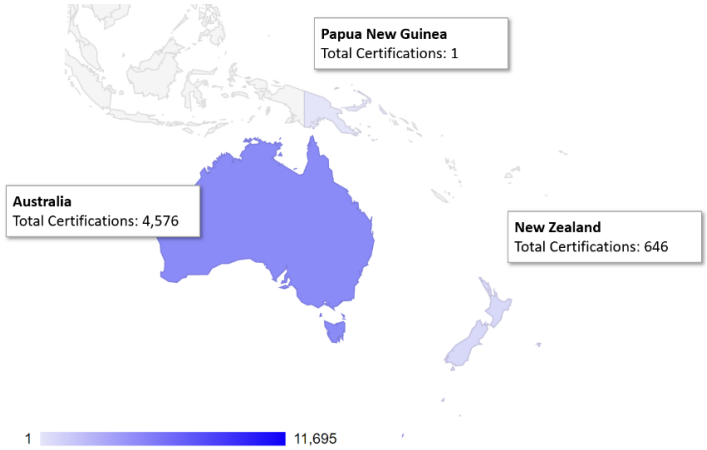
Perspectives for future growth/enhancement

231. Inter-agency coordination for skills development issues must be strengthened, and there must be a coherent feedback loop established between policymakers, skills providers, and the private sector. The MEHRD should establish a mechanism for regular consultation among government agencies, tertiary education institutions, and the private sector.

232. The ICT sector will need some incentives to develop. The domestic market for software firms is virtually non-existent. The SIG could, for example, create market demand in the form of preferred supplier programs (just like in the case of hardware firms) and other means. Through a system of structured incubation and mentoring, an enabling environment for fostering growth of digital business startups could be developed.

233. At the university level there is a need to review curricula and course offerings, and explore ways of adapting them to the digital economy. This may include the development of master's level IT courses, integrating digital business management principles within existing management courses, and fostering the development of IT and professional training institutes.

234. In the short-medium term, certificate and professional certification level training providers will be very important for SI's digital economy. Trainees will not want to invest in three to four-year degree programs when they are unsure of getting jobs in the market (which could be the reason that master's level courses have not yet emerged). However, a six- month- or year-long program with a structure placement assistance program could be more palatable. Industry standard and accepted certifications in cybersecurity, audit, governance, service delivery, and technical skills are needed to bring both credibility and confidence to domestic and foreign investors. Figure 13 (above) shows the number of TOGAF (Enterprise Architecture) certified individuals in the Asia/Australia region. Currently, the Solomon Islands has no registered enterprise architects. Figure 14 shows the number of ISACA professional certifications in the Oceania region, with the majority of certifications located in Singapore, Australia, and New Zealand.



235. One recommendation from the private sector is to continue the use of international SMEs with specialized skills in both operational and training/mentoring positions. This will help to accelerate the adoption and deployments of technologies, while training Solomon Islanders to take over critical technology-related roles. An important aspect of this issue is the need to develop information management capabilities within the agencies. There is a need for individuals that understand both the information requirements of their respective domains, as well as basic digital and technical literacy, so that they can effectively communicate those

requirements to ICTSU or other ICT service providers.

