E-commerce Readiness Assessment Report Sri Lanka

March 2020

The Commonwealth

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The Commonwealth

SRI LANKA
EXPORT DEVELOPMENT BOARD

EDB

Preface

This E-commerce Readiness Assessment Report is the result of a request by the Sri Lanka Export Development Board (EDB) for technical assistance from the Commonwealth Secretariat to conduct an e-readiness assessment for Sri Lanka and undertake capacity-building programmes for enhancing women and small and medium enterprise (SME) cross-border e-commerce knowledge. Based on international best practices, a five-parameter model for assessment and monitoring of e-commerce readiness in Sri Lanka was developed. This covers the five key result areas of e-commerce: citizen maturity; business readiness; IT infrastructure and accessibility; logistics and delivery; and policy and regulations. Using this model, indicators were developed to assess Sri Lanka's maturity or readiness levels within these parameters and a score was assigned based on the findings of the study.

The assistance was provided by the Commonwealth Fund for Technical Co-operation (CFTC) under the auspices of the Trade Competitiveness Section (TCS). Facilitated by TCS Head of Section Opeyemi Abebe, with the support of Director of the Trade, Oceans and Natural Resources Division Paulo Kautoke, the report was prepared under the direction of Former Chairperson and Chief Executive of EDB Indira Malwatte and Director General of EDB Jeevani Siriwardena.

The report was prepared on behalf of the Secretariat by Ravi Raina of Grail Consulting Ltd, and the reference group provided technical inputs, while contributions were received through widespread consultations with several stakeholders, including government agencies and organised private sector and business enterprises. These inputs were obtained through individual interviews, focus group meetings and the conduct of a stratified sample survey in Sri Lanka to capture data on e-commerce technology infrastructure, logistics and transportation, e-business modelling, technology uptake by businesses, availability of technology support services and e-payment. Two stakeholder validation workshops, chaired by Ms Malwatte, were held in Colombo to present the draft report to the stakeholders and obtain their feedback, which was then incorporated into the final document.

The staff of EDB, led by Director of IT Indu Alahapperuma and supported by Dilsha De Alwis, Export Promotion Officer, were outstanding in their efforts to see the project through and coordinated the various meetings and consultations necessary to facilitate the development of the report. Finally, the team would like to acknowledge the support of Luisa Sala (TCS) for her administrative role in facilitating the development of the report.

We also express our appreciation to current Chair and Chief Executive of EDB Prabhash Subasinghe, as well as Sri Lanka's digital trade and e-commerce stakeholders across the public and private sector, who gave their time, shared their knowledge and contributed to the preparation of the report.

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Acronyms and Abbreviations

AU	African Union
B2B	Business-to-Business
B2C	Business-to-Consumer
C2C	Consumer-to-Consumer
CFTC	Commonwealth Fund for Technical Co-operation
EDB	Export Development Board
EU	European Union
IPR	Intellectual Property Rights
ICT	Information and Communication Technology
IT	Information Technology
LCB	Licensed Commercial Bank
LSB	Licensed Specialised Bank
NBFC	Non-banking Financial Company
OECD	Organisation for Economic Co-operation and Development
P2P	People-to-People
PCI-DSS	Payment Card Industry Data Security Standard
SEO	Search Engine Optimisation
SLT	Sri Lanka Telecom
SMEs	Small and Medium Enterprises
TCS	Trade Competitiveness Section
UK	United Kingdom
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNCITRAL	United Nations Commission on International Trade Law
UPU	Universal Postal Union
USA	United States of America

Executive Summary

At the request of the Export Development Board (EDB) of Sri Lanka, the Commonwealth Secretariat engaged Grail Consulting to undertake a study aimed at assessing the e-commerce readiness of Sri Lanka.

To collect the required data and information for the study, the consultant undertook a review of relevant policy and technical documents and undertook a stratified sample survey to collect data related to the present state of e-commerce development. The sample included firms from various industry domains and business sectors, including banks and financial institutions, logistics and transport companies and e-commerce service providers. International best practices and standards on e-commerce were also reviewed as a benchmark and guide in assessing e-commerce in Sri Lanka. The results of the survey and study were the basis for the study findings.

E-commerce appears to have already taken root in the country, with a number of companies already offering goods and services online. However, this predominantly involves services in the travel and hospitality business and a restricted product range, consisting mainly of imported consumer electronics, fashion products and clothing. Nearly half of the firms said they bought or sold products online. Almost all the business firms surveyed stated the intention, and indeed many had long-term plans, to use e-commerce.

In spite of this optimism among businesses with regard to the use of e-commerce the present state of e-commerce development in the country is basic. The potential for expansion, both for the domestic market and for cross-border trade, appears to be enormous.

Based on international best practices, the consultant proposes a five-parameter model for the assessment and monitoring of e-commerce in Sri Lanka. This model covers the five key result areas of e-commerce – *citizen maturity; business readiness; IT infrastructure and accessibility; logistics and delivery*; and *policy and regulations* – and provides five levels of maturity or readiness for each of the five parameters. Under this proposed model, the consultant assesses the present state of maturity of e-commerce in Sri Lanka using data collected through the sample survey and document study.

The results of this assessment exercise are as follows:

1. Citizen readiness: Level 2

2. Business readiness: Level 2

3. IT infrastructure and accessibility: Level 3

4. Logistics and delivery Level 2

5. Policy and regulations Level 3

Citizen maturity for e-commerce is estimated to remain at the basic level. Challenges exist in terms of low internet availability and low usage of e-payment as a result of lack of awareness, skill and trust. Business maturity for e-commerce in Sri Lanka is estimated at 0.34 on a continuum of 0–1. This indicates that businesses have started e-commerce but the current level of maturity is still basic. On average, businesses score low in terms of availability of skills, know-how and technology infrastructure as well as on the adoption of technology for selling and buying.

The country has wide logistics and transport infrastructure in terms of rail, roads, waterways and air transport facilities; meanwhile, a large number of logistics firms provide a range of logistics services. However, at the current time, logistics firms may not be able to effectively and efficiently support e-commerce firms. Although some logistics firms are adopting information and communication technology, this is not the case for the whole delivery chain. Lack of resources, skills, know-how and awareness, and indeed lack of automation in material handling, is a major challenge facing firms in relation to effectively supporting e-commerce. Substantial investment is required to transform existing logistics firms and to establish new logistics enterprises specifically designed for e-commerce.

IT infrastructure and accessibility and policy and regulations parameters are assessed as being at a higher level of maturity than the other three parameters. Internet penetration is estimated at 30 per cent. This has to rise, and high bandwidth must be made available to increase the digital population. Meanwhile, although Sri Lanka has already enacted the necessary laws and policies on all the subjects relevant to e-commerce, a fresh review of these will be necessary to remove inconsistencies and conflicts that exist between these and the corresponding civil and criminal laws of the country, and to optimise them to meet the needs of the country. A review of the policies relevant to e-commerce is also necessary.

A strategic plan for e-commerce development and its implementation is necessary to overcome the challenges the country currently faces. The proposed strategic e-commerce development programme could bring under a single umbrella all policy, regulatory, skill development, awareness-raising, investment and other systemic actions that must be taken to unlock the considerable potential for e-commerce in Sri Lanka.

1. Introduction and Background

1.1 Introduction

The consultant was retained by the Commonwealth Secretariat to undertake a study to determine e-commerce readiness in Sri Lanka. The terms of reference included study and analysis of the existing state of e-commerce in the country and policies on technology, e-commerce, trade and development. This report specifically reflects on the level of maturity in policies, laws and regulations, infrastructure and other parameters of importance to e-commerce. Making comparisons with more developed and matured e-commerce jurisdictions, gaps are identified and recommendations made for bridging them.

1.2 Methodology employed

The assignment was executed in phases. During the first phase, data and information were collected through the study of technical reports and publicly available reports and, most importantly, through the conduct of a stratified sample survey in Sri Lanka. This latter aimed to capture data on e-commerce technology infrastructure, logistics and transportation, e-business modelling, technology uptake by businesses, availability of technology support services and e-payment. A stratified sample was chosen to closely reflect the population characteristics. Table 1 presents the composition of the sample. Business entities made up the largest segment surveyed. They represented the various business sectors and industry domains and covered firms following the business-to-business (B2B) and business-to-consumer (B2C) business models.

Table 1. Composition of the e-commerce survey sample

Sample no.	E-commerce actor/ stratum	No. of organisations
1	Business firms in various business sectors	76
2	Transportation and logistics firms	9
3	Financial institutions and banks	7

1.3 Conceptual background of e-commerce

E-commerce is technology-driven commerce. Under e-commerce, the nature and outcome of commerce do not change but how the outcomes are achieved and how the commercial processes are undertaken do – and the changes are significant. Figure 1 presents a high-level conceptual diagram that provides a broad illustration of the structure of the e-commerce ecosystem.

Any business transaction or trade requires the existence of sellers, who have products and services to offer, and buyers, who are willing to purchase the offered goods and services. Some basic processes must occur for any business deal to successfully conclude. These include information exchange between buyer and seller leading to a purchase agreement or contract, price agreement, transfer of goods by the seller to the buyer and, indeed, transfer of moneys for the goods purchased by the buyer to the seller. In the e-commerce scenario, these basic business processes are driven or facilitated by technology, as Figure 1 shows.

The primary e-commerce channel involves suppliers (which could be product manufacturers, traders, dealers and retailers as well as service providers) on the one hand and buyers of those products and services (which could be individual consumers and businesses and institutional buyers) on the other. Between these two are e-commerce players, which provide the digital platform and services for online commerce to take place. For the primary e-commerce channels to function effectively, there is a need for enablers, as Figure 1 shows. These include internet and information and communication technology (ICT) service providers; banks and financial intermediaries; logistics providers such as transport companies, post office courier service companies, etc.; social networking sites; and call centres that facilitate the e-commerce process one way or another. An important stakeholder and enabler of e-commerce at the national level is the government, which sets the policies and establishes the legal and regulatory environment. The role and importance of the various stakeholders and participants can best

Figure 1. Generic e-commerce ecosystem
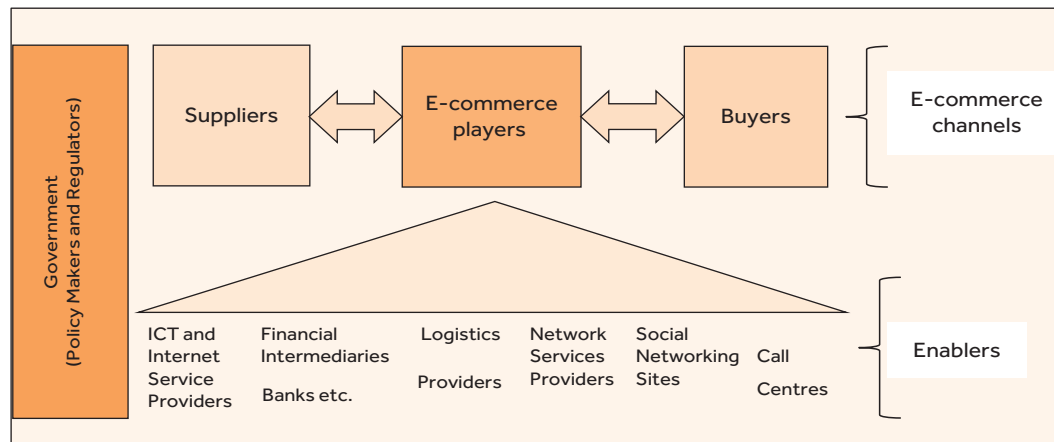
Source: Grail Analytics

be appreciated if we take a look at Figure 2, which depicts the major flows that occur as e-commerce transactions take place, reflecting the roles of various participants.

For e-commerce to take place optimally, three main types of transactional flows must occur. *Information and documents* must flow between the supplier of products or services and the buyer of these over a secure electronic platform, to be provided by the e-commerce players. The information between supplier and buyer flows back and forth until the transaction reaches the order placement stage.

As the order is placed over the e-commerce platform, the buyer has to transfer money to the supplier through what we have termed here '*monetary flow*'. This occurs through financial intermediaries operating in a digital environment

and platform, such as the payment gateway on which the buyer's credit or debit cards can operate or other such digital payment mechanisms.

The last flow that must occur is that of *product movement* from the supplier to the buyer. In most cases, this has to occur in the physical environment, except in the case of e-service providers such as travel companies and others that can provide services digitally using logistics companies, such as transporters, warehouse operators and courier companies. The policy, oversight and regulatory roles of the government are to be kept in mind, in addition to roles and functions of the various direct e-commerce participants.

Table 2 summarises the participants in the e-commerce ecosystem and their respective roles.

