USAID'S LEADERSHIP IN PUBLIC FINANCIAL MANAGEMENT

Detailed Guidelines for Improved Tax Administration in Latin America and the Caribbean
Chapter 12. Information Technology

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List of Acronyms and Abbreviations

Acronym	Definition
CIAT	Inter-American Center of Tax Administrations
COTS	Commercial off-the-shelf
CRM	Customer relationship management
ERP	Enterprise resource planning
FAQ	Frequently asked questions
FTE	Full time equivalent
ICT	Information and communication technology
IADB	Inter-American Development Bank
ISP	Internet service provider
IT	Information technology
ITIL	Information technology infrastructure library
ITSM	Information technology service management
LAC	Latin America and the Caribbean
MIS	Management information system
ODS	Operational data store
OECD	Organisation for Economic Co-operation and Development
OLAP	Online analytical processing
SLA	Service level agreement
TIN	Taxpayer identification number
VAT	Value added tax

ACKNOWLEDGMENTS:

Chapter 12. Information Technology

Information technology (IT) has experienced rapid advancement in the last few decades. IT has had a direct and profound impact in the way private and public entities conduct business. In particular, IT is a crucial component of modern tax administration, as it enables tax administrations to better gather and analyze information, proactively manage workload and resources, foster a cooperative engagement with taxpayers, and standardize the treatment of taxpayers, facilitating the uniform application of the tax law.

Today, IT is increasingly important to tax administration. In 2008, the OECD estimated that tax administrations spend at least 15 percent of their total budget on IT.[1]   However, tax administrations in need of IT interventions face an increasingly complex IT solution landscape, with many areas of potential IT interventions, multiple approaches to implementation, and many vendors. In addition, IT remains costly and is often less successful than desired.

The objective of this chapter is to discuss the core IT components and capabilities as they relate to tax administrations.

12.1. Leading Practice

The purpose of this section is to discuss leading practices in the use of IT in tax administration. Specific focus is given to the role of IT in supporting the core functions of a typical tax administration as well as leading practices in the implementation of an IT support organization.

12.1.1. The Role of IT in Tax Administration

Historically, the most prevalent use of IT systems in tax administrations has been to underpin the core tax administration tasks of processing returns and payments and collecting relevant information. The 'core tax' component of contemporary IT systems continues to provide support for these tasks, enabling the tax administration to move away from heavy manual processing and to direct its resources to facilitating, monitoring, and enforcing compliance. Today, IT also facilitates voluntary compliance by opening multiple, interactive and electronic channels with taxpayers. This component of modern IT systems, dubbed the 'e-tax system,' may include support for electronic registration, filing, payment, information dissemination, and other functions. With respect to compliance monitoring and enforcement, the 'compliance performance system' of modern IT systems supports the tax administration's audit and collections functions in collecting and managing information on target areas where non-compliance poses greatest risks to revenues. In addition, as with any organization, the 'management information system' (MIS) component of the modern IT solutions facilitates decision-making by getting the right information to managers and staff. This IT solution 'landscape' for tax administrations is shown in the following figure and is further detailed below.

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[1] OECD (January 2009), p. 78.

Figure 12.1. An illustrative IT solution landscape
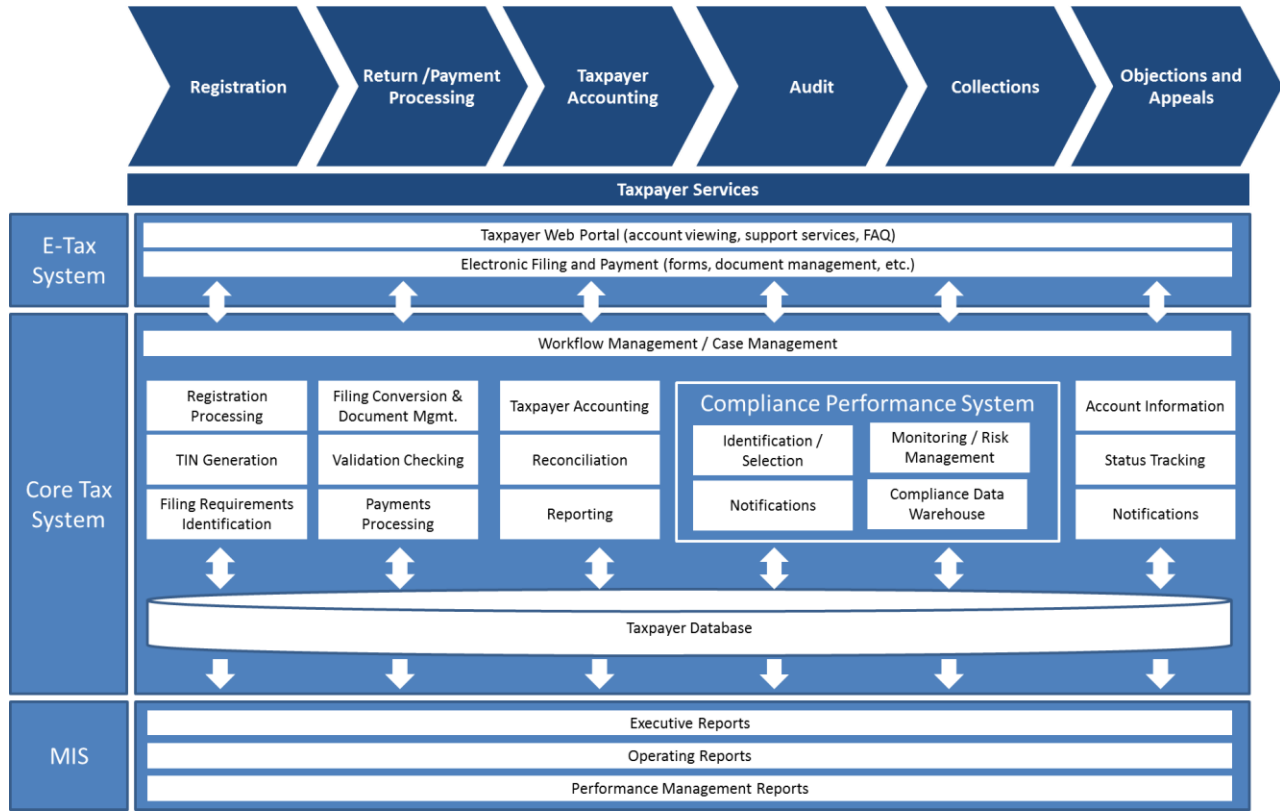
Core Tax System

What is dubbed the 'core tax system' in this solution landscape model is the central system of record in a tax administration and the primary enabler for intensive processing. It provides technology support, at varying levels, to all functions of the tax administration: processing of registration filings and issuing taxpayer identification numbers (TIN); validating and processing returns and payments received through different channels; maintaining taxpayers' accounts; providing tools to identify and pursue delinquent taxpayers; automating appeals tracking; and providing taxpayer service staff with access to taxpayer information to enable a better level of service, among other functions. The following are examples of the type of IT support to each of the tax administration's functions.

Figure 12.2. IT support to tax administration functions with the core tax system

Registration	Return/Payment Processing	Taxpayer Accounting	Audit	Collections	Objections and Appeals
Maintain taxpayer details	Capture and validate returns / payments	Manage taxpayer accounts	Monitor compliance	Enforce compliance	Manage objections and appeals process
• Store taxpayer identifying and compliance data • Issue taxpayer identification numbers • Notify taxpayers of obligations • Report on size and location of taxpayers	• Capture and store tax return data , payments, refunds • Detect errors; automate return workflow • Calculate interest and penalties	• Keep taxpayer balance by tax type / reporting period • Update balances on payments, refunds, penalties, and interest • Report to the government's accounting system	• Score taxpayers for risk to revenues, select taxpayers to audit • Notify taxpayers • Store third-party data • Automate the audit workflow • Assist with strategic audit quality reviews	• Identify taxpayers with arrears • Prioritize cases • Notify taxpayers • Assist with the collections workflow • Allow an integrated view of the taxpayer for liability offsets	• Track status • Provide access to taxpayer accounts and history of actions

Taxpayer Services

Provide support, information, education to taxpayers:
- Open multiple, electronic channels for filing and payment
- Deliver a wealth of information
- Allow taxpayer self-service

Registration: Registration is the process, by which the tax administration collects basic taxpayer identifying information, including names, addresses, and legal entity types. This information allows the tax administration to know who its taxpayers are, where they are located, and whether they are active or inactive. Modern tax administrations also collect compliance information, such as business activity types or estimated turnover, to plan future compliance activities. During registration, most tax administrations issue a unique TIN and, perhaps, a registration certificate, and provide the new taxpayer with information on his or her filing and payment obligations.

The basic registration functionality of a tax IT system includes the storing and maintenance of taxpayer identifying information, the automatic issuance of TINs and taxpayer certificates, and the automatic determination of taxpayer filing requirements. Effective registration with tax IT systems uses unique TINs to facilitate exchange of information between government agencies to ease the detection of non-compliance; integrates registration across taxes to allow for a single view of the taxpayer during audit or collections; centralizes the registration database to allow for effective non-compliance monitoring; provides a single facility to the taxpayer to register for all taxes to simplify compliance; and interfaces

with the e-tax system, allowing new taxpayers to register online.[2] A single, centralized taxpayer registration database also enables proper planning, allowing the tax administration to rationalize staffing and resources based on the size and geographic location of the active taxpayer population. Many of these tasks would be impossible without IT. For example, an IT system can automatically verify that a newly issued TIN is, in fact, unique, while the same verification would be nearly impossible manually if the taxpayer population is large.

Return, payment, and refund processing: Filing and paying are the two primary obligations of the taxpayer. Returns and payments require significant effort on the part of both the taxpayer and the tax administration. Their smooth processing reduces costs to the tax administration, reduces risks to the flow of tax revenues, and increases taxpayer certainty, which improves the perception of fairness amongst taxpayers and facilitates voluntary compliance.

Tax IT systems that handle the processing of returns and payments must quickly and accurately capture and validate taxpayer data from paper and electronic documents to electronic transactions. For example, during paper return processing, tax administration staff will enter major transactions from the tax return into the tax system. During payment processing, payment transactions may similarly be entered into the system, although in most countries it is common to allow payments through financial institutions (banks). These are processed by the tax administration and reflected in the taxpayers' accounts electronically and automatically. Data integrity is a fundamental pre-requisite. The tax IT system usually allows for some form of data entry verification and return computation verification, automatically flagging exceptions. Specialized workgroups that are established to handle errors and exceptions are facilitated by the workflow management functionality in the IT system. All returns are archived electronically and are easily accessible during audit and collections. Return and payment data are used to automatically calculate liability, interest, and penalties. Since the data entry of taxpayer returns and payments remains one of the most labor intensive functions within the tax administration, an effective tax IT system incorporates functionality for electronic filing and payment, including payments through financial institutions.[3]

Taxpayer accounting: The tax administration maintains taxpayer ledgers with balances of taxpayer liabilities – tax, interest, penalties, and others – and refunds owed, and records debits and credits to these balances from payments or refunds. Similarly to registration, proper taxpayer accounting enables other tax administration functions. Modern tax administrations maintain balances by tax type and reporting period, but allow a single look at the taxpayer across taxes for purposes of compliance or, perhaps, the offsetting of tax liabilities.

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[2] Many systems in emerging countries are inhibited by a poorly designed, disparate approach to registration. Too often, registration systems are specific to tax types, regimes, or ad-hoc structures. This creates obstacles for taxpayers and complicates the process for tax administrations.

