

FORUM ON TAX ADMINISTRATION

# Implementing Online Cash Registers: Benefits, Considerations and Guidance



# **Implementing Online Cash Registers**

Benefits, considerations and guidance



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## *Preface*

Throughout the world, digital technologies are significantly impacting economies, businesses and society and creating new products, services and business models. While digital transformation can create new challenges for tax administrations, it also makes new tools available to improve tax compliance, reduce administrative burdens on taxpayers and help to support growth.

The success of modern tax administrations is increasingly becoming dependent on access to data flows, including in real-time. This will only increase with the development of “the internet of things”, a network of connected devices and sensors constantly measuring and transmitting real-time data about the behaviour of the surrounding environment. One of the most important data flows for tax compliance purposes is information on retail income. It is also one of the most important economic indicators, characterising consumer confidence as well as the health of economy.

Cash registers provide the key source of original data in the retail sector for tax auditors. In their efforts to address unreported sales and the hiding of income, tax administrations have made many attempts to ensure timely and uncompromised access to this source of information. Advances in digital technology have opened new opportunities for the enforcement of closer controls over retail transactions and reducing tax risks that were traditionally associated with the vulnerability of cash register data.

In 2014, the Federal Tax Service of Russia (FTS) developed and started testing a new solution enabling it to get online access to retail sales data generated by electronic cash registers equipped with secure fiscal data units. This system also has the functionality to transmit data in real-time to the FTS servers. Following a successful pilot, legislation was introduced mandating the use of online cash registers in all retail businesses across Russia through a phased implementation process.

In essence, the FTS has created a secure “internet of things” network providing it with a continuous real-time flow of nationwide data critical for assessing tax compliance and, in Russia’s case, also providing important statistics on economic performance and retail prices. The introduction of the new online cash register system has improved fiscal transparency and already raised tax compliance significantly. It is also facilitating the creation of a level playing field for fair competition among retail businesses as well as contributing to the protection of consumers’ rights, reducing compliance burdens and providing new opportunities for businesses.

After the encouraging results of the first phase of implementation became obvious, we introduced the OECD Forum on Tax Administration Bureau to our work and stepped forward to share our experience with other Forum on Tax Administration (FTA) members. The original goal was to develop a “how-to” guide that could be useful for other FTA members considering the introduction of online cash register systems in their own jurisdictions.

As our work progressed, we studied the practices of other countries that have implemented similar systems and learned about different approaches and arrangements that help these tax administrations achieve their objectives. The experiences of these tax administrations are also included in this report to provide a more comprehensive overview of possible existing solutions. I hope that this document will be useful for those seeking to implement online cash register systems in their countries.

I would like to thank the FTA Bureau for giving their support to the Online Cash Register Project, the FTA members which participated in the project and the OECD Secretariat whose guidance and advice aided us in the production of this report. I would also like to thank the National Tax and Customs Administration of Hungary for their kind support and generosity in hosting the Online Cash Register Workshop in Budapest, Hungary.

Finally, I would like to thank the Project Team from the Federal Tax Service of Russia who led the Online Cash Register Project as well as all the people of the FTS who have been involved in the development and implementation of the online cash register system in Russia, whose practical experience was the basis of the “how-to” guide contained in this publication.

Mikhail V. Mishustin

Commissioner of the Federal Tax Service of Russia

## *Table of contents*

<b>Abbreviations and acronyms</b> .....	7
<b>Executive summary</b> .....	9
<b>Chapter 1. Introduction</b> .....	11
1.1. Electronic cash registers as a compliance instrument .....	11
1.2. Considerations for mandating secure electronic cash registers .....	13
1.3. Core requirements of secure electronic cash registers .....	17
<b>Chapter 2. Online cash registers: adoption and implementation</b> .....	19
2.1. Advantages and disadvantages of mandating Online Cash Registers .....	19
2.2. Core elements of successful implementation of OCRs .....	21
<b>Chapter 3. Online cash registers: Case studies</b> .....	27
3.1. Case study Hungary .....	27
3.2. Case study Korea .....	33
3.3. Case study Russia .....	38
<b>Notes</b> .....	50
<b>Annex A. “How-to” guide for implementing an online cash register system</b> .....	51
 <b>Figures</b>	
Figure 3.1 Number of installed cash registers .....	29
Figure 3.2 Systems architecture .....	31
Figure 3.3 Declining VAT gap .....	32
Figure 3.4 Korean OCR architecture .....	34
Figure 3.5 Increasing number of issuances and OCR stores .....	37
Figure 3.6 Transition to online cash registers .....	39
Figure 3.7 System architecture .....	41
Figure 3.8 Example of a Virtual cash register .....	45
Figure 3.9 Architecture of the VRC .....	47
 <b>Tables</b>	
Table A.2 Risk area: Integrity of transaction .....	54
Table A.1 OCR Business case key elements .....	54
Table A.3 Risk area: Software .....	55
Table A.4 Risk area: Internal memory .....	55
Table A.5 Risk area: External files .....	55

Table A.6	Risk area: Reporting	56
Table A.7	Types of stakeholders	58
Table A.8	Core elements of the project plan	60
Table A.9	Key skills sets identified by those who have experience with introducing OCRs	61
Table A.10	Cost elements	63
Table A.11	Main functionalities	64
Table A.12	Legal aspects	65
Table A.13	Tax administration system considerations	68

## Boxes

Box 1.1	Country examples of electronic cash register usage	12
Box 1.2	Examples of benefits of secure ECRs	16
Box 2.1	Impacts on compliance	20
Box 2.2	Cash receipt validation by customers	23
Box 3.1	Implementation of the OCR system in Hungary	29
Box 3.2	Penalties	31
Box 3.3	Cash receipt issuance terminals in Korea	36
Box 3.4	Cash receipt contents	37
Box 3.5	The fiscal drive	42
Box 3.6	Business benefits	43
Box 3.7	Legislation in Slovakia	45
Box 3.8	Exempted tax payers	46
Box 3.9	Results of the VRC implementation in Slovakia	49
Box A.1	Engaging with the business community	58

*Abbreviations and acronyms*

<b>API</b>	Application Programming Interface
<b>ECR</b>	Electronic Cash Register
<b>ERP</b>	Enterprise Resource Planning
<b>EUR</b>	Euro
<b>FCU</b>	Fiscal Control Unit (Hungary)
<b>FTA</b>	OECD Forum on Tax Administration
<b>FTS</b>	Federal Tax Service (Russia)
<b>HUF</b>	Hungarian Forint
<b>KRW</b>	Korean Won
<b>KYC</b>	Know Your Customer / Know Your Client
<b>NTCA</b>	National Tax and Customs Administration (Hungary)
<b>NTS</b>	National Tax Service (Korea)
<b>OCR</b>	Online Cash Register
<b>OECD</b>	Organisation for Economic Development and Co-operation
<b>POS</b>	Point of Sale
<b>QR code</b>	Quick Response code
<b>RFID</b>	Radio Frequency Identification
<b>USD</b>	United States Dollar
<b>VAN</b>	Value-added Network
<b>VAT</b>	Value-added Tax
<b>VCR</b>	Virtual Cash Register
<b>XML</b>	Extensible Mark-up Language



## Executive summary

In the retail sector, sales data represents a primary source of information that is critical for business management reasons as well as tax reporting, payment and verification.

Cash registers have long been, and remain, the main tool for accurate recording of sales transactions from business to customer. They generate records and issue cash receipts showing the subject and price of transactions as well as providing proof of sales between business and customers. A previous study by the OECD (OECD, 2014), noted that technology in this area has been changing the way retail businesses operate and showed how tax compliance could become an integral part of the cash register systems businesses use to carry out their daily transactions. The use of secure electronic cash registers, also known as fiscal tills, was used as an illustration of this changing landscape, helping to address issues of security, accuracy and reliability, including for reporting and verification purposes.

However, as the technology used by businesses for transaction recording and storage of data has become more sophisticated, so have the measures used by those attempting to commit fraud and evade tax. In earlier research the OECD (OECD, 2013) identified a number of risks for tax administrations and honest businesses arising from the vulnerability of electronic cash register data to sales suppression and consequent under-reporting of income. The risk areas identified were: the integrity of transactions, software, internal memory, external filing and reporting. Each of these risk areas presents opportunities for sales data to be deleted, changed or, in the case of the actual transactions, not being recorded at all. Such fraudulent activity could be carried out by unscrupulous business owners as well employees of a retail business, including through purposeful misuse of hardware or software.

It was recommended that tax administrations should develop a strategy for tackling electronic sales suppression within their overall approach to tax compliance, improving detection and counter measures, and promoting voluntary compliance.

Since then a lot of progress has been made. Many tax administrations have been implementing strategies to prevent sales suppression fraud, as shown by many of the examples presented in this report. Of course different tax administrations chose different solutions and different ways of engaging with stakeholders depending on their national circumstances. For some jurisdictions, though, the adoption of a specific type of electronic cash register, online cash registers, has been an important part of such a strategy.

The main characteristic of these online cash registers is their online connectivity with the tax administration. Sales data is shared in an automated and systematic manner with the tax administration, either triggered by the sales system itself or by the tax administration on demand. A number of countries which have introduced online cash registers have recorded significant improvements in tax compliance in the retail sector.

At the September 2017 Forum on Tax Administration (FTA) Plenary, Commissioners agreed to the proposal by the Federal Tax Service of Russia that it should lead a project

to produce a report on experiences with implementing an online cash register system as well as a “how-to” guide for those considering the possible introduction of such a system. This was not to suggest that an online cash register was necessarily an optimal solution for a particular country, but rather intended to assist in the determination of the costs and benefits of such a system and to allow countries to benefit from the lessons learned by others in the design and implementation process.

This report consists of four parts:

- Chapter 1 briefly describes the broader picture as regards electronic cash registers, including online cash registers, and the factors that tax administrations may wish to take into account when considering options.
- Chapter 2 focuses on the core elements of successful introduction of online cash registers: the business case; the legal framework; stakeholder management; and data management.
- Chapter 3 consists of four short case studies of the implementation of online cash register systems in Hungary, Korea, Russia and Slovakia.
- The Annex contains a “how-to” guide which provides recommendations and guidance for tax administrations that may wish to consider adopting and implementing online cash registers. This is drawn from the experiences of those who have already introduced such systems. While focused on online cash registers, this guide may also be useful to administrations considering the implementation of other types of secure electronic cash registers.

This report has benefited from the participation of FTA and non-FTA members from Armenia, Australia, Azerbaijan, Belarus, Belgium, Cambodia, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, India, Indonesia, Italy, Latvia, Lithuania, Luxembourg, Mexico, Norway, Poland, Portugal, Republic of Korea, Russia, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sweden and the United Kingdom. It also reflects the discussions, ideas and presentations from a workshop hosted by the National Tax and Customs Administration of Hungary, as well as the findings and conclusions of a survey of participating tax administrations.

## **Caveat**

Tax administrations operate in varied environments, and the way in which they each administer their taxation system differs in respect to their policy and legislative environment and their administrative practice and culture. As such, a standard approach to tax administration may be neither practical nor desirable in a particular instance. Therefore, this report and the observations it makes need to be interpreted with this in mind. Care should be taken when considering a country’s practices to fully appreciate the complex factors that have shaped a particular approach. Similarly, regard needs to be had to the distinct challenges and priorities each administration is managing.

## Chapter 1

### Introduction

#### 1.1. Electronic cash registers as a compliance instrument

1. Many countries have introduced legal frameworks requiring retail businesses to use some form of secure electronic cash register (ECR), including online cash registers (OCRs), to generate and preserve sales data for tax compliance purposes. At the same time, advances in digital technology have also led to an expansion in the types of secure electronic cash registers available to businesses, reducing the costs of such systems. Models available range from low-cost fiscal tills (which may now be in the form of a mobile application) and linked fiscal printers at one end, to more sophisticated systems which form part of the enterprise business management systems at the other end (for example as part of inventory control, accounting and ordering).

2. The hierarchy of the different broad classes of electronic cash registers as regards to their effectiveness in preventing tax fraud is set out below. This list is not meant to suggest that a particular option is always preferable to another. This depends on wider cost-benefit considerations as well as the context and priorities in a particular jurisdiction.

- **Non-secure electronic registers** which maintain paper records of transactions which can be seen by tax administration officials in an audit. These can be easily manipulated by under-recording of sales (which is the case for all paper based cash registers), physical deletion of records or the creation of fake records (including the misclassification of sales when differential Value Added Tax (VAT) or sales tax rates apply).
- **Secure electronic tax registers**, often know as fiscal tills, which contain a secure memory which captures the details of transactions such as the amounts, classification of goods, the applicable tax and the time of the transaction. The secure memory remains intact even when the machine is not connected to power. In theory these secure memory units are only accessible by the tax administration. These units can be protected with seals which indicate when they have been tampered with physically. While physical deletion of records is not generally possible without destruction of the device, software now exists which can alter or wipe the records in the memory or stop them being stored in the memory in the first place.
- **Electronic signature devices** in conjunction with a **secure electronic tax register**. These devices create records with unique electronic signatures (usually a long string of numbers) together with the details of the transaction. These are stored with the transaction data and also printed on the customer's receipt. These unique digital signatures allow each transaction to be traced and verified and the unique

identifier guarantees that the data has been generated by the particular taxpayer and has not been altered since the transaction was created.

- **Online cash registers** which share the security features of the above types of secure electronic tax registers but where the information is transmitted directly or through an approved intermediary to the tax administration. The information is sent in encrypted form and can be received by the tax administration in real-time or close to real-time. Encryption of data at all stages does not allow owners or employees of businesses to alter records which are stored in the OCR's internal memory. Where the transmission of sales data to the tax administration is done in real-time, this means that external files are formed at the time of the sale which allows the tax administration to have an authentic copy of all files.

### Box 1.1. Country examples of electronic cash register usage

In *Argentina* electronic cash registers and fiscal printers were first implemented in the late 1990s. In December 2013, the requirements were strengthened to incorporate new technology with improved intelligence and security features in response to evasion techniques that emerged. The new equipment generates electronic files of transactions, including a digital signature. The files are regularly transmitted to the tax administration in a similar mechanism as is used for the filing of tax returns.

In *Austria*, from the beginning of 2016 it has been compulsory to issue cash receipts. Businesses with a turnover of more than EUR 15 000 are required to have electronic cash registers or other electronic recording systems for digital recording of transactions. Each cash register must draw up a data collection log to record and store each individual cash transaction. The data collection log has to be exportable without delay in case of a request from the tax administration. From April 2017, a secure electronic signature creation device has to be contained within the cash register and the electronic signature must be printed on each receipt.

*Belgium* introduced legislation for certified cash registers designed to address VAT fraud in 2014. The solution consists of four pillars: a technical solution to secure the data (making tampering detectable); certification of the devices for security purposes; registration of all devices with the Ministry of Finance; and a programme of on-site auditing.

The *Czech Republic* introduced a requirement for the electronic recording of sales in 2016. The first phase of electronic registration of sales was launched on 1 December 2016 and applied to food services and accommodation services. The second phase commenced on 1 March 2017, applicable to retail and wholesale businesses.

*Hungary* began the introduction of an online cash register system in 2014 to reduce under-declaration of sales in business-to-consumer transactions. A subsidy programme was established to foster the spread of OCRs. It was expanded to a wider range of retail businesses in 2017.

In *Italy*, since 1 January 2017, the electronic storage and transmission of revenue data has been mandatory for businesses supplying goods and services through vending machines. All transaction data is processed by the master system component of the vending machine. Acquisition of the data and transmission to the tax administration server is done on a periodic basis (sometimes daily). As from 1 January 2017, VAT operators carrying out retail transactions and other similar activities may opt for the electronic storage and daily transmission of data to the Revenue Agency through telematic cash registers. Electronic storage and transmission must be made through media that guarantee the authenticity and durability of data, including that they are stored in permanent and unalterable memories.

### Box 1.1. Country examples of electronic cash register usage *(continued)*

In the *Netherlands* a voluntary quality-mark has been developed. This quality mark signifies that a cash register fulfils the requirements to store and process data reliably, and that alterations to transactions can be detected. The set of quality mark indicators were developed following extensive consultation with developers and distributors of cash registers.

*Portugal* uses the data from invoices (including paper invoices and from cash registers and POS systems) to detect mismatches and identify fraud between VAT paid and invoices sent by taxpayers to the tax administration. As a result of these (and other) measures the estimated VAT gap in Portugal decreased from 16% to 10 % from 2012 to 2016.

In *Russia*, the Federal Tax Service (FTS) started the transition to mandatory online cash registers in early 2017. Such registers instantly upload sales data to the FTS data processing centres. As required by legislation, each receipt generated by online cash registers has a Quick Response (QR) code that enables customers to verify the transaction by comparing it to the information maintained by the tax administration.

*Sweden* requires that sales must be registered in a cash register connected to a fiscal control unit. Manufacturers of cash registers must meet specified standards in order for the register to be approved for use. The fiscal control unit must be certified by a specific body within the Swedish Tax Administration. Taxpayers must register with the tax administration to confirm that they are using a cash register connected to a fiscal control unit. The information in the control unit is encrypted and can only be read and decrypted by the Swedish Tax Administration.

*Source:* (OECD, 2017a).

## 1.2. Considerations for mandating secure electronic cash registers

3. Decisions to mandate any form of secure electronic cash register will usually be taken on the basis of a cost-benefit calculation. Both costs and benefits can vary considerably depending on the context within a particular country as well as implementation choices made.

### *Benefits*

4. Four main objectives have been identified with regard to mandating the use of secure electronic cash registers. These are:

- better tax compliance
- protection of fair competition
- reduction of compliance burdens
- enhanced consumer protection.

### *Better tax compliance*

5. The primary objective for requiring the use of some form of secure electronic cash register is to enhance tax compliance. This is both through reducing opportunities for under-reporting as well as enabling more effective and timely detection and enforcement.

6. The scale of compliance benefits that can be achieved will vary depending on the background conditions in a particular country which need to be analysed carefully. Particular issues to consider will include:

- **Size and nature of under-reporting**, in particular the:
  - **Prevalence of non-registered businesses**: if there is a large informal economy, then mandating the use of secure cash registers can only work as part of a wider strategy of enhancing business registration and the payment of tax. Such a strategy does not need to precede the introduction of a secure ECR system. For example where penetration of mobile devices is high, then an option might be to require the use of low cost virtual cash registers. These can be downloaded in app form and can be connected to low cost fiscal tills. The data can be stored securely on the device, in the cloud or even used in an OCR system. Monitoring the use of such devices of course requires effective auditing and control.
  - **Extent of cash transactions**: where there are high levels of cash transactions, then secure electronic cash registers can be highly effective in enhancing compliance as shown in a number of countries. Where there is greater use of electronic payments, then there may be greater base compliance, particularly where the possibility exists of cross-checking payments recorded by the business with data from payments processors (merchant acquirers).
  - **Role of customers**: where a good or service is high value, customers will often demand a receipt as proof of purchase. However, there may be little interest or checking of receipts for lower value goods or services beyond checking the price. In some instances, there may also be implicit or explicit collusion with the seller as regards the price of the goods or service (for example unreceipted cash payments being a condition of discounts). As well as attempting to enhance social norms through communications strategies, a secure ECR system can help to change customer attitudes, including through incentivising consumers to ask for formal receipts and, in some cases, to validate them.
- **Robust estimates of the degree of non-compliance**: as well as understanding the general compliance environment, it will be important in any cost-benefit analysis to try and obtain robust estimates of the scale of non-compliance both generally and per sector as well as to estimate the difference that secure ECRs could make in different areas. This can be done through analysis of audit results, comparisons with other countries, top-down analysis of trends, consumer surveys and pilots, etc.
- **Understanding the extent of the current use of ECRs**: even in the absence of regulatory requirements a large number of businesses will often use ECRs with different levels of security. More secure ECRs will often be used in larger businesses, including for accounting and tax reporting and to minimise opportunities for internal fraud. Particular consideration should be given to whether it is possible to upgrade existing ECRs where necessary, as well as options for low cost secure ECRs.
- **Alternative methods of enhancing compliance**: in any cost-benefit analysis, it is important to consider what can be achieved through a range of alternative measures and the comparative cost. For example it may be possible to use soft measures such as quality-marking particular ECRs and incorporating the use of such ECRs into risk assessment and co-operative compliance regimes. In addition, there may be other data sources, such as data from merchant acquirers, that can be used to improve risk assessment where electronic payments are made. Regulatory

measures, such as mandating the provision of receipts, and providing easy options for customers to whistle-blow can also help to enhance compliance. Of course many of these alternative measures will rely on effective on-site auditing and it will also be important in looking at the counter-factual to measure the cost and impact of such compliance activities in changing behaviours.