Figure 2. Transactional flows under e-commerce
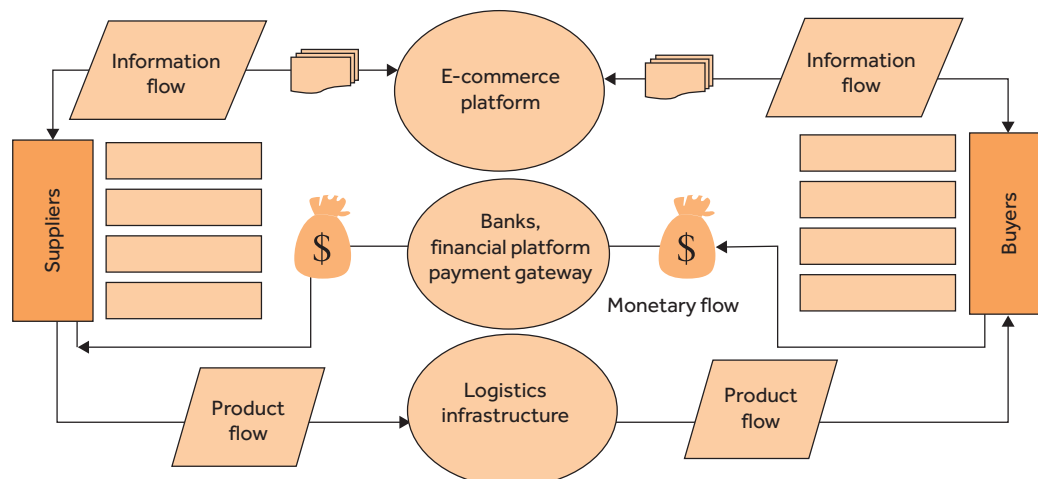
Source: Grail Analytics

Table 2. Major role of participants in a typical e-commerce ecosystem

Participant	Role	Remarks
Suppliers of products and services	Make available goods and services	Could be manufacturers, traders and even individuals
Buyers of products and services	Buy goods and services and pay for them	Could be companies, businesses and individuals
Transporters and logistics companies	Transport goods from seller to buyer and back; manage supply chain	Transporters, warehouse owner and supply chain participants
Banks and financial institutions	Facilitate digital payment	Banks and non-banking institutions
Service providers	Technology and non-technology services	Telecom and internet companies, internet service providers, digital marketers, e-commerce platform providers and technology support service providers
Government	Make policies, laws and regulations	Regulators and law makers

Source: Grail Analytics

1.4 Review of global e-commerce trends and best practices

The development of global domestic and international trade and commerce during the past 10 years has been marked by a sharp increase in e-commerce in almost all geographies and territories. The share of e-commerce in total trade and commerce is increasing rapidly almost everywhere, in developing and developed countries alike. However, the rate of growth of e-commerce in the developing countries of Asia is much higher than elsewhere in the world, particularly in high-population countries like China and India. China has now surpassed the USA as the largest e-commerce market, whereas India is among the fastest growing e-commerce markets in the world, with an annual rate of growth of about 70 per cent.

Looking at global e-commerce developments and emerging trends, a number of significant observations can be made. A summary of major observations is as follows:

1. The policy and regulatory environment, which includes the laws, regulations and trade and technology policies of the government, must be conducive to the development and growth of e-commerce in the country. In this regard, many governments are now reviewing and readjusting their commerce and technology development policies and commerce and trade laws and regulations.

International and regional organisations such as the United Nations Conference on Trade and Development (UNCTAD), the EU and the AU have formulated best-practice guidelines to help national governments formulate policies, laws and regulations that facilitate e-commerce development.

2. Back-end technology systems, including telecommunications and internet infrastructure, must be developed, mature, reliable and secure. While technical standards and best practices from organisations like the International Telecommunications Union are universally available to help in the development of secure internet back-end systems, innovative models have also been used to overcome the challenges of low bandwidth and lack of power in some jurisdictions.

3. Businesses must be e-commerce-ready both as electronic-based suppliers and as electronic-based consumers. This will, among other things, entail their maturity in terms of technology infrastructure and systems, trained staff and business systems and policies that are attuned to successful operations in a digital environment.

4. Citizens, as the major consumers of goods and services, must be e-commerce-mature in terms of availability of skills and tools to

successfully engage in e-commerce and willingness to adopt e-commerce. This in particular involves means and willingness to adopt electronic modes of payment such as credit and debit cards or mobile-based payment modalities.

5. The logistics and transport sector must be sufficiently developed and mature to effectively provide e-commerce logistics services to e-commerce operators.

1.4.1 E-commerce policies, laws and regulations

While e-commerce brings significant advantages for business and commerce, it comes with a host of legal and public policy issues that must be addressed appropriately. The proliferation of e-commerce gives rise to a number of legal challenges. These include challenges related to legal recognition and enforcement of electric contracts; protection of consumers and personal data; prevention and prosecution of cybercrimes; proper collection of taxes due on cross-border

electronic transactions; and protection of intellectual property rights (IPR).

International organisations such as the UN and the Organisation for Economic Co-operation and Development (OECD) have been at the forefront in addressing these issues. In particular, the UN has operationalised a number of framework instruments to guide member states in addressing the legal and policy issues that have followed the rise of e-commerce. Table 3 presents some of the important model frameworks and standards issued by international and regional organisations and national governments that could provide useful benchmarks for establishing an e-commerce policy, legal and regulatory environment in Sri Lanka.

1.4.2 E-commerce logistics and transportation

The logistics system under the e-commerce mode is significantly different from that in the traditional system. The supply of goods from the warehouses of producers to those of e-commerce operators must occur, and so must the delivery of

Table 3. E-commerce international guidelines, frameworks and standards

Organisation	Guidelines, standard practices and frameworks
UN	UN model laws on e-commerce and electronic signature prepared under the auspices of the United Nations Commission on International Trade Law (UNCITRAL) • UNCITRAL model law on e-commerce • UNICITRAL model law on e-signatures • UN convention on use of electronic communication in international contracts • UN guidelines on protection of privacy and consumers in context of e-commerce • UN rules on cyber-security in the context of e-commerce
OECD	• OECD guidelines on privacy and consumer protection in context of e-commerce • OECD guidelines on privacy and trans-border data flows • OECD guidelines: consumer protection in context of e-commerce • OECD Ottawa taxation framework • OECD guidelines on cyber-security in context of e-commerce • OECD guidelines for cryptography policy\
EU	• EU e-commerce directive • E-signatures directive 1999 • Consumer Protection EU Fundamental Rights Charter, Article 30 • EU Data Protection Regulation 2018 • EU Directive on Attacks against Information Systems, Directive 2013/40

Source: Grail Analytics

Table 4. Transformative moves by major international logistics companies

Organisation	Location	Recent expansion/transformation initiatives
XPO Logistics	USA	Has developed e-commerce logistics through acquisitions and serves customers through last-mile and logistics divisions
Clipper	USA	Significantly exposed to e-commerce through relationship with fashion and retail blue chip clients
La Poste	France	Has invested substantially in its express and parcel service to handle expanding e-commerce demand
Deutsche Post DHL	Germany	Has demonstrated importance of e-commerce by realigning its business to offer one-stop service to its clients across globe
Japan Post	Japan	Has responded to expansion of e-commerce by developing new services and acquiring Toll Holding Ltd
Yamato	Japan	Provides delivery services for two largest online retailers, Amazon and Rakuten
SF Express	Japan	Has expanded geographically, opening offices and service stations in Asia, Europe and North America and establishing partnerships for cross-border e-commerce
Australia Post	Australia	Building digital assets and infrastructure to support growth of e-commerce in Australia
Singapore Post	Singapore	Has expanded geographically through acquisitions as a part of its strategy to be a regional leader in e-commerce logistics
Aramex	USA	Developing its e-commerce services to capitalise on shift to online shopping; expanding its presence through joint ventures and partnerships
US Postal Service	USA	Has introduced and continues initiatives in 2015 to exploit the growth of e-commerce and its parcel business
Fed Express	USA	Has introduced e-commerce through targeted acquisitions and considers the segment of considerable importance
UPS	USA	Has introduced cross border e-commerce offering services in 100 countries if they shop online in USA and UK
Seko	USA	Has grown its operations alongside its clients and boosted its e-commerce by improving its technical capabilities

Source: Transparency International (2016) Global E-commerce Logistics

goods ordered online to the end customers. The important difference in logistics in e-commerce occurs in the level of automation in the logistics process. If the benefits of e-commerce are to be obtained in their totality, the whole supply chain has to be automated and integrated.

The logistics industry the world over is apparently in a state of transformation in response to the increased demand arising from the extraordinary growth being witnessed in e-commerce. The challenges posed and the demands made for fast, reliable, competitive and secure logistics have made it imperative for existing logistics companies to make changes in their operations with high dependence on technology. Table 4 shows some of main changes brought about by some of the major existing international logistics companies in recent years.

1.4.3 E-commerce business models

As with any traditional business, in e-commerce the existence of a well-laid out business model is essential. At the very basic level, there are three e-commerce business models:

1. The business-to-business (B2B) model, whereby transactions take place between one business firm and another – somewhat similar to the industrial or institutional business model in traditional business;

2. The business-to-consumer (B2C) model, whereby business firms and service providers supply goods and services to individual consumers – similar to the consumer business model in traditional business;

3. The consumer-to-consumer (C2C) model, whereby the goods and services are supplied by one consumer to another, for example the marketing of professional services.

Based on these three basic models, firms are developing and adopting many other models. For instance, the e-tailer model is a variation of the B2C model whereby the firm sells goods on the internet, using either its own inventory or an inventory owned by a third party. Omni channel operators have emerged in recent years; here, a firm combines e-commerce and traditional commercial practice.

For B2B e-commerce, net marketplaces and platforms represent the most common business model in use. These essentially bring together a large number of suppliers, each with a digital catalogue, and an equally large number of purchasing firms on a single platform to conduct business transactions. The net marketplace/platform could be owned either by an independent third party or cooperatively by all its members. In recent years, industry-specific business models have emerged, for instance e-commerce operators dealing in only specific products like food products, fashion products, clothing, etc.

1.4.4 E-commerce security needs and challenges

Issues related to electronic payment and security of data and personal information are of paramount importance. The main issue of concern among e-commerce operators and consumers relates to security of personal data as e-commerce transactions take place, when both the buyer and the seller are exposed to the threats of a security breach in terms of loss of data, loss of privacy and, in the worst case, use of fraudulently obtained information for personal gain, leading to financial loss for e-commerce participants. Fear of being targeted by hackers and loss of privacy represent a major reason for distrust among potential e-commerce participants.

Most, if not all, countries worldwide have adopted policies, regulations and technical measures to mitigate the threats and risks to their information and e-commerce systems from hackers and cybercriminals, and have initiated measures to protect the data and privacy of confidential information. For the development and regulation of e-commerce, most countries have adopted a multi-level response, conceptually depicted in Figure 3. The security assurance programmes at firm level as well as national level aim to enhance security along the following strategic dimensions (Table 5).

Figure 3. Legal, regulatory, policy and technological response on security

- Data
- Technology solutions
- Organisational procedures and policies
- Laws, policies and standards

Table 5. Strategic dimensions in the e-commerce security assurance response

Integrity	Ability to ensure the information being displayed on a site or transmitted/received over the internet has not been altered by an unauthorised party
Non-repudiation	Ability to ensure e-commerce participants do not deny (i.e. repudiate) their online actions
Authenticity	Ability to establish the identity of the person or entity with whom you are dealing on the internet
Confidentiality	Ability to ensure messages and data are available only to those who are authorised to view them
Privacy	Ability to control the use of information about oneself

1.4.5 E-commerce payment systems

Even though cash and cheque continue to be the dominant modes of payment in most of Asia and Africa, e-payment though credit and debit cards and in recent years through mobile money systems is changing the payment scenario in most of the developing countries of these regions. As countries adopt electronic payment and go online, economic growth accelerates and financial inclusion expands. This is particularly true of developing countries, where access to finance is a major challenge. Powered by the internet, electronic payment combines efficiency, transparency and accessibility; many developing countries find this an effective solution to accelerate financial inclusion.

Electronic payment has come a long way since the introduction of the first charge card as a payment instrument in 1950 by Diners Club. The World Payment Report 2015 notes that card payment led the growth of non-cash transactions, making up 62 per cent of the total of US$357 billion in non-cash transactions in 2013. The share of cards in emerging Asia is even greater, accounting for more than 82 per cent of all non-cash transactions, with the rest made up of direct debit and credit transfers and cheques. The landscape of card and electronic payment has also passed through a number of changes, driven by the inherent need to make it convenient and secure. New players, other than banks and financial service providers, are coming into the industry, changing the way the industry has operated so far.