[3] In most emerging countries, tax return and payment processing is either paper-driven or supported by tools that simply record data electronically as submitted. Supporting information, such as financial statements, are paper-based. Processing is heavily impacted by large volumes of filings during specific times and often results in 'acceptance' delays and data transcription errors.

With IT, the taxpayers' accounts are accurately and automatically updated in a timely manner during the processing of returns, payments, refunds, and with the assessments of tax, interest, and penalties. All tax-related transactions are recorded in a formal accounting system for balancing, reconciliation, and reporting. Historic records for all tax liabilities, payments, penalties, or interests are stored electronically and are instantly accessible.

Audit: The role of the audit function is to monitor compliance by examining returns and supporting information. Modern tax administrations prepare an audit plan based largely on staffing levels and previous audit experience and attempt to select those returns for audit that pose the highest risk to revenues, thus subjecting compliant taxpayers to rare audit interventions, while making potentially non-compliant taxpayers fully aware of costs to non-compliance. Audits can be extensive and may include face-to-face interviews with the taxpayer, inspection of the taxpayer's facilities, financial ratio analysis, third-party data validation, and an inspection of books and records, whereby sample transactions are "walked through" the entire bookkeeping process. The audit workflow is generally complex, following different paths depending on the circumstances. For example, an auditor may take various courses of action, such as: deciding not to pursue the audit due to a lack of risk to revenues; forwarding the audited return for fraud investigations; or completing the audit and requesting supervisor approval of audit results. Audit steps and results are documented in detailed audit reports for use in potential appeals and periodic strategic audit quality reviews.

A basic tax IT system assists the tax administration, first, with the audit plan, by automatically quantifying the risk that each taxpayer poses to revenues and selecting high-risk taxpayers for audit. The system may automate the audit case workflow and, in some cases, will do so fully, such as through the automatic forwarding of cases to auditors based on the auditors' skills and availability. The system also provides relevant return and other available information to the auditor during the actual audit and, in modern systems, may provide a view of taxpayer accounts that is integrated across taxes and tax periods. The rapid initiation of investigations in cases of potential taxpayer fraud is incorporated into the business and system processes. Audit reports are archived for easy access during objections and appeals and for strategic quality reviews. In modern systems, audit information is captured in the compliance database – discussed below – for future audits of the same or other taxpayers, since discovering pertinent information about one taxpayer, when auditing another, is possible. Finally, third-party validation is especially important, and the system may solicit information from a variety of third-party sources in the verification process (e.g., bank account statements, business transactions, insurers, and employer data, including expense reports, among others).

Collections: Tax administrations enforce compliance by pursuing and obtaining or negotiating outstanding payments, initially through engagement with the taxpayer, and, where necessary, through legal enforcement. Modern tax administrations employ an integrated approach to collection enforcement and debt management, where the taxpayer is treated as a single entity for tax debts. This reduces the workload on the tax administration and simplifies interactions with the taxpayer. In addition, a cost-benefit based approach to collections, in which the modern administration prioritizes

collection potential before pursuing collection actions, can have a positive impact on the tax revenue stream.[4]

Accurate taxpayer accounting with IT can enable the collections process with the automatic identification of delinquent accounts and the automatic generation of relevant notices. In some countries, collections have been supported by automatic call center facilities that target delinquent taxpayers with calls to remind them of their taxation obligations. The collections case workflow is managed by documenting all collections actions taken and forwarding cases to appropriate officers and management. Information generated during the collections process is integrated into the compliance database for use in future collections or audit activities. Modern IT capabilities in the area of collections also allow for the automated prioritization of collections cases based on the potential of the case to produce revenue.

Objections and appeals: The taxpayer should be allowed to file objections directly with the tax administration regarding its decisions and should also be able to appeal those decisions outside of the tax administration (e.g., through the courts).[5] This provides recourse to the taxpayer and plays a central role in establishing a perception of fairness and engendering voluntary compliance.

Since objections and appeals are the only recourse actions available to taxpayers, and are generated by taxpayers for specific cases, these require careful consideration and the opportunity for automation is limited. Many countries take a "manual" view of these processes. That said, IT can support the objections and appeals function by providing access to the taxpayer account information, tracking the status of objections and appeals cases, and registering the results of appeals. In addition, the e-tax system can allow for the electronic filing of objections and can provide online information updates to the taxpayer with regard to the objections process.

Taxpayer services: Taxpayer services facilitate voluntary compliance by providing information, education, and assistance to taxpayers during filing, payment, collection, and other processes. Modern tax administrations provide support to taxpayers across all tax administration functions, tailor information to different types of taxpayers and taxes, provide both easily accessible and complex information, and use multiple channels, including the web, paper brochures, and telephone inquiries.

IT support to taxpayer services typically begins simply with the provision of online information to taxpayers or with the automated routing of taxpayer inquiries. The maintenance of a well-organized taxpayer web portal, for example, with instructions and frequently asked questions, reduces phone and other inquiries and provides uninterrupted information to taxpayers. Many tax administrations have gone further, introducing e-tax systems. These are described below.

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[4] For example, larger and more recent debts may be given priority over other collections cases, when the analysis indicates that these cases may have higher revenue potential. Risk-driven approaches to collections have received much attention recently. See, for example House of Commons (2009) and Office of the Controller and Auditor-General (2010).

[5] The internal reconsideration process followed during objections and the external appeal process are quite different and are usually handled by separate divisions in the organizational structure of the tax administration. Further detail is provided in Chapter 11.

E-Tax System

The e-tax system offers electronic registration, filing, and payment, as well as education and information to taxpayers. Broadly, the e-tax system is a comprehensive internet portal[6] that forms a suite of secure self-service options to taxpayers, may provide a single point for information and actions, is typically available 24 hours a day and 7 days a week, and does not require intervention from tax administration staff. An e-tax system is not necessarily a standalone IT component. For example, the e-tax system must be integrated with the core tax system to provide the taxpayer with services, such as the ability to view account information and the status of refunds. The e-tax system is thought of as a separate component, as, unlike other components, it is 'taxpayer-facing.'

E-tax systems are often thought of solely as IT support to taxpayer services. It should be clear, however, that e-tax systems do more than provide information, education, and assistance to taxpayers. With components such electronic registration and filing, they also reduce the tax administration's cost of administering taxes. Taxpayers also enjoy reduced costs of compliance when they no longer have to spend time and effort to contact the tax administration by correspondence, telephone, or in person, at the tax administration's offices, where long delays are customary.

Compliance Performance System

The compliance performance system supports the tax administration in identifying potential non-compliance, in selecting for audit those taxpayers that pose high risk to revenues, in prioritizing those collection cases that have high potential for obtaining revenue, in tracking compliance cases from initiation to closure, and, for future planning, in developing intelligence on areas (industries, geographical areas) where the level of non-compliance and fraud is systematically high.

Similarly to the e-tax system, the compliance performance system is not a standalone IT component. In fact, this system must be integrated with the core tax system, as it must draw on taxpayer information. The compliance performance system, however, is usually discussed separately, as it has functionality and information that is very specific to compliance monitoring and enforcement. For example, audit selection requires that each taxpayer is classified according to the risk that this taxpayer poses to the government's revenue stream – a task that cannot be done manually and that is also not used outside of audit and, perhaps, fraud investigations. In addition, audit risk-scoring and other activities used to detect and address non-compliance require the storing and use of extensive information – from taxpayer accounts, to historic information on compliance risks, activities, and results, to third-party data. Along with the relative complexity of compliance process workflows, this integrated 'compliance data warehouse' justifies treating the compliance performance system as a separate component.

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[6] Mobile phones have also become an important additional electronic service delivery channel that has grown rapidly over the past 5-10 years. The OECD previously reported that just over half of surveyed revenue bodies revealed the use of taxpayers' mobile phones for taxpayer service-related purposes, although, for the most part, the services offered were fairly limited and the volumes quite low. OECD (March 2010), p. 56.

Management Information System

The MIS facilitates the collection and dissemination of performance information throughout the tax administration. It plays a crucial role in the smooth operation of a modern tax administration by ensuring that staff and management get the appropriate reports at the right time.

Frequent and accurate reports can assist with identifying emerging performance and revenue risks and internal problems and provide management with sufficient advance warning to develop an appropriate response. For example, in the area of collections, reports on the inventory of tax arrears, new arrears, and closed arrears help define whether there is too much new debt or whether there is too little production by the collectors. Management of the collections function can use these and other reports to determine how many collection cases can be addressed, which cases can be put aside, whether different methods of contacting taxpayers should be used, whether to seek additional staff, whether to focus on a particular non-compliant sector, or whether staff need additional training.

Although the MIS relies on the taxpayer database as shown earlier in Figure 12.1, it is discussed here as a separate component of the IT system for two reasons. First, the MIS is very important to performance reporting and management. Second, in practice, the MIS normally extracts and analyzes data separately from the core tax system. This prevents transactions that require significant processing power, such as report retrieval, from competing against core tax transactions. For example, in federated system architecture,[7] an operational data store (ODS) – a database that integrates data from several sources with the purpose of further processing – can be used for online analytical processing activities (OLAP), such as data manipulation and reporting, while also integrating and standardizing data taxonomies from multiple, disparate sources.

12.1.2. Sequencing of IT Improvements

Many tax administrations in emerging and transitional economy face limited funding. These countries must decide on a limited set of IT interventions and choose the activities and processes that are most suitable for IT and that have the greatest impact on achieving strategic objectives.

There are no "one-size-fits-all" solutions, and the appropriate IT intervention depends on the existing capability and the specific strategy of the tax administration, among other factors. Where the tax administration has limited or no IT, however, the following sequencing of IT interventions is likely to be successful. First, the tax administration should use IT to support its comprehensive registration function. This is the foundation upon which subsequent IT functions are built. It provides the tax administration with the basic information necessary to manage its taxpayers. Second, the tax administration should automate heavy processing and resource intensive functions, such as taxpayer accounting, filing, and return, payment, and refund processing. Efficiencies in these areas allow the tax

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[7] The federated system architecture is a decentralized system architecture, where several teams or business units share data in a semi-autonomous way – controlling certain elements of their corresponding data (e.g., registration information may be controlled independently of return processing information) – but where, despite autonomy, teams are expected to comply with certain common concepts or behavior during data processing (e.g., both registration and return processing describe taxpayers and affect the same taxpayer accounts).

administration to redirect resources to more valuable revenue mobilization activities, such as risk-driven audit and cost-benefit driven collections, and will reduce the costs of compliance for taxpayers to enhance voluntary compliance. Third, IT should be used to enable compliance activities (e.g., a compliance performance system) and to further reduce the cost of compliance for taxpayers (e.g., an e-tax system that provides information, education, and support beyond simply allowing electronic filing and payment).

In the long-run, the tax administration should aim to implement integrated tax systems that support all functions and taxes with common case management and workflow applications. If revenues must be mobilized in the short-term, a comprehensive and integrated registration system and accurate taxpayer accounting, followed by systematic compliance programs are key.[8]

Another important factor is the sequencing in the deployment of taxpayer support services. Typically, taxpayer services are deployed in coordination or as part of an overarching e-Government strategy. In the absence of a specific e-Government coordination agency, tax administrations with the support of the IT organization will embark in delivering electronic services to taxpayers and citizens in general. Delivery of these services generally follows the three phases of e-government[9]. The three phases, namely: publish, interact and transact, align in the evolution of use of ICT as a tool to support taxpayers. During the publish phase, the tax administration makes available relevant information to taxpayers in its website including: legislation, forms, filing calendars, frequently asked questions among others. In the interact phase, functionality for capturing taxpayers requests may be implemented such as making available email addresses, discussion boards or even making available forms or other mechanism to allow taxpayers to submit specific inquires. Finally, during the transact phase, gradually or as part of an integral effort, a full eTax System is made available to taxpayers. The phases do not necessarily have to be implemented in sequence and, in most cases, the interact and transact phases are deployed as part of an overall implementation effort.