7. In general, it is important to note that the full benefits of secure ECR systems as regards improving compliance depend heavily on the wider tax compliance environment, including the set of activities undertaken to address the informal economy. The adequacy of that wider environment needs to be assessed and major gaps identified. For example, it is critical that there is an efficient and effective regulatory system in place for business registration so that businesses are known to the tax administration with appropriate penalties for non-compliance. That said, secure ECRs can also assist in strategies to improve the quality and effectiveness of compliance activity. For example they can help to create something of a virtuous circle, incentivising compliant businesses and consumers to become part of improving the overall compliance environment.

### *Protecting fair competition*

8. While many businesses will be tax compliant, where a significant number are not this can lead to unfair competition and detrimental impacts on honest businesses, including bankruptcies, and reductions in public revenues. In the worst case significant non-compliance can erode confidence in the effectiveness of the tax administration and may lead to growing non-compliance among formerly compliant businesses.

9. In this case the introduction of a secure ECR system, accompanied by a focus on high-risk taxpayers, can potentially have positive effects on compliant businesses' confidence in the effectiveness of the tax administration. Since competition issues are usually a sectoral issue, some tax administrations may first want to mandate secure ECRs in those sectors where under-reporting is estimated to be more prevalent before a wider roll-out. Alternatively, where such a strategy might result in significant opposition to the policy from within the sector, starting with a sector with higher estimated compliance may help to prepare the ground for wider implementation.

### *Reduced compliance burdens and opportunities for business*

10. As noted above, many businesses will already use secure ECRs to provide information that they need for business and tax reporting, reducing record keeping and reporting burdens. Where there is a connection to a computer, this can feed directly into the businesses' accounting and tax reporting software. This is increasingly possible with low cost solutions such as virtual cash registers.

11. As well as reducing reporting burdens, the use of secure ECRs can also provide reassurance to tax administrations as to the reliability of data provided by a business. This may reduce the needs for on-site auditing, which can be costly for a business as well as the tax administration. The more data that is gathered from secure ECRs, the more that tax administrations can use data analytics to detect outliers and enhance risk assessments. (This is particularly the case in OCR systems, covered in the next chapter.)

### *Consumer protection*

12. The introduction of secure electronic cash registers is in many cases accompanied by activities to enhance the quality of receipt issuance. This will contribute to protection of consumer rights through guaranteeing that the purchase was legitimate and correct, while at the same time making it easier to take action if goods are found to be counterfeit by having the evidence of the purchase stored in a tamper-proof system.

#### **Box 1.2. Examples of benefits of secure ECRs**

In the **Netherlands** a voluntary quality-mark has been developed. This quality mark signifies that a cash register fulfils the requirements to store and process data in a complete and reliable manner, and that alterations to transactions can be detected. The set of quality mark indicators was developed following extensive consultation with developers and distributors of cash registers. The Netherlands also encouraged the development of a voluntary quality-mark for ECRs as regards the secure storing and processing of data. The quality mark was developed with inputs from developers and distributors of cash registers. Encouragement for the use of such registers focussed initially on supermarket franchisors, which have an interest in preventing any harm to the name and reputation of their business. This was possible in combination with the concept of co-operative compliance in which the tax authorities made agreements with the franchisees on checking doubtful returns based on the use of these registers. There were positive results. Of those suspected of under-reporting (around half of the franchisees in the sample) around 85% came to a voluntary agreement with the tax administration. This resulted in the recovery of tax and changes in behaviour, with enhanced governance in the sector, including more discussion with supermarkets about internal audit mechanisms.

In 2013, **Sweden** evaluated their ECR system approach and calculated a permanent effect of at least USD 300 million annually in increased revenue from VAT and income tax.

13. Where the functionality exists, the use of digital receipts sent to the consumers' email address will make it easier for consumers to verify and record their purchases. Where digital receipts are recognised to have the same legal status as a hard copy, this can make it significantly easier for consumers to exercise legal rights to return goods, removing the necessity to keep hard copies.

### **Costs**

14. To identify the costs to business, as identified above, it will be important to understand the existing use of secure ECRs, ideally on a sectoral basis.

15. It is also important to understand the nature of the market in ECRs. Where there are few suppliers of secure ECRs then the costs accompanying rapid implementation across all sectors may be high, particularly so for very small retail businesses (although in some cases virtual cash registers within a mobile or PC may be a possible low cost solution). Larger businesses may already use more secure ECRs and in some cases, depending on the market, there may be options to retrofit existing tills with additional security features (including online connectivity). Where that is not possible then there can be high upfront costs.

16. Even where costs are estimated to be high, there may be options to reduce them, including:

- Delaying the entry into force of legislation mandating secure ECRs. This can both make it easier for businesses to plan for changes and allow more time for the market in secure ECRs to respond and for competition to reduce costs. As the number of countries adopting secure ECRs increases, the market may be able to respond increasingly rapidly.
  - Phasing the introduction of secure ECRs, for example starting with larger businesses which may be able to absorb costs more easily or be able to upgrade existing ECRs.
  - Offering assistance to reduce the costs. This could be by providing subsidies to certain types of businesses with set-up and/or running costs through grants, tax deductions or tax credits. It may also be an option to work with developers of virtual cash registers to allow them to be provided free of charge to small businesses.
17. While not as significant as costs to business, there will also be costs for the tax administration in supporting the introduction of mandatory secure ECRs, including changes to its own systems, particularly in the case of online cash registers.

### 1.3. Core requirements of secure electronic cash registers

18. Regardless of type, there are three core considerations for secure ECRs to provide a secure chain from the sale of the good, to the recording of the transaction and to the reporting of the transaction information to the tax administration. These are:
- product integrity
  - transaction data integrity
  - auditability.

#### *Product integrity*

19. From a secure chain perspective – i.e. trust in the accuracy and completeness of the data – it is important to ensure that commercial ECRs meet certain quality standards. In particular, they should not have prohibited functions, or hardware or software weaknesses, that allow sales suppression. Often these standards will specify that data must be stored separately and securely from the cash register in a tamper-proof environment to prevent manipulation or hacking. Acceptable options might be for the data to be stored on an external device that is connected to the cash register (a fiscal unit), fully integrated inside the cash register or within the receipt printer (for example on a microchip or sim card), or connected to and stored in cloud-based solutions.

20. One mechanism for seeking to achieve product integrity is to support self-regulation by specifying requirements needed to obtain a voluntary quality-mark. (See the example of the Netherlands in Box 1.2 above.) Success is based on the expectation that meeting such a quality mark would be seen to be in the interests of both providers and businesses, for example in reducing risks of audit and in enhancing the internal security of the business. This may be more likely in certain sectors than others, particular where the internal security considerations are highest, and among larger enterprises such as retail chains.

21. The other approach to ensuring product integrity is through regulatory requirements for secure ECRs to meet specified standards. This could be done by putting out the production of such ECRs to tender or to put the detailed requirements in legislation and allow any producer meeting these requirements to sell secure ECRs. In either case,

administrations will want to consider how best to certify that the particular ECR model meets the requisite requirements. This could be done by the tax administration itself or by a public or private licensing body (as is the case for many other goods which need to meet particular requirements, such as for health and safety reasons).

### ***Transaction and data integrity***

22. In addition to product integrity, tax administrations together with policy makers may want to formulate detailed data content requirements. These requirements state the details of what data – usually termed fiscal data – must be recorded and printed on the purchase receipt at the time of the transaction. This can include the amount of the sale, the amount of VAT / sales tax due, the time, date, and invoice number, the mode of operation that the register was in (such as training or operational mode), and the type of receipt (such as final bill, non-final bill or refund). By doing so, these requirements ensure that the information is most useful to the tax administration for verification and for compliance action. (OECD, 2017b)

23. Another option to help ensure integrity of the data is the introduction of a digital signature or a control code which provides a unique identifier with the details of the sales transaction. The digital signature is stored with the transaction data and also printed on the customer's receipt, e.g. as a Quick Response (QR) code. Digital signing or coding allows for the digital encryption of transactions and the tracing of transactions to particular businesses, registers and points in time. (OECD, 2017b).

### ***Auditability***

24. When the tax administration has access to sales data any time they want, it can act as a powerful deterrent to taxpayers subsequently altering records. These sales data can be made available in different ways and in different formats, supported by different types of electronic cash registers. For example, sales data and the integrity of the product and data can be assessed during an onsite tax audit. Alternatively there may be the functionality for sending the data to the tax administration on demand or automatically through online channels.

25. Another way of stimulating and regulating auditability and transparency is allowing the possibility of public monitoring of cash receipt issuance (either by reporting or validating). This may also be incentivised. This can encourage awareness amongst the public of the risk of tax evasion and tax fraud through the misuse of receipts, and enables them to act as a supporting compliance mechanism.

## *Chapter 2*

### **Online cash registers: adoption and implementation**

#### **2.1. Advantages and disadvantages of mandating Online Cash Registers**

##### *Advantages*

26. As the different generations of electronic cash registers (ECRs) have become more tamper-proof, it has become increasingly difficult to manipulate the data after the transaction is recorded in the cash register. However, all ECRs remain vulnerable to “skimming”. Skimming is where transactions are not recorded on the till and any receipts given to customers for those transactions, where they are given, are not produced by the secure ECR.

27. The latest generation of secure ECRs are online cash registers (OCRs). OCRs, which send transaction data periodically or in real-time to the tax administration, can make it easier to detect such practices by providing tax administrations with large quantities of data from across part or all of the retail sector.<sup>1</sup> This allows the tax administration to analyse the data through advanced analytics techniques to uncover patterns which indicate a higher risk of misuse of the tax register and under-recording of transactions. For example, among other things, it is possible for algorithms to compare, on an automated basis:

- **sales of similar stores:** where these fall outside of certain ranges, this may indicate problems
- **ratio of cash sales to credit card sales:** where there is a low amount of recorded cash sales compared to comparable stores, this may indicate skimming, i.e. that a significant amount of cash transactions are not recorded in the register
- **sales of the same store at different times:** where this does not follow a usual pattern, for example being outside of expected daily or seasonal variations, it may indicate that further investigation is needed. The level of detail included with the transaction allows the tax administration to know, for example, if issues are confined to some registers in a multi-register store or to certain time periods. This may also allow the tax administration to alert the business which may itself want to investigate possible internal fraud.

28. As more data is gathered from registers over time, the better the algorithms can become at detecting anomalies for further investigation. (This may also be a fruitful area for machine learning.) Other key benefits of OCR systems are:

- **Security of data:** once the data has been transferred to a secure location, it cannot be changed or manipulated by the business. The existence of a permanent, unalterable back-up of records may also have benefits to business and customers. Granting access to these records, with appropriate authentication, can be beneficial to consumers if they have lost paper receipts and for business for internal management or analytical purposes.

- **Easier controls:** in addition to analysis of the data, a real-time or close to real-time OCR system can also facilitate physical monitoring. An example is where a tax officer, using a mobile device connected to the system, can see immediately if transactions match what they can see visually (such as customers leaving a store with a bag or leaving a restaurant). OCR systems can also allow customers to be part of the control system by matching their receipt (through a QR code or the unique receipt identifier) with the information that has been received by the tax administration.
- **Wider regulatory uses:** subject to data protection constraints, it may be possible to share OCR data with other regulators. This may allow, for example, the appropriate regulator to check whether businesses are meeting regulatory requirements such as price controls on certain goods, opening times or restrictions on certain sales (for example sales of alcohol may only be allowed at certain times). More broadly it may aid in the policing of anti-monopoly measures, anti-money laundering and the detection of illicit financial flows.
- **Economic statistics:** the availability of real-time or close to real-time market data can provide economic policy makers with a rich source of data for economic analysis purposes. For example, this can allow them the opportunity to track changes in retail prices and to understand changes in the basket of goods without any delays or the possibility of sample bias. It can also allow them to see the actual development of multiple retail markets of goods and services rather than having to model their behaviour based on estimates or historical data. Such data can be valuable for facilitating economic policy decisions, thus expanding the role of the tax administration in the government.

### Box 2.1. Impacts on compliance

In *Hungary* the introduction of an OCR system contributed to a major decrease in the VAT gap from 20.9% in 2013 to 13.7% in 2015, leading to a 15% increase in VAT collections.

In *Korea*, the introduction of the OCR system resulted in 96.5% of transactions becoming visible to the tax administration by 2016 (i.e. validated by a cash receipt) as opposed to just 37.7% in 2004. Cash receipt issuance increased eleven fold over this period.

*Russia* reported a considerable improvement in VAT compliance rates by retailers after introducing their OCR system. In 2017 the retail sector demonstrated a 38% increase in VAT collection compared to 2016.

*Source:* Project Survey and Workshop, 2018.

### Disadvantages

29. There are three main issues with OCRs:

- **Costs for business:** cost considerations for mandating secure ECRs were outlined in Chapter 2. While this would need to be explored further when considering the implementation of OCRs, additional costs for building online connectivity into new cash registers may not be overly significant. There is now a growing global market in such OCRs and in online connectivity of devices more generally. The additional costs over and above the costs of mandating secure non-online ECRs are likely to

come from three sources. (As discussed in Chapter 2, such costs can be supported by the government if it wishes.) These sources are:

- **Retrofitting:** costs may be lower if online connectivity is capable of being retrofitted to existing ECRs rather than necessitating the purchase of new OCRs. This is something that would need to be explored with manufacturers and developers.
  - **Infrastructure:** there may be additional infrastructure costs, such as the installation of fixed lines for connection to the internet. It may, though, be possible to reduce such costs by the use of wireless technology or to largely eliminate them by use of mobile connectivity.
  - **Ongoing transmission of data:** the cost of sending data via the internet will depend on the market in different countries and should be simple to assess. There may also be some costs associated with having back-up facilities for sending data in the event of connection problems.
- **Costs for tax administrations:** tax administration costs can be significant where all data is transferred automatically online to the tax administration for analytical use (rather than on demand for individual controls). There will be some costs for importing the data, the development of user interfaces, analytics programmes and for training and recruitment. However the bulk of the costs will be in maintaining secure storage of the data. This is likely to require large and constantly expanding server capacity, potentially very large depending on the scale of the country, which may even involve the construction and maintenance of dedicated data centres. (This is an area where discussions with administrations which have introduced OCR systems is likely to be very helpful.)
  - **Data privacy concerns:** As regards the OCR systems which are in operation, they do not pose specific data privacy concerns as currently used. This is because the transaction records do not identify any details of the individual customers but just details of the transaction and the supplying business. While some verification systems may involve the registration of customers, the use of this information will be subject to data protection legislation and is optional for customers. In this respect, the data privacy issues for OCR systems are part of a wider public debate about the amount of data that it is appropriate to centralise in government hands. On the one hand, the sharing of data can bring benefits to taxpayers in terms of reduced burdens, increases in public revenue from tackling non-compliance and potentially better services from more joined-up government. On the other hand, this can raise concerns about the potential use of big data<sup>2</sup> and the loss of individual control over data.

## 2.2. Core elements of successful implementation of OCRs

30. Based on the experiences reported in a survey of tax administrations which have implemented or are implementing OCR systems, there are four main core elements which are critical to successful implementation and use of an OCR system. These are:

- a compelling business case
- stakeholder engagement and support
- a robust legal framework
- the quality and effective use of data.

### ***Compelling business case***

31. A compelling business case is important for building robust government and wider public support for the reform against the understanding that there are likely to be some strong opposing voices.

32. The basis for a sound business case is a solid understanding of the costs and benefits that the new system will give rise to. This calls for high-quality analysis of the current environment as regards the size and nature of the retail economy, estimated non-compliance, the costs of implementation and the expected benefits (ideally in quantified form).

33. In particular, it will be important to present in detail the immediate costs which will fall on business and the range and value of benefits (which will be shared more widely). These include increased tax revenue, fair competition, a reduction in compliance burdens over time and enhanced consumer protection.

34. Transparency can be an important element in building a compelling business case, allowing stakeholders to challenge any assumptions made and to establish the credibility of estimates that are made. The business case also provides the foundation for policy decisions on implementation, such as timetable, possible phasing and possible support to business for additional costs.

### ***Stakeholder engagement and support***

35. Acknowledging and taking into account business interests is considered to be a critical part of the implementation process. Most administrations reported that they have actively engaged businesses in the different stages of system implementation. This has been done through a number of channels including discussion fora, private and public consultation and dedicated workshops, including on a regional basis. Interaction with businesses has also involved chambers of commerce, industry associations and other representatives of the wider business community.

36. Engagement with retail customers has also been considered highly important given that the overall benefit can be large although individual benefits may be more diffuse. This can involve educational media campaigns, the involvement of consumer groups, discussions with focus groups and wider public consultation. Explaining concrete benefits to consumers is particularly important both at:

- the system level, for example increased public revenues, better services and fair competition and
- the individual level, for example the ability to verify the validity of receipts for guarantee or return purposes, more efficient and secure record keeping, and having evidence to support complaints of e.g. overcharging or the sale of counterfeit goods.

37. Engagement with producers of cash registers and software developers is also critical both in understanding the possibilities within the existing market place, for example the ability to retrofit existing devices, as well as how the market can be expected to respond to the introduction of an OCR system. This will include developing an understanding of the viability and costs of possible solutions ranging from OCRs with limited functionality (including mobile virtual cash registers) to high-end products.

38. Most tax administrations reported that when considering the introduction of OCR systems, they engaged with tax administrations which had already implemented such systems. This can be extremely helpful in understanding expected costs and benefits, implementation issues and the wider market place in OCRs. Evidence from the experience of other countries can also be very helpful in building a compelling business case.

### Box 2.2. Cash receipt validation by customers

Some countries have developed a dedicated mobile application to help retail customers exercise and protect their rights.

In *Greece* an app is available which allows customers to scan the barcode contained on a receipt and to check the validity of the receipt. This does not require the use of any username or passwords.

In *Korea*, the app functionality is integrated with electronic wallets and allows the creation of a “mobile card” in the form of barcode which can then be presented to store clerks for storing and verifying cash receipts.