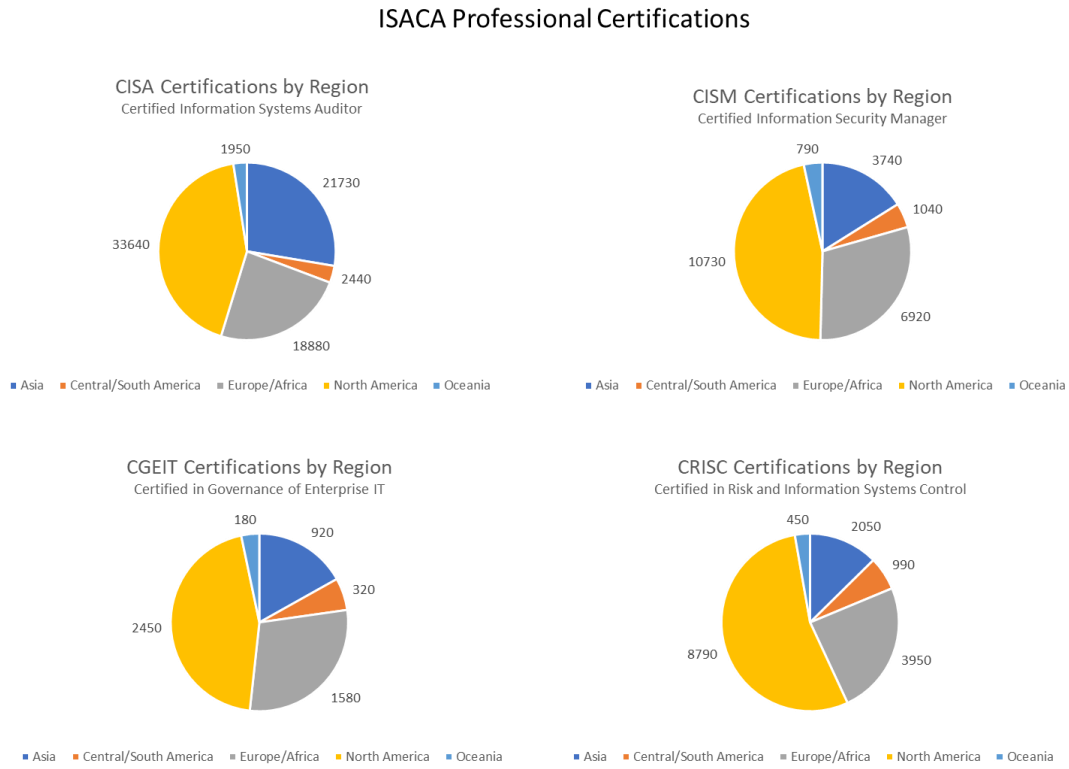


Figure 14: ISACA professional certifications by region

236. A broad-based digital literacy and ICT awareness program needs to be launched. Policymakers will need to understand the various policy implications of the digital economy; legislators will need to understand the various policy, societal, and economy-wide implications of the digital economy envisioned for the Solomon Islands; and the general populace will need opportunities to strengthen literacy and to be made aware of the various advantages and disadvantages (including risks and "good" cyber-practices and "cyber-hygiene") of access to broadband-based internet services and applications.

F. Digital Identification

237. A digital ID system (e.g. a national ID system) supports the effective and efficient delivery of public and private sector services and the introduction of platforms to enable digital government and digital economy. By allowing people to reliably authenticate their identity in face-to-face and online interactions, digital ID can make services more accessible and enable such services to move to the internet, which is important for populations on outer and remote islands. For example, a robust digital ID system can simplify and streamline the customer onboarding process for banks and other financial service providers, shifting from the need for multiple documents to verify identity and address to, potentially, a single number for authentication (e.g. PIN code, One Time Password through SMS, or biometrics). Such streamlining can also make it possible for agents equipped with mobile or other point-of-sale (POS) devices to open accounts on the spot (including in remote areas), rather than requiring

customers to visit bank branches. Similarly, by establishing uniqueness of individuals, a digital ID system will facilitate interoperability and linkages, in appropriate circumstance, of data on the same individual across information systems, which will support e-government and could help reduce leakages (e.g. eliminating ghost civil servants, ghost social assistance beneficiaries etc.).

238. To maximize the benefits and mitigate the risks, it is critical that digital ID systems are implemented in line with international best practices. The Principles on Identification for Sustainable Development (see box below) offer a useful guiding framework around the pillars of inclusion, design, and governance. For example, digital ID systems should be linked with civil registration systems that continuously capture births and deaths as they occur, which will ensure accuracy and improve the efficiency of the digital ID system. Likewise, there should be a comprehensive legal regime for data protection and privacy, which provides safeguards for how personal data is collected, used, and shared. Costs can be reduced by not depending on a physical card for authentication but instead leverage a database (subject to the availability of connectivity), and vendor and technology neutrality can be achieved by adopting international standards. Finally, people – as data subjects – should have oversight and control over their data.

Box 4: Principles on identification for sustainable development: Towards the digital age

23

Inclusion: Universal coverage and accessibility

1. Ensuring universal coverage for individuals from birth to death, free from discrimination.
2. Removing barriers to access and usage and disparities in the availability of information and technology.