In the context of e-commerce, some means to make payment online is essential to conclude e-commerce transactions. While in developed countries almost the entire population carries debit or credit cards, in developing countries most citizens do not have any these; indeed, a large proportion of citizens do not even have bank accounts. This is seen as a challenge to the expansion or adoption of e-commerce or general online transactions where online payment is a requirement. Mobile money systems like M-Pesa in Kenya have made considerable inroads in Asia and Africa, either as a mechanism for payment between individuals, often called people-to-people (P2P) payment, or as a means to pay for goods and services ordered online.

Recognising the absence of credit and debit cards in many countries, and in some cases the reluctance of consumers to make advance payment for goods ordered online, e-commerce companies often offer the option of paying on delivery. The logistics companies responsible for delivery of goods ordered online have the added responsibility of collecting payment from the purchaser at the time of delivery.

1.5 E-commerce readiness and maturity models

Various models have been developed and deployed around the globe to assess the readiness and maturity of e-commerce, both at the level of individual enterprises and at the level of a nation. Particularly relevant in this regard is the UN's suggested model for assessment of the e-commerce readiness of nations. UNCTAD, as the agency responsible for the development of global trade and commerce, in its Information Economy Report of 2015 put forward a simple model for assessing the e-commerce readiness and maturity of nations. Similarly, the EU has developed its own model of e-commerce readiness and maturity. Many of the major global e-commerce players have developed and deployed national models for e-commerce maturity assessment. Models and systems have also been suggested, developed and deployed for individual segments of the e-commerce ecosystem, such as models for retail e-commerce as against B2B e-commerce.

1.5.1 UNCTAD e-commerce readiness and maturity model

UNCTAD's e-commerce readiness assessment model identifies key factors that collectively determine the level of readiness and maturity of nations for e-commerce. Based on analysis of these factors, the model provides a B2C e-commerce readiness index for some 136 economies in the world. Table 6 presents the UNCTAD index for the top 10 countries in 2018.

According to UNCTAD, one of the key factors that is essential for e-commerce development is the existence of a reliable and secure *internet service* to enable the generation of online orders and permit their execution online. One useful indicator of this factor is the number of websites existing in a country. However, it has often been observed that, though a large number of websites may be in existence, only a few may be active participants in e-commerce. Given that e-commerce sites require security software, one widely available proxy for the

Table 6. Top 10 economies in the UNCTAD B2C E-commerce Index 2018

2018 rank	Country	Share of individuals using internet	Share of individuals with an account	Secure internet servers	UPU postal reliability score	Index value	2017 index rank
1	Netherlands	95	100	100	90	96.1	4
2	Singapore	84	98	98	100	95.2	18
3	Switzerland	94	98	94	94	95.0	2
4	United Kingdom	95	96	90	96	94.4	6
5	Norway	98	100	87	90	93.5	3
6	Iceland	98	99	98	78	93.5	11
7	Ireland	81	95	95	100	92.8	19
8	Sweden	96	100	86	89	92.8	7
9	New Zealand	88	99	87	96	92.6	10
10	Denmark	97	100	96	74	91.8	13

quality of e-commerce infrastructure is the number of secure servers using encryption technology for internet transactions.

The second key factor considered important for the development of e-commerce is the *payment system* for online transactions. This would broadly include the existence and usage of credit and debit cards, mobile money or other mechanisms to enable online transactions.

The third important factor is logistics, or the *delivery system*.

For each of the three factors seen as essential for e-commerce development, UNCTAD uses indicators such as number of secure internet servers to measure the level of development of the ICT infrastructure and services that support e-commerce; number of individuals with accounts or use of electronic cards as an indicator of the online payment system; and, lastly, postal reliability as an indicator of the development of logistics and postal home delivery service (Table 6). Whether or not the use of these indicators is justifiable is debatable. One major consideration in the choice of the indicators could relate to challenges that may be encountered in using better-suited indicators for which data may not be available or may be difficult to gather.

1.5.2 Government-sponsored e-commerce benchmarking models

Governments of some countries, including India and the UK, have in recent years taken initiatives to develop framework for national-level e-commerce benchmarking, using already existing methodologies for technology-based programme benchmarking. For instance, the UK government and industry have provided a possible structure for a national-level benchmarking framework built around the Information Age Partnership e-commerce adoption model. This takes the following factors as inputs into the development of a composite benchmark:

- Skills and capital available in the market;

- Readiness of infrastructure for main economic actors;

- Cost and availability of technical infrastructure;

- Progress in promoting use, and in developing value in use;

- Changes in behaviour by individuals, firms and government;

- Trust in e-commerce.

2. E-commerce Situational Analysis in Sri Lanka

2.1 Introduction

This section assesses the baseline situation of e-commerce in Sri Lanka based on the documentary research and study, as well as on the sample survey undertaken to collect data from the various e-commerce participants in the country, which included business firms, technology service providers, banks and financial institutions and logistics and transport companies. Given limited time and resources, it was not possible to undertake a comprehensive population survey in order to assess the readiness of citizens. However, for this study, the readiness of citizens is assessed indirectly through review of previous studies and reports as well as publicly available data on citizens' usage of technology. The assessment is divided into five major categories.

2.2 Policies, laws and regulations

Sri Lanka has taken various significant steps towards creating an enabling environment for ICT use within the government and in society at large. To encourage e-commerce, the government has passed several laws aimed at facilitating e-government and e-commerce. The most important e-commerce-related digital laws enacted and policies formulated by Sri Lanka are briefly described below.

2.2.1 Electronic Transactions Act 19 2006

The Electronic Transactions Act was enacted in 2006 and was brought into operation with effect from 1 October 2007. Following ratification of the United Nations Electronic Communication Convention by Sri Lanka in 2015, the government amended the Act in 2017 to align it with the standards established by UNCITRAL's Model Law on Electronic Commerce (1996) and Model Law on Electronic Signatures (2001) in order to provide greater legal validity for e-commerce and e-business providers and to ensure international validity of such e-contracts. The stated objectives of the Act are:

- To facilitate domestic and international electronic commerce by eliminating legal barriers and establishing legal certainty;

- To encourage the use of reliable forms of electronic commerce;

- To facilitate electronic filing of documents with government and to promote efficient delivery of government services by means of reliable forms of electronic communications; and

- To promote public confidence in the authenticity, integrity and reliability of data messages and electronic communications. This has ensured that electronic communication is officially and legally accepted as a proper means of communication.

2.2.2 Computer Crimes Act 24 of 2007

The Computer Crimes Act of 2007 provides for the identification of computer crimes and stipulates the procedure for the investigation and enforcement of such crimes. The aim of the Act is to criminalise attempts at unauthorised access to a computer, computer program, data or information; unauthorised use of computers regardless of whether the offender had authority to access the computer; and unauthorised modification, alteration or deletion of information and denial of access, which makes it an offence for any person to program the computer in such a manner so as to prevent authorised persons from obtaining access. Other offences sought to be created under the proposed Act include causing damage or harm to the computer through the introduction of viruses and logic bombs; unauthorised copying of information; unauthorised use of computer services; and interception of a computer program, data or information while in transmission from one computer system to another.

2.2.3 Data protection policies and rules

Data protection is apparently an important area of focus of Sri Lanka's government. Data protection rules have become increasingly important in the

current information age, where personal data have become a significant asset of many companies and the risk of misuse can be high. Growth and innovation in the digital economy in Sri Lanka need to occur while safeguarding the rights of individuals and ensuring consumer trust.

In order to prevent misuse of personal data, the EU Data Protection Regulation is seen as the guiding framework for the formulation and adoption of regulations issued under the Information and Communication Technology Act of 2003. The government of Sri Lanka is currently developing a legislative framework to provide for mechanisms that safeguard the personal data of individuals while respecting domestic written laws and applicable international legal instruments.

2.2.4 Consumer Affairs Authority Act 9 of 2003

The Consumer Affairs Authority Act was passed in the Parliament on 9 January 2003. It came into force with the establishment of the Consumer Affairs Authority. Its aim is to protect consumers from unfair trade practices and traders and businesses from unfair competition and restrictive trade practices. The Act is a general consumer protection legislation that does not address the specific challenges and issues of consumer protection in e-commerce.

2.2.5 Intellectual Property Act 36 of 2003

IPR of individuals and companies are protected in Sri Lanka under its IPR Act of 2003. Sri Lanka has signed a number of major IPR treaties, including the Paris Convention for the Protection of Industrial Property, the World Intellectual Property Organization copyright treaty, the Berne Convention for Literary and Artistic Works and the Patent Cooperation Treaty. Online products and services copyrighted or patented under the Act would also secure protection. For instance, an infringer who offers counterfeit products for sale online could be held liable under the IPR Act.

A Cyber-Security Bill is at its final draft stage and waiting to be approved. The objectives of the Act will be to ensure the effective implementation of the National Cyber-Security Strategy in Sri Lanka; to prevent, mitigate and respond to cyber-security threats and incidents effectively and efficiently; to establish the Cyber-Security Agency of Sri Lanka and empower other institutional frameworks to provide for a safe and secure cyber-security environment; and to protect critical information infrastructure.

2.3 ICT infrastructure backbone

After nearly two decades of war, which disrupted normal life and economic activities, the telecoms sector has exhibited strong growth. A sharply increasing trend in telecoms usage, especially in mobile usage, can be observed. The number of active SIM cards has increased from a mere 0.43 million in 2000 to about 28.2 million in 2017. Dialog Axiata, formerly known as Dialog telecom, is the biggest mobile provider. Mobitel, owned by Sri Lanka Telecom (SLT), is the second largest provider, with 9 million subscribers. Etisalat has 4.2 million users. The two smallest mobile service providers are Airtel and Hutch, with 2.5 and 0.8 million subscribers, respectively. By 2019, the total number of cellular mobile connections had grown to 33.5 million, with over 12.5 million broadband and dial-up internet connections.

2.4 Logistics and transport in Sri Lanka

Logistics and transportation of goods is an important part of the e-commerce ecosystem. As such, a review of the country's transport infrastructure and its state of development was undertaken with a view to determine if the present state of logistics and transport could effectively support e-commerce. Logistics and transport in the country is multimodal, with a developed network of roads, rail and air transport, as well as a wide network of waterways and port infrastructure. The government has also, in the recent past, initiated a number of projects and programmes to improve roads, expand road connectivity and improve materials-handling systems at the ports.

To obtain a deeper understanding of the logistics sector and its readiness for e-commerce, a sample survey of logistics firms was undertaken. A sample of nine logistics organisations was given a structured questionnaire. The data collected through the survey were analysed to make the observations in Figures 4 and 5.

The logistics and transport sector of the country consists of a large number of firms and organisations providing logistics and transportation and related services. More than 500 Sri Lankan logistics and transport companies and firms are listed on the web. Some of them are integrated

Figure 4. Logistics firm size distribution based on annual revenue
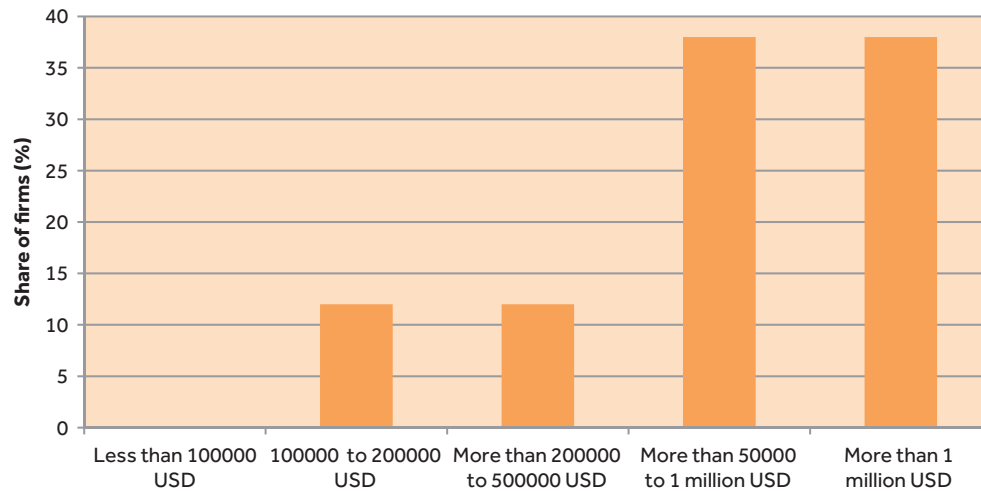
companies that provide end-to-end transport services including goods collection, warehousing, transportation and delivery services; many others provide more restricted and focused services.

The firms in this sector are primarily small and medium size enterprises (SMEs), except for some larger multinational firms that operate in Sri Lanka (Figures 4 and 5). The other major inferences that can be drawn from the survey data are discussed below.

2.4.1 Geographical and product coverage

The logistics and transport companies of Sri Lanka are focused mainly on international and nationwide services, accounting for about 80 per cent of the firms surveyed (Figure 6). Only a few firms work locally and regionally in Sri Lanka. It is interesting

to note that nearly 20 per cent of firms are serving regionally within Asia, focusing on India, Maldives and other nearby regional markets.