In *Russia* any receipt can be verified in real-time through a free mobile application available for download. Verification involves scanning the QR-code which by law has to be displayed on every receipt. If the receipt does not comply with statutory requirements, the app will detect a violation. The app can then validate the receipt and automatically file a complaint if the data does not match. The risk of being checked for violations in real-time is a strong check against non-compliance.

In *Slovakia* customers can use an app to scan a QR code on the receipt, or enter the unique numerical identifier, to check its validity. Violations can be reported to the tax administration. Slovakia also has a nationwide cash receipt lottery where citizens can register their receipts. A validity check on registered receipts is run through the tax administration’s systems.

*Source:* Project Survey and Workshop, 2018.

39. Administrations which introduced OCR systems also stressed the importance of continuous engagement with stakeholders during the various stages of the implementation process. Creating effective channels, such as working groups and online networks, for hearing and reacting to feedback from stakeholders is important in evaluating the effectiveness of the system and in picking up implementation concerns at an early stage. Some tax administrations created online personal accounts for business owners. This allows them not only to view their transaction history and file reports but also to contact tax officials with complaints, questions and requests for assistance or clarifications. Many countries also provide advice over the phone with the help of specialised call centers.

### ***Robust legal framework***

40. Creating a robust regulatory environment is a vital step in the early stages of the implementation process. The regulatory framework in most cases includes an overarching national law with additional regulation making powers. Some degree of rule-making power is often delegated to the tax administration. The legal framework establishes the obligation, or the right in a voluntary system, for taxpayers to use online cash registers. It also sets the system’s technical specifications and the dedicated processes concerning secure data transfer and storage.

### *Mandatory usage of OCRs*

41. Most administrations chose to enforce the mandatory usage of OCRs (except for Italy, where the use of the new system is currently optional outside of vending machines). This ensures a swift take-up and a quick adoption rate and creates a level playing field

in the sectors covered. (This may be all sectors or sectors considered higher risk.) The certainty it creates can also stimulate a competitive market in online cash registers.

42. In Hungary, Slovakia and Russia the legal framework also established a transition period for the reform. Staged implementation helped those countries to ease the administrative burden on taxpayers. The transition period between initial introduction and full implementation lasted between one and three years. The sectors covered by the requirements, including in staged implementation, will be set out in legislation as well as any exemptions from the requirements (for example where there is no internet connectivity, exemptions for certain professions, etc.).

43. To support the mandatory usage of the OCR system and to protect its integrity, most administrations require the OCRs to be registered with the tax administration. To do so, retailers provide information on themselves and the apparatus in a dedicated registration form (usually online). The Korean Tax Administration also requires more detailed information about the operator's ability to use the OCR in certain cases, including a financial statement and operational plan. An important step of the registration process is assigning a unique registration number or code to each online cash register that is stored securely inside the device's fiscal storage unit and is featured in the transmitted transaction data.

44. Legislation will also set out penalties for those who fail to comply with the legal requirements, for example failure to register tills, to use them properly, to issue cash receipts to customers or to transmit the sales data. The amount of the fine often depends on the legal status of the business (company, self-employed or over a certain size). A fine can either be fixed or correspond to the amount of non-reported tax obligations or the value of the purchase. It is common that repeated violations lead to more serious penalties, with many tax administrations having the right to disqualify officials or to suspend business activity temporarily. In the early days of implementation there may be use of warnings instead of fines. In the case of Russia, voluntary self-reporting about an offense may lead to exemption from liability depending on the circumstances.

45. In many cases the legal framework sets out the detailed technical specifications of the OCRs as well as the general obligations. This is usually combined with some kind of certification and approval procedure for the particular model of OCR or for each OCR, sometimes involving third-party experts. The aim is to ensure that cash register hardware and software conforms to the legal, technical and functional requirements and are resistant to tampering.

46. A number of tax administrations that have introduced an OCR system reported that online cash registers are legally required to contain a special storage device (a fiscal memory unit). This unit keeps a secure encrypted log of all events, including transactions and the issuance of receipts. The principal requirement for storage devices is that their content cannot be altered. In many cases the unit also stores taxpayer-specific information. Greece and Slovenia do not require the presence of such a device within the machine. In Slovakia the memory unit also stores and safeguards transaction data when the internet connection is lost. These data are then shared with the tax administration the moment online connections are re-established. Other mandatory technical features of the cash register often include a certain structure of log files, robust encryption algorithms, a printing device and connectivity to the internet.

*Data standards and security*

47. All survey respondents confirmed that their legislation and regulations set out the information which must be included and reported on every transaction recorded by the OCR. Some countries do not require the full set of the details included in the cash receipt to be reported, limiting the required information to a core set of elements such as the seller's name and tax ID, date and time, transaction value and VAT payable, etc. It should be noted that the legal definition of a transaction for the purposes of the system usually includes the supply of both goods and services.

48. In many countries a unified standard file format is defined to facilitate data transmission from connected OCR devices to tax administrations, for example the XML format of the standard audit file for tax (OECD, 2005).

49. The data collected by the OCR system is generally not open to the public. However in some countries access to data can be arranged for businesses that are the original source of such data or to selected public administration bodies. It is common for the data to be stored for periods of five to six years. However, in some countries the duration for information storage is not limited.

*The quality and effective use of data*

50. Regular data transmission of the records to the tax administration deters taxpayers from altering records as they know the tax administration will have direct access to the data. Information exchange with the tax administration can be in real-time or at periodic intervals. As online automatic transmission relies on internet or mobile network connectivity, periodic uploading through mobile online devices with secure data buffering capabilities may be suitable in places where reliable connectivity is not in place. This may in some cases be more manageable for the tax administration. The tax administration is able to use the data, increasingly through advanced analytic processes, for audit case selection and in targeted compliance activities. It can make such activities more efficient as the data is already available without having to send a specific request or attend an on-site audit examination. This also assists tax administrations where data may otherwise be stored in another jurisdiction which can pose challenges for audit.

51. Although OCR systems are highly effective in terms of increasing compliance rates in retail businesses through the deterrence effect, auditing is still a necessary instrument to detect non-compliance. Auditing can, though, in many cases be carried out largely remotely. In Russia, for example, the introduction of OCRs led to a drastic decrease of field audits and an increase in the number of remote desk audits.

*Exchange of sales data*

52. The online connectivity of OCRs with the tax administration is the key characteristic of every OCR. However, countries demonstrate different approaches to the implementation and periodicity of the data transfer from OCRs to tax administration servers.

- In Russia the OCR device has to stay connected to the communication network at all times and transactions are transferred in real-time. In Hungary the system transmits every 30 minutes, while in Greece and Korea the transfer takes place at the end of each business day.
- An important element of the data collection system indicated by several tax administrations is the role of intermediary service providers. Italy, Korea and

Russia have placed this additional link in the data chain between online tills and tax administration servers. These intermediaries (often referred to as data operators) are tasked with maintaining a secure reliable channel for sales data, and in some cases with other related functions such as installation and maintenance of cash register devices, primary validation of data, etc. Intermediaries must obtain approval from the tax administration. In Greece, Hungary, Slovakia and Slovenia data is transmitted directly to the storage systems of the tax administration.

- All tax administrations participating in the survey have prescribed instructions for cases when internet connectivity is temporarily lost or in case of blackouts. In most cases, cash registers are supposed to keep all transaction data in their internal memories until connection is restored. There are various time limits for such a mode of operation – from five days (Italy) to thirty days (Russia). Hungary, Slovakia and Russia have special provisions for areas not covered by stable online connections.

### *Public and private data usage*

53. Introducing the online cash register system often leads to increased inspection and control capabilities for tax administrations. Most tax administrations see possibilities to further integrate OCR controls with other data, for example with information on business-to-business VAT.

- Russia is implementing a system integrating data generated by its Automatic VAT Control System and its Radio Frequency Identification (RFID) goods tagging system with retail sales data from the OCR system. This will enable a comprehensive view of the movement of product and financial flows in the country. Russia is also looking at wider uses of OCR data, including its use in analysing the evolution of retail prices in real-time, in analysing trends in the retail market and in some regulatory contexts.
- In Slovakia, the tax administration plans to use the data received from the OCR system to cross-check information with tax returns.
- Greece, Hungary and Italy provide taxpayers with access to the sales data generated by their cash registers. This is usually done by means of a personalised account at the tax administration web portal. This gives retailers a unique opportunity to self-assess their revenue using live, reliable data. It can also assist them in preparing and filing their tax returns, as well as their KYC (know your customer) obligations. Slovakia and Slovenia make data available to other public authorities such as the courts and police.

## *Chapter 3*

### **Online cash registers: Case studies**

54. This chapter describes the introduction of online cash registers in four countries: Hungary, Korea, Russia and Slovakia. These are intended to show the different ways in which online cash register systems can be implemented to provide food for thought for countries considering the introduction of such systems. These case studies are, of course, in summary form and interested countries may wish to investigate further to inform their own plans. Each case study sets out:

- **Challenges:** what were the primary reasons and objectives behind the decision to adopt and implement online cash registers?
- **Approach:** what were the key design features chosen?
- **Implementation:** what were the main stages and challenges of implementation?
- **Operation:** how does the system operate in practice?
- **Results:** how successful was the introduction of OCRs?
- **Lessons learned:** what were considered to be the main factors in successful implementation?

#### **3.1. Case study Hungary**

##### *Challenge*

55. Although the use of electronic cash registers had been made mandatory in Hungary since 1993 there were concerns about the scale of hidden and under-reported sales. The main objective of the 2012 decision to move to OCRs was to increase the reporting of income and payment of tax by non-compliant businesses, helping to decrease the shadow economy and promote fair competition.

##### *Approach*

56. The development of the OCR system was based on successful international examples that had been implemented or were being introduced in Bulgaria, Croatia and Georgia. Hungary also utilised the experiences of countries that had recently revised existing cash register or billing systems (Belgium, Sweden and Portugal).

57. Hungarian regulations designate the scope of those who use the online cash register by listing activities contained in the official business activity register (TEÁOR). Compared to the previous ECR system, the range of those obliged to use a cash register did not change in the first phase of the introduction of the OCR system.

58. Every transaction where a receipt is due has to be recorded in the OCR. This is frequently checked by the tax administration. The key additional element compared to the previous system is the introduction of a Fiscal Control Unit (FCU), which supports the registration, storage and transmission of sales data in a way that the data cannot be altered or deleted.

59. Well defined technical requirements of online cash registers were included in legislation. All old cash registers not meeting those requirements had to be replaced with the new type, containing an FCU. All newly introduced types of ECRs (including Point of Sales (POS) systems<sup>3</sup> which incorporate cash register functions) had to meet the new requirements and had to get a licence for distribution. Cash register installation is based on installation codes provided digitally by the Hungarian Tax Administration.

60. In principle, a document must be issued for each and every fiscal transaction in Hungary. A receipt can be provided instead of an invoice if payment is immediate and the buyer of the goods or services is the “end user”. Providing cash register receipts to customers is required of all retail stores, catering units (excluding mobile units), rental services, repair services and pharmacies. Some exemptions have been made for e.g. travel agencies, delivery services and wine producers’ retail outlets. All printouts, including non-fiscal custom documents, are also recorded within the FCU in a fully reproducible way.

61. The implementation of the system also supported the development of the tax administration’s risk management, selection and audit activities. The risk analysis of the acquired data made it possible to better allocate the available auditor resources.

62. In order to decrease the costs, those businesses which were within scope of the new OCR system were able to receive financial support for the purchase of online cash registers or for the online transformation of POS terminals. Financial support was available for businesses with an annual turnover of less than HUF 500 million (around EUR 1.6 million) in 2011, provided that they were not in arrears for tax. The amount of subsidy was HUF 50 000 (around EUR 160) per cash register, available for up to five units.

63. In order to facilitate the process, users entitled to a subsidy could purchase the cash register from the seller for a price with the amount of the support already deducted. The Government transferred the amount of support directly to the seller, however, only after the actual commissioning of the cash register.

### ***Implementation***

64. The process of designing the new system began in October 2012. The first draft of the legislative act regulating the online cash register system was released in December 2012 and entered into force in February 2013. The legislation was subsequently amended with clarifications being made in a number of areas based on experience with the use of the system.

65. The first FCUs were developed by a private sector producer at the end of April 2013. The first licences were issued in early July 2013. The first online cash registers were commissioned at the beginning of September 2013 with the objective of live manufacturer testing. Roll-out of online cash registers began in November 2013. During the first phase, companies which already used an electronic cash register device had to migrate to an online cash register, an ECR containing a FCU.

66. By the beginning of the summer of 2014, anyone could purchase a cash register without any delay with an option to choose from several different models, among others

POS systems with cash register functions included. After several extension periods, the government set the final deadline for introduction of OCRs by businesses within scope at 31 August 2014. This meant that eighteen months passed in total between the legislation entering into force and the completion of the first phase.

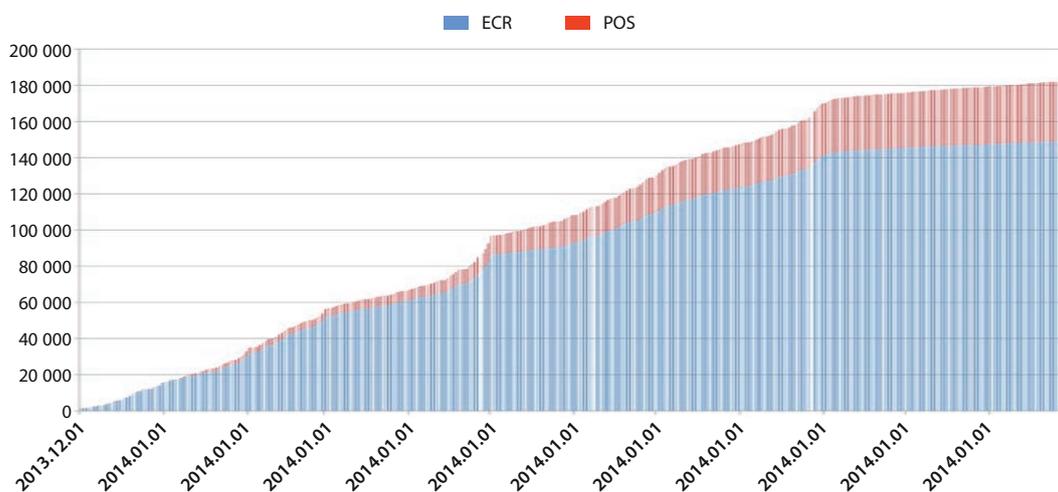
### Box 3.1. Implementation of the OCR system in Hungary

#### Milestones

2012	May	Start of planning for the new system
2013	February	Legislation passed
	July	First licence for an online cash register product granted
	September	First OCR pilot
	December	Roll-out of first the first OCRs
2014	April	Deadline for installing the ECR/POS with financial support
	August	Deadline for introduction of OCRs by covered businesses
2017	January	New business activities obliged to use OCRs

67. By the end of August 2014 already almost 150 000 ECRs and 30 000 POS systems were operating within the new regime. As of that time, only those cash registers which comply with the new requirements and are approved could be used. To ensure that the FCU operating software is free of any hidden functions, each type had to be certified by three independent professionals who examined the source code of the software.

Figure 3.1. Number of installed cash registers



Source: Hungarian tax administration, project Workshop, 2018.

68. The total governmental cost of the introduction was around EUR 26.7 million. Of this, around EUR 16.7 million was spent on acquiring governmental hardware and software systems and around EUR 10 million was paid as subsidies to businesses to ease the burden of implementation.

69. In the light of the successful first phase of OCR introduction, the range of business activities required to use cash registers was extended in January 2017. This applied the requirement to use an OCR to: taxi services, massage services, car and bike repair garages, currency exchange businesses, plastic surgeons and clubs and discotheques.

### ***Operation***

70. All OCRs are required to be equipped with a Fiscal Control Unit (FCU). The FCU is a separate circuit inside the housing of the cash register, but does not form part of the cash register. The FCU, in effect, is functioning as a “tax administration agent”, recording, storing and forwarding all relevant data generated by the cash register to the National Tax and Customs Administration (NTCA).

71. The communication with the NTCA’s servers is via the mobile phone network. The data is not transferred in real-time in order to avoid extra administration when the mobile network or the NTCA server is unavailable. It is sent in close to real-time though. The FCU attempts to connect to the NTCA’s server every 30 minutes. If the mobile phone network is temporarily unavailable, the cash register must still remain functional. To ensure the integrity of the log files, hash codes and strong encryptions (Public Key Infrastructure) are used.

72. The FCU performs the following tasks:

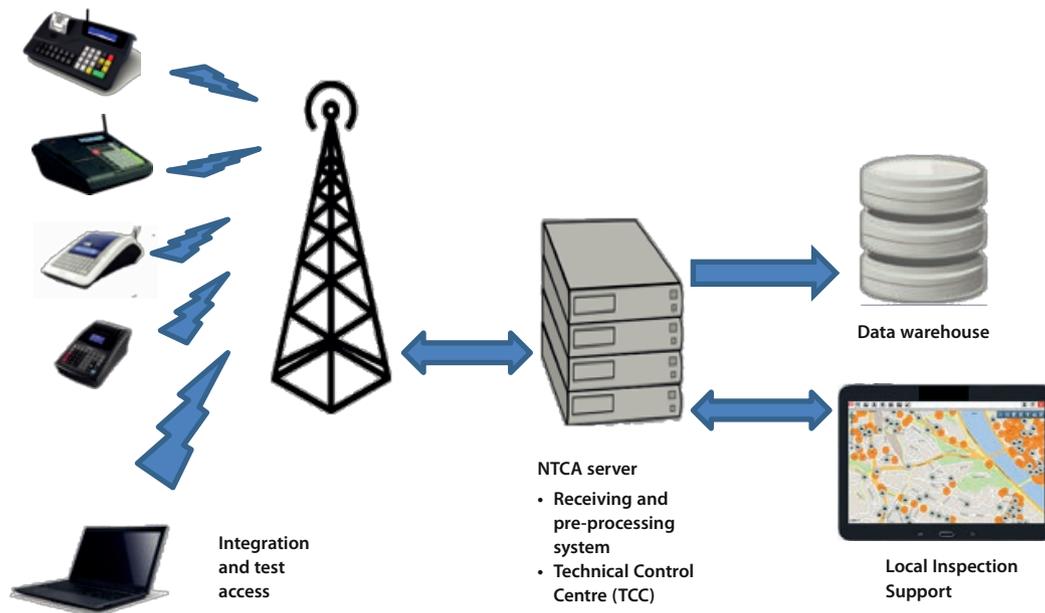
- keeping a log of the complete data content of each document issued
- keeping logs of the events in the cash register, which are relevant to inspection (blackout, opening and closing the times, etc.)
- storage of the log files throughout the lifetime of the FCU
- regularly sending the log files to the NTCA. Every 30 minutes, the FCU signs on to the NTCA’s server and tells it how long the log file has been open and how many entries it contains. If requested by the NTCA server, the FCU sends that data.

73. The data kept in the log file of the FCU consists of:

- all of the data contained in the cash register receipts in XML structure and digitally signed by the FCU
- operational data: power on/off, time update, trial mode on/off, etc.
- details of communication, both inbound and outbound, with the NTCA server.