Design: Robust, secure, responsive and sustainable

3. Establishing a robust—unique, secure, and accurate—identity.
4. Creating a platform that is interoperable and responsive to the needs of various users.
5. Using open standards and ensuring vendor and technology neutrality.
6. Protecting user privacy and control through system design.
7. Planning for financial and operational sustainability without compromising accessibility.

Governance: Building trust by protecting privacy and user rights

8. Safeguarding data privacy, security, and user rights through a comprehensive legal and regulatory framework.
9. Establishing clear institutional mandates and accountability.
10. Enforcing legal and trust frameworks though independent oversight and adjudication of grievances.

[23] The Principles were developed by more than 24 international organizations in 2017, including the World Bank Group, the Asian Development Bank, UNICEF, UNDP, UNHCR.

Current situation and recent developments

239. The Solomon Islands does not currently have a national ID system to serve as a foundational ID (for general identification purposes). However, it does have a biometric-based voter registry that also issues voter ID cards, which are used (on face value) as evidence of identity for most transactions (along with driving licenses). The voter registry and driving license system – as functional ID systems – are limited to adults who are registered as voters or drivers, and are not designed to provide authentication services, such as to banks for customer due diligence during account opening.

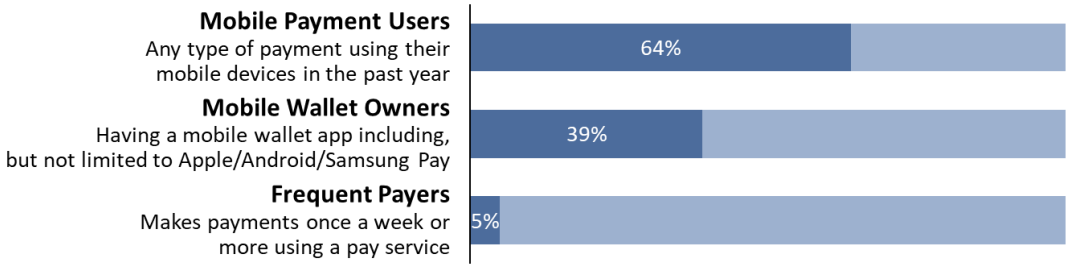
240. The Solomon Islands does have electronic civil registration system managed by the Ministry of Home Affairs, which has been supported by UNICEF. While the system is advanced, there are coverage gaps among the existing population, owing largely to the limited number of locations where people can register (only at the Ministry of Home Affairs in Honiara and the two largest hospitals). This system offers a strong basis on which a population registry could be compiled.

Perspectives for future growth/enhancement

241. There is a compelling case for a national ID system in the Solomon Islands that is worth exploring, particularly with early use cases around financial inclusion, social protection, and e-government, and for further support to strengthen coverage. Such a system should be linked to the civil registration system and associated with parallel efforts to expand coverage of civil registration, which will be important for the integrity of any future national ID system. The government may wish to consider carrying out an ID4D Diagnostic[24] to identify strengths and weaknesses of the current identity landscape and to make recommendations regarding a future national ID system.

G. Digital Payments

242. Online payment systems are a key enabling element for e-commerce and more broadly for a digital economy. Making or receiving payments across digital channels is rapidly replacing physical means (cash and checks) (see Figure 15 below[25]).



[24] More information on ID4D Diagnostics is available at https://id4d.worldbank.org/Diagnostic-Guidelines

[25] Payments Cards & Mobile - Global usage statistics from 2018

Figure 15: Digital payments vs. physical payments

243. Between 2014 and 2017, the share of adult account holders in developing countries using digital payments rose by 12 percentage points (see Figure 16[26]).