As Figure 7 shows, Sri Lankan logistics firms handle various products, from industrial raw materials and products to agricultural commodities in bulk to agro-processing products and various consumer products. It is noteworthy that distribution is almost uniform across product categories. However, if coffee and tea are clubbed together with agro products, this category would be dominant, accounting for about 40 per cent of firm engagement.

2.4.2 Resources and equipment

On the availability of infrastructure resources and equipment, a broad picture emerges. The firms surveyed collectively had 83 offices and fewer than

Figure 5. Logistics firm classification by size of employment
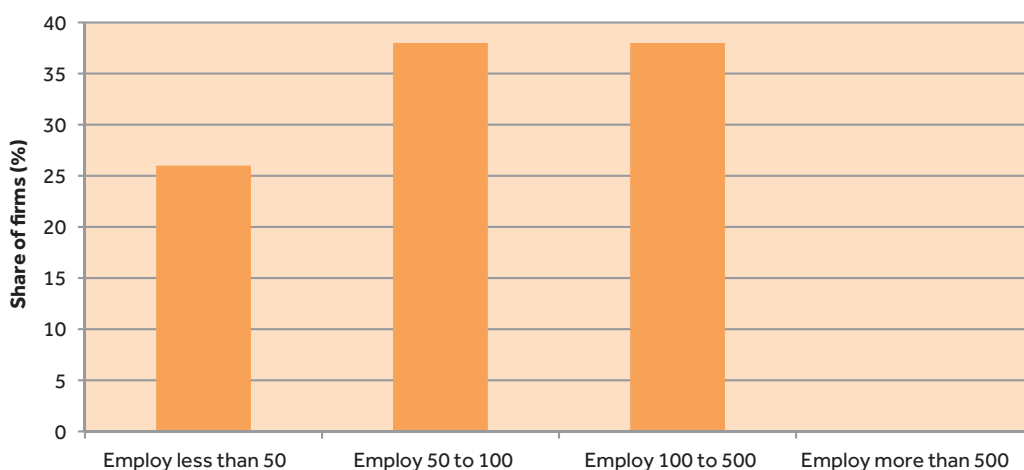
Figure 6. Logistics firms; geographical coverage

- Local
- Regional within Sri lanka
- National
- Regional within Asia
- International
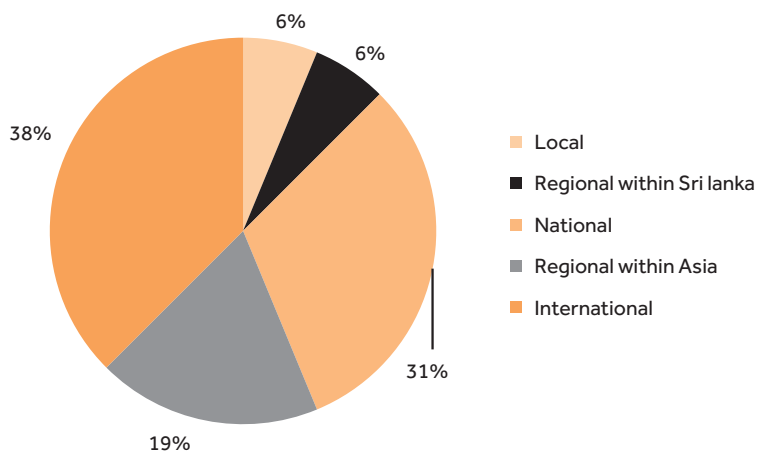
Figure 7. Logistics firms' product coverage

- Industrial and Engineering Products
- Raw materials for construction industry
- Raw Agriculture Produce in bulk
- Raw Agriculture Products in packages
- Processes Agro Products
- Coffee
- Tea
- Raw Leather
- Leather Products
- Textile and Clothing
- Food Products
- Other consumer products
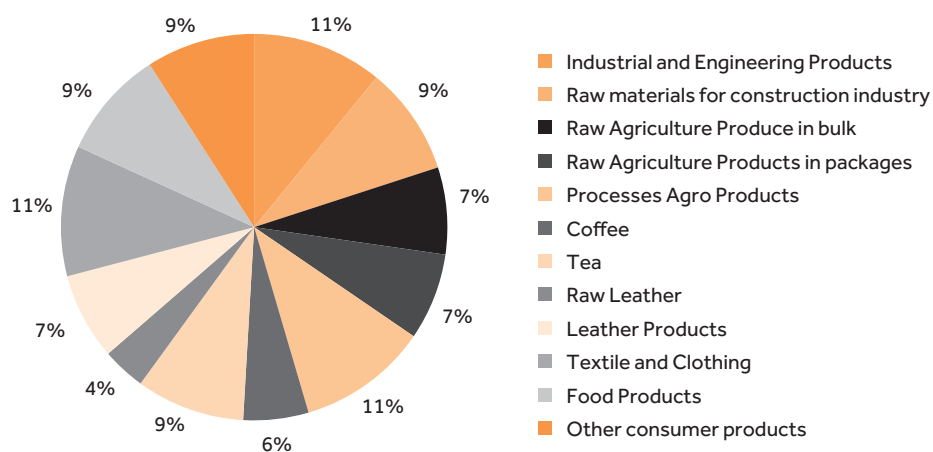
Figure 8. Physical infrastructure for logistics firms
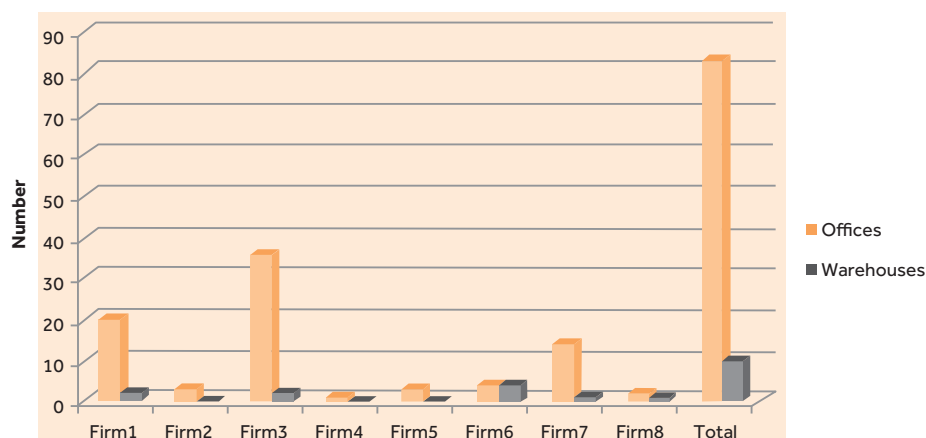
10 warehouses. Thus, there is on average one warehouse for every ten offices. However, many of the firms surveyed did not have a warehouse at all, whereas one firm had only four offices but four warehouses to serve them. On the other hand, one firm, widely distributed within the country, with 36 offices, had only 2 warehouses to serve them (Figure 8).

Though there is considerable variability in the availability of material handling equipment in the firms surveyed, each firm on average employs

Figure 9. Material handling resources: numbers available per firm
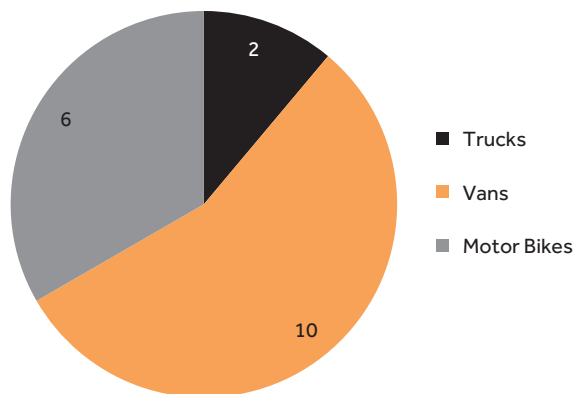
two trucks, ten vans and six motorbikes for the transportation of goods. Twenty-five per cent of the firms do not have any material handling equipment, being logistics support service firms. Only 20 per cent reported refrigerated trucks and storage facilities for the transportation of perishable goods (Figure 9).

2.4.3 ICT application by logistics firms

The survey results indicate that all logistics firms use ICT in one form or another. Nearly half of the firms employ ICT for routine office task management on stand-alone systems; the other half of the firms employ ICT though a developed system (Figure 10).

Of the firms that employ ICT in a developed manner for the management of their normative functions, nearly three-quarters, or 75 per cent, employ systems that are web-integrated systems in the logistics chain. The balance, a quarter of firms, employ standalone ICT systems for their internal work (Figure 11). Windows is the predominant

technology platform used in logistics firms, with some firms also using open source technologies.

2.4.4 Policies and regulations in logistics firms

Most of the firms interviewed reported non-existence of any set policies, except for the service-level agreements that they have with their customers. Some reported the existence of International Air Traffic Association rules that they had to follow. There are apparently no set government policies or regulations that the firms are required to follow with regard to their operations other than the general commercial and tax laws of the country.

2.4.5 Existing services to e-commerce companies and perceived readiness

Many of the firms surveyed indicated that they were already serving e-commerce companies but most of them were reluctant to disclose the names of these. In addition, all companies were ready and optimistic about emerging e-commerce trade.

2.5 E-commerce among business firms

The most important actors in the e-commerce ecosystem are the firms themselves, as sellers and buyers of good and services online. For e-commerce to mature, it is essential that firms be able and willing to adopt technology, to offer and in many cases deliver their products and services either digitally or with substantial use of technology. In the B2B business model, the businesses themselves can also be the buyers. Therefore, business maturity, as buyers of products and services online, is important.

Figure 10. ICT adoption by logistics firms
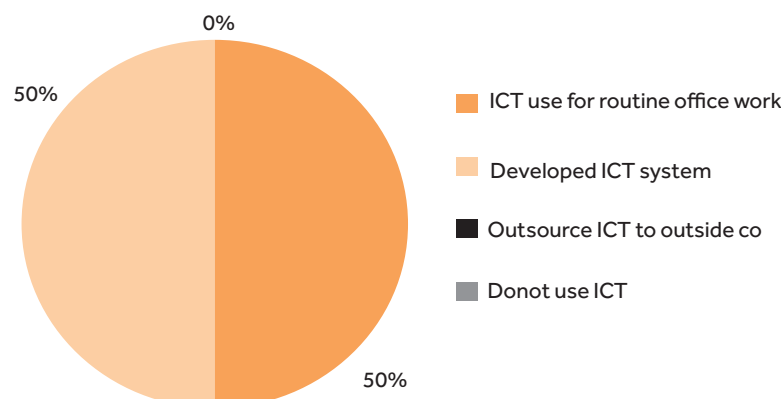
Figure 11. ICT systems in logistics firms
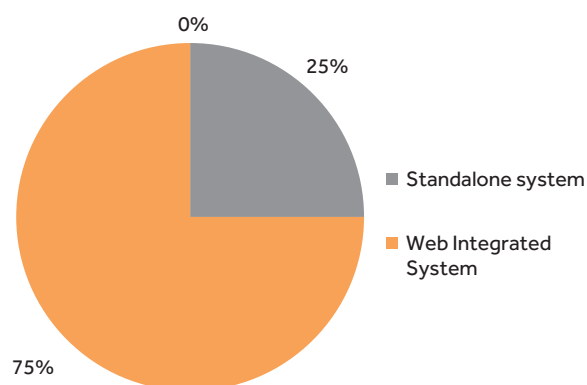
E-commerce in Sri Lanka seems to be developing fast. Besides hotels, travel agents and banks that are already offering services online, a number of B2C and B2B companies are in operation. Table 7 lists the major ones.

As the list in Table 7 suggests, most companies are concentrated in the B2C market segment and in consumer electronic products. There is enormous potential for the expansion of e-commerce in other consumer and industrial markets and product categories. In order to obtain a deeper understanding of the readiness of business firms for e-commerce, a random sample of 76 businesses were given a structured questionnaire. The sample covered firms of all sizes: small, medium and large (Figure 12), with a preponderance of SMEs. The sample was stratified based on ownership and constitution (Figures 13 and 14). Most importantly, the sample was stratified so as to represent all the major industry domains and business sectors (Table 8).