Box 12.1. Guatemala's BancaSat eTax services[10]

In August 2001, Guatemala initiated BancaSAT, an online tax filing and payment system supported by the World Bank and managed by the Guatemalan tax agency, Superintendencia de Administración Tributaria (SAT). In December 2002, BancaSAT accounted for 84 per cent of the tax revenues of the country. The online system has significantly reduced SAT's transaction costs and improved service delivery. The system is considered largely successful and highly regarded by users, in particular because of its simplicity.

12.1.3. IT Support Organization

Previous sections discuss the benefits that technology brings to tax administrations. This section addresses the intricacies of the organization in charge of delivering, managing, and maintaining the full range of technology solutions supporting the tax administration.

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[8] Murdoch et al. (2012), p. 5.
[9] InfoDev (2002), p. 3.
[10] Wajsman (n.d.), p. 1.

Tax administrations are often a part of larger organization – the Ministry of Finance. In most cases, the Ministry of Finance, has established an organization structure that includes an enterprise IT governance mandate. In other cases, tax administrations may be semi-autonomous or autonomous revenue authorities with dedicated IT support, but may still have to respond to an overarching mandate for the use of technology for the delivery of services. In both, a dedicated IT Department or an IT organization at the ministerial level is key to the delivery of IT services.

> "The introduction and adoption of computerized information systems in rich private firms in developed countries is difficult and poorly understood. Introducing information technology (IT) in public bureaucracies of developing countries with limited resources, weak management, and unskilled staff is even more difficult."
>
> *Source: Information Technology and Innovation in Tax Administration edited by Glenn P. Jenkins*

Historical Evolution

In terms of IT organization, tax administrations and, more broadly, Ministries of Finance, are not much different from regular commercial organizations. Investment in IT support and applications within the organization is assigned based on strategic priorities, with some departments reaching a higher level of computerization than other departments that are deemed less strategic. In the case of Ministries of Finance in emerging and transitional countries, for example, is not uncommon to find that the finance function (accounting and treasury) has reached a more advanced level of maturity than a tax or a budget department in terms of computerization.

**Figure 12.3. A typical Ministry of Finance IT organization**
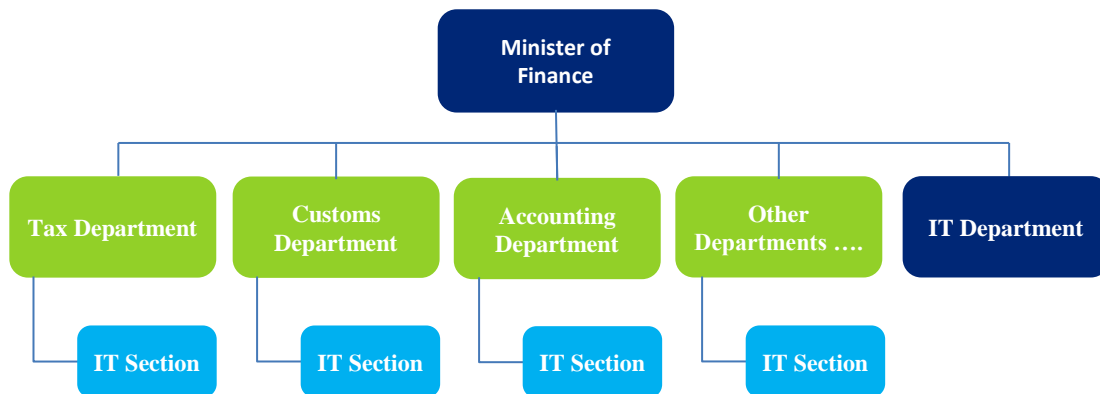
Today, however, donors and governments understand the role of technology in the tax administration, and, at different levels, tax administration modernization projects have considered computerization as a key component. Unfortunately, it is not uncommon to find that IT departments at the Ministry of Finance level lack the competencies and infrastructure to support the implementation of reforms or to quickly react to demands generated by the reform efforts. This lack of central support usually forces reform projects to establish independent IT efforts. This is not unique to tax reform or tax administrations, or to government organizations for that matter. There are cases where broader

reforms encompassing not only tax administration and policy, but also financial management, have contributed to the creation of IT support units or workgroups that tend to evolve into full-fledged IT sections. In El Salvador, for example, as a result of the implementation efforts of the Modernization of Tax Administration System (MOST), and later on the Modernization of Financial Systems (SAFI), IT resources were assigned to support the tax, customs, treasury, budget, and accounting departments. Over time, these pockets of IT support have evolved into separate sections that rarely communicate or interact, creating potential integration,[11] standardization, and, in some cases, information security risks. Another historical factor that contributed to the decentralization of IT was the transition from central mainframes to distributed computing that facilitated the creation of geographically or departmentally dispersed resources.

IT silos within organizations are a common issue that reaches national levels in the case of governments. The Treasury Board of Canada, for example, has recognized this issue and enacted the "directive of management of information technology," referencing the fact that "The federal government invests a significant portion of its annual budget on information technology and supporting infrastructure. Rapidly developing technology, incompatible business practices, and the fragmented approach to IT investments undermine effective and efficient delivery of government programs and services. Multiple data centers and networks also pose significant security risks. A more strategic approach to IT investments is needed to ensure interoperability of departmental systems and compatible business practices."[12]

Figure 12.4. A typical departmental IT organization
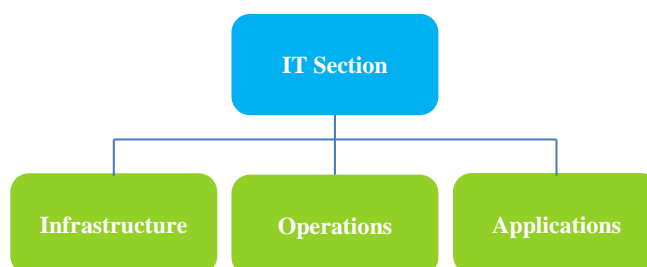
In addition to the departmental silos, by nature, IT organizations tend to create internal silos around technology domains or platforms, such as servers, databases, or applications. IT departments are commonly divided or separated into infrastructure sections and application sections. In general, this division of responsibilities is designed to clearly define each person's responsibilities and activities,

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[11] Integration not only refers to infrastructure integration, but also information integration. A typical information integration issue in Ministries of Finance emerges from the different importance that pieces of key information is given depending of the business process that the IT application supports. For example, a TIN is of prime relevance for the tax administration, but is not equally important for a treasury or accounting department that focuses on effective handling of accounts payable and receivable, but not on properly requesting or validating TIN numbers for government suppliers. In this case, when the tax administration wants to request data from the financial system for, say, VAT reconciliation purposes, the information provided typically lacks proper validations, making it impossible to consolidate and match taxpayer information. Similar cases can be observed in Customs administrations, for example, where the focus of the business is to collect and protect all Customs and Excise revenues, and to control the import and export of contraband goods that can be achieved without even capturing a TIN.

[12] Treasury Board of Canada Secretariat (2009), section 3.2.

which are supported by specific job descriptions. However, this separation in technology domains creates additional issues, including the lack of an integrated view of technology as a service to the business, in our case, the Tax Administration. Resources become so focused on their own domain that they lose perspective and fail to understand the overall picture.

With this type of organization, the applications group tends to be the closest one to the business (or, for the purposes of this document, the tax administration), and tends to garner a larger share of the budget for IT resources than the infrastructure group. This dynamic usually leaves the infrastructure group with scarce resources for maintenance and upgrades, which is one of the main reasons why, over time, infrastructure becomes outdated, unreliable, and unstable.

Infrastructure Consolidation

One step in the right direction that Ministries of Finance are taking towards a reliable provision of IT services is infrastructure consolidation. As discussed previously, application management and supporting infrastructure has sprawled over different departments as part of individual initiatives, creating a different array of infrastructure management issues. 'Infrastructure' here refers to the core physical components that provide common services across the organization, including connectivity, equipment, systems, and software. This infrastructure is used to build the capabilities of specific systems, such as a Tax Administration System or a Financial Management Systems. Often, in Ministries of Finance, infrastructure to support the tax administration and Customs is physically separate and maintained by separate groups. Similarly, infrastructure supporting Financial Management Systems is also managed by departmental resources. This situation, as pointed out before, creates an array of integration, security, and other issues and does not exploit the potential savings in maintenance and acquisition that can be obtained when planning and execution is conducted in a centralized fashion.

With the advent of reliable and more accessible communications technology, it is now possible to centralize infrastructure for consolidated management purposes, providing access to this infrastructure to different departments and allowing them to continue their regular operations and application development efforts without the burden of properly maintaining the underlying infrastructure. The Latin America and the Caribbean (LAC) region has experienced a rapid growth in accessibility to telecommunications infrastructure, and donors are also focusing resources in further developing the sector to support government initiatives. For example, in its strategy for the information and communications technology (ICT) sector, the World Bank states that: "Governments are investing in connectivity infrastructure for government systems; installing high-bandwidth, low-cost networks; extending government networks and services to unconnected institutions, provinces, and universities (National Research and Education Networks); establishing emergency communications; and minimizing the risks of information-security and privacy breaches."[13]

Infrastructure consolidation should be led by the Ministry of Finance's IT Department and supported at the highest ministerial level to mitigate any potential resistance by affected departments. IT sections at

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[13] World Bank (2012), p. 25.

the departmental level will usually support consolidation efforts, as they are perceived as a relief from the complex task of properly maintaining and avoiding infrastructure obsolescence, among other benefits. In general, infrastructure consolidation efforts, when executed properly, should bring benefits that include: operational efficiency, enhancing operational staff efficiency, reducing power and cooling costs, streamlining disaster recovery functions, and minimizing the cost of data center administration.

It is important to understand that, depending on the complexity of the organization, infrastructure consolidation efforts can take several months to a couple of years to complete.

One important aspect and consideration during infrastructure consolidation that is usually neglected is the close cooperation with the implementation partner or vendor in order to define and implement monitoring techniques with a service-oriented approach. Vendors at network, server, storage, application, and desktop levels need to work in coordination and integration in order to provide the IT Department with relevant and opportune information on the performance of the different components. In an ideal scenario, all the elements are combined to support a business process that reflects established policies and automatically delivers pre-determined levels of services. For example, network and storage utilization may become critical for a VAT tax return processing service at the end of every month. In this case, and as defined by policies, resources are prioritized to this particular service over other services, such as internet access for employees.