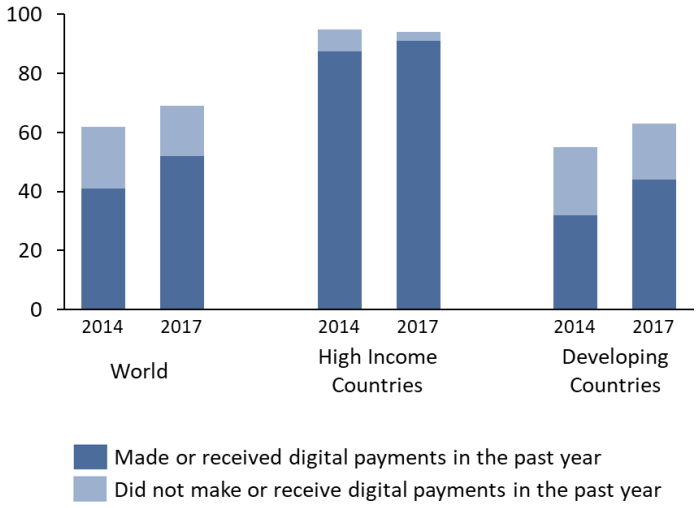


Figure 16: Using digital payments

244. This is despite pervasive regulatory, technical, and awareness challenges. In the developing country context, a non-linear evolution from cash to mobile money to card-based transactions is observed, and interventions are required at multiple levels to develop the demand and supply sides.

Current situation and recent developments

245. Solomon Islands has a largely cash-based economy[27] and lacks significant payments and fintech regulation. The finance sector is small. Due to the simple nature of the market, there is no current law in relation to P2P lending, crowdfunding, or virtual assets.

246. Only around 35 percent of the population have active bank accounts[28] and the financial market is described by the Central Bank as underdeveloped.[29] The government has emphasized its commitment to digitize 80 percent of payments by 2020 as part of its National Financial Inclusion Strategy and through a commitment to the United Nations Capital Development Funds "Better than Cash Alliance".

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[26] World Bank Global Findex Database

[27] APG Mutual Evaluation Review (2019)

[28] According to the 2018 CBSI Annual Report, "By end of 2018, total active users of financial accounts reached 233,972. According to Solomon Island government statistics the population is 680,806. The 35 percent is arrived at using these figures.

[29] 2018 CBSI Annual Report

247. The national payments system bill developed by the Central Bank with the technical support of the WB is pending before parliament. The bill delineates the technical and legal basis for facilitating online payments in the country and will have widespread implications on a range of payments-related developments. E-government services involving government payments to/from citizens and business-to-business transfers are planned but not yet implemented since the legal basis does not currently exist. Similarly, banks have not yet rolled out online payment systems but will be readily able to do so since most of the major banks are Australian entities and already possess active and proven products.

248. Under the Draft Bill, digital payment systems will be regulated as a form of "payment system". A payment system operator or a provider of payment services must be licensed and supervised by the Central Bank. "Payment services" includes the issue or acquisition of payment instruments, effecting remittances, and any other service relating to the transfer of money, including "electronic money". It excludes the provision of solely online or telecommunications services or network access. Financial institutions already licensed under the FI Act will not need to apply for a license for the purpose of providing payment services but will need one to operate payment systems.

249. While mobile banking solutions exist, the main functionality is used for online banking and mobile top-ups. Since the deployment of the first mobile money solution in 2013, mobile money accounts have increased dramatically. Consumer trust and willingness to adopt mobile money solutions has not been a significant issue. It is expected that consumers will adapt well to mobile payments as and when functionalities emerge.

250. All three major banks in the country have mobile banking/mobile money solutions: ANZ (Go money), BSP (Branchless Banking), and POB (POB Purse). The expansion of mobile banking has greatly contributed towards financial inclusion as well. Consider that since the launch of ANZ's goMoney application in 2013, the application has experienced a sharp rise in adoption. In less than two years, the service attracted 24,500 customers, 15,500 of whom had never previously held a bank account. The appeal for consumers is primarily also due to the convenience of not having to travel to limited physical bank branches, as well as the safety dimension of carrying cash across large distances.

251. In July 2019 the Central Bank issued a practice guidance note on mobile money services with the objective of establishing a procedure for those wishing to provide mobile money services. The overall payments system ecosystem is moderately well developed for mobile banking/mobile money but is immature for card-based systems. Cash on delivery is the predominant payment mechanism in the country; debit cards exist but are not widely used.

252. Person to person transfers constitute the third most important functionality of mobile banking solutions, the other two being checking account balances and topping up mobile phone credit balances. The usage profile is high-volume, low-value remittances, and while currently only 5 percent of total remittances are through mobile banking, this may scale up quickly. According to the IMF[30], the business case is strengthened primarily due to two factors:

[30] IMF Country Report No. 18/57, Solomon Islands: 2017 Article IV Consultation-Press Release; Staff Report; and Statement by the Executive Director for Solomon Islands, IMF, 2018.

a) The steep growth in the number of active mobile money/mobile banking agents (trailing Fiji but ahead of other countries such as Tonga, Samoa, and Timor-Leste)

b) The high number of mobile money/banking transactions relative to population, and the steady growth in the value of mobile banking transactions (as percentage of GDP, between 2013 and 2016).