The responses received from the sample firms were analysed to draw important insights on the maturity of the business firms with regard to adopting

Table 7. Major e-commerce firms in Sri Lanka

Name	Description	Host	Category
Dialog.lk	Telecom services and products		Telecoms services
Kapruka.com	Shop and send gifts; over 300 brands	NA	B2C, jewellery and watches
Takas.lk	Sri Lanka's largest online lifestyle store	Magento	Consumer electronics, products
Daraz.lk	Previously Kaymu.lk; clothes, mobiles, electronics	Oracle Commerce	Consumer electronics
Ikman.lk	A premier classified advertisements website operating in Sri Lanka for C2C sales	NA	Second hand or new items
Wow.lk	Shop, send gifts and check prices; largest online shopping mall in Sri Lanka with daily deals and travel deals	Oracle Commerce	B2C, consumer products and services
Buyabans.com	Online shopping for laptops, AC, mobile phones and washing machines	NA	B2C, consumer products
Dailcom.lk	Mobile phones and tablets	NA	B2C consumer electronics
Mydeal.lk	Daily deals and discounts	NA	B2C, clothing
Wishque .com	Sri Lanka's premium gift delivery service	NA	Fresh flowers, perfumes, jewellery
barclays.lk	Sri Lanka's largest laptop, personal computer and computer accessories store	NA	B2C, consumer electronics
Mystore.lk	Online home appliances, kitchen equipment and cake delivery	Magento	Home and gifts

Note: The list given in the table is illustrative rather than exhaustive.

Figure 12. Number of employees in each business firm surveyed
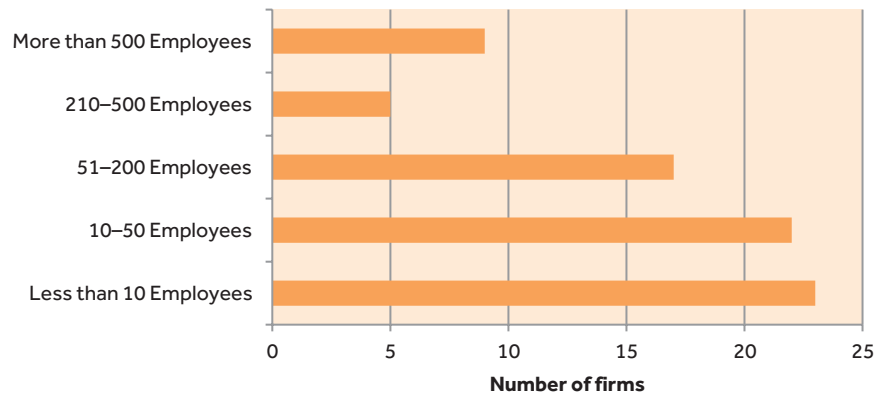
Figure 13. Sample composition of firms

- ■ Private Ltd
- ■ Public Ltd
- ■ Govt. Owned
- ■ Partnership
- ■ Not for Profit
- ■ Others
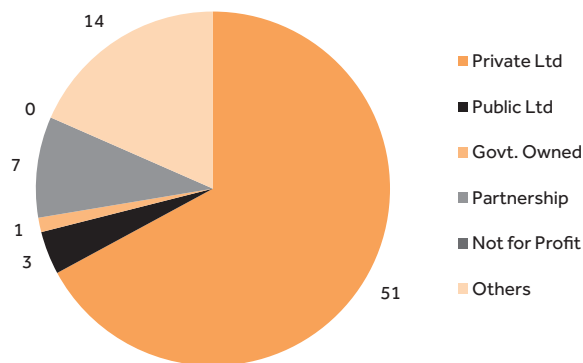
Figure 14. Sample composition annual revenue in US$

- ■ Less than 200000 USD
- ■ 200000 to 500000 USD
- ■ 500000 to 1 millionUSD
- ■ More than 1 million USD

Table 8. Stratified sample industry and business sector composition

Industry/business sector	Sample size
Agriculture producer and trader	20
Engineering manufacturer and supplier	3
Chemical manufacturer and trader	2
Construction business	1
Exporter and importer business goods	11
IT products	8
Textile and clothing industry	10
Others, including services	22
Total sample size	76

2.5.1 Diffusion of e-commerce

E-commerce as a modality of business has apparently taken roots in Sri Lanka. It is estimated that nearly 58 per cent of firms have adopted technology for sales and marketing in one form or another. Forty-two per cent of firms have yet to adopt technology marketing of their goods and services (Figure 15).

Nearly 40 per cent of firms use their own in-house technology platform for marketing their goods and services in either the domestic market or the international market, and 18 per cent of firms use a third-party technology system for this purpose.

Figure 16 shows that less than half of the business organisations in Sri Lanka have adopted online procurement of good and services for their enterprises in one form or another. Fifty-one per cent of firms have still to use

e-commerce. The study revealed that local businesses focused on domestic and international markets almost equally. Nearly 60 per cent of firms perceived their major market to be international. Therefore, it can be inferred that the business model and strategies of the Sri Lankan firms is shaped as much by local business conditions as by the imperatives of the international markets they serve or the international jurisdictions from where goods and services are procured.

Figure 15. E-commerce adoption: marketing of goods and services

- International marketing using own technology system
- International marketing using third party technology platform
- Domestic marketing using own platform
- Domestic marketing using third party system.
- Do not use
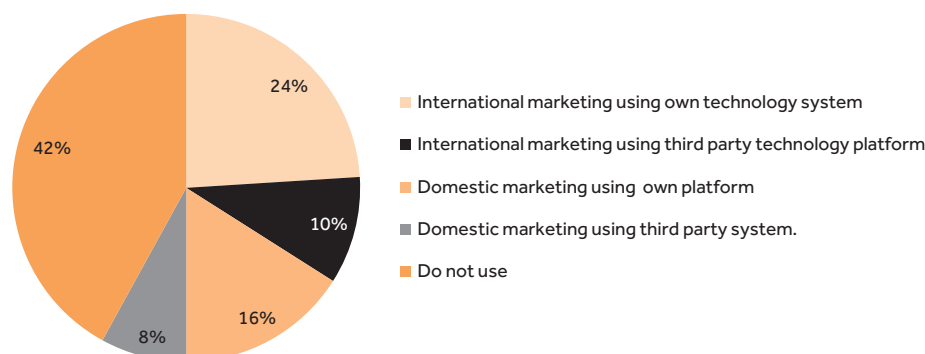
Figure 16. E-commerce adoption: procurement of goods and services

- From international markets using our technology system
- From international markets using third party technology platform
- From domestic markets using our own platform
- From domestic markets using third party system.
- None
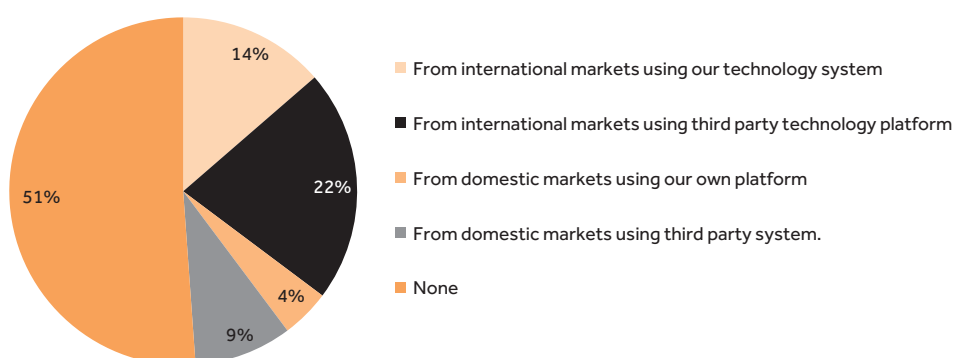
technology-based procurement. A majority of firms use a third-party technology system for the purpose of online procurement.

Though adoption seems to be proceeding well, with nearly half of firms now using technology for marketing and procurement, depth of usage is clearly at a very low level. This can be gauged from the data on the share of e-commerce-based marketing and procurement presented in Figures 17 and 18. These show that more than half of the firms do not derive any sales or purchases from e-commerce, and the other firms that are trying e-commerce are deriving

less than 10 per cent of sales or purchases from it. It can thus be inferred that, though e-commerce diffusion among businesses is developing fast, with nearly half of firms already on board, depth of usage and diffusion remain a matter of concern.

2.5.2 E-commerce technologies and systems

The technology base that is currently used for e-commerce and the trends thereof indicate the direction in which the e-commerce ecosystem in the country is developing. Questions were asked

Figure 17. Share of sales from e-commerce

- Less than 10%
- 10–20%
- 20–30%
- More than 30%
- None

Figure 18. Share of procurement from e-commerce

- Less than 10%
- 10–20%
- 20–30%
- More than 30%
- None
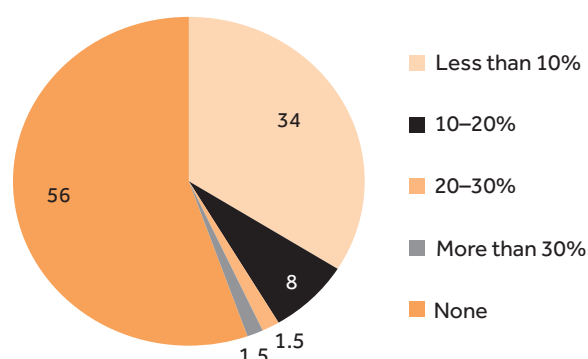
Figure 19. Third-party e-commerce platforms used for online marketing

- e-bay
- Alibaba
- Amazon
- Magneto
- Open cart
- Big Commerce
- None
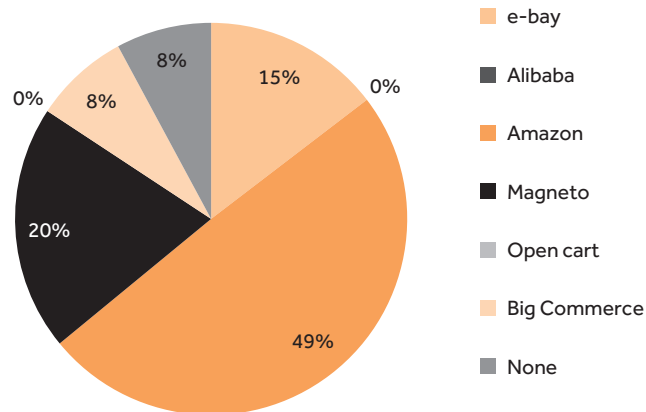
Figure 20. Factors for choice of third-party platform

- Security
- Easy Integration
- Effective SEO
- Easy Content Management
- Integrated Payment gateway
- Search and Guided Navigation
- Others
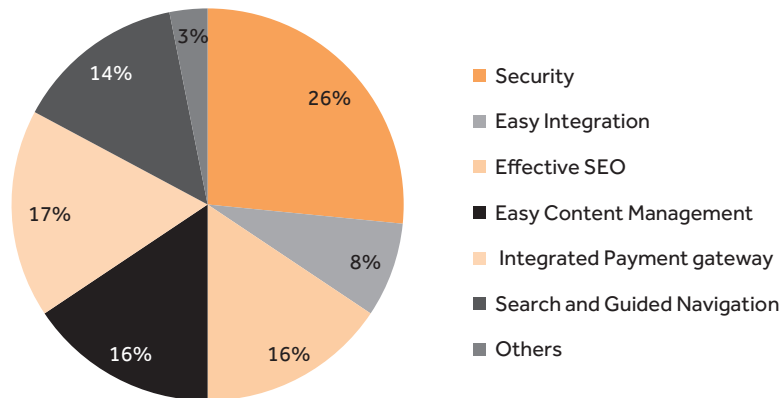
about the external platforms being used and the in-house platforms being built. The responses to these questions were analysed and are presented in the following sections.
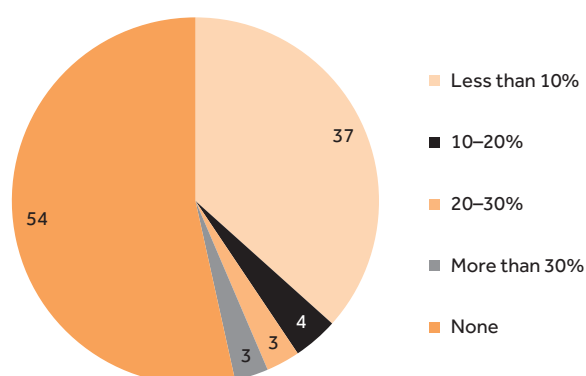
Amazon is the obvious preferred international platform used by Sri Lankan companies for e-commerce, accounting for nearly half of external platform usage. The main considerations in the choice of external platforms are security, search engine optimisation (SEO), search and guided navigation (Figures 19 and 20). These are also stated as the key factors for locally designed in-house platforms.

2.5.3 Payment modalities

A developed e-payment modality is an essential indicator of e-commerce maturity. Therefore, the current payment modalities have been assessed based on the survey results.

The data presented in Figure 21 indicate that traditional bank transfer, cheques and cash continue to be the three most common payment methods currently employed. It can also be noted that e-payment is now taking root. Fourteen per cent of payments are made by credit or debit cards and another 14 per cent by a bank-to-bank e-payment method. Nearly a quarter of payments made or received by businesses are electronic in nature.

2.5.4 ICT infrastructure and resources

Automation and general technology adoption and availability of ICT infrastructure and skills within the businesses facilitate diffusion of e-commerce.