Figure 12.5. Infrastructure consolidation
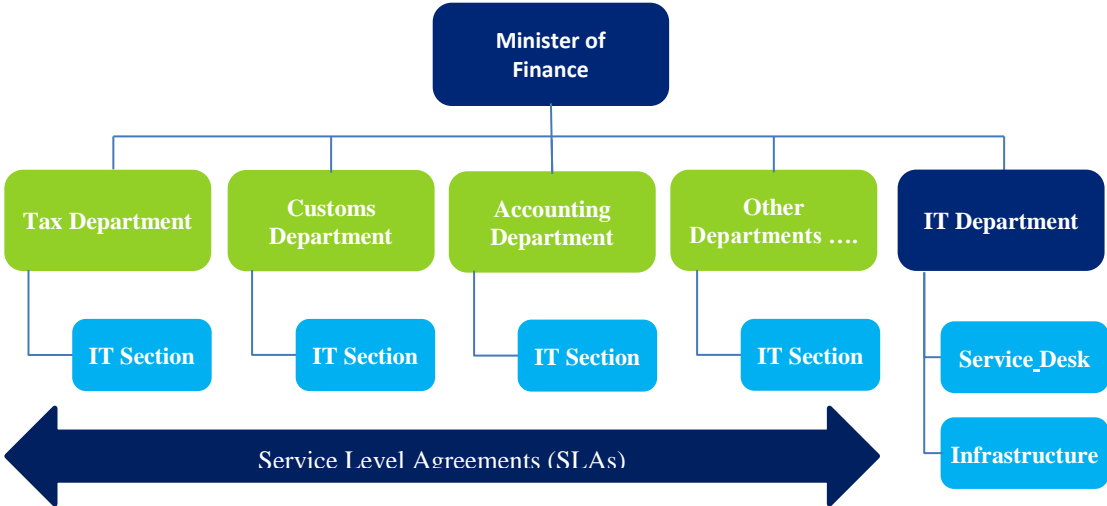
Service Level Agreements

The concept and practice of establishing, monitoring, and adhering to service level agreements (SLAs) should be introduced as part of the infrastructure consolidation efforts. The SLA exposes the organization to an IT service-oriented culture that should serve as the base for more mature service-oriented support and organization.

The Information Technology Infrastructure Library (ITIL),[14] a best practices IT service management framework, defines a Service Level Agreement as "an Agreement between an IT Service Provider and a Customer. The SLA describes the IT service, documents service level targets, and specifies the responsibilities of the IT Service Provider and the Customer. A single SLA may cover multiple IT Services or multiple Customers."[15]

In the case of Ministries of Finance, SLAs are established between the IT Department, maintaining the centralized infrastructure, and the different internal departments, including the IT section for the tax administration, whenever it is present.

The IT Department is in charge of monitoring the different SLAs for internal clients, and resources should also be dedicated to monitor SLAs between the IT Department and external vendors. External vendors include Internet Service Providers (ISPs), hardware and software providers, and vendors and third-party providers for the full array of services that the IT Department consumes.

Service Desk

With the consolidation of infrastructure and streamlining of support functions, leading practice calls for the implementation of a single point of contact between the IT organization and its customers. This is a dramatic change in the culture of support, as users in traditional organizations often learn which technicians in the IT Department can resolve their issues and become accustomed to contacting those technicians directly. However, this traditional arrangement is poorly structured and controlled, leading to unpredictable levels and quality of support for users.

ITIL introduces the concept of the "service desk" and differentiates it from the traditional "help desk." ITIL defines the "service desk" as "the single point of contact between the service provider and the users. A typical service desk manages incidents and service requests, and also handles communication with the users."[16]

In addition, the IT service desk should be differentiated from the help desks that departments establish for their customers. In the case of the tax administration, a help desk to support taxpayers may be established as part of the taxpayer services function.[17] In this case, the help desk is rightfully managed by the tax administration, but the technology used to deliver this service (e.g., the telephone system and associated hardware and software) should be managed by the centralized IT Department under the consolidated infrastructure scope of work.

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[14] The Information Technology Infrastructure Library (ITIL) is a set of practices for IT service management (ITSM) that focuses on aligning IT services with the needs of business. ITIL describes processes, procedures, tasks, and checklists that are not organization-specific, used by an organization for establishing integration with the organization's strategy, delivering value, and maintaining a minimum level of competency. It allows the organization to establish a baseline from which it can plan, implement, and measure. It is used to demonstrate compliance and to measure improvement.
[15] ITIL® V3 Glossary (2007), p. 44.
[16] ITIL® V3 Glossary (2007), p. 44.
[17] Taxpayer services are discussed in Chapter 6.

IT Policy

Another evident need is the definition of a central organization that issues policy for IT purposes. In order to minimize security and information integrity risks, and to leverage economies of scale for procurement of technology, IT organizations must follow a single and coherent policy, aligned to the overall organizational strategy and business policies.

As discussed previously, IT sections will continue to act as service providers to their own departments. When it comes to procurement and resources (both human and material), these IT sections usually operate under the governance of the department that they serve. Each IT section procures technology based on what it determines to be best for its department, which sometimes creates issues related to integration, security, and other areas. IT policies need to be established to cover the use of resources, including the Internet and other shared resources. Policies must also account for existing assets and inventory, as well as the procurement of new technology, licensing, and data retention, recovery, and security.

> "The rapidly increasing pace of technological change will have a significant impact, positive and negative, direct and indirect, on Tax administration organizations. Information technology, which includes telecommunications and computerized systems, looks set to increase productivity substantially, with savings in time as well as money, while at the same time affording customers a better service. On the other hand, the human element is affected by technological changes in different ways, by making jobs more important for some, while posing a threat to others."
>
> *Source: CIAT Handbook for Tax Administration Organizations - July 2000*

Policies should be prepared and enforced by the IT Department and issued with the full backing of upper management at the level of the Minister or Deputy Minister of Finance. One typical mechanism of control for procurement is a process whereby an IT procurement committee, led by the IT Department, is established to analyze and approve new technology procurements. Under this type of process, the procurement of goods and services cannot proceed without the approval of the IT procurement committee.

12. 2. Common Trends

This section presents IT trends that are not universally practiced, but are emerging practices in IT initiatives that tax administrations should consider.

12.2.1. Commercial Off-The-Shelf and Custom-Built IT Systems

Custom-built and COTS solutions are at the two extremes of the implementation channel spectrum. The purpose of this section is to highlight the differences between the two and the key decision factors that impact the tax administration's choice of one or the other. The focus of the following discussion is on complete IT solutions for tax administration, with all elements of the IT solution landscape discussed above, as this is when the choice of custom-built vs. COTS solutions usually arises. In practice, the term 'COTS' may apply to a narrower solution, ranging from shared infrastructure and middleware to

integrated core processing systems (registration, returns and payment processing), to shared analytics and integrated case management for compliance, and tax administrations can use a mixture of custom-built and COTS solutions for components of the comprehensive IT system.

Characteristics of COTS and Custom-Built Development

In reality, the distinction between custom-built and COTS can be difficult to discern. It is possible for a tax administration to purchase a COTS solution and to subsequently make significant alterations. The COTS solution would be tailored to such an extent that a custom development would have been a more appropriate solution. This, in itself, is not necessarily a barrier to implementation, provided that the tax administration understands the extent of modifications, plans for the associated time and cost, and ensures that support arrangements are not impacted by extensive modification. Either option, or a combination of the two, can provide value to a tax administration.

Custom-built Development

As above, in-house custom-built developments were widely employed as an implementation approach up until the late 1980s. From the 1990s to the present day, this approach has been widely reduced due to the complexity of implementation and the growing availability of external providers and products, amongst other factors, although this phasing out has been slower in emerging and transitional economies than in developed countries, perhaps due to the lack of funds, the need for flexibility, and even the biases of the IT staff. As tax administrations moved away from internal system development, the emphasis shifted to vendor provided alternatives. The shortcomings associated with in-house development, such as the lack of internal capacity, could be bridged by external providers with implementation experience and technology expertise.

Vendor provided custom-built systems have been implemented in a number of countries with varying success. A common approach to custom-built solutions is to implement them by component or module, which may be suitable for tax administrations with already existing technology, time constraints, limited resources, and a need for flexibility, or for tax administrations that aim at quick revenue gains or cost reductions. The most significant benefit associated with custom-built systems is control. By planning and implementing changes using internal or contracted IT resources, tax administrations are able to wholly own the development process, giving them significant influence over system design and implementation.

There are also disadvantages of the custom-built approach. There may be difficulties in defining business and technology requirements or in ensuring the sustainable transfer of technology from the vendor to the tax administration.[18] Sometimes, this is the result of time and cost pressures. Other times, the tax administration lacks internal expertise, as software development for a modern tax administration IT system with all key IT competencies requires knowledge in many areas, including databases, user interfaces, security, and web services, among others. In addition, vendors may have limited local knowledge, which can inhibit progress, particularly in tax administrations unused to change.

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[18] See Bozeman (2000) and Haug (1992).

Finally, designing, custom-building, and implementing a full-scale – across all functions – tax administration IT system 'from scratch' takes many years.

Figure 12.6. Advantages and disadvantages of custom-built IT solutions for tax administration

Advantages	Disadvantages
▪ A solution tailored to the tax administration's structure and needs ▪ Lower initial development cost and potential for more rapid initial implementation ▪ Greater buy-in from counterparts as they have more control over the system and have ownership over design and implementation ▪ Leverages internal expertise ▪ Capitalizes on existing investments (e.g., leverages existing technology investments) ▪ Internal control of enhancements and maintenance ▪ Flexibility to make changes as needed to be responsive to needs, especially where procedures and requirements may not be well defined	▪ Dependency on availability of internal expertise (potential key person reliance, capacity issues, etc.) ▪ Significant internal change / project management capability required for large information technology projects ▪ Difficulty retaining key IT staff ▪ Difficulty keeping pace with advanced technological change (including new technologies, security standards, etc.) ▪ Difficulty enforcing best practice (e.g., integration across tax types) ▪ Difficulty maintaining high documentation standards ▪ Longer development time for full-scale implementation

Commercial Off-the-Shelf Deployment

COTS solutions – a response to the demand for the quick implementation of robust and sustainable tax administration systems – provide cutting edge technology and implementation expertise. COTS solutions are ready-made, transferrable, and generally designed to accommodate leading practice in business processes. A good COTS solution: provides for localization (natural language, currency); uses current technology; is improved by periodic releases; allows for multiple communication channels (e.g., web-enabled); allows input from multiple sources (keying, scanning, e-filing); is able to interface with external authorities (e.g., business registry and Customs); allows for the centralized or decentralized implementation of individual functions; is modular, scalable, and maintainable; is well documented; and is hardware independent.

Most software companies issue new releases to comply with IT technological trends and so COTS solutions provide cutting-edge technology with potentially shorter implementation timelines, are rigorously tested, share deployment costs amongst users, often provide superior functionality and capabilities, and, over time, can have a lower total cost of ownership than customized solutions. There is also the potential to adopt new technologies, such as Software as a Service – a model of 'renting

software' – and Platforms as a Service – a model of renting hardware, operating systems, and storage and network capacity.[19]

In general, COTS solutions provide some level of flexibility and are typically designed in a manner that facilitates some configuration for certain functions without incurring significant development costs (e.g., form design tools and workflow design tools simplify development; tax computations and audit selection criteria are housed in "rule engines," easily accessible and configurable to local needs and legislation). Although COTS solutions are configurable to meet most of the requirements of a tax administration, some may require customization.[20] In practice, where there is high level of process variability or differences between current and leading practice, generic COTS offerings may not be fit for the purpose, and the costs to customize the COTS package can rival the costs associated with the development of a custom-built system. Key elements of process variability include a high degree of human intervention, complex business rules, and complicated organizational relationships. Where the base level of tax administration technology is very low, COTS solutions can be attractive, as sometimes it makes more sense to start from scratch with a ready-made product.