253. Remittances have strong applications for e-commerce as well. Once lead e-commerce firms start emerging, this payment mechanism can be leveraged to reduce the dependency on cash.

254. A key challenge that is impacting mobile banking/mobile money solutions is the money agent network. Given the remoteness of Solomon Islands' communities, the banking agent's liquidity, safety, and expansion is a pervasive challenge. Standardization of quality in terms of agent training is also a challenge, although the Central Bank has issued a practice note for standardizing agent selection and training. The Payments System Bill addresses the issue of agents and the CBSI will issue detailed regulations once the bill is approved.

255. The government's decision to join the Better Than Cash Alliance (BTCA), and related commitment to convert 80 percent of its payments to digital channels by 2020, is promising for the development and adoption of payment systems in the country. However, this again will require an expedited review and passage of the national payments bill as well as deployment of payment solutions. Consumer awareness to spur adoption will also be required.

256. Integration of Solomon Islands' financial system with those of New Zealand and Australia, and the due diligence that the government has invested in the AML/CFT space, have resulted in continued strong compliance with AML/CFT regulations, leading to relatively low challenges in forging correspondent banking relationships.

Perspectives for future growth/enhancement

257. The government's decision to join the BTCA and, through it, pledging to convert 80 percent of its payments to digital channels by 2020, is a significant boost to the digital finance ecosystem and e-government. This is a lofty and challenging goal and will require significant ramp-up on the ICT infrastructure side as well as the digital payments area. The government's commitment under the BTCA should be supported by developing and promoting digital payment channels in all government P2G and G2P transactions (including with government salaries, tax payments, public utility bills, etc.).

258. The national Payment Systems bill (delayed passage and pending before parliament) is an essential component that will lay out the legal basis for electronic payments in the country.. The passage of the Payments System Bill is an immediate and urgent requirement, which will allow the banks to introduce online payment solutions.

259. In parallel, the CBSI is working on the implementation of critical systems for the digital clearing and settlement of payments and securities. The new infrastructures will be active by the end of 2021 and will allow full interoperability of banks and other payment service providers, plus

a new set of services for the trading of securities. The reform will offer the opportunity to the government to progressively shift from paper-based instruments to digital tools to perform and receive payments. The WB has assisted several developing countries in this regard and has been supporting the CBSI in the ongoing reform.

260. The liquidity, network scaling, and standardization of training challenges for money agents is a choke point for adoption of mobile money solutions. This is especially exacerbated due to the geography of the country and its dispersed communities. Solutions including development of independent, non-exclusive agents that can serve all providers should be explored, as well as greater collaboration between Solomon Post, MNOs (Our Telekom and Bemobile), and the banks (ANZ, BSP, and POB) to pool resources and share agents. Innovative solutions such as large grocery stores serving as clearance points for smaller agents could also be explored. Ongoing discussions to explore the possibility, and issuing regulations enabling regulated non-banks including MNOs to issue mobile wallets, should be supported.

261. Revision of regulatory and supervisory frameworks related to AML/CFT and tax transparency, especially considering recommendations from recent FATF reviews in country, will be essential to maintain/scale up critical correspondent banking relationships as well as to remain in compliance with international requirements.

ANNEX 1 - Digital Government and Digital Economy Prevailing Factors

The Annex provides a brief overview of the prevailing macroeconomic and political context in which digital development will occur in the Solomon Islands.

1. Macroeconomic and Political Environment

Current situation and recent developments

262. A driving factor behind the 1998-2003 civil conflict was the concentration of economic opportunities and economic development in Honiara versus other provinces, including but not limited to the second largest province of Malaita. Given the diversity in ethnic makeup in different provinces, a pervasive perception that Honiara is favored in national development over the larger part of the country continues to foster discontent. This perception is ever-present and civil unrest still flares up occasionally.