74. Although nearly all of Hungary is covered by each of the three physical mobile operators, there may be places where the cash register will not be able to establish a data connection, even with the help of an external antenna (for example, a cash register located in a wine cellar). In such cases, the business has to request an exemption from providing the data online (and any exemption has to be renewed annually). Exempted cash registers, which account for less than 1% of all OCRs, are technically the same as other OCRs. The only difference is that instead of provision of data online, log files have to be sent to the NTCA by compact disc every month.

Figure 3.2. Systems architecture



Source: Hungarian tax administration, project Workshop, 2018.

75. The application for the installation of an OCR takes place through the Governmental portal for citizens. (This same portal is also used, for example, for submitting tax returns.) The user receives online a unique sixteen digit installation code from the NTCA. According to the regulations, the new cash register requests the user to enter the installation code as the first step of the installation procedure. The cash register then notifies the NTCA's server about this code. The server identifies the cash register based on the installation code and then deploys identification information on the cash register. After that, the cash register is ready for normal operation.

### Box 3.2. Penalties

It is mandatory to use the online cash registers in Hungary. In the case of the violations, including failure to issue receipts, the NTCA can impose a maximum fine of up to HUF 500 000 (around EUR 1 600) for a private individual, and up to HUF 1 million (around EUR 3 200) for companies.

The default penalty imposed for the unlicensed distribution of cash registers or the distribution of a type of cash register different from the one licensed can be up to HUF 10 million (around EUR 32 000).

Besides the default penalty, the tax administration may also require a shop to close temporarily where the violation is more serious or where the shop has failed to issue a receipt for the second time within a year of the first infringement. The period of temporary closure is twelve working days for the first infringement, thirty working days for the second infringement and sixty working days for each additional infringement thereafter.

The NTCA may take the cash register away for further technical inspection where there is suspicion of abuse. This is limited to a maximum of fifteen days.

76. The FCU has to be made available for inspection by the NTCA for 6 years after the last transaction. The cash register can only be sold if all the data accumulated on the FCU has been shared with the NTCA prior to the sale.

77. The average annual operating costs for a businesses to operate an OCR are around EUR 110, broken down to the cost of the mobile data connection (around EUR 60) and the cost of annual maintenance (around EUR 50).

78. Data coming from online cash registers is stored in the NTCA's data warehouse which was specifically created for this purpose. This data can be accessed by NTCA staff working in the risk analysis field with the appropriate authorisations. The data is mostly used for on-the-spot controls, subsequent controls and for risk analysis and audit selection. The data is also used by the NTCA to examine trends in the payment of tax. The Central Statistics Administration also has access to the data to examine trends within a sector.

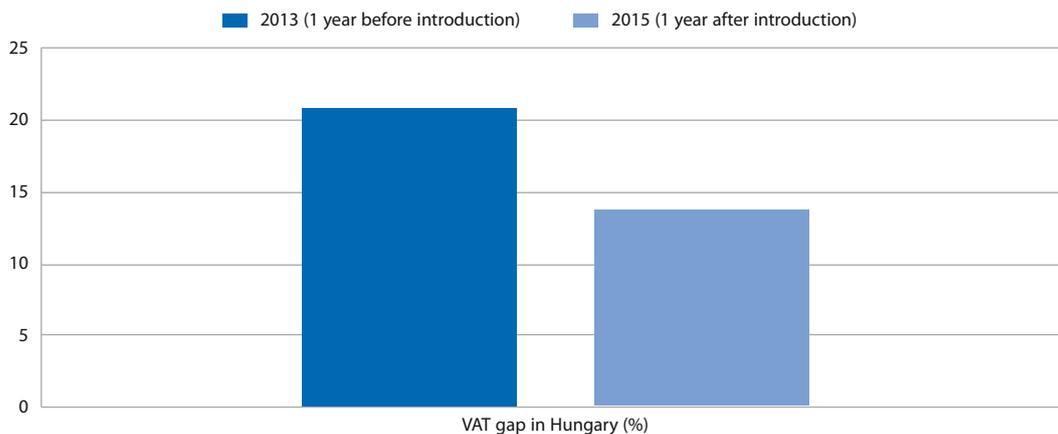
79. The largest proportion of the controls undertaken by the NTCA are to examine whether businesses are issuing receipts to customers at the time of purchase. A smaller number of controls concern the administrative obligations related to the operation of the cash register. Controlling the issue of receipts is performed at the business premises by mystery shopping.

### Results

80. In the first nine months of 2014 following the introduction of the OCR system, there was an increase in VAT paid by the covered businesses of around 15% compared to the previous year. The increase was particularly marked in sectors with a traditionally high rate of selling without receipts. For example, there was an increase of 23% in VAT payments in the case of grocery stores. The first nine months after the introduction of the OCR system saw an increase in revenue equivalent to seven times the total Government costs of introducing OCRs.

81. Overall, these increases led to an additional HUF 280 billion (around EUR 900 million) in VAT collected in comparison with 2013. Out of that the Ministry of National Economy estimates that around HUF 180-190 billion HUF (around EUR 580-612 million) is attributable to the impact of the introduction of the OCR system.

Figure 3.3. Declining VAT gap



Source: Hungarian tax administration.

82. As a result, together with other measures to decrease the shadow economy, the VAT gap in Hungary fell from 20.9% in 2013 to 13.7% in 2015 according to a European Commission report.<sup>4</sup>

### *Lessons learned*

83. The integration of the Fiscal Control Unit in online cash registers in Hungary has proved to be an effective way of controlling under-reporting of sales and income. Lessons learned with respect to the implementation and operation are:

- Legislation is needed to require the upgrading of old cash registers to meet new requirements, including the integration of an FCU.
- There can be efficiencies from the use of a mobile network for data exchange which supports “online but not real-time” communication. This has proved to be a sufficient service level in Hungary.
- It is important to invest in communication and engagement with stakeholders as well as to provide some incentives in order to encourage taxpayers to change or upgrade their existing cash registers in good time.
- The data from OCRs is a good base for audit and analysis and thought needs to be given to how to best use it, ensuring that resources are directed to businesses where control is most justified while minimising burdens on compliant businesses.

## 3.2. Case study Korea

### *Challenge*

84. In 2004, the cash payment ratio in Korea was 61% with consumers preferring to use cash when buying goods and services more than other means of payments. Identifying the real income of businesses earned by cash transactions and assuring compliance was difficult for the Korean Tax Administration. In order to increase compliance and revenue, the need for a system to trace cash payments in a more effective way was identified as an objective.

### *Approach*

85. The Korean Tax Administration researched various options to enhance the visibility of cash transactions and detect non-reporting of income. It was decided to build on the existing IT and network structure already used for the well-established credit card payment system by extending it to cash receipts through an online cash register system. A core part of the credit card system is settlement agency services (VAN, Value Added Network companies) which approve card member transactions and acquire them. VAN companies offer terminals and VAN networks to recruit merchant members and provide credit card inquiry services. The OCR system uses these VAN terminals and the VAN network.

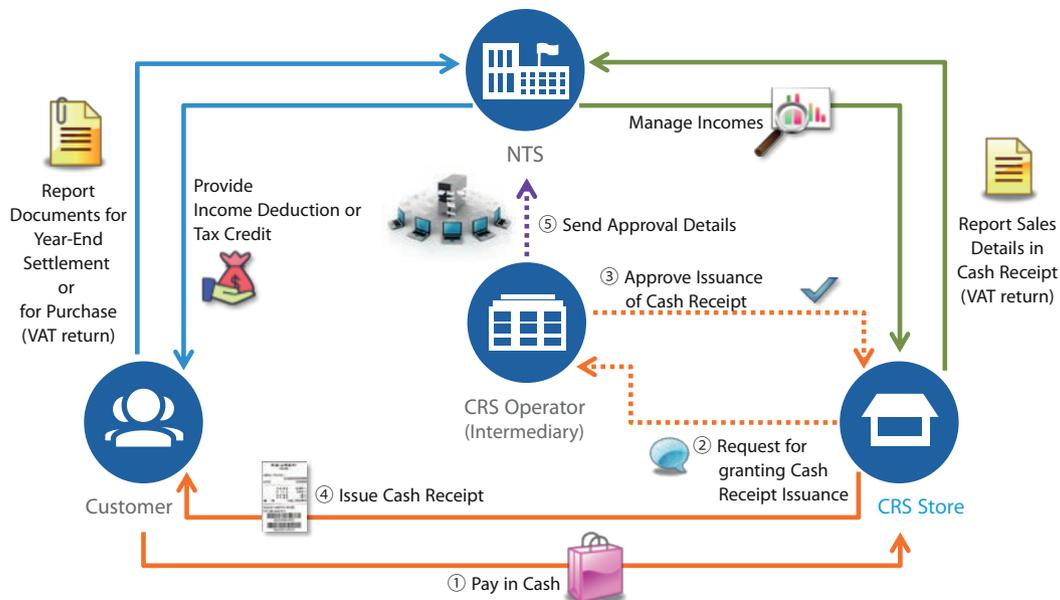
86. The following benefits were expected from introducing the OCR system:

- collecting and controlling all the cash transaction data from stores effectively in terms of management and cost
- reducing compliance costs for taxpayers
- reducing the size of the informal economy.

87. The central element in the Korean OCR approach is the use of OCR Intermediary Operators (see Figure 3.4). The OCR Intermediary Operator installs a “cash receipt issuance terminal” at a registered store which connects its sales system to the OCR Intermediary Operator. When a good is purchased, the store’s sales system sends details of the transaction to the OCR Intermediary Operator which can then give approval for the issuance of cash receipts to the customer. The OCR Intermediary Operator then transmits the cash transaction data to the Korean Tax Administration.

88. The main reason for choosing a system with intermediate OCR operators was the assessment these were able to service and control the many stores in Korea in an efficient and cost-effective manner. Small businesses however were granted the possibility to issue cash receipts via the Korean Tax Administration Internet portal site. (This site also provides information on the OCR system.)

Figure 3.4. Korean OCR architecture



Source: Korean tax administration, project Workshop, 2018.

### Implementation

89. The introduction of the OCR system in Korea followed a series of steps:

- 2001-02: this step involved researching effective mechanisms for enhancing reporting for tax purposes in the retail and services sector; and subsequently the drawing-up of a business case for a new mechanism of online cash registers based on the existing credit card data collecting system.
- 2003-04: drafting the law, taking into account the views of the business community, and sending this to the National Assembly. The basis of the law was a requirement for the compulsory online registration of all payments and the issuing of approved receipts which could be verified by the buyer. The stated purpose was to enhance compliance through a system of civil control tools while ensuring the interests of compliant business.

- 2005: OCRs were implemented accompanied by a public campaign.
90. During the preparatory phase no fundamental objections were raised as to the introduction of the proposed OCR system. Concerns were, though, raised about possible excessive cost of the equipment for businesses as well as the payment of fees to the OCR Intermediary Operators and communication charges.
91. Financial concerns were addressed in an early stage of the process with the Korean Tax Administration giving a tax deduction for implementation costs, for example the services of OCR operators. The Korean Tax Administration also incentivised the rapid roll-out of the system by offering tax credits for OCR Intermediary Operators based on the number of installed cash receipt terminals and cash receipts issued.
92. To promote the OCR system and encourage customers to request receipts for cash payments, households were entitled to a partial tax credit or income deduction for expenditure. This had to be evidenced by the entry of a valid cash receipt onto the Korean Tax Administration website. This was supplemented by a lottery programme which ran from January 2005 to December 2010 based on the entered cash receipts. KRW 100 million was paid as a top prize during the early stages of the programme.
93. The implementation of the system was done in phases depending on the category of the taxpayer, e.g. restaurants, pharmacists, doctors, etc. To expand the programme, the Korean tax administration adopted a “mandatory issuance policy” from April 2010. Under this policy, high income earners including lawyers, hospitals, and medical centres were required to issue cash receipts for cash payments for goods or services over KRW 100 000 even where customers did not request a cash receipt. This was later expanded to all businesses.
94. At all stages from the planning and development to the implementation of the OCR system close contacts were maintained with almost all business associations within the country.
95. The introduction of the OCR system included the following costs:
- Tax administration: development and implementation of the tax administration data reception complex responsible for registration and logging of online cash registers, as well as receiving, storing, systematising and analysing data received from the OCR operator.
  - Business: updating existing cash registers or acquiring new cash registers including replacements of components, as well as auxiliary services, such as communication, fiscal data processing by intermediaries and maintenance.

### ***Operation***

96. All businesses directly supplying goods and services to end-users are subject to mandatory registration as OCR stores. The threshold for mandatory registration of businesses is earnings above KRW 24M per year.
97. Businesses directly supplying goods and services to end-users are subject to the mandatory issuance of cash receipts for transactions over KRW 100 000. In the early stage of implementation cash receipts under KRW 5 000 were exempt from the obligation to issue a receipt.

98. Businesses subject to the OCR regime are required to:
- notify the tax administration about any changes in data provided
  - use cash registers for every transaction
  - use cash registers to issue transaction confirmation documents (receipts) by means of printing them on paper or sending their electronic versions
  - send the transaction confirmation documents (receipts) to the customer by e-mail upon their request.
99. Businesses which are required to register as OCR stores but who fail to do so by the due date are subject to a penalty of 1% of income.

### Box 3.3. Cash receipt issuance terminals in Korea

In Korea four types of cash receipt issuance devices are used by business stores. The terminals are provided by the CRS operators.

*Point of Sale terminals* are commonly used in large restaurants as the terminal helps the restaurant to register their sales information in real-time. The device also automatically calculates the sales data and issues cash receipts.

*VAN terminals* (connected to the Value Added Network of credit card service providers) are widely used by various OCR stores. It uses the telephone network to transmit information on credit card payment or cash receipt issuance.

*Personal computers connected to the internet* can be an option for small businesses or for those not equipped with a VAN terminal. By accessing the website of the OCR Intermediary Operator, business stores can issue cash receipts as well.

*A portable terminal* is used by food delivery service providers such as fast food delivery stores. They connect their mobile phones to the portable terminal to issue cash receipt at the customers' location.

100. In order to become an OCR Intermediary Operator, the applicant must first obtain approval from the Korean Tax Administration. As part of their application, potential OCR Intermediary Operators must provide assurances of their abilities to fulfil the OCR obligations through an operating plan which should include their system blueprint, the cost of the transfer per cash receipt and a security plan.

101. Several civil control measures have been implemented which allow the parties to the transaction to help verify that receipts are issued properly:

- OCR businesses can check the accumulated data on receipt issuance by day, month, and year on the internet
- customers whose request for a cash receipt is denied by the seller can report this to the Korean Tax Administration
- where a request for a cash receipt has been denied or cancelled, or the issued information does not reflect the actual transaction, the customer can report it to the Korean Tax Administration within a five year period. The customer will then get an income tax deduction and can also receive 20% of reported amount as a reward. In these cases, the OCR business faces a penalty of 5% of the reported amount.

### Box 3.4. Cash receipt contents

Each cash receipt must contain the following elements:

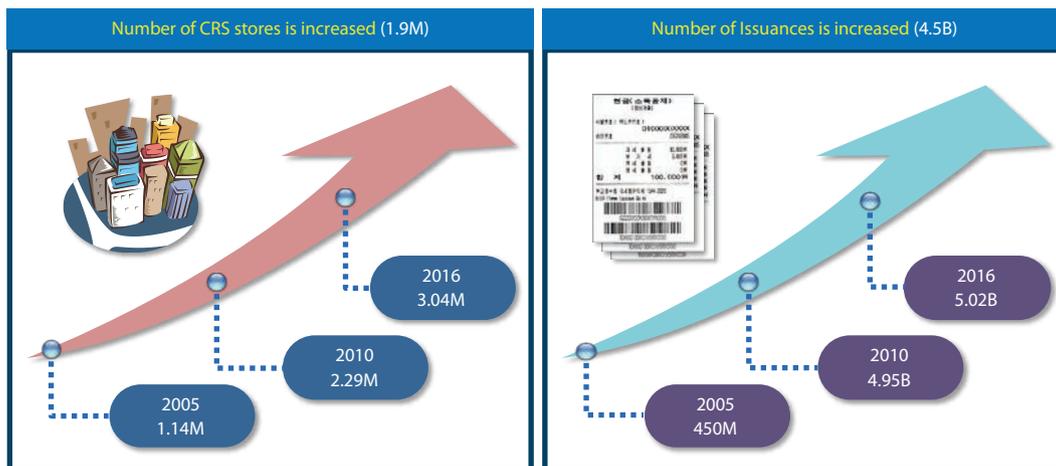
- the title of the document and the sequence number within the working shift
- the date, time and place (address) of the transaction (for online transactions, this is the website address)
- the name of the business and the taxpayer identification number
- the transaction type and name of goods, works, services, payments, etc.
- the price for a unit taking into account the discounts and extra charges
- the total amount of the transaction and the appropriate VAT rates
- the cash receipt approval number (received from the OCR intermediary)
- the address of the NTS website, where the details of the transaction can be verified by the customer
- a unique serial number.

### Results

102. Following the introduction of the OCR system and the accompanying cash receipt programme in Korea, the estimated visibility of cash and credit card payments to total expenditure in the private sector has increased gradually by more than 5% each year. It rose from 37.7% in 2004 to 96.5% in 2016.

103. At the end of 2016, the registration ratio of mandatory OCR stores to total stores was 96.5%. The number of cash receipts issued has increased eleven-fold since the implementation of the OCR system, rising to around five billion cash receipts issued in 2016. As of 2016, more than three million stores had implemented an OCR and there are currently forty-two OCR Intermediary Operators in Korea.

Figure 3.5. Increasing number of issuances and OCR stores



Source: Korean Tax Administration, project Workshop, 2018.

104. The introduction of the online cash register system has led to increased compliance and contributed to the assurance of a stable national revenue.

### *Lessons learned*

105. The following elements were found by the Korean Tax Administration to be of particular importance in the successful introduction and the effectiveness of the OCR system:

- The use of a cash receipt programme in the early stages to encourage customers to request and check receipts, with various incentives offered such as an income tax deduction, a lottery programme, and tax credits.
- Building on the existing infrastructure for credit card payments and using OCR Intermediary Operators to validate receipts was perceived by business and the tax administration as an efficient and cost-effective way of controlling large numbers of taxpayers and transactions.
- The tax administration taking an active role in verification and supplying services to businesses and customers. The Korean Tax Administration's website contains frequently asked questions, comprehensive materials about the reform and a specialised technical forum.
- Engagement with businesses. Workshops with taxpayers were held from the outset of the reform and representatives of the Korean Tax Administration presented the reforms and answered questions in television and radio broadcasts.
- Raising customers' awareness through public campaigns both to create support for the reform and to assist compliance through civil control mechanisms.

## 3.3. Case study Russia

### *Challenge*

106. The system of cash registers existing in Russia before the introduction of the new Online Cash Register System did not ensure a reliable source of revenue data or completeness of revenue records. This led to high risks of tax avoidance in the retail sector.

107. The Federal Tax Service (FTS) set the following objectives for introducing OCRs:

- Fairer competition for doing business, dramatically reducing the possibilities of fraud
- Protecting the interests of individuals and organisations
- Enhancing compliance and reducing costs for business and tax administration, including by decreasing the number of inspections.