Figure 12.7. Advantages and disadvantages of COTS IT solutions for tax administration

Advantages	Disadvantages
▪ Higher quality, fully-integrated solutions ▪ Built-in industry best practices for all IT competencies (core tax, management information, compliance performance system, and e-tax systems) ▪ Reinforces best practices as the new system provides additional discipline over processes and procedures ▪ Future development costs shared with other customers ▪ Implementation track record ▪ Cutting-edge technology ▪ Potentially shorter implementation	▪ Customization required to meet local requirements, given variability of laws and procedures ▪ Lack of buy-in with respect to changes in existing business processes, organization, and IT infrastructure by users and disputes with the vendor may lead to a failed implementation ▪ Requires significant change management capability in the absence of leading practice ▪ Relatively high initial license and implementation costs ▪ Vendor reliance for support and maintenance (i.e., external risk and

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[19] Both would reduce upfront investment costs at the expense of ongoing fees. While this is an unproven approach today, this model may work with sufficient scale. These types of offerings become more attractive in austere environments where a large capital expenditure is not possible, but where an annual subscription agreement can be completed between donors and host countries. Since information would be stored in a "cloud," security and the confidentiality of taxpayer data is a concern.

[20] For the purposes of this chapter, configuration is changing the workings of the system to conform to specific settings by using the functionality already provided to the user, without actually "programming." For example, a COTS solution may allow the design of tax forms for data entry of taxpayer returns with simple point-and-click operations. Customization means modifying the functionality of the system, perhaps through programming or data conversion.

Advantages	Disadvantages
timescales	potential cost issues)
▪ Rigorous testing and deployment methodologies	▪ Not component-wise (full package offered)

Key Decision Factors

With respect to the strategic and selection guidelines discussed above, three decision factors are most significant to the choice between custom-built and COTS solutions. These are discussed below.

Strategic Objectives

Fundamentally, the decision between custom-built or COTS solutions boils down to a choice between being in the business of software development and maintenance or relying on established, albeit standard, solutions. In essence, this is a choice between cost and control.

In total cost of ownership terms, custom-built solutions may be cheaper for smaller tax administrations, particularly in consideration of licensing costs, whereas COTS solutions may be more cost effective for larger implementations with a wider breadth of system requirements. COTS solutions may be appropriate where there is major tax administration reform across all tax administration functions that requires sufficient funding and commitment to reform and leading practice, as in the cases of Egypt and Costa Rica below.

Box 12.2. COTS Implementation in in Egypt

USAID's Technical Assistance for Policy Reform project in Egypt assisted the government during 2002-2005 with the establishment of a Model Customs and Tax Center (MCTC). The MCTC was open to taxpayers of minimum size, located in Cairo, and classified as importers. Although participation in the MCTC was voluntary, the number of participating taxpayers grew quickly from 300 in 2003 to 2,000 in 2005. Improvements in taxpayer services, such as shortening the time for customs clearance from seven days to one day, were quoted as the main reason for the interest. After the MCTC was converted into a Large Taxpayer Center (LTC) in 2005, at the recommendation of the IMF, the center handled roughly 70 percent of total Egyptian tax revenue. The LTC was cited as one of the reasons for the reduction of Egypt's overall negative fiscal balance from 9.6 percent in 2004-2005 to 6.8 percent in 2007-2008. USAID's Technical Assistance for Policy Reform II (2005-2010) assisted the government of Egypt with the merger of its tax departments into a single Egyptian Tax Authority (2006). As a result of the merger and other project activities, more than 1 million active self-assessing taxpayers in 2006 and more than 600,000 in 2007 were added to the tax rolls, income tax collections grew albeit lower income tax rates, and overall tax collections increased by reported record-breaking 20 percent year-over-year in 2006.[21]

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[21] Murdoch et al. (2012), p. 5.

Box 12.3. COTS Implementation in in Costa Rica[22]

During the 1980s and 1990s Costa Rica achieved substantial growth, but did so at the cost of significant increases in its net outstanding internal debt. The central government's domestic debt represented 15 percent of GDP in 1990 and reached 26 percent of GDP in 1997. In 1998, Costa Rica embarked on significant tax policy reforms aiming at revenue mobilization, as well as simplification, reducing the existing multiplicative legal framework, repealing a number of provisions that significantly eroded the tax base, and counteracting the revenue impacts of trade liberalization reforms from early 1990s and a number of recurrent and contradictory VAT and excise tax reforms introduced during 1990s.

In 1999, after unsuccessfully attempting to adopt the Honduran IT system, the tax administration began to develop a custom-built IT system, launched the Sistema Integral de Información para la Administración Tributaria program, and, in its 2000 strategy, identified the need for web-based modules for return filing and the re-deployment of hardware platforms. Later user satisfaction surveys, however, revealed a number of problems with the implementation. In 2006 MOF launched its New Integrated Model of Digital Tax initiative, citing not only the need to increase tax collections and minimize fiscal deficits, but also the need to combat tax evasion and corruption in the system. A number of COTS systems were identified and evaluated before the SAP Tax and Revenue Management system was chosen.

More often than not, COTS solutions in developing and transitional countries fail, because tax administration processes do not conform to leading practice and there is insufficient funding or inadequate management of change. A number of countries, such as El Salvador, Georgia, and Bosnia and Herzegovina – the latter recently moved to a "hybrid" custom/COTS solution – have opted for piece-wise reform over time with proper prioritization of targeted custom-built IT interventions. In the long-run and on occasion, custom-built solutions may prove costly with short lifespans and multiple implementation efforts, as in El Salvador.

Box 12.4. Custom-built Implementation in in El Salvador[23]

El Salvador's tax administration pursued a custom-built solution through a series of reform projects. The USAID funded Modernization of Salvadoran Taxation (MOST) project, running between 1991 and 1995, resulted in an overhaul of the tax administration landscape, including the replacement of the legacy tax mainframe system and the decentralization of computing. This project addressed the core aspects of tax administration IT and, by 1994, the MOST team had developed a custom-built FoxPro based system that included VAT and income tax registration, return processing, payment processing through banks, and some basic audit selection tools. Over the course of this project, USAID also worked with the Ministry of Finance to change its approach to taxation, with a focus on measures to improve compliance. In parallel, IADB provided support for the establishment of a Large Taxpayer Unit with an information technology department responsible for the design, development, and deployment of a separate custom-built tax administration system dedicated to large taxpayers.

In 1998 the tax administration initiated an IT integration program as part of an effort to combat a decline in tax revenues. By 2002 both systems had been integrated onto a single Linux based platform that used Informix as the database environment and PowerBuilder as the application language, replacing the MOST FoxPro system. The system facilitated increased processing requirements and eliminated the duplication of functionality. The new system, dubbed Sistema Integrado de Información Tributaria (SIIT), provided a single platform for taxpayer registration and returns processing with basic taxpayer accounting, archiving, and audit functionality.

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[22] Jimenez et al. (2012), p. 47.
[23] Ibid., p. 37.

By 2002 the new SIIT was suffering from hardware performance issues due to high data traffic and increased user demands. The Ministry of Finance requested further assistance, emphasizing the need for system modernization support and enhanced audit functionality. In 2002 USAID launched the Tax Administration Project (TAP), which deployed new hardware platforms and introduced an off-site system for field audits.

By the end of 2004 a raft of new tax measures increased pressure on tax administration operations and systems with additional compliance requirements, tighter controls on VAT, and new filling requirements. In 2005, USAID launched the Tax Policy and Administration Reform (TPAR) project aimed at further system modernization. Between 2005 and 2010 the TAPR project team replaced the SIIT system with a new version dubbed J-SIIT, which replaced Informix and PowerBuilder with Oracle and Java and provided increased data processing capacity and functionality to support web-based taxpayer services. An updated desktop client for tax officers and a Fiscal Compliance Call Center were included. The Fiscal Compliance Call Center comprised an automated system to call delinquent taxpayers, including stop filers, and remind them of their tax liability. A major focus of the TAPR project also was the complete redesign of the audit process, including the deployment of a Case Selection Management System (CSMS) that automated the risk-scoring audit selection process and the assignment of audit personnel to each case, rather than leaving such decisions to the discretion of tax officials, and monitored the progress of audit cases. A Taxpayer Assistance Call Center was also created to provide assistance, orientation, and legal guidance to taxpayers on their tax obligations.

With respect to control and intellectual property rights, the tax administration usually owns the source code of custom-built development, whereas the vendor retains ownership for COTS products. Thus, if future customization is required, the tax administration may be locked in with the COTS vendor.

Requirement Identification – Implementation Complexity

All modern tax administrations have the same core functions, such as registration, return and payment processing, audit, and so on. Even so, not all tax administration face the same level of IT implementation complexity. In the simplest case, the administration may be handling a single tax with a limited filing population and a single central tax office and processing center.[24] Given the low number of taxes (one) and the centralized staff and infrastructure, this is a tax administration relatively free from complexity. A COTS solution may not be suitable in this case, as many COTS solutions do not permit the scaling back of core revenue management functionality and are relatively inflexible in cost terms.

Complexity increases in conjunction with the number of taxes and the size of the geographic footprint. COTS solutions become more appropriate as complexity and scale increases, assuming conformity with leading practice. In addition, larger projects require a wider breadth of expertise – systems security, internet skills, document management, etc. – that is uncommon in internal IT departments. Custom-built solutions are more appropriate with smaller or targeted system implementations, where local knowledge and speed are important.

Existing Capability Assessment

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[24] Qatar is a country with a single tax, limited filing population, and a single tax office. Bosnia and Herzegovina, on the other hand, collects all major taxes and does so at different levels – national, entity, or region / municipality – and many offices. Fortunately, Bosnia and Herzegovina has a single tax administration law based on leading practice. El Salvador is another complex case of implementation (VAT), as the country attempted to connect all store registers directly to the TAS.

Attention should be given to the assessment of organizational structures and processes against leading practice. COTS solutions are developed according to leading practice and organizations that conform typically face reduced need for customization, incur lower implementation costs for COTS solutions, and have a better chance of success. Conversely, organizations that deviate significantly from leading practice are likely to encounter higher customization costs and longer implementation times. Excessive customization can, in some instances, blur the line between COTS and custom-built solutions. In cases where adhering to leading practice requires change, strong leadership support is fundamental and the administration's ability to manage and implement change must be considered.

It is often the case in developing and transitional countries that processes and existing IT solutions are ad hoc, not well documented, or simply non-existent, in which case many IT implementations will falter. Processes and capabilities should be at least formalized and, perhaps, streamlined before the IT approach is validated and custom-built or COTS solutions are pursued. It could be argued that COTS solutions can and should be used to "enforce" leading practice. If so, IT must be a part of larger reform that depends very much on political will and change management, among other factors.

12.2.2. IT as a Service Organization

IT organizations facing the challenges associated with the decentralization of technology resources and that recognize IT as a key enabler of overall business objectives are increasingly adopting and implementing actions towards becoming a service management oriented organization. To understand IT service management (ITSM), one must first understand the meaning of services. A service is a means of delivering value to customers by facilitating outcomes that customers want to achieve without having to bear specific costs and risks.[25] Furthermore, services that customers can directly utilize or consume are known as "business" services. IT organizations supporting tax administrations should move beyond a focus on cost optimization of technology domains or silos and strive to become service-oriented organizations that are also concerned with how technology components are assembled into services and how these services are delivered to the tax administration.

12.2.3. IT Organization Consolidation

IT organization consolidation, whereby multiple IT sections consolidate under a single IT Department, is an ambitious endeavor. Efforts to consolidate often face considerable internal resistance from departments that are accustomed to having direct access to their IT application resources.