263. Solomon Islands' geography imparts significant challenges to developing the infrastructure and fostering economic development outside the capital. There are 300 inhabited islands with a widely dispersed population, posing problems for connectivity, governance, and commerce. The high rate of inward migration in search of jobs and better living prospects has also put pressure on Honiara's infrastructure. This has prompted the government to set forth a range of initiatives aimed at developing services and opportunities in the hinterland. These include:

a) The development and implementation of the National Financial Inclusion Strategies (NFIS I and II- ongoing). NFIS II builds on the success of NFIS I and is aimed at achieving the following mission by 2020: 300,000 adults will be active users of formal or semi-formal financial accounts (including accounts at MFIs and savings clubs), and 90 percent of the population will have a financial service access point within one hour of ordinary travel from their home. Development partners have aligned their interventions in support of this goal. The UN Capital Development Fund/UNDP's PFIP program has wide-ranging activities aimed at encouraging the development and adoption of financial services by consumers.

b) The government has fast-tracked its e-government interventions (discussed further in this report) as a means to provide access to government services in the provinces.

c) The use of ICT to increase access to education in provinces has also been recognized as an important requirement, and supporting initiatives are ongoing. Health services is another area where online solutions have been implemented.

264. These and other initiatives have a common thread – that of digitization. Solomon Islands has started embracing digitization to overcome and bridge the physical gap between Honiara and the rest of the country with some promising results. In these formats at least, digitization has played an important role in bringing connectivity and service delivery outside Honiara. These efforts highlight the contribution of digitization to peace-building.

Perspectives for future growth/enhancement

265. One area that has remained challenging to overcome is how to generate economic activities in the hinterland that would have the most direct impact on peace-building. This is an area requiring much due diligence and fact-finding on the ground, but would certainly involve development of the country's core non-extractive sectors including:

a) The smallholder agriculture base (especially cocoa, coconut/copra, and oil palm among others) as an anchor for improving productivity, feeder services to other industries, and developing agri-entrepreneurs among others
b) The tourism sector
c) The fisheries sector, given the country's valuable fishing stocks, especially tuna

266. Digitization could help develop these sectors in the following ways:

a) Improving connectivity, communication, and ultimately collaboration between various sector stakeholders
b) Employing internationally proven technologies for efficiency gains in agriculture, manufacturing, and other segments, ultimately resulting in higher quality goods with decreased operating costs
c) Fostering local markets development (even if through social media platforms) so that sellers do not have Honiara and provincial capitals only as key markets.
d) Connecting and forging relationships with buyers in international markets, which admittedly will take time to materialize, but will still be sped up via anticipated increases in bandwidth and speed, and decreasing costs and latency (post submarine cable arrival)

2. Trade Policy and Performance

Current situation and recent developments

TRADE POLICY

267. Of the three main policies that have a bearing on the digital economy - National Development Strategy, National ICT Strategy, and National Trade Strategy – it is the National Trade Strategy that has arguably consolidated a policy focus on the overall trade potential in the country. It identified key priority sectors, many of which have a strong e-commerce potential, such as agriculture, fisheries, and tourism. In doing so, the strategy has considered those sector's productive capacities, FDI requirements, and market access negotiated by policymakers. This framework sets a valuable vision for trade-related growth. Together the three instruments serve to build a serviceable vision for aspects related to e-business, ICT sector development, and trade competitiveness, although there is no policy document that addresses the long-term digital economy strategy for the country.

268. Although not a policy document, the recent e-trade readiness assessment conducted by UNCTAD for Solomon Islands can also serve as a valuable analytical stepping stone to a long-term strategy for the digital economy. The multi-dimensional review of the e-commerce

ecosystem also provides key recommendations that can serve as starting points for development interventions for the ecosystem.

TRADE (AND ECONOMIC) PERFORMANCE

269. High concentration and reliance on logging has resulted in unsustainable treatment of its forests, and exposed the economy to external shocks arising from wood prices. This is exacerbated by weak economic activity in productive sectors. A similar situation may happen with mining in the future as the sector benefits from upcoming projects coming online, requiring careful consideration.

270. According to the IMF, infrastructure spending, fisheries, and agriculture are expected to keep growth rates buoyant in the short term, despite an anticipated decrease in logging production. Sectoral growth is projected for fisheries, tourism, and agriculture, which are also priority areas noted in the National Development Strategy.