### *Approach*

108. The FTS has a strategy for an automated tax administration based on the view that technology is key to enhancing tax compliance and reducing burdens. Studying effective mechanisms to ensure the completeness of revenue reporting for tax purposes in retail and services, the FTS believed there were huge benefits to be gained in introducing OCRs. The FTS was convinced that the real-time and secure transfer of transaction and payment data to the tax administration had great potential to foster compliance and detect fraud easier and earlier, allowing the tax administration to take appropriate and timely actions.

109. After studying international experiences with OCRs in Korea post 2012, OCRs were piloted in Russia in 2014-15. The basis was the idea of online registration of each payment, allowing its verification by the buyer. Such a design minimised the scope for violations by creating a system of civil control tools, while ensuring the interests of compliant businesses.

110. A short but comprehensive description of a vision outlining the functionality of the future system was published. This greatly helped in achieving consensus on the technology hardware and software selection process and helped to identify the solutions that were chosen to run the system.

111. The decision to implement the online cash system was based on the positive results of the 2014-15 pilot. The legal basis for the pilot was established by a Russian Federal Government Resolution. This gave the FTS the legal authority to conduct the OCR pilot in the retail sector, including all transactions with cash and credit cards with respect to the sale of goods, works and services.

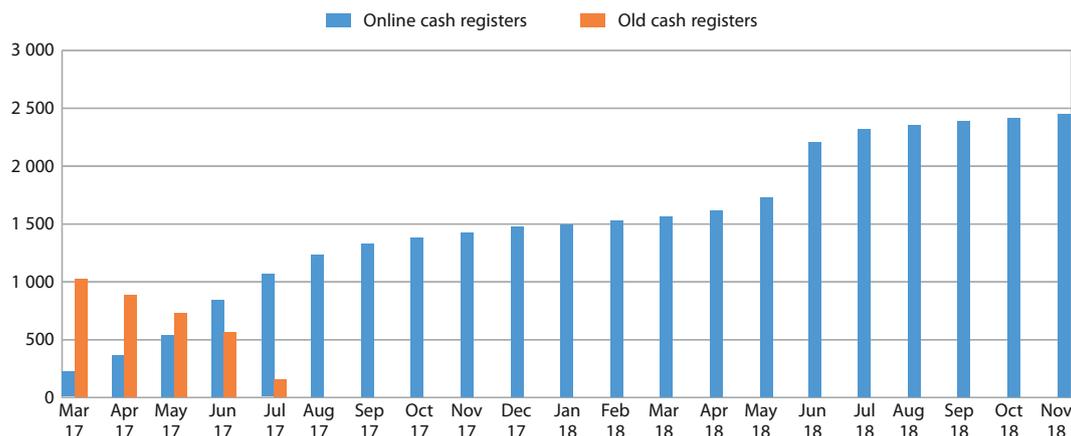
112. The pilot lasted for six months and was run in four regions out of eighty five regions of the Russian Federation. It involved creating and testing a variety of business solutions for different taxpayer categories and their specific characteristics. The pilot showed that the efficiency of the existing cash register system could be increased dramatically. The old system was technically outdated and could not fully ensure the completeness of revenue reporting for tax purposes and, at the same time, was burdensome for businesses.

113. The legal requirements for OCRs apply for every transaction separately (each and every receipt), but only for business-to-consumer transactions.

### **Implementation**

114. The introduction of OCRs was done in phases. After the pilot, the law for OCRs was drafted in 2016 and sent to Parliament. The views of a wide range of stakeholders from different agencies of the government, legislators, business associations, businesses of different sizes and individuals were collected, analysed and taken into account in the design and specifics of the OCRs.

Figure 3.6. **Transition to online cash registers**



Source: FTS of Russia.

115. The transition to OCRs was split into three phases:
- All retailers, who had earlier been obliged to use cash registers, had to use the new OCR starting from 1 July 2017. This included taxpayers in the retail trade who used the General Taxation Regime or the Simplified Taxation Regime.
  - Taxpayers in the retail trade who used the Unified Tax for Imputed Income or Patent Tax Regime, as well as taxpayers providing public catering services with no hired employees, all had to use the new OCR system starting from 1 July, 2018.
  - All other taxpayers who did not move to the new OCR system in the first two phases have to use the new system starting from 1 July 2019. These are mainly taxpayers active in the service sector, who previously had not been obliged to use cash registers.
116. The Russian tax administration developed the data reception function responsible for the registration and logging of online cash registers, as well as for receiving, storing, systematising and analysing data. The FTS has acquired new functions and powers, most of which are technical functions intended for the system administration.
117. Every online cash register has to be registered. The registration process can be done online and is similar to registering a new computer or a mobile device. The application form for cash register registration includes the following information: the taxpayer identification number, the address (for online transactions – the web-site address) and the place of cash register installation and application, the name of the cash register model and of the fiscal drive, and whether the cash register will only be used for sale of services and online transactions.
118. To contribute to a smooth transition to OCRs, the government covers the investment costs associated with OCRs for small businesses by means of a special tax deduction. The self-employed have the right to reduce the amount of the Unified Tax on imputed income or the amount of the tax in the Patent Tax Regime by the amount spent on the cash register (not more than around EUR 250 for each cash register). This is subject to the cash register being registered with the FTS between 1 February 2017 to 1 June 2019. The FTS published video instructions on its website as to how to register the OCR online as well as information about the legal rules and obligations for OCRs.
119. According to the law, all retailers are obliged to use online cash registers, except retailers located in remote or inaccessible areas with poor communications. Lists of such areas are approved by regional authorities.

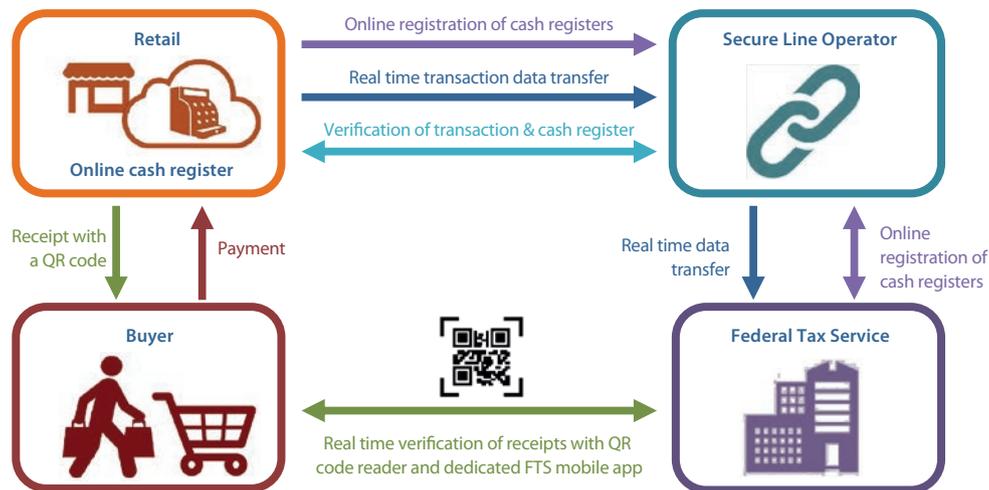
### ***Operation***

120. Requirements for cash registers are set out in federal law. These requirements include that OCRs must have the following features:
- a hard casing marked with a serial number and a real-time clock inside
  - recording and storing fiscal data in fiscal drives
  - forming fiscal documents in electronic form with details of the transactions
  - transferring fiscal documents in encrypted form to the FTS via Fiscal Data Operators immediately after the recording (including resending fiscal documents which did not receive confirmation from the Operator)
  - printing fiscal documents on paper (with exceptions for online sale retailers and some categories of vending machines).

121. A cash register must also be able to print cash receipts with a Quick Response (QR) code no smaller than 20 × 20 mm. The QR code contains encrypted details needed to verify a cash receipt. The cash register must be able to print out a receipt via any external printing device. These cash receipts contain compulsory features that are set out in federal legislation, e.g.: date, time and place (address) of the transaction (for online transactions – the website address), the taxpayer identification number, the price for a unit taking into account the discounts and extra charges together with the appropriate VAT rate, the cash register registration number and the address of the FTS website, where the transaction and associated details (known as the “fiscal attribute”) can be verified.

122. Any receipt can be verified by consumers and any suspected violation can be reported to the FTS via a dedicated free downloadable FTS app. The FTS app for receipt verification has other functions as well. It allows a customer to register a personal online account where he or she can store a history of all purchases which can be used for financial planning purposes. The FTS app also allows the customer’s phone number or e-mail address to be generated as a QR code on the screen. The QR code can then be presented to the cashier in order to receive an electronic version of the receipt by smartphone or e-mail. The FTS also allowed access to the receipt verification Application Programming Interface (API) for third party developers who can integrate verification functionality into their applications, including for the purposes of their own loyalty programmes.

Figure 3.7. System architecture



Source: FTS of Russia.

123. Non-compliance with the OCR system requirements is punishable by a fine. Management officials are fined an amount between 25-50% of the transaction value performed without the use of a cash register, with a minimum fine of around EUR 140. Organisations are fined for 75-100% of the transaction value, with a minimum fine of around EUR 420. In the case of any subsequent non-use of cash registers for total transaction amounts above around EUR 14 000 management officials are disqualified for one to two years. Legal entities and individual entrepreneurs are subject to suspension of their activity for up to ninety days. Violating the procedure of cash register usage leads to warnings of management officials and legal entities with fines of between EUR 21-42 and EUR 70-140 respectively.

124. The OCR system enables new types of audit activities that give the FTS the authority to automatically monitor transactions, analyse data, monitor the use of cash registers and inspect them remotely.

125. The OCRs are subject to a certification process. Non-governmental expert organisations verify whether a certain cash register model complies with the legal requirements. The FTS maintains the registry of the models of cash registers and fiscal drives which are compliant with the law, as well as lists of each individual cash register and fiscal drive.

126. The FTS gives permissions to entities to act as Fiscal Data Operators. These Operators receive and validate information from the OCR register and send the information to the FTS. The protocols for fiscal data processing, including the format, are published by the FTS. (Fiscal data processing is defined as any operation connected with the fiscal database carried out by the Fiscal Data Operator using technical means, including data receipt, validation, collection, recording, transferring data to tax administration in the form of fiscal documents and providing access to such data to the tax administration.)

#### Box 3.5. The fiscal drive

The functions of the fiscal drive of the Russian OCR are to:

- counter information security risks
- form fiscal attributes for every fiscal document
- store the registration number of the cash register and the taxpayer identification number
- store information about Fiscal Data Operators and other details of the registration report
- store a registry of fiscal data in a non-adjustable, non-volatile way for a prescribed period of time
- form fiscal documents for any cash register model, including encrypted documents, and transfer them to a Fiscal Data Operator.

### **Results**

127. Preliminary analysis of the data indicates that a significant part of retail sector has come out of the informal economy. According to various estimates, revenue per cash register increased considerably and in some cases by 100% compared to the pre-reform level. According to available data in 2017, there was a 38% increase in VAT collection from the retail sector compared to 2016.

128. The introduction of the OCR system also led to the development of a new and competitive market in the Russian Federation for online cash registers. Over fifty-two domestic manufacturers offer over 150 models of online cash registers, meeting a range of business needs in the retail and service sectors. Over fifty online cash register models with limited functionality are offered at prices lower than around EUR 250 making them an accessible option for smaller business. Fiscal data processing and communications are handled by nineteen Fiscal Data Operators.

### Box 3.6. Business benefits

The OCR system allowed the FTS to establish a level playing field for business activity and drastically decrease the possibilities of abuse.

Real-time access to sales data allows the FTS to undertake online risk management by identifying and reacting to high-risk transactions. Data analysis on the basis of algorithms containing criteria to detect non-compliance not only allows better risk analysis but also facilitates remote auditing. This targeted approach increases the efficiency of audit and analytical functions while reducing the number of tax audits, thus reducing administrative tax burdens on compliant taxpayers.

The introduction of the OCR system has also encouraged greater digitalisation of the retail trade, including access to cloud services and APIs, and has helped to open new business opportunities for smaller retailers.

129. Integrating the OCR data with other data sources, like the VAT Control System and the Radio Frequency Identification (RFID) based tagging system for certain goods, allows the FTS to take a comprehensive view and analysis of product and financial flows in the country and further improve the detection of non-compliance.

130. The introduction of the OCR system is now allowing the FTS to consider abandoning mandatory filing of tax returns for certain types of taxpayers thus reducing the administrative tax burden.

### *Lessons learned*

131. The FTS considers that the following elements are critical in a successful introduction and implementation of OCRs:

- As with any significant reform, it is essential to involve a wide range of stakeholders from different agencies of the government and legislators as well as business associations, businesses of different sizes and individuals. This helps to improve the design of the OCR system and to gain support for its introduction. Businesses may influence decision-making by sharing their ideas, experience and insights.
- It is also vital to test the OCR using a sandbox<sup>5</sup> environment or by means of a pilot project before the OCR is legislated and implemented. (This may need enabling legislation.)
- The inclusion of a certification process in the OCR system and publication of certified models of OCRs contributes to an effective and efficient introduction. It may help taxpayers to make informed choices as to which OCR they want to buy.
- System introduction, support and maintenance costs can be significant for businesses that are obliged to use OCRs. Developing an appropriate stimulus package eases the burden of switching to the new system and helps deliver a smoother introduction.
- Likewise, phasing in the OCR system can help businesses to adjust and can fairly distribute the burden of implementation both for businesses and for tax administrations.
- Implementing the feature of civil control in OCR systems may contribute to its success since it also provides benefits and protections for retail consumers.

- Universal coverage was an important success factor for the introduction of the OCR system in Russia. This removes the opportunity for non-compliant taxpayers to engage in unfair competition. Nevertheless, there may be good reasons for sectoral approaches and specific exemptions.
- Organising education campaigns within the tax administration so that tax officers would learn the possibilities and limitations of the new system helps to ensure that it is used effectively and efficiently.
- The publication of easily understandable publicly available information about OCRs (legal requirements, specifications, registration rules, etc.) is essential for a successful implementation process. Taxpayers who are fully aware of the system parameters and understand them are more motivated to effect the transition in a timely manner.

### 3.4. Case study Slovakia

#### *Challenge*

132. The Financial Administration of the Slovak Republic is responsible for collecting taxes and social contributions from retailers. There was a relatively high estimated percentage of non-compliance within the retail sector, influenced among other things by a high percentage of cash transactions. Important causes behind this compliance gap were:

- for cost reasons, many retailers did not have an electronic cash register or other point of sales system, which provided opportunities to avoid the registering of sales as these were considered too expensive
- even where data was stored in an ECR, as a result of the large variation in ECR models, formats and functions, on-line connection with the tax administration was not possible.

133. The Slovakian Financial Administration decided to draw up a strategy to introduce online and virtual cash registers. The main objectives were:

- increasing tax compliance and state revenues
- enhancing risk management and audit effectiveness (both through better resource allocation and enhanced audit tools)
- reducing administrative burdens for taxpayers by reducing costs for purchasing, using and maintaining cash registers.

#### *Approach*

134. The basis of the Slovakian Financial Administration's strategy was that effective use of technology is a key element in implementing a successful tax compliance management strategy. The introduction of online cash registers was considered as a long term, ongoing project in which technological and legal development go hand-in-hand. The basic elements of the Slovakian approach are:

- the introduction of ECR's is founded in laws and regulations which oblige retailers to use ECR's to register sales of goods and specified services
- the establishment of a certification process for ECRs. This is currently undertaken by the Customs Office. The intention is to shift responsibility to the Financial Directorate for the certification authority of online cash registers to ensure that they meet all the requirements stipulated in law

- the step-by-step introduction of supporting technological innovations, from the currently used Virtual Cash Register (VCR) to the implementation of e-Kasa in 2019 (see below for an explanation of e-Kasa).

135. In the end fully online cash registers will reduce the operational costs of cash registers. Businesses covered by the requirements will no longer be obliged to manage the periodical maintenance of hardware and software components like specific fiscal memory functions. In addition to that, all information about the sales will be stored in the servers of the tax administration and will be accessible to the relevant business, tax inspectors and other authorised persons within the tax administration. Based on risk models, tax audits will be better focused, reducing burdens on low-risk businesses. Administrative burdens connected to the registration process will decrease.

### Box 3.7. Legislation in Slovakia

Act No. 289/2008 Coll. on electronic cash registers. This amended the act of the Slovak National council No. 511/1992 Coll. on tax and payment administration.

The Act regulates ECRs, in particular: the certification process; the definition of basic terms; requirements for the ECR, fiscal printer, fiscal memory, service organisations, essential elements of the receipt, financial closures, obligatory records and seals; violations, sanctions and fines.

The Act also regulates the requirements and usage of on-line cash registers and virtual cash registers, the process of certification of OCRs, the process for registration of new OCRs, the obligations as to the usage of OCRs, and the requirements on cash receipts.

### Implementation

136. The Slovakian Government amended the legislation on ECRs in 2015. The list of services providers required to use electronic cash registers was widened to services such as taxi services, hotel and hostel accommodation services, life and non-life insurance services, legal services, accounting services, veterinary services, hospital and medical services, travel agency services and dental services. The legislation required that by the 1st of April 2015, these service providers were obliged to use either a certified ECR or VCR.

Figure 3.8. Example of a Virtual cash register



Source: Financial Administration of the Slovak Republic, project Workshop, 2018.

137. The VCR was introduced as a free-of-charge solution for businesses newly obliged to register sales due to amendment of the Act governing ECRs in 2015. The VCR was intended to be a user-friendly and free web-based and mobile application. It was developed by the Financial Administration of the Slovak Republic for these small and medium sized enterprises.

138. The introduction of the VCR was aimed at increasing tax compliance, enhancing and simplifying tax audits and more efficient risk management. Retailers who were already obliged to use certified electronic cash registers can also now choose to use VCRs.

139. The benefits of VCRs versus ECRs as regards ease of use and cost are:

- There is little or no cost for setting up the VCR. The system can be run on any supported device – PC, tablet or smartphone with a connection to the internet.
- Data storage is centralised and the Slovakian Financial Administration can easily access and analyse the data.
- Fewer obligations and technical requirements for businesses using VCR compared to those using ECRs.

140. When VCRs were first introduced, only those providing the services newly added by the amendment to the Act could use a VCR instead of an ECR. In 2016 this limitation was abolished and each business could decide whether to use a VCR or ECR to register sales.

#### **Box 3.8. Exempted tax payers**

Taxpayers selling specific goods are exempted from the obligation to use an ECR or VCR. These include those selling public transport tickets, telephone cards, daily newspapers and periodicals, commemorative banknotes, commemorative coins, collector coins, postal stationery for philatelists, goods sold via vending machines, goods delivered by postal services, goods sold by a disabled person, or goods sold in practical teaching of pupils.

Taxpayers providing specific services are also exempted, including services sold via vending machines, parking tickets, services sold in mountain cottages which are not connected to the road and public electricity network and services sold by disabled people.

141. In the second half of 2017, the Slovakian Ministry of Finance decided to implement fully online cash registers solutions similar to the system introduced in the Czech Republic. This system is called e-Kasa. E-Kasa will merge the existing VCR and ECR systems into one online sales registering system which will, in a second phase, be connected to the Financial Administration. The e-Kasa system is expected to reduce the average costs of EUR 200 to EUR 300 by around EUR 56 per cash register.

142. An advisory group has been established to assist the implementation process comprising representatives of business and non-governmental bodies as well as vendors of ECRs.