Figure 22 presents data on the IT resources of the businesses. Only 11 per cent of firms do not have any IT infrastructure, owing to lack of resources, skills, know-how or willingness. A quarter of all firms have their own IT departments with trained IT personnel in the employment of the firms; 14 per cent of firms subcontract IT work to specialised outside vendors. Thirty per cent of businesses have a web presence through either a website or a portal of their own. The data do not reflect the efficacy

Figure 21. Payment modalities
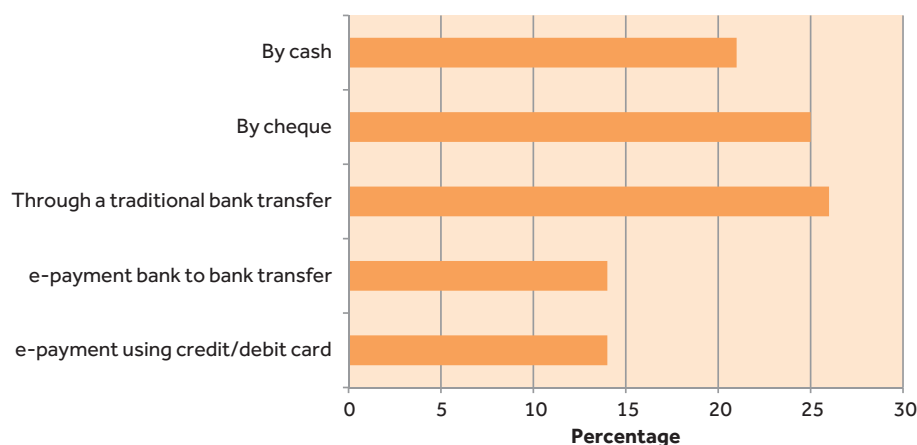
Figure 22. ICT infrastructure and resources

- Own IT department with trained IT persons
- Have servers, hardware, PCs and Software
- Subcontract IT work to other companies
- Have own website and portal
- No resources
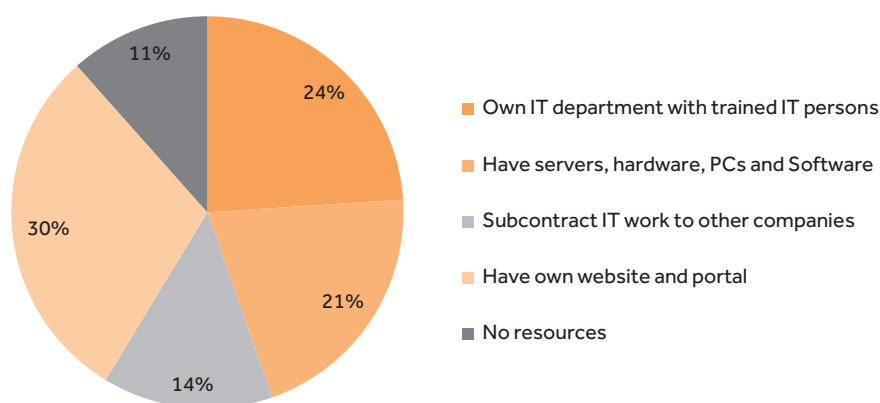
and optimality of the IT systems that the firms may currently have but do indicate that ICT adoption within businesses is fairly widespread.

2.6 Banking and financial ecosystem

The banking and financial ecosystem in the country was reviewed in order to assess its level of maturity to effectively support e-commerce. At the end of June 2018, the formal banking sector consisted of 25 Licensed Commercial Banks (LCBs), including 12 branches of foreign banks and seven Licensed Specialised Banks (LSBs). Seven of the country's major banks were administered a questionnaire to collect data about their operations, coverage and technology application, and, most importantly, services for electronic payments for businesses and individuals. The data collected through the questionnaire were supplemented with information from web sources and published

documents. Table 9 presents the main results of the survey undertaken.

The sample of banks whose data have been obtained includes a number of local and foreign banks that operate in the country. Publicly available information puts the number of local banks at 21 and foreign banks at 12, indicating that the country has a well-developed formal banking sector. In recent years, non-banking financial companies (NBFCs) have developed in the country. The NBFCs are very numerous indeed, at 56, with a branch network of some 1,300. The reach of the banks and NBF companies is large, covering almost the whole country.

Almost 60 per cent of the commercial and retail banks in Sri Lanka offer credit card facilities and a much larger percentage offer a debit card facility. Some of the banks have their own payment gateway, whereas others employ third-party payment gateways. Credit or debit card usage

Table 9. Summary of bank survey results

Bank	Nature	Credit cards	Debit cards	Internet banking	Mobile banking	Payment gateway	Security	Remarks
Commercial Bank	Retail, Commercial	Yes 30–50%	Yes 10–30%	Yes	Yes	Own	TFA	One of largest Visa/Union; local
Hatton N. Bank	Commercial	Yes less 10%	Yes 10–30%	Yes	Yes	Yes	TFA	Locally owned
National Savings	Retail	No	Yes 10–30%	Yes	No	Yes	TFA	Locally owned
Seylan Bank	Commercial	Yes 10–30%	Yes 50%	Yes	Yes	Yes	TFA	Locally owned
State Bank of India	Commercial	No	Yes	Yes	Yes	No	TFA	Foreign owned
HSBC	Retail	Yes 50%	Yes 50%	Yes	Yes	No	TFA	Foreign owned
Citibank	Commercial	No	No	Yes	No	No	TFA	Foreign owned

by businesses and individuals is rising. In many of the larger banks it is over 50 per cent of the total account population; in others it can be as low as 10 per cent. On average, it can be roughly estimated that nearly 30 per cent of bank clients use either a credit or a debit card for payment services on the internet or by mobile phone.

Almost all major banks offer internet and mobile banking services. Secure operations of online banking seem to be the policy of each bank; all banks that offer online services conform to the two-factor authentication protocol and Payment Card Industry Data Security Standard (PCI-DSS) security standards. A recent report indicates that there are some 1.6 million credit cards in circulation in the country, which confirms the rough estimate of some 10 per cent of the population made though the survey. The large number of debit cards in circulation has been calculated at some 20 million. However, debit cards issued by most banks are primarily used for ATM operation, and less for payment online. Thus, an estimate of 30 per cent of debit cards used for payment for online services appears to be reasonable.

2.6.1 Mobile money scenario

Though the banking and NBFC network is apparently extensive, offering banking and financial services throughout the country, a large section of the population in very remote areas and without bank accounts may be left out of the financial mainstream. Money transfer and payments with mobile technology as a base have been particularly appealing to such segments of the population. As in other developing countries of Asia and Africa, mobile money payments seem to be developing and expanding in Sri Lanka.

Dialog Axiata, the largest telecom company in Sri Lanka, launched a service known as EzPay in 2007, which failed to take off since it required users to have an account with any one of the three pre-specified financial institutions. In June 2012 it launched eZ-Cash, which witnessed far better adoption. Recently, the telecoms company has launched Genie, a mobile payment aggregation application. In addition to Dialog's mobile payment applications, the Nation Trust Bank has launched FriMi, which requires an account with the bank. Many other banks, including the Commercial Bank and Sampath Bank, are introducing mobile-based financial services of various kinds

In recent years, the use of mobile money payments has increased sharply, as Figure 23 shows. There has been an increase of some 300 per cent during the past two years in the total mobile payment transaction value. The average transaction value is also increasing on a year-to-year basis (Figure 24).

Figure 23. Growth in mobile payment linked to customer accounts (bank-dependent)
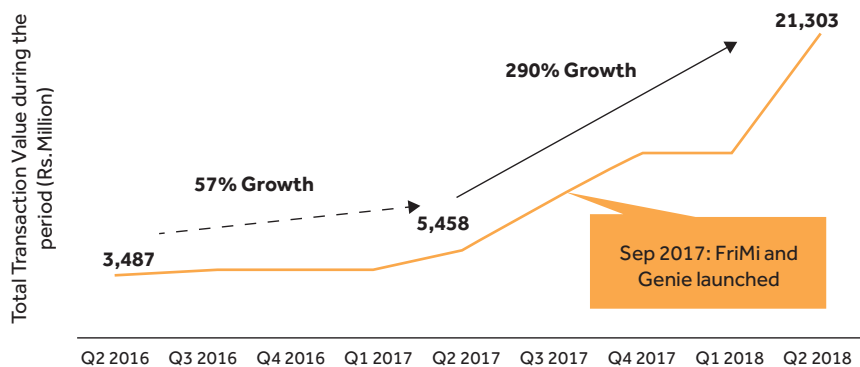
Source:
Central Bank of Sri Lanka

2.7 Technology ecosystem in Sri Lanka

The presence of secure, reliable and affordable telecoms services is an essential requirement for e-commerce. Have been embroiled in a civil war for nearly two decades, the Sri Lankan telecoms industry had to contend with the challenges of a war-torn economy. Since the end of the civil war, the telecoms industry has crawled to its present state and is now well placed for vigorous growth.

A significant spike in the telecoms industry is now evident. By 2019, the total number of cellular mobile connections had grown to 33.5 million and rising, and over 12.5 million broadband and dial-up internet connections, increasing Sri Lanka's internet penetration to 30 per cent and the total number of internet users to 6.1 million. Dialog Axiata, formerly known as Dialog telecom, is the biggest mobile provider, with the best coverage in the country, followed by Mobitel, owned by SLT, and two smaller providers, Airtel and Hutch. The presence of multiple telecoms providers has increased market competition and pulled prices down to affordable rates – as low as 0.57 per cent of gross national income.

Development of the ICT sector, and its use for the development of Sri Lankan society and the economy as a whole, has been the government's overarching aim for several decades, and continues to be an important policy goal of the present government. To realise this goal, the E-Sri Lanka

Figure 24. Average transaction values of bank account-dependent mobile payments
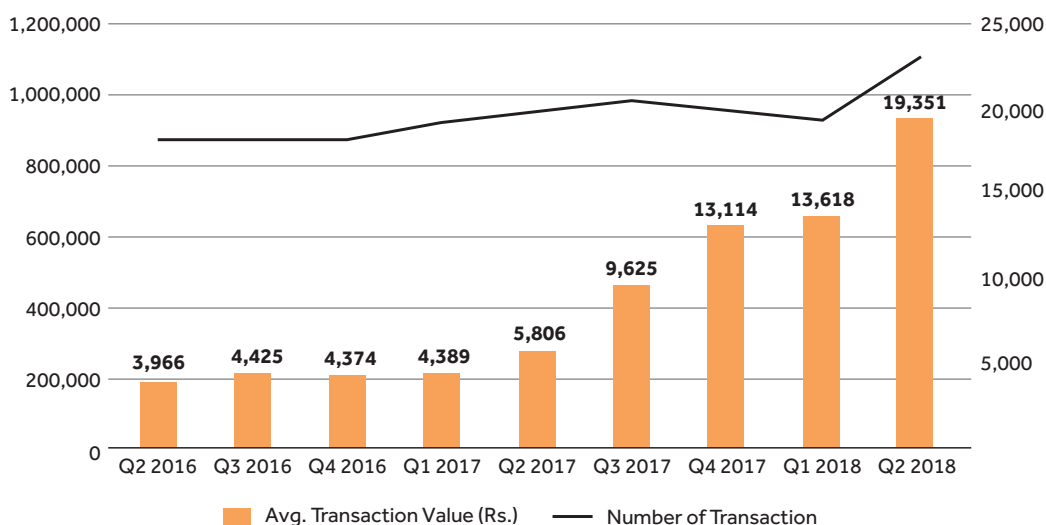
Source:
Central Bank of Sri Lanka, RoarTech Analysis

Strategic Plan was developed in 2003, which, among other things, led to establishment of the ICT Agency under the Ministry of Telecommunication and Digital Infrastructure. This has the mandate to spearhead promotion of ICT for governance and development within the government and in Sri Lankan society at large. The agency is at the forefront in driving IT and implementing programmes to ensure the development of IT in cities and villages. Under the E-Sri Lanka Plan of Action, many strategic programmes and projects have been initiated, including development of the ICT infrastructure backbone; ICT for governance and development; ICT skills generation; and creation of a vibrant software and business process outsourcing industry in Sri Lanka.

The present state of the IT sector in the country is characterised by a large number of software and IT-enabled software companies and an expanding innovation and start-up culture. At present, the Sri Lanka Software and Services Company Association, with 200 members, aims to make the Sri Lankan software industry a US$5 billion enterprise by 2022.

3. E-commerce Readiness, Maturity and Recommendations

3.1 Introduction

The previous sections have presented a conceptual framework for the development of e-commerce, international standards and best practices and an overview of the present state of development of the various strategic component parts of e-commerce in Sri Lanka. Considering the current baseline state of e-commerce in the country, covering policies and regulations, technology environment, logistics, e-payment and financial service imperatives, this section presents an e-commerce maturity model. This will help determine the present state of readiness of e-commerce in the country and set up a system to continually monitor e-commerce development as the country moves from the present baseline state of maturity to the target state of full maturity.