271. The smallholder sector is relatively well organized and can offer an anchor role for development for sectors such as cocoa, coconut, and other agri-based sectors. The agriculture sector has exhibited solid growth in the past decade.

272. The high degree of informality (79 percent of the employable population) is a cause for concern given that a high proportion of formal sector jobs are supplied by the government and the logging sector.

273. Entrepreneurship development in the M/SME sector is extremely weak, and for services sectors such as IT or nascent sectors such as e-commerce, the ecosystem does not adequately provide support. This has a direct tie-in with innovation in the country.

274. Strong growth in international reserves (rising from approximately US$100 million in 2007, to more than US$500 million in 2013 based on IMF figures) function as a buffer for external shocks such as a downturn in exports.

275. Solomon Islands imports far more products (2,905) than it exports (304) and the corresponding import base (101 countries) is almost double the export base (54 countries).

Table 6: Trade partners

Rank	Partner	Number of HS6 Products exported	Export value (USD '000) / %	Top exports
1	China	12	273,318 / 62.5%	Wood/ Raw material/ Intermediate goods
2	Italy	4	30,510 / 7%	Intermediate goods / raw material/ consumer goods
3	UK	4	19,309 / 4.4%	Vegetable/ Intermediate goods / raw material
4	India	2	17,242 / 4%	Wood
5	Philippines	7	16,203 / 3.7%	Raw material/ vegetable /wood
Rank	Partner	Number of HS6 Products imported	Imported value (USD '000) / %	Top Imports

1	Australia	2100	92,484 / 20.4%	Consumer goods/ capital goods/ machinery and electronics
2	Singapore	764	70,486.5 / 15.5%	Consumer goods/fuel/capital goods
3	China	2001	67,393 / 14.6%	Consumer goods / capital goods/ metals
4	Malaysia	1449	47,707 / 10.5%	Capital goods/ consumer goods/ machinery and electronics
5	Japan	540	30,383 / 6.7%	Transportation/ capital goods/ machinery and electronics

Source: WITS

276. Exports in 2016 amounted to US$ 437 million, of which more than US$ 300 million originated from wood products. Other relatively (compared to wood exports) minor exports stemmed from crude palm oil, dried cod, and whole cocoa beans. The value addition component in the export basket is low and the bulk of the products are commodity-based in raw form.

277. The import basket is diverse and comprises petroleum oils, rice and automobiles as the top three imports. Total imports in 2016 amounted to US$ 453.8 million. Solomon Islands imports a broad range of consumer items and exhibits strong import dependency and related import cost given the average distance from suppliers.

278. Solomon Islands's trade deficit is largely driven by a natural dependence on imports to fulfill its consumption needs for consumers and private sector alike. The 2015 enterprise survey notes that 86 percent of manufacturing firms use material inputs and/or supplies of foreign origin, much higher than the EAP average (17 percent) and the lower middle-income average (35.8 percent). Small firms are especially dependent with 100 percent of small firms reporting imports of inputs. This naturally has led to a high trade deficit but has a larger impact on the competitiveness of Solomon Islands goods in international markets. The high costs of importing high-volume inputs contributes to a high cost structure, which has to be passed on to consumers. An example lies in the EU fisheries market, where Solomon Islands products have lost degrees of competitiveness to Thai and other products owing to higher cost products.

Perspectives for future growth/enhancement

279. Improvements in the ICT infrastructure, and especially broadband, offer significant opportunities for existing value chains to add elements of digitization where needed to benefit from efficiency gains. This addition of the 'e-' aspect is currently less prominent in developing country contexts but is gaining ground.

280. In Solomon Islands, digitization in areas of trade facilitation is already occurring through ASYCUDA, and the imminent deployment of the CDS. Solomon Post's pilot projects regarding a GIS-based addressing system is another innovation. A review of the planned e-government initiatives in the country is an indication of the significant impetus that the government is placing on streamlining its services through digital means, and this can be replicated in principle within key value chains as well.