### Operation

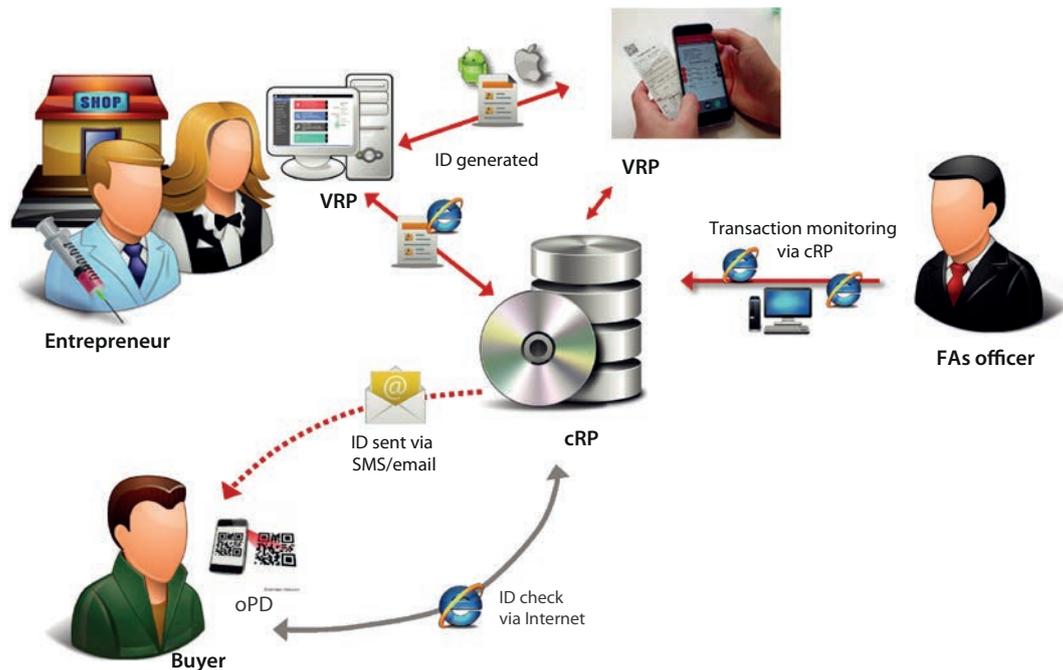
143. The Virtual Cash Register is software which can be used on a PC, a tablet or a smartphone with a connection to the internet. It enables the taxpayer to issue receipts and send transactions to the tax administration.

144. A business owner can decide to migrate from a traditional (certified) cash register to a VCR. The process for registering the use of a VCR is straightforward:

- The taxpayer fills in and files an application form online.
- The Slovakian Financial Administration will process and validate the application and assign a specific code to the new cash register and send the login data to the taxpayer.
- The taxpayer downloads the application to the mobile device or runs the web application from within their internet browser.
- The taxpayer logs on to the VCR with the login data provided by the tax office. At the time of the first login, the taxpayer is forced to change the password for security reasons. The taxpayer can then log on to the VCR application.
- The taxpayer can then set up the VCR application (tax rates, items, etc.) and the virtual cash register is immediately ready to use.

145. The VCR can be operated only when the internet connection is on. In the situation when there is an internet connection blackout, the VCR cannot currently be used. There is no “off-line” mode. In that case the business is obliged to use another cash register or issue alternative receipts which have to be registered within 48 hours after the VCR is back online.

Figure 3.9. Architecture of the VCR



Source: Financial Administration of the Slovak Republic, project Workshop, 2018.

146. From mid-2019 those currently using ECRs will have to upgrade their current ECRs or purchase new models to allow online connectivity under the e-Kasa system. Introduction of the e-Kasa system will be phased, starting with optional use in April 2019 and obligatory use in July 2019, when taxpayers have to be ready to use OCRs or VCRs to register sales. Business will have until July 2019 to register for the e-Kasa system. Each OCR will have to be registered with the Financial Administration. For the users of VCR there is no change and they are not obliged to “re-register” their VCRs.

147. The process for registering the use of an OCR is also straightforward as it is for the VCR:

- The taxpayer fills in and files an on-line application form.
- The Slovakian Financial Administration will process and validate the application form and assign a specific tax code to this OCR.
- The taxpayer logs on to a portal and downloads the initialisation data package to another device. The initialisation package obtains all information about the OCR (unique tax code for OCR, address of premises, TIN, taxpayer’s register information) and a security certificate.
- The taxpayer can then set up the OCR (date, time, tax rates, items, etc.) and the OCR is ready to use.

148. All online registered transactions whether by the VCR or OCR will be entered into the central server of the Financial Administration and are accessible to the Financial Administration’s officers. All transactions will also be accessible to the taxpayer through his or her online portal. Transactions which were registered by the OCR in the so-called offline mode (when the internet connection was lost) are stored in the device and the business is obliged to re-establish the internet connection within 48 hours after the malfunction occurred or use another OCR. (This will usually be automatic if due to a connection issue.)

149. There are three situations where specific circumstances apply:

- The business is located in an area where there is no internet connection. In this case the business is required to send stored data once in every thirty days.
- In the case of an electricity black out or OCR system break down, the business is obliged to issue paper receipts to its customers. These alternative receipts have to be registered in the OCR within 48 hours after system recovery.
- In the case of temporary disruption to the internet service, the business has to issue “off line” cash receipts which are stored in the OCR device. These alternative receipts have to be registered at the central server within 48 hours after the internet connection is restored.

150. The public is encouraged to engage in civil control of receipts. Each cash register receipts will have a QR code and buyers can scan the QR code or type in the unique ID of the cash receipt to a mobile application called “Over doklad” (translated: “Check the receipt”) to check whether the cash receipt is valid or not. If it is not, buyers can send a notification to the Financial Administration which will trigger an investigation (on-the-spot audits, etc.). The Financial Administration also intends to integrate the “Over doklad” application with the National Receipt Lottery. After the receipt is checked, the buyer will have the opportunity to easily and quickly register it to the “Lucky receipt lottery” and participate in the draw.

151. Future OCRs will provide the following information to the Financial Administration: the price per item, the total price, the applicable tax rate, the amount of tax, date and time, place of the sale or service, identification of the cash register, confirmation of the issue of a receipt and the (optional) identification of the customer.

### **Results**

152. The estimated revenue from the gradual introduction of e-Kasa in 2019 is approximately EUR 72 million, rising to EUR 117 million in 2020 and to over EUR 120 million thereafter. The introduction of e-Kasa is expected to reduce the VAT tax gap in the hotels, restaurant and catering sectors and in the retail and service sector by 15%. The total estimated budget costs for the Financial Administration for the implementation of e-Kasa is approximately EUR 18 million.

#### **Box 3.9. Results of the VRC implementation in Slovakia**

Registered VCRs:	39 668
Login information sent:	39 437
VCRs used/activated:	30 885
VCRs deactivated:	3 085
Valid cash receipt issued: 10 841 154	
Value of issued cash receipts: EUR 719 667 639	
Total amount of VAT contained in the cash receipts: EUR 13 511 164	

### **Lessons learned**

153. The Slovak Republic considers that the following conditions determine a successful introduction of OCRs:

- Close consultation on the timing and planning of the implementation with business taxpayers and the organisations that design and implement the online cash registers. They have to be able to prepare for and handle the changes in their processes, e.g. registration, monitoring, controlling and evaluating.
- Benchmarking with already implemented solutions. Do not reinvent the wheel.
- Close communication with all interested bodies: experts, non-governmental bodies, sectoral associations, cash registers vendors' associations, other state bodies, universities, etc.
- Allow taxpayers a sufficient amount of time to prepare their transition to the OCR system.
- Introduce affordable solutions for taxpayers, in particular small businesses, e.g. free of charge applications, or if possible and feasible, a state subsidy.
- Develop the ability (systems and people) to be able to analyse big data, including for risk assessment purposes.

## Notes

1. OCRs which send data on demand from the tax administration can be an effective auditing and monitoring tool but do not offer the same analytical benefits as OCRs which automatically send data.
2. Big data is the term given to large data sets, both structured and unstructured, which are too large or complex for traditional data-processing.
3. A Point of Sales (POS) system supports the processing and recording of transactions between a (retail) business and its customers at the moment in which services and/or goods are purchased. It usually supports a broad range of customer based functions. A retail POS typically includes cash register functionalities. In Hungary ECRs are special hardware devices with an integrated FCU, whereas POS systems are often desktop computers with an external FCU connected to it.
4. [https://ec.europa.eu/taxation\\_customs/sites/taxation/files/study\\_and\\_reports\\_on\\_the\\_vat\\_gap\\_2017.pdf](https://ec.europa.eu/taxation_customs/sites/taxation/files/study_and_reports_on_the_vat_gap_2017.pdf).
5. A sandbox is the term for an isolated environment that simulates the real use environment as closely as possible and allows testing in a way which does not risk adversely impacting live systems.

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## *Annex A*

### **“How-to” guide for implementing an online cash register system**

154. This Annex contains a “How-to Guide” describing practical approaches, tools and techniques that might be used by countries considering the introduction of online cash register (OCR) systems. The defining characteristic of OCR systems is that the cash register is directly connected to the tax administration’s secure storage and retrieval systems allowing real-time or periodic transfer of data. This guide draws on the experience of tax administrations which have implemented or are in the process of implementing an OCR system.

155. It is hoped that this guide will be useful to those with varying degrees of prior knowledge on OCRs, helping them through the steps from initial consideration of objectives and cost/benefit implications to full implementation. In using this guide in practice, tax administrations may wish to consider seeking advice from FTA members with experience in the implementation of OCRs.

156. The guide is divided into four sections:

- The first sets out the initial considerations when first exploring the possibility of introducing OCRs, in particular the importance of developing clear objectives.
- The second section sets out the main elements that need to be examined in establishing an initial cost-benefit analysis, including through initial consultation with stakeholders, to inform decisions on the viability of the project or alternatives.
- The third section sets out the key elements of an implementation project plan.
- The fourth section goes into more detail on each element of the project plan.

#### **Section 1. Objectives for an OCR system**

157. The starting point for consideration of an OCR system is the identification of objectives. As an outcome of such consideration, it is advised that tax administrations develop and publish a strategic vision, which is well understood and shared inside their organisations and externally. It is important that such a strategic vision is developed through a consultative process with both internal and external stakeholders to understand the current cost-benefit position for different options but also the potential for future uses once other conditions are met (such as the uptake of the online registers, internet performance and the development of relevant systems to use any additional functionality).

158. Different implementation goals are likely to imply different methods concerning the selection of legal approaches and technologies and the further organisation of the system, as well as the rights and obligations of involved parties. In particular, given that over time additional implementation goals and functionality might become desirable, it is important to consider the introduction of a solution based on a scalable platform. This will allow for

an unlimited number of potential future government and private sector users facilitating future expansion and increase of functionality.

159. The following objectives have been identified by those tax administrations which have introduced OCRs.

### ***Better tax compliance***

160. The primary objective will usually be the improvement of fiscal transparency and tax compliance through reducing opportunities for under-reporting and enabling more effective and timely enforcement. The scale of benefits that can be achieved as regards tax compliance requires a good understanding of the current position as regards the extent and nature of the informal economy, current use of secure tills and robust estimates of the degree of non-compliance by registered businesses.

161. It is important to note that by themselves OCR systems will not necessarily lead to significant improvements in tax compliance. In addition to the monitoring and enforcement of the completeness and accuracy of reporting under OCRs, they of course sit in a wider compliance environment. The adequacy of that wider environment needs to be assessed and major gaps addressed. This is particularly the case as regards the registration process and the wider regulatory system for business registration so that businesses are known to the tax administration, as well as the set of activities undertaken to address the informal economy.

### ***Fair competition***

162. While many businesses will be tax compliant, where a significant number are not paying their fair share this can lead to unfair competition. In the worst case this might affect confidence in the tax administration and negatively impact wider compliance. In this case an OCR system applying either to all retailers or all businesses in a particular sector where under-reporting may be more prevalent (for example the restaurant sector in some countries) can potentially have strong positive effects on overall compliance attitudes.

163. Increasing public awareness of the new analytic capabilities which became available through the introduction of online cash registers will help support fair competition among market participants. Such an approach is likely to be welcomed by honest and compliant businesses who suffer from unfair competition.

### ***Consumer protection***

164. An OCR system can also contribute to the protection of consumer rights through guaranteeing that the purchase was legitimate and correct. At the same time, having the evidence of purchase stored in a tamper proof system can make it easier to take action if goods are found to be counterfeit.

165. OCR systems can also make it easier for consumers to exercise their legal rights to return goods particularly if digital receipts are recognised to have the same legal power as a hard copy. This can be enhanced if the system makes it possible to send digital copies of receipts to an email address provided by customers. At the same time, if the tax administration system allows for it, online availability of digital copies of old receipts can save buyers the trouble of keeping a hard copy receipt should they decide to return or exchange a purchased item in the future.

166. A functional OCR system can also provide the opportunity to verify cash receipts issued by the seller against the online data received by the tax administration servers. This can serve as a highly effective civil control tool through which, in effect, customers carry out a real-time audit of the completeness and correctness of revenue reporting by retailers. Traditional compliance mechanisms and approaches could not allow such wide-scale monitoring of actual situations in the field

### ***Improved statistical and economic analysis***

167. An OCR system can serve multiple applications as a result of being a continuous source of reliable periodic or real-time retail statistical data reflecting financial flows and market conditions in the economy.

168. The availability of actual real-time or close to real-time market data can provide economic policy makers with enormous amounts of high-quality big data that they have never had before at their disposal. This can allow them the opportunity to track and see the actual development of multiple retail markets of goods and services, including retail prices, rather than model their behaviour or use limited sample surveys. There may also be opportunities to enhance the policing of anti-monopoly measures, anti-money laundering, illicit financial flows and to develop a greater understanding of the informal economy.

### ***Reduced compliance burdens and opportunities for business***

169. As regards compliance burdens for business, data provided through OCRs may enable remote online registration and audits without face-to-face interaction with taxpayers, reducing costs for business where no issues are found. Depending on the nature of the business and the tax law requirements, the data may also be sufficient for partial or full pre-filling of tax returns.

170. The system also potentially allows retail business owners to improve financial reporting and accounting as well as to further reduce employee theft through better internal auditing capability. The data generated by OCRs may also allow businesses to improve efficiency in other ways as well as be used for promotional and analytical purposes.

## **Section 2: Initial cost-benefit analysis**

171. There are six main elements that need to be considered in drawing-up an initial cost-benefit analysis prior to decisions being taken on whether and how to implement an OCR system. These are important for understanding whether an OCR system is a proportionate response given the risks involved, the scale of implementation challenges and costs for both businesses and tax administrations as well as the potential revenue gains from enhanced compliance.

### ***Understanding the current environment and potential gains***

172. The first part is to develop a solid understanding of the current environment. This includes the size and nature of the retail economy, estimated non-compliance in different parts of the retail economy and the main opportunities for non-compliance. The background to this is set out in the first part of the report on OCRs, drawing from the 2018 survey of tax administrations.

Table A.1. OCR Business case key elements

Key aspects	Comments
The extent of cash transactions versus electronic payments	Electronic payments create records in banking and credit card payment systems, whereas cash can be invisible.
The estimated number and nature of unregistered taxpayers in the retail sector	Which sectors are particularly vulnerable and what would the expected tax revenue be from different compliance approaches?
Evidence from compliance activities	Have compliance activities uncovered non-compliance and what have been the main reasons – e.g. manipulation of data, skimming, fake invoices, etc.?
Views of compliant taxpayers	Are compliant taxpayers affected badly by unfair competition? Is the behaviour of non-compliant taxpayers affecting their own attitude towards tax compliance?
Risks of under-reporting of tax: level and underlying reasons	Is the implementation of OCRs likely to eliminate or diminish the reasons behind compliance risks? Is evidence of impacts of implementation of OCRs in other jurisdictions applicable?
Maturity of technological conditions for transition to online cash registers	Is the internet of mobile communication network coverage sufficient; are there conditions for a competitive market for cash register manufacturers; are there available suppliers of technical solutions?

### *Understanding the current usage of electronic cash registers*

173. In order to understand both the gains and the wider costs and implementation challenges of an OCR system, it is important to understand the penetration and type of electronic cash registers used in different parts of the retail sector and their vulnerabilities. The objective here is to get a complete picture of challenges that taxpayers face while using cash registers, e.g. what costs they incur in the process, how streamlined is the procedure of purchasing and registering a cash register and how are any current ECR security requirements monitored.

174. This phase of understanding the current usage of electronic cash registers might include a risk analysis. In earlier research the OECD (OECD, 2013) has identified a Risk Model for Point of Sale Systems looking at the vulnerability of cash register data in terms of electronic sales suppression. The model identifies five risk areas with each of them presenting opportunities for sales data to be either deleted, altered or not recorded. These risks areas include: integrity of transaction, software, internal memory, external files and reporting. Each of these areas is subject to specific risks compromising retail sales data.

175. The original Model offers a comprehensive description of possible risks that are valid for most elements of cash register use. This paragraph further extends the model by measuring the risk levels and highlighting advantages that can be achieved by introducing OCR systems.

Table A.2. Risk area: Integrity of transaction  
Advantages of an OCR system in addressing cash register vulnerabilities

Online cash register system			
Risk type	Risk level	Issue addressed	Advantages
Buyer and seller agree not to use paper cash receipts	Medium	A customer might agree to buy something from a retailer if the item is low priced and its future use does not possess significant risks.	The tax administration is in position to act as an unbiased information provider and feed online retail sales data back to the customer at the time of transaction. The buyers are able to recover digital copies of their online cash register receipts.
Incomplete input of transaction	Low	In other cases, there is a conflict of interest between a seller and a buyer.	The owner of the business will not be able to make changes in the data that has already been transferred to the tax administration.
Incorrect input of transaction	Low	The buyer is interested in having a proof of purchase with the complete and correct description of the transaction in the cash register receipt.	

Table A.2. **Risk area: Integrity of transaction** (continued)

Risk type	Online cash register system		
	Risk level	Issue addressed	Advantages
Untimely input of transaction	Low	The owner of the business or an employee might be meddling with data at the end of the business day or before the reporting period.	It is not possible for a business to go back and change the records once the sales data has been transferred to the tax administration in real-time.

Source: Based on the Risk Model for Point of Sale Systems (OECD, 2013).

Table A.3. **Risk area: Software**

Advantages of an OCR system in addressing cash register vulnerabilities

Risk type	Online cash register system		
	Risk level	Issue addressed	Advantages
The software suppresses sales data and does not store all information about all actions carried out on the cash register	Medium	Some software and hardware developers and suppliers have been known to produce and offer products allowing data to be changed and altering reporting and tax returns.	Online transfer of data and its retention on file in the tax administration reduces the risk of use of such software by retailers by allowing easier detection of anomalies.

Source: Based on the Risk Model for Point of Sale Systems (OECD, 2013).

Table A.4. **Risk area: Internal memory**

Advantages of an OCR system in addressing cash register vulnerabilities

Risk type	Online cash register system		
	Risk level	Issue addressed	Advantages
Corrupt data stored in memory and internal files.	Low	Owners of retail businesses may manipulate cash register sales data critical to successful tax audits.	The internal memory is encrypted and sealed. The owner of the business cannot alter the internal memory. (This is not solely a feature of an OCR.)

Source: Based on the Risk Model for Point of Sale Systems (OECD, 2013).