3.2 E-commerce maturity model for Sri Lanka

As has been mentioned, e-commerce development is multidimensional. If e-commerce is to develop optimally, either at the level of individual enterprise or at the level of the nation, each strategic component part needs to develop maturity and readiness. As a part of this study, the consultant undertook a comprehensive study and review of the various e-commerce benchmarking and maturity models being employed in various countries and jurisdictions, including the UK, the EU and India, guided by the UNCTAD-recommended e-commerce maturity assessment guidelines. A five-parameter model is proposed for Sri Lanka that includes the following as the parameters to be benchmarked:

1. Consumer readiness;

2. Business readiness;

3. IT infrastructure and accessibility;

4. Logistics and delivery;

5. Policies, laws and regulations.

Indicators associated with each of the five parameters have been identified. This model will be the basis for a monitoring system to evaluate progress as e-commerce develops in the country. In estimating the overall e-commerce maturity index and a single benchmark for the country, the five parameter scores will need to be combined into a single index.

3.2.1 Consumer readiness

Consumer readiness relates to such factors as consumer awareness and skills in employing technology for buying and selling online; propensity in using technology; trust in the technology and systems; and attitude in adopting new technology and trying new system of e-commerce. Most importantly, it relates to how often and how prepared consumers are to use credit or debit cards or other means of electronic payment. This relates primarily to B2C e-commerce.

3.2.2 Business readiness

For B2C and B2B e-commerce to develop and grow, it is essential that businesses, industries and other corporate entities that are either e-commerce service providers or e-commerce consumers have to be ready, with their technology and management systems optimally developed and deployed. They should have the awareness and skills necessary for maintaining their infrastructure and efficiently running their technology systems and providing and consuming e-commerce services.

3.2.3 IT infrastructure and accessibility

The availability of secure internet and mobile connectivity is central to e-commerce as it is to other forms of e-services and transactions online. The spread of internet and mobile connectivity, the use of smart devices and the cost of mobile services and internet are also important factors in determining the level of B2C e-commerce. On the other hand, business consumers will need the IT infrastructure at their end as much as

the IT infrastructure and services in the general technology ecosystem. There have to be reliable web hosting services, content developers and IT service providers, and businesses have to have the technology skills to develop and run their own IT infrastructure, reflected in the business readiness factor mentioned above. Electronic means for business payments is another factor of importance in this parameter, and it is essential that the technology infrastructure in banks and financial service providers be developed.

3.2.4 Logistics and delivery systems

E-commerce transactions are successfully consummated only when the products and services are delivered to the buyer. Existence of a supporting logistics and transportation system, level of automation in logistics firms and presence or absence of warehousing and transportation systems used by transporters and courier companies are all important factors that will determine how ready and mature the country's logistics and transportation system is to support e-commerce, both B2C and B2B.

3.2.5 Policies, laws and regulations

The status of government policies, laws and regulations covering technology, commerce and trade determines how mature the Sri Lankan ecosystem is for e-commerce. The policies and laws and regulations may or may not be conducive to e-commerce. Several gaps and weaknesses could exist in the policy environment, laws and regulations that may hinder the development of e-commerce. Thus, the e-commerce maturity and benchmarking system must account for government policies, laws and regulations.

3.3 Indicators

The e-commerce benchmarking and maturity assessment system for Sri Lanka has to be appropriate to the situation in the country. Data on certain indicators may not be available on a routine basis. Thus, when choosing the indicators, we have to keep in mind the difficulties that may be encountered in obtaining reliable data, and go for those that can use data already being collected by one or other agency of the government. Table 10 gives the proposed indicators for the five benchmarking parameters.

3.3.1 Scoring the indices

The score for each of the five parameters defined above is estimated based on the value of each of the indicators attached to it. The raw observed basic score (from 0 to 1) will need to be multiplied by weightage from 1 to 10, depending on the relative importance of each indicator. The total parameter index score is estimated as shown in Table 11.

$$\text{Parameter index score} = \frac{\text{Sum}(B_1 \times W_1 + B_2 \times W_2 \ldots B_4 \times W_i)}{\text{Sum}(W_1 + W_2 + W_3 \ldots W_i)}$$

- Level 1 = parameter score from 0 to 0.2
- Level 2 = parameter score more than 0.2 but less than 0.5
- Level 3 = parameter score more than 0.5 but less than 0.75
- Level 4 = parameter score from 0.75 to 1.0

In estimating the overall e-commerce maturity index and a single benchmark for the country, the five parameter scores estimated above can be combined in the same manner as for estimation of individual parameter scores. This is illustrated in Table 12.

$$\text{E-commerce maturity index} = \frac{\text{Sum}(P_1 \times W_1 + P_2 \times W_2 \ldots P_4 \times W_i)}{\text{Sum}(W_1 + W_2 + W_3 \ldots W_i)}$$

- Level 1 = maturity score from 0 to 0.2
- Level 2 = maturity score more than 0.2 but less than 0.5
- Level 3 = maturity score more than 0.5 but less than 0.75
- Level 4 = maturity score from 0.75 to 1.0

3.4 Baseline state of e-commerce readiness and maturity

Using the framework and the model presented here, the current state of readiness of each of the five parameters can be estimated. These five parameter readiness indices, combined, provide a single e-commerce maturity index for the country. In the following sections, the baseline e-commerce readiness index for each of the five parameters is estimated based on the survey data and the situational study that has been done.

Table 10. Proposed indicators for an e-commerce benchmarking system

Parameter	Indicators
Consumer readiness	• Proportion of consumers purchasing online • % of consumers aware of and skilled in online purchasing • % of consumers using computers and internet • % of citizens using mobiles • % of population using credit or debit cards or other electronic means of payment
Business readiness	• Proportion of firms adopting IT systems • Proportion of firms with skilled IT staff • % of firms purchasing online • % of firms selling online • % of firms with web presence • % of firms using electronic payment
IT infrastructure and accessibility	• % of population with internet access • % of population with mobile access • % of firms reporting security and service satisfaction • Availability of IT Infrastructure
Logistics and delivery	• % of transport and logistics firms with IT systems • % of population on developed air/transport infrastructure • % of firms with integrated warehousing and transport system • % of population with home delivery services from courier companies
Policies, laws and regulations	• Proportion of ICT, trade and taxation policies that are aligned with e-commerce needs • Proportion of ICT, commercial, civil and other laws that aligned with e-commerce needs • Proportion of regulations that are aligned with e-commerce needs

Table 11. Methodology for scoring the parameter indices

Indicator	Basic score	Weightage	Weighted score
Indicator 1	B1	W1	B1 × W1
Indicator 2	B2	W2	B2 × W2
Indicator 3	B3	W3	B3 × W3
Indicator 4	B4	W4	B4 × W4
Total		Sum (W1 + W2… Wi)	Sum (B1 × W1…)

Table 12. Methodology for estimating the e-commerce maturity index

Parameter	Parameter score	Weightage	Weighted score
Parameter 1	P1	W1	P1 × W1
Parameter 2	P2	W2	P2 × W2
Parameter 3	P3	W3	P3 × W3
Parameter 4	P4	W4	P4 × W4
Total		Sum (W1 + W2… Wi)	Sum (P1 × W1…)

3.4.1 Baseline consumer readiness

In the model presented here, the indicators for consumer readiness are stated as follows:

1. Proportion of consumers using mobile

2. Percentage of consumers using internet

3. Percentage of consumers using e-payment (credit/debit card or mobile money)

4. Percentage of consumers purchasing online

5. Percentage of consumers aware and skilled in purchasing online

The current survey and study of the first three indicators have generated enough data and information. Since no population survey was undertaken, the data for the last two indicators are limited. Therefore, indirect estimates of these indicators were made. Mobile usage is almost ubiquitous, and internet penetration of 30 per cent is estimated. From the data obtained from the banks, consumer use of credit cards is estimated

at about 10 per cent. This should be scaled up to 30 per cent, as many consumers who do not have or use credit cards use mobile payments. Table 13 gives the estimate of the baseline consumer readiness index.

3.4.2 Baseline business readiness

The survey of business enterprises undertaken as part of this study provided large amounts of data reflecting the readiness of businesses in Sri Lanka for e-commerce, as presented above. Business e-commerce readiness indicators are as follows (Table 14):

1. Proportion of firms adopting IT systems

2. Proportion of firms with skilled IT staff

3. Percentage of firms purchasing online

4. Percentage of firms selling online

5. Percentage of firms with web presence

6. Percentage of firms using electronic payment

Table 13. Baseline consumer readiness index Sri Lanka

Indicator	Basic score	Weightage	Weighted score
Proportion of consumers using mobile	1.0	1	1
Percentage of consumers using internet	0.3	3	0.9
Percentage of consumers using e-payment	0.2	3	0.6
Percentage of consumers purchasing online	0.1	2	0.2
Percentage of consumers aware and skilled	0.2	1	0.2
Total		10	2.9
Baseline consumer readiness index			0.29
Baseline consumer readiness maturity level			Level 2

Table 14. Baseline business readiness index Sri Lanka

Indicator	Basic score	Weightage	Weighted score
Proportion of firms adopted IT systems	0.4	2	0.8
Proportion of firms with skilled IT staff	0.25	1	0.25
Percentage of firms purchasing online	0.30	1	0.3
Percentage of firms selling online	0.58	2	1.16
Percentage of firms with web presence	0.3	2	0.6
Percentage of firms using electronic payment	0.3	1	0.3
Total		10	3.41
Baseline business readiness index			0.34
Baseline business readiness maturity level			Level 2

Section 2 presented data on all the six indicators. The data collected through the survey were used to make estimates of the value of each indicator. For instance, 30 per cent of the sampled firms indicated a web presence, giving the fifth indicator a value of 0.3. Similarly, it has been estimated that only 30 per cent of the firms use electronic payment at present.

3.4.3 Baseline IT infrastructure and accessibility

The basic backbone IT infrastructure for e-commerce consists of telephone and internet connectivity that provides the necessary electronic means for conducting e-commerce in an environment that inspires reliability and gives the necessary security. Though internet connectivity continues to be low, at 30 per cent, mobile services are at more than 100 per cent. On the negative side, there are apparent concerns about security. Data and information obtained as a result of the survey and study were used to develop the baseline readiness index for IT infrastructure and accessibility. The below mentioned indicators are proposed for estimating the IT infrastructure readiness index. The first two indicators reflect the development of an overarching back-end ICT infrastructure system, such as telecoms infrastructure, mobile accessibility and internet. The third and fourth indicators reflect the quality and affordability of telecoms services, security and consumer trust (Table 15).

1.   Percentage of population with internet access

2.   Percentage of population with mobile access

3.   Percentage of firms reporting security and service satisfaction

4.   Availability of IT infrastructure

3.4.4 Baseline logistics and delivery

Information on the current state of logistics and transport in the country, presented in Section 2, provides sufficient data to assess the maturity and readiness of logistics service providers to effectively support e-commerce. Indicators for evaluating baseline logistics and delivery maturity are (Table 16):

1.   Percentage of transport and logistics firms with IT systems

2.   Percentage of population on developed air/ transport infrastructure

3.   Percentage of firms with integrated warehousing and transport system

4.   Percentage of population with home delivery services from courier companies

3.4.5 Baseline policy and regulation

Section 2 discussed the policies and regulations that have a direct or indirect impact on the development of e-commerce . This includes the laws and policies related to data protection, consumer protection, IT security, digital transactions and signature laws and policies. The degree of development or maturity of the legal, regulatory environment is assessed based on the following indicators (Table 17):

1.   Proportion of ICT, trade and taxation policies that are aligned with e-commerce needs

2.   Proportion of ICT, commercial, civil and other laws that aligned with e-commerce needs

3.   Proportion of regulations that are aligned with e-commerce needs

Table 15. IT infrastructure and accessibility index Sri Lanka

Indicator	Basic score	Weightage	Weighted score
Percentage of population with internet access	0.3	3	0.9
Percentage of population with mobile access	1.0	2	2.0
Percentage of firms reporting security and service satisfaction	0.50	3	1.5
Availability of IT infrastructure	0.40	2	0.8
Total		10	5.2
Baseline IT infrastructure and accessibility readiness index			0.52
Baseline IT infrastructure and accessibility readiness maturity level			Level 3

Table 16. Logistics and delivery index Sri Lanka

Indicator	Basic score	Weightage	Weighted score
Percentage of transport and logistics firms with IT systems	0.5	3	1.5
Percentage of population on developed transport infrastructure	0.6	2	1.2
Percentage of firms with integrated warehousing and transport system	0.15	3	0.45
Percentage of population with home delivery services from courier companies	0.5	2	1.0
Total		10	4.15
Baseline logistics and delivery readiness index			0.415
Baseline logistics and delivery readiness maturity level			Level 2

Table 17. Policies and regulations maturity index Sri Lanka

Indicator	Basic score	Weightage	Weighted score
Proportion of ICT, trade and taxation policies that are aligned with e-commerce needs	0.6	4	2.4
Proportion of ICT, commercial, civil and other laws that are aligned with e-commerce needs	0.6	4	2.4
Proportion of regulations aligned with e-commerce needs	0.4	2	0.8
Total		10	5.6
Baseline policies and regulations readiness index			0.56
Baseline policies and regulations readiness maturity level			Level 3

3.4.6 Baseline e-commerce readiness index

The five factor e-commerce maturity model involves combining the readiness indices of the five strategic parameters into a single index, and assigning weightage to each of the parameters involved, as explained before. Based on the estimated maturity indices of the five factors, Table 18 estimates the combined e-commerce readiness/maturity index of Sri Lanka.