281. Apart from these examples, little value chain digitization is occurring in the country. One of the contributing reasons is that the focus on productive sectors away from logging and mining has just started. This remains an interesting and essential area of further research. The National Trade Policy Framework echoes this sentiment:

'Even if there is no immediate increase in direct services exports, the benefits to the economy through ease of doing business and the attraction of FDI may have secondary trade-related effects. ICT in archipelago states can address the effects of economic fragmentation, allowing the central authorities to communicate quickly and effectively with the outer islands and for outlying areas to be included in overall economic growth. Communications technology can reduce the need for international and domestic travel and freight. Access to international scholarship is necessary for the development of greater domestic research capacity, and Solomon Islands' small population precludes the creation of high-quality traditional libraries. Cheaper and more advanced international communications technology also enables stronger connections – including economic links – between resident and overseas communities. ICT can also fuel the development of the financial sector through technologies such as mobile payments. Finally, a good ICT infrastructure is critical for attracting FDI, particularly outside the tourism sector, which will be important in the coming years.'

3. Access to Financing

282. Access to financing is frequently a key challenge in LDCs, and especially when the financing requirements, both operational as well as capital, are for a sector that is relatively unknown to the commercial sector. There are also significant and pervasive demand and supply-side challenges which are hard to overcome.

Current situation and recent developments

283. The access to financing area is one of the weakest links for Solomon Islands within the digital economy ecosystem. The country has some of the highest interest rate spreads in the region, as well as a lending environment where commercial banks and loan-seekers have not formed a level of trust owing to a number of factors.

284. Financial inclusion is a priority for the government. Two broad strategies aimed at developing the financial infrastructure (NFIS I) and developing the demand-side financial literacy (NFIS II) have been developed to achieve financial inclusion. NFIS II is currently active.

285. The commercial banking sector has largely been unable to cater to lending requirements for the broader M/SME sector. The reasons are varied, some in common with other developing economies and some that are unique to Solomon Islands:

a) The weak growth of the productive sectors such as agribusinesses and services, and consequent M/SME segment originating from these sectors has meant that commercial banks have not been sensitized to the requirements or the potential for growth in these sectors. This is especially true for e-commerce, IT, and other areas that are currently in the nascent state in the maturity curve.

b) Financial literacy is a significant challenge as well as a current focus area for the government under the NFIS II, aimed at developing trust and increasing adoption among the consumer base for financial products.
c) Weak capability of MSMEs to demonstrate creditworthiness through paperwork, financial statements, and sound business plans.
d) A weak culture of repayment, stemming from over-reliance on informal networks and an overall lack of formalization in the M/SME segment.
e) Lack of options for utilizing movable assets as acceptable collateral.

286. Digital economy/e-businesses/e-commerce are all new concepts to Solomon Islands, and even the ICT sector (for software) has not exhibited any significant levels of growth. In this environment, level of startup activity is significantly weak, and the banking sector is not well attuned to the potential or the requirement for such firms.

Perspectives for future growth/enhancement

287. An important need exists to foster meaningful discussions with regulated lenders and sector associations representing sectors anticipated to be early adopters of e-commerce, such as agri-business and tourism, as a means of fostering trust development and product development.

288. Digital financial services (mainly through mobile phones) would need to include a loan-seeking component to cater for dispersed populations given that there is an inordinately low number of brick-and-mortar banking facilities in the hinterland/islands. Exploring how the network of cash agents across the country could be harnessed would also be important.

289. As part of projects and activities planned for reaching the stated goals of NFIS II, digital economy dimensions should be included, for instance aimed at building financial literacy for consumers.

ANNEX 2 - Solomon Islands Digital Economy Workshop Report

ANNEX 3 - List of Institutions Consulted

Ministry of Communications and Aviation
Ministry of Finance and Treasury (including ICT Support Unit)
Central Bank of the Solomon Islands
Ministry of Foreign Affairs and Trade
Ministry of Commerce, Industry, Labour and Immigration
Ministry of Justice and Legal Affairs
Ministry of Education and Human Resources Development
Ministry of Health and Medical Service
Ministry of Public Service
Office of the Attorney General
Telecommunications Commission of the Solomon Islands
Solomon Islands Submarine Cable Company
Solomon Post
Solomon Islands Visitors' Bureau
Our Telekom
Bemobile
BJS
DHL
Eworld Technology
FXBC Datec Solomon Islands
Chamber of Commerce
SolFish
ANZ Bank
TIASI

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