Table A.5. **Risk area: External files**

Advantages of an OCR system in addressing cash register vulnerabilities

Risk type	Online cash register system		
	Risk level	Issue addressed	Advantages
Corrupt data stored in memory in external files	Low	The data is altered at the time of transfer from internal memory devices to data storage.	External files are formed at the time of sale before any data might have been transferred to external storage. File backups are stored by the tax administration and not by the taxpayer.

Source: Based on the Risk Model for Point of Sale Systems (OECD, 2013).

Table A.6. **Risk area: Reporting**  
Advantages of an OCR system in addressing cash register vulnerabilities

Risk type	Online cash register system		
	Risk level	Issue addressed	Advantages
Manipulation in the design and creation of reports.	Low	False information can be transferred into the accounting systems to generate tax returns.	The tax administration is aware of retail sales volumes and turnover before or at the same time as reports are sent into the business accounting systems. In addition to preventing fraud, this provides an opportunity for pre-filling of returns and potentially reduced compliance burdens. The sales data backup files are maintained by the tax administration. Businesses are protected against loss of retail sales records that can be recovered from tax administrations. This also makes deliberate deletion of data by a business redundant.

Source: Based on the Risk Model for Point of Sale Systems (OECD, 2013).

### ***Understanding the costs of the necessary technology to allow OCRs***

176. Choosing the right parameters for the underlying technological hardware and software solution of the OCR system is a challenging process. It involves taking into account the current and future objectives and the scope of the system, as well as the opinion and views of the business community, including manufacturers of cash register equipment.

177. Estimates of costs of the introduction of an OCR system is best done on a sectoral basis given the wide variety that is likely to be seen in the sophistication of existing registers used by small retailers, medium sized retailers and the largest retailers.

178. This is likely to call for a range of different solutions, including:

- small and relatively unsophisticated devices, including systems that utilise PCs and mobile devices;
- the development of add-ons to existing cash registers used in larger businesses which may be connected to their internal Enterprise Resource Planning (ERP) systems. (Introduction of ERP systems will often have required considerable investments and consideration should be given as to whether existing ERP systems can be adapted to smooth the transition to the use of connected online cash registers.)
- the development of new OCRs with different functionalities depending on business requirements.

179. A survey of currently available models and early consultation with existing cash register producers as to their ability to develop new models and to what timetable will be important. It will also be helpful to look at experiences in other countries of the range of cash registers produced and the availability of off-the-shelf products in the global market. These of course may need adaptations for different countries and for different required functionality.

180. In most economies the retail sector is currently undergoing wide-scale digital transformation and tax administrations need to keep up with this process in order to be more effective in their monitoring and compliance activities. The challenge in this regard is making the OCR solution scalable and adaptable to the rapid changes expected in technology.

### *Understanding additional requirements for the tax administration*

181. It will be important to map out in the initial stages the expected range of changes that will need to be made to the tax administration systems and processes to enable the objectives of the OCR system to be met. This includes the features of the software needed to receive and process OCR data. Many such changes can have long lead times.

182. Coupled to this, HR issues, including skills, training and recruitment, as well as awareness-raising initiatives need to be looked at against the background of a change in compliance interventions.

183. In addition, it will be important to look at whether changes are needed beyond usual tax administration functions to be able to make use of the economic and statistical data that may be available through the OCR system.

### *Consultation with stakeholders*

184. Prior to implementing the OCR system, it is vital to identify all possible stakeholders and receive their opinions, including as far as possible on the underlying evidence base with regard to costs and benefits and implementation challenges.

185. This process should start with internal consultations within the tax administration itself. There are a number of departments whose contribution to planning the system is extremely important. Primarily these include the Audit and IT as well as procurement and HR departments. To facilitate system implementation, a tax administration might consider establishing a project implementation unit comprised of representatives of all involved internal stakeholders. An important focus will be on approaches to system development and implementation as well as identifying barriers that can stall this process.

186. External consultations which take into account the position of as many stakeholders as possible will help ensure successful operation of the OCR system. Care needs to be taken to ensure that views are surfaced from businesses of different size and from different sectors given the different starting points, available resources and implementation challenges that different businesses will face.

187. Tax administrations also need to be prepared to deal with the opponents of the OCR system who will feel threatened by increased business transparency but will likely not go into direct criticism of the system itself. They will rather argue that the costs of introducing the new system and acquiring of new online cash registers can be too high on a nationwide scale (although, of course, this can be a very legitimate concern).

188. Poor web penetration in some areas might be used as an argument against universal coverage of all taxpayers by the system. Lack of information about the introduction of the new system might also be used as an argument for increased business uncertainty and compliance costs. Introduction of new digital technologies will over time reduce some administrative compliance burden on users of OCR devices, which might also be taken as a business threat by vendors and manufactures of existing cash registers.

189. Given that any OCR system will impose costs on business, it is important in stakeholder interactions to explain the wider societal and economic benefits as well as the benefits that can be brought to their sector of the retail market.

190. Tax administrations or other involved government agencies should not be the only advocates of an OCR system. Attempts should be made to foster a positive image of the system within the business community itself. These should not be based on some abstract benefits but rather refer to solid business cases. Compliant taxpayers' views, their challenges and benefits should be among the principal priorities of the implementation process.

### Box A.1. Engaging with the business community

Acknowledging and taking into account business interests is a critical part of the OCR systems introduction process. There are various forms of such engagement, including discussion fora, bilateral and multilateral consultations, workshops, etc. Interaction with businesses has often involved chambers of commerce, industry associations and other representatives of the wider business community.

Compliant market players in most countries supported the implementation process as they were key beneficiaries of measures to tackle the informal economy. Some concerns arose in connection with implementation costs, but responsive actions from tax administrations may be possible to address those concerns (for example through phasing introduction, offering tax deductions, etc.). Anonymous big data generated by online cash registers can also made available to retailers and manufactures to use in their bonus and discount programmes (subject to applicable data protection rules).

Retail customers are an important group to engage since they can benefit from greater transparency in the retail sector. A number of tax administrations have introduced apps allowing customers to verify the validity of cash receipts. Some have encouraged this by giving tax credits to customers verifying receipts or by entering such customers into lotteries.

In Slovakia use of free Virtual Cash Registers through mobiles or PCs is facilitating a reduction in hardware and software costs for businesses. The new online cash registers to be rolled-out in 2019 in the e-Kasa system is also expected to reduce administrative compliance burdens as businesses will no longer obliged to manage periodic maintenance of hardware and a fiscal memory will be not in place. All information about the sales will be stored in servers of tax administration and be accessible to the relevant business as well as the tax administration.

191. A number of tax administrations which have implemented OCR systems have found that compliant businesses tend to support the system as it makes the market more even and transparent, minimising unfair competition. In communicating the wider benefits, it is important at the initial phase to get support of those groups – including compliant businesses and customers – that will benefit from implementation of the OCR system.

192. It is important in this regard to draw up a readily understandable list of the benefits to compliant taxpayers of an OCR system. In particular, the system provides small businesses with access to planning and analytics that is usually only available to large retail chains. Benefits can include a reduction of reporting forms, a rich source of reliable data about their customers, and the opportunity to streamline such functions as procurement, analytics, security, IT and loyalty programmes.

Table A.7. Types of stakeholders

Stakeholders	Comments
Politicians	Given that the introduction of a mandatory OCR system can lead to additional costs and may raise data privacy concerns, it is important that the case for wider societal benefits is made at a high level. In addition, a key element of such public messaging is the importance of stakeholder consultation on implementation issues, costs and data privacy.
Press	At the outset, there needs to be more detailed communication with the press on the objectives of the OCR system, the overall benefits and costs, and the tax administration's plans for undertaking consultation. Consideration should be given to how other groups – e.g. consumer groups or compliant businesses – might support such interactions.

Table A.7. **Types of stakeholders** (continued)

Stakeholders	Comments
Business associations, industry unions	All concerns raised by the business community should be logged, considered and responded to. Interaction with business associations can be useful to communicate the benefits of the system implementation (level playing field, reduced administrative burdens, new self-assessment capabilities, etc.) as well as to identify cost reduction mechanisms to ease the transition. It is vital to analyse the collective opinion of compliant businesses and take it fully into account.
Consumer associations	Implementation of OCR systems facilitates the protection of consumer rights. The benefits for retail consumers (legal proof of purchases, redress against counterfeit goods, etc.) should be clearly communicated along with the mechanisms provided for exercising civil control such as online verification of receipts.
Developers of OCR systems and apps	Introduction of OCR systems opens a new market for developers and manufacturers as well as distributors and vendors of cash register equipment and software. These stakeholder groups are also likely to support change as it brings them new income opportunities.

### *Comparison of options*

193. To inform final decisions on implementation, the costs and benefits of different options need to be considered. Ideally these should range from doing nothing, through to enhancing current compliance activities (for example audits and investigations, communication campaigns, behavioural nudges, etc.) to mandating use of electronic tax tills without online functions and/or the use of fiscal printers as well as the adoption of an OCR system.

194. In considering the options it will be important to look at not just the early costs and benefits but longer term improvements in compliance and the degree to which reduction of the informal economy might stimulate wider economic activity including through a reduction in unfair competition.

195. It is worth considering publication of this analysis to demonstrate publicly that the costs and benefits of different options have been fully considered and to allow up-front challenge to such analysis.

## **Section 3: Project plan**

196. Before beginning the process of implementation of an OCR system, it is important to consider all the elements of the project plan and to ensure that adequate discussion of these elements takes place at the outset.

197. This is critical since while some elements will be of a sequential nature, some will need to be carried out in parallel and everything will be interconnected. Precision on the elements of the project plan is also vital for setting budgets, identifying existing skills gaps, estimating timetables and for informing internal and external communications and consultation. It will also help to identify where initial knowledge of prior conditions is inadequate, such as knowledge of the existing penetration of electronic cash registers, internet connectivity and hardware and software providers among other things.

Table A.8. Core elements of the project plan.

Project items	Comments
Assembling of the project team for initial phase	This should include economists, analysts and business process experts as well as those with an understanding of the wider compliance environment and compliance tools. At the planning stage the team might also include representatives of business associations as well as other stakeholders.
Understanding of objectives and prior conditions, scoping	This needs to be of sufficient comprehensiveness and depth to allow informed decisions to be taken and to minimise risks of overspends or a failure to achieve goals. At this stage it is important to articulate the overall outline of the project, set out the planned coverage of the OCR system, refine the implementation goals and draft a timetable.
Selecting technical solutions	Where market solutions for OCR tills are not already available, decisions need to be taken early on whether to go down the tender route or to put out required specifications in legislation. Consideration also needs to be given to the process for testing and validating technical solutions, including who it should be done by (in particular, whether in-house or by external experts).
Expanding the project team to allow for implementation	This needs to include a wide range of tax administration officials, led at senior level, capable of exploring all of the issues covered by the project plan.
Resourcing and budgeting	Early consideration needs to be given to costs for tax administration both for the implementation and operational stage (including additional staff and training).
Functionality	Early decisions need to be taken on the core functionality at the start of the system and future planned or potential uses. This stage needs to consider how additional functionality could be added at minimum cost.
Legislation	Consideration needs to be given to the legislation needed to mandate (or incentivise) an OCR system including possible phasing, data protection and use issues. The legislative timetable will impact on what can be undertaken without excessive risk and needs to be factored in.
Consultation and communication	Consultation and communication with stakeholders, internal and external, is crucial to ensure smooth delivery of the project to time and cost.
Internal systems development and implications	Given the time lags in systems development, early consideration needs to be given to how data from the OCR system will be used by the tax administrations (or wider government), the changes needed to existing systems or development of new ones, recruitment, training, etc.
Sandbox testing	It is highly advisable to build into the process an offline mechanism for testing and refining solutions before any wider roll-out.
Piloting	Piloting of the developed system is advisable given the costs involved in wider roll-out. This is an important option for ironing out possible implementation issues and to ensure that roll-out will proceed smoothly.
Implementation timetable	In the light of testing and piloting, decisions need to be taken on the final implementation timetable. Where there is a differential state of readiness in different sectors, it may be advisable to consider staged implementation.
Implementation issues	During implementation it is important to have mechanisms in place to capture any issues arising and to deal with them quickly.
Analysis and enforcement	Once the OCR system is in place, in full or part, consideration needs to be given to when to move from analysis of the data to begin any necessary enforcement activity, including the application of penalties. There may be a period of soft enforcement through warnings and/or support as businesses adapt to the new system.
Monitoring, evaluation and collecting feedback	The requirements for how to monitor and evaluate the effectiveness of the OCR system needs to be considered early in the process to ensure that adequate functionality is built in. This also implies building channels for feedback from taxpayers on any issues or requests on their part so that they can be dealt with in a timely manner.
Security	Having a vast amount of data being transmitted from business to the tax administration, as well as the ongoing storage of such data, requires great attention to be paid to how to keep the data secure. This includes security from external attacks or weaknesses and from internal misuse, whether accidental or deliberate.

## Section 4: Specific project elements

198. This section sets out the main issues that need to be considered in implementing an OCR system drawing on the experiences of countries that have done so already (including where they have encountered unexpected issues). This assumes that the initial evaluation and consultation has been done to establish the evidence base and the broad scope and objectives of the system and that decisions to proceed have been taken.

### *Establishing an implementation project team*

199. To be successful it is important to establish a project team with the skills to cover areas ranging from the management of a complex project, to the internal changes, budget and training needed to make proper use of the new system as well as the management of external communication and consultation.

Table A.9. Key skills sets identified by those who have experience with introducing OCRs

Skills needed	Comments
Project management skills	Introduction of an OCR system is complex and touches many aspects of the tax administration. There are many moving and interlinked parts to the project and clear understanding of the risks and contingency planning is needed.
Technical knowledge of current tax administration IT and what needs to be done to introduce new functionality	Technical capabilities are vital for the project in terms of bringing the selected sales data recording, transfer and processing technologies to life and interconnecting them with tax administration systems. Understanding of IT security and data protection requirements are also paramount.
Understanding of the compliance picture and risks and compliance tools	Implementation of OCR systems requires a good understanding of areas in the tax system where non-compliance risks tend to appear. A knowledge of risk management and compliance tools will allow the shaping of the OCR system to reduce those risks.
Understanding of business processes in trade and retail	To make the OCR system a part of taxpayers' natural environment (and thus reduce burdens) a good understanding is required of how businesses of different size operate in different sectors. This will facilitate and streamline the implementation process.
<i>Communication and consultation</i>	This includes effective positioning of the concept, getting a clear and comprehensive message across to the end user, raising awareness and educating stakeholders through the efficient use of various media. It is vital that taxpayers understand the benefits of the system.
<i>Behavioural insights</i>	A good understanding is needed of how a disruptive change can be implemented most smoothly, including the case for possible incentives.
<i>Knowledge of the market in cash registers</i>	Understanding the parameters of the cash register market and its potential is important in laying out the requirements for the system functionality, as well as shaping any staged approach.

*Note:* Italics indicates skills should be available but not necessarily within the core project team

*Source:* project Survey, 2018.

### *Scope*

200. The overall scope will be set in the decision-making process. A more detailed scoping of the coverage, functionality and timetable for the introduction of an OCR system will be necessary to ensure that the project is properly scoped at an early stage and critical interdependencies identified. This will also allow for adjustment of the composition of the project team if necessary or the identification of additional internal or external expertise that will need to be drawn in.

201. A more precise scoping is also important for the early stages of communication and consultation. This is particularly the case where the introduction of such a system may be controversial among some groups. In this respect the scoping plan will need to consider which elements should be fixed at the outset and which might be subject to adjustments following consultation and further experience gained during implementation. This is important in providing both certainty as to the overall project and flexibility to adapt to issues as they arise, helping to ensure the achievement of the overall goals.

### ***Selecting technical solutions for OCRs***

202. There are two main routes for selecting technical solutions for OCRs; either through a tender or by putting out the requisite specifications and allowing vendors or businesses to develop OCRs.

203. The limitation of the tender model can be in the variety and cost over time of the machines that are produced, given that the tender will be awarded to a limited number of vendors and certification will be required (by the tax administration or an authorised third party).

204. The other choice is for tax administrations to put out specifications for acceptable devices, facilitating completion among developers, producers and manufactures of online cash registers and fiscal drives as well as supporting services. It might be feasible to publish information about the model range of cash registers and their components, including prices and the fees for accompanying services. Such efforts will be aimed at improving user access to a wider selection of point of sale terminals and fiscal drive models that fit the needs and specifics of particular companies or individuals.

205. A competitive market in online cash register models with varied functionality and different price bands can better meet the demands of different types of business. For smaller businesses or self-employed individuals, models with limited functionality might be sufficient, which could be offered at lower prices. To support the use of online cash registers by small businesses and self-employed individuals, governments might consider introducing special subsidies or tax credits programmes to cover some of the associated purchase expenses.

206. The introduction of an OCR system creates opportunities for the development of new cash register equipment meeting new legislative requirements. This can promote the growth of companies involved in the manufacturing of online cash registers and fiscal drives and create more advanced skills and jobs in the economy. The use of more sophisticated OCRs can also provide longer term benefits to some businesses, improving their stock management, accounting systems, business planning and so on.

207. Consideration should also be given to software and hardware solutions that add required fiscal data collection, storage and real-time data transfer functionalities to existing ERP and ECR systems. This approach may help avoid significant business transition costs, at least relative to the turnover volumes of such companies.

208. Smaller businesses may be particularly vulnerable during the OCR introduction phase. Attention should be given to those cash register manufacturers that offer competitive software app solutions, including those consisting of a smartphone or a tablet, connected to a cash receipt printer. Paperless technologies, including legal recognition of digital or virtual receipts, should also be considered.

### *Tax administration resourcing and budgeting*

209. Ensuring that sufficient resources are in place for the whole project is a key early consideration even if many parts might be estimates. In particular, having a good general understanding about the implementation timetable will ensure that sufficient resource can be guaranteed, including the availability of key staff, for the entirety of the project.

210. Estimates of IT systems development are always difficult and experience of previous IT projects as well as implementation of OCRs in other countries should be utilised. There may be many different aspects to this depending on the degree of functionality being considered. It would be as well to estimate the marginal cost of each element of additional functionality so that it can be tested on a cost/benefit basis (although it may not be possible to isolate the cost/benefit of a particular application since it might be a critical component for gaining business or public acceptance of the system).

211. One of the most significant costs is likely to be storage depending on whether new sites are needed in addition to new equipment. It will be important to factor in, where appropriate, the cost of land, construction, equipment, security, ongoing maintenance, etc.

212. In addition, if consideration is being given to providing incentives to business which are subsidies rather than tax credits, then allowance needs to be made for this in the outline budget. There should be a clear understanding at this stage of what costs will be borne by taxpayers and plans should be made for minimising those costs.

213. One way of trying to capture all of the budget and resource considerations might be to do a walk-through of all of the elements of the project from start to finish, including costs such as consultation and communication in order to prevent overruns.