A recent study by the Ministry of Finance in El Salvador concluded that a major IT consolidation of its Financial Management Units (Treasury, Accounting, Budget, and Public Investment) addressed issues and provided the benefits presented in the following table:[26]

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[25] Cartlidge (2007), p. 6.
[26] Dirección Nacional de Administración Financiera (2012), p. 8.

Figure 12.8. Issues and benefits of IT consolidation in the Ministry of Finance

Issues	Potential benefits
- Duplication of efforts. Application maintenance is provided by different actors and units originating different solutions to what are usually common problems; - Lack of IT support to departments that are less developed in IT; - Lack of adherence to IT policies; - IT services are provided as a reaction to issues and do not proactively identify and tackle potential risks; - IT strategy is defined at a department level and lacks a more integrated financial management vision; - No single point of contact for Financial Management Units at the Government level to support their operations. - Difficulty developing new projects due to minimal flexibility in terms of resources; - Lack of standardization; and - Solutions lack a long-term vision.	- Increase the level of availability of the Financial Management System; - Design and development of integrated solutions; - Maximize the utilization of shared resources; - One single solution for similar issues; - Policy standardization and application; and - Empower staff by sharing a common technology framework.

The analysis above, applies to an IT organization that supports the finance function but the result of the study also apply to Tax Administrations where fragmentation of IT support has occurred and even for Tax Administrations that are part of a larger organizations with dispersed IT support.

12.2.4. The IT Solution Decision

The first examples of IT systems in tax administration can be traced back to the 1960s. Developed in-house, these were standalone applications, designed to support specific tax administration functions, and were generally not integrated across tax types or functional areas.[27] Over the following two decades, tax IT systems began to occupy an increasingly central role in the operation of tax administrations and, by the early 1980s, the first integrated systems appeared. [28] These were custom-built and, thus, one-off solutions developed in accordance with the specific requirements of the tax administration. Built either in-house or by external providers, these systems had long and complex development cycles, high-risk implementations, and significant investment expense.

During the 1990s, the demand for integrated tax IT systems continued to grow, and, as the 1990s drew to a close, commercial off-the-shelf (COTS) solutions became widespread. These were ready-made, rather than designed for specific needs, and typically based on leading practice. While they still required

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[27] The U.K. Inland Revenue's first computer system, planned in the 1960s to run nine computer centers across the country, implemented 'Centre I' in 1968. Margetts (1999), p. 109.

[28] The EC VAT information exchange system (1993) and the Indonesia property tax system (1985) are discussed in Jenkins, (1996).

customization and investment expense, they were marketed as integrated and configurable to meet the varying requirements of modern tax administrations with reduced implementation timelines and investment costs.

In the early 2000s, COTS solutions expanded to incorporate enterprise resource planning (ERP) and customer relationship management (CRM) applications. Provided by ERP/CRM vendors such as Oracle, SAP, and Microsoft, these were marketed to tax administrations as all-encompassing solutions, providing the means not only to implement and automate common processes across taxes, but also to more effectively manage workload and resource distribution through workflow management applications and monitoring progress through enhanced management information systems.[29]

Today, the pace of change in IT provides continuous innovation in systems development, including in tax administration systems. It is no surprise that modern tax administrations around the world use a variety of IT solutions to meet their technological needs. In 2010, the OECD reported that developed countries used, nearly universally, custom-built solutions for traditional revenue management functions, such as registration, collections, and audit, and a mixture of custom-built and COTS solutions for modern functions, such as online applications and reporting.[30] Emerging economies, on the other hand, used a mixture across all functions. While large, integrated tax IT systems are almost ubiquitous in OECD countries, however, they are less common in emerging economies,[31] where IT capability tends to reflect the maturity of the tax administration.

The IT Solution Landscape

IT systems enable modern tax administrations, providing the means to achieve strategic objectives through data management, process automation, and taxpayer engagement. If appropriately designed, tax IT systems can help tax administrations to effectively collect and store taxpayer information, conduct analysis for targeted compliance activities, and provide taxpayers with simple channels for complying with tax obligations.

There are a number of ways in which IT can benefit the tax administration, but the decision to implement IT is not always simple. While available solutions for comprehensive and integrated modern tax administration IT system have similarities, with the typical components of the IT landscape, there are also differences. There are, for example, distinct implementation channels, such as custom-built and COTS solutions, that may influence the cost, time-to-market, and usability of the solution. There are various 'roadmaps' to the system, including piece-wise implementations – component by component – or full-scale implementations – of all IT components across all tax administration functions. There is perhaps a simple, historical rationale for the fact that tax administrations in OECD countries use custom-built solutions for traditional functions and COTS solution for 'modern' ones. These administrations may

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[29] Puerto Rico, for example, implemented PeopleSoft for taxpayer registration and management in 2004-2006.

[30] OECD (March 2010), p. 4.

[31] In 2000, Arturo A. Jacobs stated that developing countries' "organization's information systems are still largely manual. At best, tax administrations in many developing countries count only on a smattering of computer equipment at a few office locations, much of it old equipment supported by outdated technology." Jacobs (2000), p. 1.

have opted against full-scale implementations and chosen modern solutions to accommodate new activities and complement already present IT components for traditional functions. There are also, of course, many vendors[32] and various potential areas for IT intervention. The purpose of the remainder of this section is to provide an approach to making the appropriate IT decision.

IT Procurement as a Strategic Business Decision

Although IT can clearly contribute to the tax administration's objectives, the decision to procure IT should not be taken lightly. IT solutions may require changes to the organization, processes, staffing roles, and staff skills. In addition, IT solutions are costly and will divert the administration's limited resources from other important activities, but may falter if not appropriate. Even if the implementation itself succeeds, an unfitting IT solution may have a short shelf-life and limited usefulness. The IT decision is thus a strategic business decision,[33] one that must conform with the tax administration's overall strategic objectives to ensure usability and the needed level of institutional capacity, and one that is preceded by a rigorous cost-benefit analysis to ensure that the administration's limited resources are spent wisely.

Strategic Objectives

The tax administration is not an IT provider, and IT is simply an input that allows the tax administration to perform its tasks and achieve its objectives. Although the primary task of tax administrations is the same – to collect the right amount of tax from the right taxpayer at the right time – their interim strategic objectives can vary greatly: to achieve uniformity in applying tax laws; to provide quality service and taxpayer education; to improve targeted audit programs; or to develop effective managers. Each of these objectives calls for a different IT intervention. For example, uniformity in applying the law can be achieved through automated workflows that reduce discretion. Quality service and taxpayer education may call for an e-tax system or components thereof. The better targeting of audits requires automated risk-scoring mechanisms or, perhaps, a compliance performance system. Effective management relies on an MIS.

Of course, long-term strategic plans would likely take a holistic approach to tax administration, addressing organization, taxpayer segmentation, staffing, facilities, functions, human and institutional capacity, integrity, and communications, as well as technology. In the medium term, however, IT interventions should conform to other programs and projects of the tax administration. It would be inappropriate, for example, to pursue the automation of audit workflows if a subsequent organizational restructuring is expected to change the levels of audit reviews and approvals.

Cost-Benefit Analysis

The cost of IT implementation is relatively simple to define and quantify. Still, there are direct costs to IT, such as hardware, software, procurement, implementing, integrating, operating, training, and

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[32] An illustrative list of vendors is provided in Appendix 12.A.
[33] Oliver (2002), para. 2.

replacement expenses, indirect costs, including staff time spent on requirement definition and other procurement activities, training, testing, and general downtime, while the solution is being deployed.[34] An illustrative list is provided below. This total cost is sometimes dubbed the 'total cost of ownership' of the IT solution.

The benefits of IT implementation can and should be translated directly into contributions towards the tax administration's tasks. First, with IT, the direct costs of administering the tax system may diminish. For example, data entry staff time will be reduced due to the introduction of e-filing, making the administration more efficient. In practice, it is more likely that resources – budgetary, staffing, or other – that become available to the tax administration after IT implementation would be placed into new uses. For example, with the introduction of e-filing, staff may be re-trained to provide education, support, and information to taxpayers. Second, the tax administration may become more effective. For example, e-filing reduces the number of keypunch errors made by tax administration staff during data entry. Third, benefits to taxpayers should be included, as the tax administration is not a profit-making business, but an integral part of the government machinery. With e-filing, taxpayers may spend less time and money preparing, printing, and mailing paper returns, as well as less resources following up on the status of their filings, payments, and refunds. This means that the tax administration becomes less intrusive in the business environment. Fourth, the tax administration may become more even-handed in applying the law. Furthermore, e-tax systems lessen the opportunity for corruption by reducing direct interactions between tax administration staff and taxpayers. A specific e-filing initiative may be complemented with automatic return checking and notifications, reducing staff checking and the corresponding discretion.

The following are illustrative quantifiable costs and benefits of IT implementation.

Figure 12.9. Illustrative costs and benefits of IT implementation

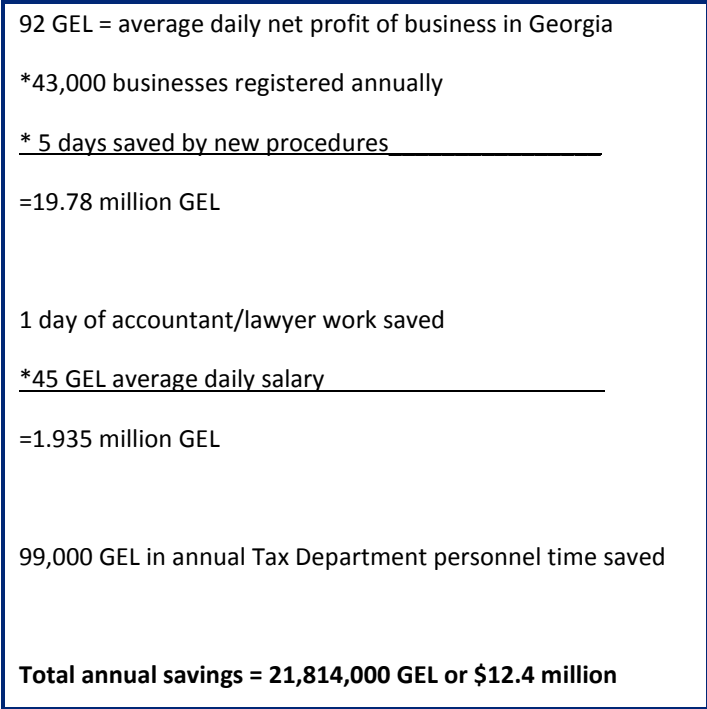| Illustrative costs	Illustrative benefits
Procurement costs: ▪ Hardware and software / licenses; ▪ Staff time spent on procurement, implementation, integration, operation, testing, training; ▪ Staff downtime. **Operating costs:** ▪ Maintenance (e.g., backups, license tracking, security prevention / recovery, IT personnel time); ▪ Infrastructure (floor space, electricity); ▪ Internal and external audits; ▪ Future training.	**Effectiveness:** ▪ Higher revenues with more formal taxpayers, less fraud and evasion, or larger assessments. **Efficiency:** ▪ Less staff time on core tasks. **Better business and taxpayer environment:** ▪ Less taxpayer time spent on compliance; ▪ Less staff time spent on non-compliance (involuntary errors). **More uniform application of the law:**

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[34] To simplify matters, the term 'opportunity cost' is not used. The government's staff labor and IT solution suppliers to government hardly operate in competitive markets and, hence, the opportunity cost of IT implementation does not necessarily reflect supply costs. Using opportunity costs, however, would necessitate that the social benefits of foregone tax administration actions be investigated, which, as discussed below, is difficult.