A graphical representation of the readiness indices of individual parameters is given in Figure 25. The target maturity levels are also shown.

3.5 Conclusions and way forward

Based on the results obtained through this study, it can be broadly concluded that e-commerce is already established in Sri Lanka but the degree of its penetration and adoption is still limited. The country

has considerable potential to expand e-commerce. It can be said that currently not more than 10 per cent of commerce is technology-driven. This indicates that great potential remains untapped. In the five-parameter model of e-commerce maturity indexing proposed, the country is estimated at Level 2 with an index value of 0.42 on a continuum of 0–1. This indicates substantial potential for development. Notwithstanding the lack of data on some aspects, the study reveals many gaps and challenges that stakeholders must address to accelerate the development of e-commerce in the country. A strategic plan of action needs to be designed and implemented to accelerate e-commerce.

3.5.1 Developing consumer readiness

Consumer readiness or maturity has been estimated at a low level of 0.29 on a continuum of 0–1, indicating that consumers in Sri Lanka

Table 18. E-commerce readiness index Sri Lanka

Indicator	Basic score	Weightage	Weighted score
Consumer readiness index	0.29	5	1.45
Business readiness index	0.34	5	1.7
Logistics and delivery readiness Index	0.41	5	2.05
IT infrastructure and accessibility readiness index	0.52	5	2.6
Policies and regulations readiness index	0.56	5	2.8
Total		25	10.5
Baseline e-commerce readiness index			0.424
Baseline e-commerce maturity level			Level 2

Figure 25. Baseline e-commerce maturity Sri Lanka
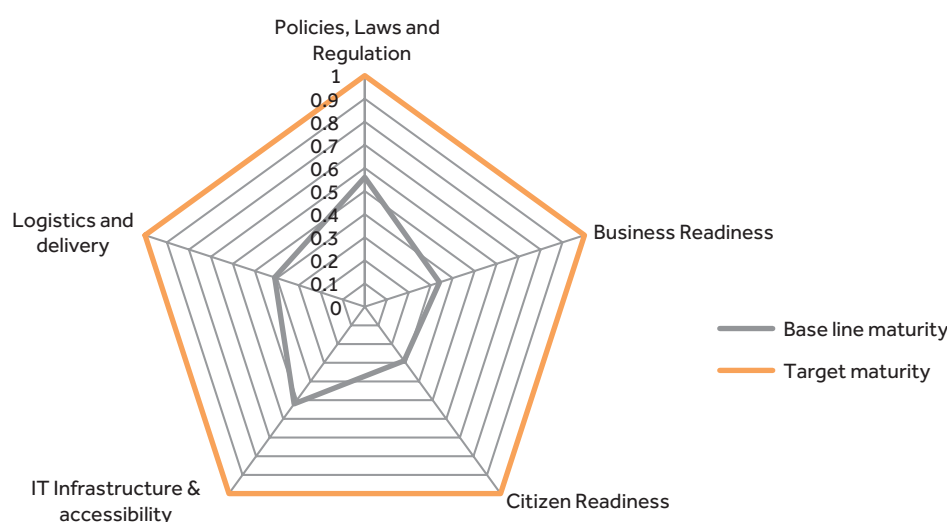
have started adopting online buying of goods and services but this is still at a low level. The range of products purchased is limited to only a few categories such as consumer electronics, mobile phones, fashion products and clothing.

The main challenges to faster and wider diffusion of e-commerce among consumers are low penetration of internet, low level of adoption of e-payment modalities arising from limited credit card/debit card penetration and perceived risks and lack of trust in e-commerce. Lack of awareness and skills among the general population is another factor. As part of the strategic e-commerce development plan, the government in association with businesses should launch consumer awareness and skills development activities among the general population to enhance their know-how and trust in e-commerce and mitigate their fears.

A comprehensive study undertaken on e-commerce readiness among Sri Lankan consumers has highlighted the factors challenging wider use of e-commerce among the general population:

'Sri Lanka has not yet passed the medium level of e-readiness because of the less coverage of Internet and low computer and Internet literacy levels. However, the existing Internet users display comparatively high adaptability to e-commerce transactions. A Sri Lankan Internet user has a moderate level of Internet shopping usage while more people pay bills through Internet and access Internet banking application. Development of infrastructure creating high awareness and opportunities will improve the Internet usage and the e-commerce involvement of people in Sri Lanka. With a matching e-commerce

model, there is a high possibility in creating a very active e-buyer community in future if authorities take the correct actions soon.'[1]

The conclusions of this study are largely in conformity with the results obtained here. Proactive involvement of the government and businesses is called for to develop the readiness of consumers through availability of broadband internet services at reasonable prices; encouragement and expansion of the digital payment ecosystem by making credit and debit cards available at easy terms and promoting mobile payment modalities; and, most importantly, raising the awareness, skills and trust in e-commerce of the general population using scientifically designed programmes and launching mass campaigns. Supply-side constraints need to be removed through wider availability of online shopping options in terms of a broader range of products and services available online.

3.5.2 Developing business readiness

Based on this study, business maturity for e-commerce in Sri Lanka is estimated at 0.34 on a continuum of 0–1. This indicates that businesses have started e-commerce but the current level of maturity is still basic. On an average basis, businesses score low on availability of skills, know-how and technology infrastructure as well as on the adoption of technology for selling and buying. As mentioned previously, only less than one-third of firms have a web presence, and almost a similar proportion market or purchase their goods and services online. This indicates that nearly 70 per cent of firms are yet to adopt e-commerce in a serious way. Fewer than half of firms have developed technology systems. Thus, ICT adoption within businesses for management of operations and for normative functions, like buying and selling, is at less than half. Raising awareness and know-how, both technical and managerial, of firms is evidently called for. Training and retraining business managers for successful e-commerce is necessary.

In the current e-commerce scenario among Sri Lankan businesses, product and market focus seems to be restricted to certain products and certain markets, such as digital products, mobile phones, fashion products and the like, for young and educated people. The range of products and the markets they serve must expand as the

current myopic vision gives way to a more inclusive e-commerce business development. Business models and strategies need to be developed at the firm level to cover specific markets or product categories. Support for e-commerce innovation, both technological and management, must occur.

For accelerated e-commerce adoption by businesses, outside technology and management innovation support must be available to firms to enable effective and efficient e-commerce transformation. As part of the strategic plan for e-commerce development, the government and business associations must facilitate innovative business modelling and technologies for individual firms. The Ministry of Digital Infrastructure and Information Technology already has several projects and programmes under its ICT Agency aimed at developing ICT innovation, start-up and entrepreneurship. under which innovative ICT products and services are nurtured to maturity. Similar innovation in the e-commerce business area is necessary. In this regard, the Ministry of Trade, with the support of academia and business associations, can develop a strategic programme to promote and support e-commerce innovation within Sri Lankan firms.

3.5.3 Developing logistics and delivery readiness

The logistics and transportation sector in Sri Lanka, in terms of road, rail, waterways and air connectivity as well as the range of services offered and the products handled, seems to be fairly well developed. However, the current state of development of firms in the sector raises doubts as to their readiness to effectively support e-commerce.

One of the major challenges the logistics firms face is their lack of automation. Fewer than half of the logistics firms in Sri Lanka currently employ ICT systems for management of their operations, and in most cases these systems are stand-alone. Only about 15 per cent of firms are said to have integrated systems that cover the whole delivery chain. The e-commerce environment is highly competitive; therefore, fast delivery becomes a unique selling proposition for most e-commerce companies. Moreover, the delivery cost constitutes a significant part of the total product cost. Therefore, logistics management for e-commerce is driven by a need to minimise both delivery cost and time. Automation of the

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1   Jayasekera, J.C. (2009) 'Readiness of Internet Users for E-Commerce – Case Studies from Sri Lanka'

delivery chain is essential if schedules are to be maintained, and operations are tightly controlled in order to minimise costs. The second challenge facing logistics is their lack of resources, including warehousing space, storage and transport equipment for specialised and perishable products, equipment for automated material handling and trucks and other delivery resources.

The government, in collaboration with transport and logistics companies, needs to develop and implement a strategic plan for transformation of existing logistics companies and encourage investment in the establishment of greenfield logistics service firms that are designed and developed from the beginning for e-commerce services. Similarly, logistics delivery chain investment is necessary for warehouses, distribution and sorting centres and other support services for e-commerce delivery.

As in other countries, the national postal service, Sri Lanka Post, with an already wide network of delivery points, needs to be supported and developed as a local courier organisation to service e-commerce companies. Indeed, Sri Lanka Post is already providing services as a parcel and courier company as well as a support company for financial services, bill payments and other digital services. Development of Sri Lanka Post as a courier and parcel transport services organisation rather than as an e-commerce company to be appears strategically prudent, considering that its core competence lies in parcel delivery services.

3.5.4 Developing IT infrastructure and accessibility

The basic IT infrastructure required for e-commerce includes secure, reliable and fast internet and communication support services. Sri Lanka has done extremely well in the development of its mobile telephony. With about 28 million mobile subscriptions, the country has achieved 130 per cent mobile phone penetration, perhaps among the highest in Asia. Sri Lanka was among the first countries in Asia to roll out mobile broadband, in 2003, and kept the lead in rolling out upgrades much ahead of neighbouring countries. The operators have also followed innovative business models that have brought almost the entire population into the market.

However, internet penetration remains low, at 30 per cent, yet the service is available in all parts of the country, even in remote areas. The mobile service in urban and semi-urban areas is rated as good by most users The latest trend is the Fixed 4G LTE technology, through which many Sri Lankans who live in rural and remote areas can now access a good telephone and broadband internet service. On the whole, the IT infrastructure and accessibility parameter in Sri Lanka appears to be much better developed than the other four parameters for e-commerce. Accordingly, the maturity of the IT infrastructure accessibility is rated at Level 3.

3.5.5 Developing policy and regulatory maturity

The policy, legal and regulatory instruments that directly affect e-commerce are those that relate to electronic transactions, electronic signatures, taxation laws, IPR protection, cyber-security, commercial and personal data protection and consumer protection in the digital environment. The policies, laws and regulations that indirectly, but significantly, affect e-commerce are those that relate to ICT in general, trade and commerce. In all these areas, Sri Lanka has policies, laws and regulations, as mentioned in Section 2.

Electronic transactions laws are among with most significant legislative documents with regard to e-commerce. The Electronic Transactions Laws, which recognises digital documents and digital signatures as legal, was amended nearly two years ago to bring it in conformity with the United Nations Electronic Communication Convention – the international standard for e-commerce legislation. Similarly, the country has enacted laws on IPR to help promote e-commerce in intellectual- and content-based products like music and art. Another area of importance in the context of e-commerce relates to consumer protection and data protection laws and regulations.

Although Sri Lanka has already enacted the necessary laws and policies on all the subjects relevant to e-commerce, a fresh review of these laws is necessary to remove inconsistencies and conflicts that might exist between these and the corresponding civil and criminal laws of the country, and to optimise these laws and their related policies to fit the emerging situation in Sri Lanka. Data protection has assumed considerable importance in recent times in view of the risks associated with holding personal data at remote global locations over which national authorities may have no control.

Data protection policies and laws need to be reviewed to ensure they conform with EU guidelines on data protection. In this context, it is necessary to examine the government's policy on e-commerce web hosting with international platforms in locations outside Sri Lanka.

Review of other policies relevant to e-commerce is also necessary. For instance, policy on foreign direct investment in e-commerce retail has been much debated in India because of its impact on traditional retailers. Similar e-commerce policy debate and review is necessary in Sri Lanka. It may be necessary to take a fresh look at the general ICT and trade policies of Sri Lanka to see if these provide the necessary impetus for the development of e-commerce in the country. A comprehensive up-to-date e-commerce policy may be necessary for Sri Lanka that addresses all the country's policy issues relevant to e-commerce under a single umbrella.

The Commonwealth