Illustrative costs	Illustrative benefits
Replacement: ▪ Replacement, upgrade, or decommissioning expenses.	▪ Higher revenues.

It should become immediately obvious that the table above displays two types of benefits of an inherently different nature. Efficiency and business environment improvements reduce economic efficiency losses. In economic terms, with such improvements, both the tax administration and the taxpayer can be made better off without making either, or anyone else, worse off. Higher revenues, on the other hand, are simply additional transfers from the taxpayer to the government. In an economic sense, a cost-benefit analysis of changes in government operations should include only the first type of benefits. It is possible to argue that, when the government provides goods and services that would not be provided by the private sector due to externalities or transaction costs, higher revenues would similarly bring about efficiency improvements. However, this is not always the case. A cost-benefit analysis of IT improvements should be appropriately constrained to comparing procurement, operating, and replacement costs with improvements in administration and taxpayer efficiencies.

The following figure shows a simple estimate of the monetized benefits of unified business and tax registration in Georgia.

Figure 12.10. Monetized benefits of unified business and tax registration in Georgia[35]

92 GEL = average daily net profit of business in Georgia

*43,000 businesses registered annually

* 5 days saved by new procedures_____

=19.78 million GEL

1 day of accountant/lawyer work saved

*45 GEL average daily salary_____

=1.935 million GEL

99,000 GEL in annual Tax Department personnel time saved

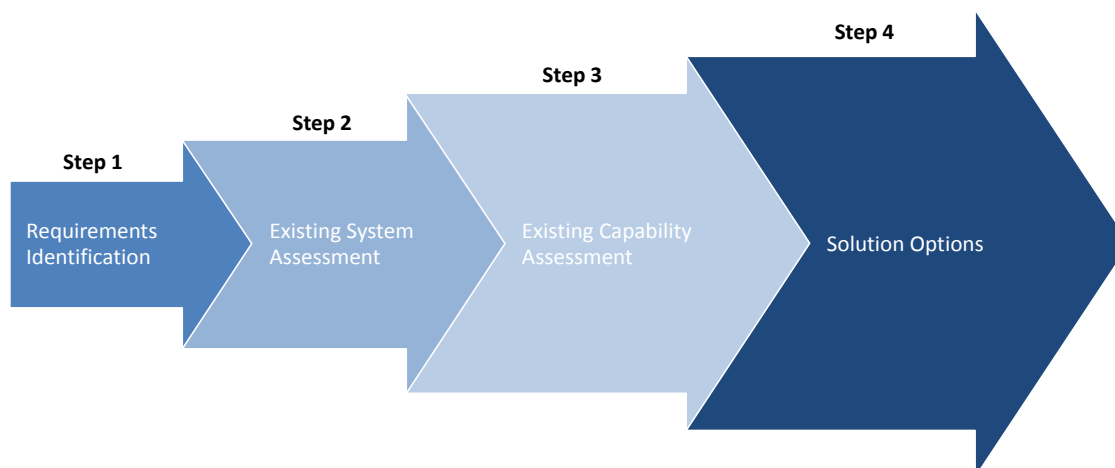**Total annual savings = 21,814,000 GEL or $12.4 million**

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[35] Adapted from Gallagher (n.d.).

Not all inputs can be easily translated into quantifiable costs. For example, IT implementation may result in staff frustration. Similarly, not all improvements can be easily translated into quantifiable strategic outcomes. For example, third-party data matching can improve compliance monitoring and enforcement and will help institute a perception of fairness amongst taxpayers, improving voluntary compliance and resulting in higher collections, as well as in general taxpayer satisfaction. Difficulties in monetizing costs and benefits, such as staff frustration or taxpayer satisfaction, should not detract from the need for a cost-benefit analysis. In some cases, tax administration officials can rely on the experience of other countries to develop general benchmarks. For example, a 2007-2008 Danish study found that taxpayers subject to third-party reporting and matching had evasion rates below 1 percent compared to 40 percent for taxpayers not subject to third-party reporting and matching.[36]

Selection Guidelines

A simplified IT acquisition process of four steps is shown in the figure below. The tax administration can follow this or a similar process after validating the strategic business need for IT investment. The first step in this acquisition process is to identify the requirements for the solution. The second and third steps are to assess existing systems and capabilities. The last step is to review system solution options and identify the most appropriate one. These are detailed below.

Figure 12.11. Four-step IT acquisition assessment process

Step 1 Requirements Identification
Step 2 Existing System Assessment
Step 3 Existing Capability Assessment
Step 4 Solution Options

Requirements identification: A typical full-scale – across all elements of the IT solution landscape – tax IT system procurement comprises over three hundred requirements, including general technical requirements, specific technical requirements for each of the core tax administration functions, and a number of non-technical requirements related to security, user interface, and other. These are derived from the strategy and must comply with existing business rules (e.g., legislation), documentation and training needs, and the need to cooperate with other agencies, amongst other factors.[37] Attention to these is important, as future development, customization, testing, and piloting are the most time

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[36] Dogan (2011), p. 71.
[37] World Bank (n.d.), p. 1.

consuming and costly part of the implementation and would be streamlined with properly specified and detailed requirements.

Existing system assessment: Existing (legacy) systems should be assessed to understand if such systems can accommodate IT requirements and to identify the gaps between existing systems and future system needs.

Existing capability assessment: An assessment of existing capabilities, including previous development experience, should include the IT capacity of future users, the capacity of IT staff to develop and support the system, the need for modifications to existing structures and processes, and the ability of the tax administration to manage change. The latter is specifically important in larger implementations that may require wider institutional change.

System options: Solutions that satisfy the requirements should be researched and analysis completed, including total cost of ownership and timing of implementation. The figure below presents an illustrative example of the decision criteria and the key questions that need to be answered when assessing system options.

Figure 12.12. Illustrative system selection decision criteria framework

Decision driver	Definition	Illustrative weight
Cost of ownership	How does each option compare against other options in terms of total cost?	15%
Core to business	How well does each option relate to the business direction, activities, and capabilities?	15%
Time to market	How quickly will the option deliver the solution, and is this in line with strategic objectives and corresponding action plans?	15%
Degree of customization	How well does each option provide the needed functionality, and how much additional development is needed?	15%
Skilled resource availability	What level of skilled resources is needed to develop or support each option, and are sufficient skills available?	15%
Technology compatibility	How well does each option complement existing technology (e.g., architecture, infrastructure, security)?	15%
Intellectual asset strategy	How well does each option meet the intellectual property ownership needs or requirements of the administration?	5%
Exit strategy cost	How costly is it to exit each option?	5%

12.3 Tax Administration Maturity

The maturity levels of tax administrations, with regards to IT structure and management, are discussed below.

Information Technology: Maturity Level 1

Key word: "Paper-based"

- Taxpayer registration information is placed in paper-based systems or supported by basic computerized tools, such as Excel or Access. Many taxpayers are not registered or entered in the system, and the registration system does not provide support for registration compliance. There is no automated support for duplication validation. Management reports summarizing the taxpaying population do not exist.
- An IT system does not exist.
- IT is limited to the use of Microsoft Office or similar applications, typically for the issuance of notices (manually typed) or for keeping an ad hoc database of taxpayers.
- The use of common applications as IT solutions is ad hoc and varies across individual staff. Common applications have limited ad hoc documentation.
- IT development / procurement decisions are taken by individual staff and address the needs of their specific position.
- Limited IT training is provided to selected junior staff and includes only basic computer skills (i.e., Microsoft Office).
- No IT staff exists to provide support with simple tasks, such as computer and network setup.

Information Technology: Maturity Level 2

Key word: "Disjointed"

- The IT system provides only processing support to core functions (e.g., registration, filing and payment processing). The system was built incrementally, storing tax information separately for each type of tax or for each administration function.
- IT is used in some core functions (usually registration and taxpayer accounting), but not in other core functions (e.g., fraud investigations, audit). IT is generally not used by support function staff (e.g., legal services). IT use is limited to the automation of simple processing and does not provide management information, facilitate workflow, or provide taxpayer support.
- The use of specific IT applications is ad hoc and varies across divisions. Specific IT applications have limited ad hoc documentation.
- IT development / procurement decisions are taken by heads of specific decisions and address the needs of their specific decision.
- Limited IT training is provided to selected junior staff and includes mostly basic computer skills and on-the-job training in the use of the IT solutions.

- Limited IT staff provides support with simple tasks, such as computer and network setup, as well as with occasional requests by division managers for development.

Information Technology: Maturity Level 3

Key word: "Supporting"

- Registration information is maintained through occasional ad hoc programs, but not in a timely manner. Maintenance includes both adding new registrants and removing taxpayers who are no longer active. It does not include updating information upon taxpayer reorganization.
- A formal registration system, integrated across tax types, exists and new taxpayers are registered accurately and in a timely manner.   Unique TINs are assigned and verification prevents duplicate entries. The system provides sufficient management reports, but these are not used.
- Sufficient information to determine liability is captured electronically as soon as practical (i.e., before computational verifications, audits, etc.). The IT system provides efficient data capture facilities that increase data accuracy (e.g., optical recognition technology, where practical). Returns are captured offline by the taxpayer or financial institutions, and transmitted to the tax administration for further validation and processing.
- Payment information is captured electronically, and all required information for a proper matching with a tax liability is present. Proper matching of payments with liabilities allows the administration to maintain an accurate and reliable taxpayer account and balance.
- Information, support, and education are provided through somewhat detailed instructions, but usually just for common processes (e.g., filing, but not audit or collections). These instructions are rarely updated and do not take taxpayer feedback into account. Taxpayer services are tailored by taxpayer segment (individual / business, large / small, etc.) and by type of tax. Taxpayer services use multiple channels (telephone, web, paper) and vehicles (FAQs, instructional brochures). There is, however, a need for expert technicians for complex queries. Information provided by taxpayer services is not binding on the tax administration. IT is used to deliver information by means of websites that disseminate information, instructions and forms. The tax administration website is occasionally updated and is not easy to use or does not provide sufficient information to taxpayers.
- The IT system includes primarily two competencies: 1) processing support for core functions; and 2) a limited web-enabled system for taxpayer services / self-services, with functions such as online registration, filing, and payment. The system is integrated across tax types and functions, merging all information.
- IT is used in most core functions (except, perhaps, fraud investigations) and is available to staff of support functions (e.g., legal services). IT provides automation, facilitates workflow, produces management reporting and information, and provides taxpayer services, although management reporting and information are usually ad hoc, and taxpayer services and workflow facilitation are limited.

- IT system applications are integrated across taxes for some functions (e.g., payment and taxpayer accounting), but not others (e.g., filing, refunds). The IT system was documented when initially built or acquired, but the documentation has not been updated.
- IT procurement / development decisions are taken by senior management, who review IT requirements and evaluate solutions. The IT solutions, however, are not a part of the overall strategy of the tax administration.
- Training on the use of the IT solutions is provided to all junior staff, but rarely to management staff. Management staff does not use the system, but rely on IT staff for reporting.
- An IT division participates in designing, defining requirements, documenting, and procuring the IT system. The tax administration, however, faces difficulties retaining knowledgeable staff.

Information Technology: Maturity Level 4

Key word: "Integrated"

- Registration information is maintained regularly and in a timely manner, not only by adding new registrants, but also by removing taxpayers who are no longer active, and by updating information upon taxpayer reorganization.
- A formal registration database and system exist and new taxpayers are registered accurately and in a timely manner. Unique TINs are assigned and verification prevents duplicate entries. The system provides sufficient management reports that are effectively used by officials. Web-enabled registration allows taxpayers to register and maintain their records.
- Sufficient information to determine liability is captured electronically as soon as practical. Electronic filing is implemented and supported by the IT system. The IT system provides a consistent taxpayer account facility, keeping track of liabilities and payments by tax types and tax filing periods. Every financial event that is recorded is directly reflected, in nearly real time, in both the tax administration's own revenue accounting ledgers and the taxpayer account.
- The IT system allows the processing of all payments received from the taxpayer through different channels. Payment information is delivered to the tax system in electronic format, and multiple options of payments are offered to taxpayers on the e-tax/web system.
- Information, support, and education are provided across all tax administration functions (e.g., registration, filing, payment, etc.). These are detailed and are updated regularly based on taxpayer feedback. Taxpayer services are tailored by taxpayer segment (individual / business, large / small, etc.) and by type of tax. Taxpayer services use multiple channels (telephone, web, paper) and vehicles (FAQs, instructional brochures, expert technicians responding to complex questions and generalists for other questions). Information provided with taxpayer services is binding on the tax administration. The tax administration website is properly updated, and tools to interact with taxpayers have been implemented.
- The IT system(s) includes four competencies: 1) processing support for core functions; 2) an MIS for data management and analysis that facilitates the collection and dissemination of information throughout the organization; 3) a web-enabled system for taxpayer services / self-services; and 4) a compliance system.

- IT is used in all core and support functions and provides automation, produces management reporting and information, and facilitates workflow and taxpayer services.
- IT system applications are integrated across taxes and tax administration divisions. The IT system is fully documented and the documentation is regularly updated with changes, if any.
- IT solutions are validated within the tax administration's overall strategy. Specifically: 1) the business need is validated; 2) all costs are accounted for (total cost of ownership includes implementation, maintenance, training, etc.); 3) general technical, specific technical, and non-technical requirements are taken into account; and 4) various solutions are evaluated.
- Basic computer skill training and training on the IT system is a part of the tax administration's training curriculum. All staff, junior and senior, are provided training, including refreshers, and management regularly uses the system for management reporting.
- An IT division participates in designing, defining requirements, documenting, and procuring the IT system. The tax administration has access to competent and experienced IT staff.

12.4. Latin America and the Caribbean

LAC countries have made significant progress in the application of IT to support the tax administration functions. Particular focus has been given to the taxpayer service functions and the return processing function with different degrees of progress in other core functions. A recent study by the Inter-American Development Bank (IADB) collected information from 17 tax administrations in LAC.[38] Among the more relevant observations, the report notes that in the survey countries:[39]

- With the exception of Brazil, Ecuador, and Mexico, all the observed tax administrations define the specifications for IT investments and the vast majority of computer software to support tax administration functions is developed internally.
- Most of the observed tax administrations have evolved from the "publish" phase of e-Government to some level of the "interact" and "transact" phases[40] described in Section 12.1.2. The services offered include forms, frequently asked questions, and the filing of applications or appeals.
- Internet return filings have steadily increased in the countries surveyed and, in some cases, represent the most important filing method, such as in Argentina, Chile, Dominican Republic, Ecuador, Mexico, and Peru, along with Brazil where electronic filing is practically the only method of filing.

The points above illustrate the progress LAC countries have made in applying IT to improve operations. It is important to note that the level of computerization achieved by most tax administrations has been the result of progressive, focused efforts oriented to improve some specific component of the overall IT support spectrum. For example, in the Dominican Republic, after the implementation of the "Virtual

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[38] The 17 countries survey by the IDB in the preparation of the report are: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru and Uruguay. The IDB has initiated a similar exercise for the British Caribbean.
[39] Inter-American Center for Tax Administrations (CIAT) et al. (2012), section 6.3.
[40] See section 12.1.2.

Office" project in 2006, the percentage of returns filed electronically grew from none in 2006 to 80 percent of VAT and 75 percent of Income Tax returns processed by the administration.[41]

The discussion above would place some LAC countries in the third level of the maturity model, with some of the most advanced countries conforming to attributes of the fourth level of the maturity model.

There is still a lot of room for LAC countries to realize efficiencies through the use of IT. As noted by the IDB in their analysis of the state of tax administrations, "there is still great scope for increasing the use of [the] Internet, which still has an insufficient use…[S]olutions such as electronic invoicing and fiscal printers to promote better implementation of the tax system should also be considered."

12.5. Key Benchmarks and Guidelines

The following are key guidelines and selected benchmarks for this chapter, discussed throughout the chapter and summarized here:

- **Use of IT in Tax Administration.** The use of IT is not a choice, but a necessity of modern tax administration. The use of appropriate IT, when implemented correctly, helps tax administrations become more effective by increasing revenue, delivering better services to taxpayers, and maximizing the utilization of scarce resources. Similar to the way that businesses use IT to support their operations, modern tax administrations must implement IT solutions to achieve their strategic and operational goals.
- **Process simplification and business reengineering as a prerequisite.** A basic IT solution must cover the core processes of a tax administration. It is also important to remember that IT must support sound and streamlined processes, which implies that process reengineering and best practices must be aligned with the IT solution. There is no benefit in implementing an IT solution to support outdated and ineffective processes. The implementation of an IT solution must follow process simplification.
- **Sequencing of IT Improvements.** The use of IT evolves alongside tax administration practices. In an initial stage, tax administrations focus on registering and capturing taxpayer information and filings. At a later stage, audit and case management functions become important. At this point, information is collected from different sources to support the audit function, tax administrations evolve towards a risk management focus, and information is used to implement sophisticated risk profiles and case selection for audit. Finally, IT becomes important in supporting the policy management function and enabling the creation of models with historical data.
- **Implementing IT requires a strategy.** Developing and implementing a coherent IT strategy is crucial for successful IT procurement and implementation. When required, changes in legislation must be implemented, organizational structures may have to be redefined, and enhanced operational procedures should be developed.
- **IT is a service.** IT supporting organizations must evolve into service-oriented organizations, but this is a long path that should be carefully planned and executed. A natural path of

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[41] Batista (2009), p. 23.

implementation starts with IT infrastructure consolidation, before moving towards the implementation of specific processes, such as incident management[42] and change management[43]. Implementation of these processes should be in accordance with established best practices and frameworks, such as ITIL.

- A recent benchmarking study that included 13 different countries from Europe, North America, and Latin America found that "the strongest correlations between IT and increased efficiency occur where IT substantially reduces or eliminates manual work (e.g., data capture technology in submission processing, sophisticated website features in taxpayer service)."[44]

- Gartner, a technology research firm in the United States, routinely surveys organizations in different sectors to determine their IT investment at the enterprise-level. Three relevant metrics were produced in their most recent publication for government organizations with an operating budget of less than 250 million USD, against which LAC tax administration IT can be benchmarked[45]:
  - IT spending as a percent of operational expense is 11.1 percent;
  - IT spending per employee is $16,172; and
  - IT Full Time Equivalents (FTEs) as a percent of employees is 7.0 percent.

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[42] ITIL (2007), p. 39 defines the incident management process as "the process responsible for managing the lifecycle of all incidents. Incident management ensures that normal service operation is restored as quickly as possible and the business impact is minimized."

[43] ITIL (2007), p. 16 defines change management process as, "The process responsible for controlling the lifecycle of all changes, enabling beneficial changes to be made with minimum disruption to IT services."

[44] Dohrmann et al. (2009), p. 9.

[45] Guevara et al. (2012), p. 13-15.

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Appendix 12.A. Sample of COTS Vendors and Products

Multiple vendors provide COTS software for tax administration. This section contains descriptions of some of those vendors and details of their offerings. This is not an exhaustive list of vendors, but represents a sample of some of the more established vendors in the market.

Figure 12-A.13. Sample of COTS vendors and products

Vendor / product	Description of services	Sample implementations
Bull / e-ris	• A company known for its hardware solutions. • In the last decade, expanded into tax administration. • Products include tax administration (e-ris) and Customs. • Product components include: FlexStudio (interface management), FlexFlow (workflow management, FlexForms (form customization) and FlexRules (rules engine). • There is a rules engine called FlexRules. • Integration with other technologies can be managed using XML Web Services.	e-ris: Namibia, Zambia, Saudi Arabic, Morocco, and Egypt Previous versions: Botswana, Rwanda and Ethiopia
CRC Sogema / SIGTAS	• Known for international development projects with 25 years of experience in emerging markets. • Tax administration product is SIGTAS (Standard Integrated Government Tax Administration System) • SIGTAS is part of CRC Sogema's public finance and tax reform portfolio. • SIGTAS has all of the core tax administration services including case management, audit, appeals and interest and penalty functionality. • SIGTAS can be implemented in client-server architecture or a web environment.	Twenty countries on three continents and the Caribbean
Crown Agents / TRIPS	• International development company working in the public and private sectors. • TRIPS was introduced in 2003 and forms a small part of a much larger business. • Uses Oracle as its foundation and is considered more of a portable solution that a fully configurable COTS. • Includes integrated taxpayer view containing information from VAT, direct taxes, duties, permits, licenses and other taxes when all implemented.	VAT in Jordan, Ghana, Guyana, Philippines, Mongolia
Fast Enterprises / GenTax	• Developed in 1997, occupies a significant position in the U.S. tax administration marketplace • COTS solution, GenTax®, has a series of taxpayer services that allow account status viewing, filing and payment history, and file and pay online. • Supports core tax administration functions and is designed to support full configuration including returns, letters, penalties, interest, transactions, taxpayer types, workflow, screen layouts, window flow and more. • Developed on Microsoft technologies it can be adapted for client	Approximately 15 U.S. states, three Canadian provinces and Trinidad and Tobago.

Vendor / product	Description of services	Sample implementations
	needs	
Oracle / ETPM[46]	• A global enterprise software company. • In 2006, Oracle purchased SPL WorldGroup. • Although SPL WorldGroup was focused on revenue and operations management for utilities, this was the beginning of Oracle's commitment to developing a COTS solution for tax and revenue departments. • COTS solution is Oracle Enterprise Taxation and Policy Management and includes all the core tax administration functions. • Functionality includes: single taxpayer view, revenue legislation automation, business process configurability, upgrades, and self-service.	Dutch TA, Vermont, Kentucky, and New Zealand in process
SAP / TRM[47]	• A global company with clients in 50 countries • With 300 customers worldwide, SAP can be considered a market leader in enterprise application software. • SAP provides a number of revenue and taxpayer solutions including services to implement, support, and maintain a tax administration system directly or through global partners. • COTS product is PSCD (Public Sector Collection and Disbursement) • PSCD includes all core tax administration functions • Functionality is divided into modules. At the core is SAP Tax and Revenue Management. Taxpayer registration and case management is added through SAP Customer Relationship Management. Taxpayer online services comes from Taxpayer Online Services, SAP 2.0.	Most recent Slovenia, Costa Rico, Pennsylvania, Zimbabwe, and Queensland
TCS / DigiGov	• Estimated by some analysts to be the largest provider of information technology in Asia and the second largest provider of business outsourcing in India. • Located in 42 countries with more than 145 offices. • Primary focus for tax products to date has been India and North America • COTS product is DigiGov which provides a comprehensive tax administration solution • Functionality includes business process automation, controls on tax evasion, manual errors management, and a taxpayer service.	13 state departments in India, Uganda

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[46] Oracle Enterprise Taxation and Policy Management.

[47] Tax and Revenue Management.