Table A.10. Cost elements

Areas to consider	Comments
<b>Tax administration costs</b>	
Resource cost of the project team	Remuneration for the members of the project team and opportunity costs
IT system build costs	Capital expenses for designing, developing and implementing the necessary infrastructure and software, plus recurring maintenance and operation costs
Data storage costs	This should include any construction and equipment costs, as well as the ongoing running costs. The system should be capable of adapting to support constantly increasing amounts of sales data and indefinite storage.
Public awareness campaign costs	Mass-scale introduction of new technologies should be supported by an effective media strategy, including drafting and producing information materials, conducting educational events, establishing a support hotline, etc.
Taxpayer cost compensations	Cost reduction measures and direct compensation of taxpayer costs connected with purchasing new cash registers or updating existing ones are an effective support tool and can help to smooth the implementation process.
<b>Taxpayer costs</b>	
Non-recurring costs	Transition to OCR systems requires purchasing new cash registers or updating existing ones. The costs can be different for different types of business.
Recurring costs	Use of OCR systems may require that taxpayers bear the costs of communication, maintenance and support as well as the periodic replacement of the OCR itself.

### *Functionality*

214. It will be important to specify all of the different functionalities needed by the OCR system to achieve primary goals and any secondary goals identified, even if they may be implemented at a later stage. This requires in-depth brainstorming and simulation of what is expected by the different parts of the tax administration and any external stakeholders (other parts of government, businesses, and consumers). This should be continuously refined as new information becomes available during the consultation process. It would be advisable for some of the project team to visit or be visited by other countries where an OCR system has been introduced to understand the range of functionality adopted elsewhere.

215. At the design stage developers should also consider introducing evident advantages that a new online cash register system will have for business and/or consumers over already existing cash register systems. Although such advantages may be specific to different countries, the focus should be on developing and implementing business processes and solutions that are clearly aimed at establishing fair competitive environment for all retail market players, reducing administrative burdens, enhancing consumer protections and providing useful functionality for business.

216. In addition, it is important at the design stage to ensure that functionality is in place which provides any information deemed necessary for monitoring and evaluation of compliance (for example monitoring the amount of time that a cash register is not reporting data). Again, it will be important to brainstorm this with all relevant stakeholders on an ongoing basis.

Table A.11. **Main functionalities**

Functionality	Purpose	Comments
Availability of secure casing and a secure data transfer device.	Hindering unsanctioned tampering with the cash register device.	This ensures that data is authentic, protected and secure.
Availability of a secure fiscal memory device.	Minimising or hindering illegal adjustment of sales data.	In many cases OCR adopters use some type of a fiscal storage unit which is installed inside cash register devices or, in some cases, an external certified control unit connected to the cash register. The functions of these units are to securely record, store and transmit sales data with no possibility of amending, altering or deleting information. Real-time data encryption helps to eliminate the opportunity for hindering or making illegal adjustment of sales data.
Support of data transfer from the user to the tax administration through a fiscal data operator	Providing high-quality services 24/7 at the lowest available price based on fair competition.	This ensures transmission of data in an authentic, protected and secure manner over the Internet, which may involve using encryption algorithms.
Ability to receive digitally a fiscal identifier from the fiscal data operator and reflect it in the receipt.	Ensuring that sales data has been transferred correctly, allowing validation of the receipt.	The goal is to prevent tampering with the sales data and ensure the transparency of all transactions.
Availability of a real-time clock device.	Protection against tampering with fiscal data.	Time stamping is an important element in preventing tampering with sales data.
Ability to confirm credit card payments.	Hindering manipulations and protecting customers' rights to use all forms of payment.	Capturing all retail transactions in one system can reduce opportunities for skimming or manipulation.
Ability to continue the operation and recording of all transactions in the absence of an online connection and to be able to transfer such data to the tax administration once the connection is up.	Ensuring seamless and non-volatile operation of businesses.	This reduces the risks of such interruptions in connection (which may be deliberate) being taken as an opportunity to under-report.

Table A.11. **Main functionalities** (continued)

Functionality	Purpose	Comments
Ability to print out receipts that include the prescribed information.	Protecting consumers rights and providing the tax administration with necessary data, hindering illegal manipulation of sales data.	This might include: name of the document; company name or name of the seller; TIN, cash register identification number; the serial number of receipt; date and time of purchase; the price of purchase; type of tax system used by the taxpayer; form of transaction (cash or credit card); fiscal identifier; fiscal regime; the name of fiscal data operator; the address of the website where this information can be verified and digital copies of receipts are maintained.
QR codes printed out on every receipt providing real-time web links to actual transaction data. stored by tax administrations	This can allow consumers to verify that receipts are real without the possibility of interference by the retailer.	For QR codes to work, applications need to be developed allowing easy verification with tax administration records.

*Note:* Functional requirements drawn from experiences of countries that have implemented OCRs.

*Source:* project Survey, 2018.

### Legislation

217. Legislation is likely to be necessary even if the system is not mandated in the first instance in order to cover privacy and data protection concerns and to establish any obligations that different parties need to meet (including for the tax administration around resources and the different uses of information).

218. The legislative process provides an important opportunity to have a full public policy debate as to the objectives of the system, its coverage and use. This can be a critical part of establishing the credibility of the proposed system and providing certainty for taxpayers. There should be thorough planning of how to best support the legislative process in achieving this aim, for example through prior consultation, the production of supporting material and public education campaigns.

219. Thought should be given to what should be contained in primary legislation and what should be left to secondary legislation (which will usually have a quicker timetable given that it will generally concern more technical issues). Flexibility can be important where there are uncertainties about implementation, coverage or functionality.

Table A.12. **Legal aspects**

Aspects of legislation	Comments
Which sectors and size of business should be mandated to adopt OCRs.	Universal coverage is considered by many tax administrations as one of the most important success factors of OCR system implementation since it reduces opportunities for non-compliant taxpayers to engage in unfair competition and can help in it being seen as a fair systemic reform. If not all sectors are covered from the outset, it may be advisable to take regulation making powers to extend coverage when conditions are met.
Possible powers to enable a transitional period for implementation (or to extend a transitional period).	It may be advisable, where possible, to take regulation making powers to allow for phased implementation, or to prolong phased implementation, post consultation. This can be useful to give the most cost constrained businesses, in particular small and medium enterprises and the self-employed, more time to prepare for the new requirements.
Obligations arising from the use of the OCRs' by retailers.	It may be advisable to introduce a set of user obligations including: requirements to use only certified/approved software and hardware; mandatory online registration of OCRs' with the tax administration; requiring the use of OCRs in each sale transaction; and transmission of such sales transaction data to the tax administration.

Table A.12. **Legal aspects** (*continued*)

Aspects of legislation	Comments
Certification requirements for the OCR devices.	<p>Certification requirement for OCR devices should be considered as an important element of compliance.</p> <p>It is highly advised to develop a set of technical requirements for OCR devices aimed at ensuring data integrity and secure communication. This might include a requirement for the OCR to contain a special data storage device or a fiscal memory unit.</p> <p>Manufacturers of such devices might be required to undergo a certification/approval procedure. This could either be done in-house by the tax administration or by external experts (who may be approved by the tax administration). Consideration should be given to developing procedures with the least compliance burden.</p> <p>It is worth considering giving the tax administration the power to maintain a register of certified/approved OCR devices and certification experts, and keep it updated and accessible to the public.</p>
Possible powers to allow for cost sharing or tax credits.	<p>In response to expected criticism that the system can be costly for businesses, it might be worth considering introducing legislation that will allow the introduction of mechanisms to reduce implementation cost burdens for some categories of OCR users.</p>
Data protection issues, including possible onward sharing of information beyond the tax administration.	<p>In some countries, legislation will be required to create gateways between authorities and to specify the different purposes for which the data has been collected and can be used.</p>
Setting out the required functionality of the OCRs.	<p>It may be advisable to take a regulation making power to allow for changes and additions to functionality in the light of implementation issues and for future-proofing purposes.</p> <p>It is advised to introduce requirements describing the core information that will be include in the sale receipts.</p>
Fines that can be charged for violations.	<p>It is advisable to introduce a system of fines to identify possible violations. Fines should be proportionate, deterrent and effective.</p> <p>It should also be considered that introduction of a new system might result in unintentional violations and users might be given a certain period to get accustomed to the new requirements before penalties are applied.</p>
Exemptions from the use of OCR.	<p>Universal coverage facilitates successful implementation of the OCR systems by reducing the opportunities for under-reporting of income. However it might be considered that certain types of business activity or businesses below a certain size are exempted, permanently or temporarily, from the use OCR devices. (It may be that as the cost of OCRs reduces, the case for exemptions becomes weaker.)</p> <p>Temporary exemptions from the use of OCR can be advisable for certain events like power failures, lack of internet availability or exceptional circumstances such as the theft or accidental destruction of the cash register. Such exemptions should be carefully limited and controlled.</p>

### Consultation

220. In addition to consultation at the initial pre-decision-making stage, ongoing consultation will be vital to ensure that the project proceeds smoothly. Consideration should be given to having a formal structure for consultation, possibly through one or more consultative groups representing different sectors and sizes of business. In addition, outreach to the wider business community through “town hall” meetings can be important in helping to establish buy-in to the project, including among the wider community. This can also help to surface issues which may be present at local levels (for example, lower penetration of existing cash register systems, poor internet connectivity, etc.).

221. The attitude adopted by the tax administration during consultation is important to consider. Digital technology has had a large impact on the functionality and performance

of cash registers but the relationship between their users and tax administrations might have very much remained unchanged. Apart from playing their natural role of auditors and forensic experts, tax administrations should take on the role of service providers for users of online cash register and treat them as clients rather entities which they are mandated to control. The users of online cash registers are expecting tax administrations to offer them the same level and quality and convenience as they would get from the most advanced companies that offer digital services. This requires a deep inventory and analysis of all interactions with all involved stakeholders.

### ***Internal systems development and implications***

222. The changes needed to tax administration internal systems and the wider implications for the tax administration (including staff deployment and skills) will be largely determined by the new functionality required to meet the aims of the system. Since it is probably invariably the case that things will either be missed or new functionality will be sought either by the tax administration or stakeholders following experience with the operation of the system, it is important to consider the introduction of a solution based on an open source scalable platform. This will allow for an unlimited number of potential future government and private sector users facilitating future expansion and increase of functionality, where appropriate.

223. In addition to the functionality needed for achievement of the objectives of the OCR system, it is also important to look as well at interactions with business and consumers. Contemporary users of OCRs expect that all interactions with a tax administration should be done digitally online without personal contact. This approach needs to be extended to all business processes that may be happening within the life cycle of an online cash register device from the moment of its online registration to the transferring of real-time sales data and filing reports.

224. All user compliance processes should be designed using intuitive interfaces which do not require any special knowledge or the involvement of experts. Registration of a cash register should be as simple as purchasing and activating a new mobile device or buying software online. The online transfer of receipts data as well as all filing of regular reports should be done automatically without any human involvement other than in exceptional circumstances.

225. Applications can also be developed either by the tax administration or by external providers to provide useful features for consumers such as the ability to verify receipts to reduce the risks of counterfeit goods or the storage and retrieval of old receipts where needed to return goods in the event of problems.

226. New functionalities can be further enhanced by providing third party developers with application programming interface (API) access to collected sales data. For example, verification technology can also be used by retailers in their promotional and loyalty programmes thus facilitating compliance and consumer activity. Before proceeding with introducing these services for wider use it should be considered that these functionalities can create enormous data flows that might be costly for tax administrations to maintain and operate.

Table A.13. **Tax administration system considerations**

Considerations	Comments
Storage of data received.	The amount of data that will come into the system may be huge. Consideration will need to be given inter alia to initial storage and future expansion options, maintenance of the storage facility, connectivity and back-up arrangements.
Integration into tax administration systems for compliance purposes.	Consideration should be given to the different uses of OCR data within the tax administration (for example, data analytics, possible prefilling of tax returns, etc.).
Systems needed for monitoring, evaluation and reporting.	Effective evaluation tools are vital for timely and efficient decision-making going forward and for identifying any system problems.
Security arrangements and data protection.	This is an area of priority concern. Detailed data on sales, whether at system or business level, must not be lost, stolen or abused. Systems must be fully secure, including procedures preventing unauthorised access to data and misuse of data.
Development of new systems to achieve end goals.	With end goals subject to flexibility during the whole implementation process, it is important that the system is scalable to allow for new features and functions.
New skills needed and/or new staff	Development and implementation of the OCR system involves creating a strong multidisciplinary project team combining professionals in tax compliance, analytics and data, social science as well as information technology and systems security. Expected large volumes of data generated by the OCR system may require bringing in new skills in analytics and data science. Reaching out to key stakeholders and involving them in the assessment of project implementation and its impact might also be beneficial.

### ***Sandbox testing***

227. Selecting and testing technology solutions that form the basis of the system is critical to its future operation. Given the costs and sensitivities surrounding the introduction of an OCR system, it is important to start with sandbox testing of the technology and business processes before the system is fully rolled out on a nationwide scale. This is to ensure that any issues are ironed out before wider deployment which, if not addressed early, could undermine the credibility of the system.

228. The size and scope of testing might vary depending on the economic and legal environment as well as readiness of businesses to accept the OCR system. It may be preferable that testing is performed without significantly changing the existing legal environment regulating the use of cash registers and without interfering with normal business processes in the retail sector, including the treatment of customers. At this stage online functionality could be tested as an addition to existing systems.

229. Part of early testing should be basic in-house testing of data transfer from dummy online cash registers to the servers of tax administration and from these servers back to the dummy registers. This stage requires involvement of a limited number of cash register manufactures and software developers who are willing to participate in these early tests. Special attention should be paid to identifying data items that will be generated by OCR systems and collected by tax administrations. These tests also create information that is needed for developing the OCR system IT infrastructure requirements.

230. Successful operation of the system is likely to be subject to developing (ideally) comprehensive classifiers of goods and services and making their use mandatory by all involved parties. Without this it may not be possible to verify if the right rate of tax has been applied nor would it be possible to develop wider statistical functionality (for example on the evolution of prices). If not already available, developing such classifiers may present a challenge and goes beyond the functional responsibilities of tax administrations. Use of AI and neuro network technologies might be considered in order to streamline the identification of various sale items and categorising them.

### ***Piloting***

231. As in many areas of significant change in tax administration processes, it is good practice to pilot the introduction of an OCR system both to identify any implementation issues and to understand the use of the system in practice (and possible additional necessary functionality). Financial feasibility and the practical data transfer technology can be tested as well as the adequacy of the technical requirements for operation of online cash registers. It also provides an opportunity to test requirements for guidance and training and for tax administration support (for example through online chats or help lines, including identifying where support might be needed 24/7).

232. Live testing of technology requires making decisions about the geographical scope of the tested area and the selection of businesses to engage in testing new technology in real life relationships between sellers, customers and the tax administration. This may well best be done on a voluntary basis to ensure that participating businesses are looking to work with the tax administration to improve the system. The testing should have clear time limits that will allow analysis of the impacts on all involved parties as well as tax compliance consequences.

233. To support these transactions the tax administration should have developed and installed an IT infrastructure solution which will be capable of supporting all transactions and the exchange of data generated by participating parties. Legislative changes might be required to regulate these actions.

### ***Implementation timetable and costs***

234. A phased transition period establishing deadlines for different types of businesses may well be useful for achieving smooth implementation of the OCR system. A decision to approach implementation in phases should be based on the existing retail market structure. It should be established what types of retail businesses are either already using or not using cash registers.

235. Where introduction is done in phases, there should be a foreseeable and clear time frame to enable proper planning by business and the tax administration particularly where complete coverage of the whole retail market sector is the end goal.

236. In addressing the issue of use of online cash registers by small retail businesses and individuals, consideration should be given to providing these groups with sufficient time that will allow them to accumulate the resources necessary to cover the cost of transition.

237. Implementation of an OCR system will bring new obligations and costs for businesses required to use them. Costs may include expenses associated with purchasing of new point of sale terminals and fiscal drives, connection to a network, registration, updating of systems and software, maintenance and replacement of parts as well as communication fees, etc.

238. Hardware and software system design should also include tools and solutions that minimise the efforts and costs needed for connecting, registering or updating systems and software, as well as for meeting auditing requirements. The use of automatic online services performed without human involvement will facilitate a reduction of administrative burdens. Online updating of the system as well as remote auditing should be done in a way which does not interfere with the running of the business.

239. Governments may choose to support policies aimed at subsidising the costs of acquiring OCRs, such as issuing tax credits or making such costs fully or partly deductible.

These policy decisions should consider which types of businesses might be eligible to take part in a compensation programme as well as set the limits of reimbursement.

240. The cost of mobile data communication tariffs should also be understood and consideration given as to whether support should be given to businesses for the additional costs. Such tariffs can cover the communication service costs of data transfer and interaction with third-party applications (warehouse software, cloud services, etc.). For example, such data communication costs could be made a tax deductible expense.

241. An important part of reducing costs of the implementation process is raising awareness of stakeholders. Media campaigns and meetings with concerned interest groups can facilitate implementation efforts. Taxpayers should be given any necessary information, in simple and illustrative form or “how-to” instructions. Support mechanisms need to be ready to provide users with help when they need it. The role of such mechanisms is especially important at the time of transition.

### *Analysis and enforcement*

242. Online real-time or periodic collection of sales data from large numbers of OCRs creates new opportunities for monitoring tax compliance. Big data and advanced analytics tools are capable of identifying compliance risks without involving taxpayers and users.

243. The data flow from users to tax administration servers should ideally allow analysis of each transaction including the time of sale, geo-referenced location of every till as well as the breakdown of sold items, their price, tax paid and the tax rate as well as the total amount on every receipt. Combined analysis of such data will permit the establishment of general patterns and identify unusual deviations that might need to be addressed by a tax administration or other regulators and controlling authorities.

244. Cross-referencing retail sales data flows with existing internal databases of tax administrations, as well as with other data originating in external sources, is capable of creating new solutions and approaches to identifying risks and solving tax compliance problems. The developers of online cash register system should consider building in the ability to link this data with appropriate government or private sector data sources (which may need to be activated by future legislation).

245. The risk of non-compliance should be balanced by an effective system of fines for violations. The system should, as far as possible, be able to identify possible violations automatically without human involvement and ideally make automated decisions about imposing a fine (subject to appropriate thresholds). It is worth considering whether users should be given the opportunity to be exempt from liability, or pay a reduced fine, if they have identified and voluntarily reported a violation.

246. The inclusiveness and efficiency of the system can also be enhanced by public control app solutions that create penalty risks for non-compliant retailers and enhance the protection of consumers’ rights. These functionalities can be achieved by new mobile apps that can be used for buyer identification, online real-time verification of sales, access to old receipts and easy mechanisms for reporting if non-compliance has been suspected.

### ***Monitoring, evaluation and collecting feedback***

247. Effective system implementation is impossible without executing monitoring activities.

248. Methods to measure the functioning and effectiveness of the system should be considered at the design stage. Evaluation can be based on several indicators. For example, these might include growth in recorded revenue, growth of the tax base, growth of tax collection, reductions in administrative burdens (including through reducing the number of on-site audits), growth of business satisfaction rates and changes in the tax collected as a result of OCRs in particular sectors or regions.

249. It is also vital to establish effective channels to collect feedback from retailers and consumers. Timely information about challenges and issues they are facing will better inform decision makers in daily operation of the system and in efforts to improve it over time. Hopefully most implementation issues will be picked up in the sandbox testing and piloting phases if undertaken (as strongly recommended). However, experience suggests that new issues will arise as the system is rolled-out more widely, particularly to smaller businesses, either as to missing functionality or to glitches.

250. The implementation of the system should entail building a feedback collection tool allowing for timely identification and resolution of bugs and issues. It is useful to categorise potential issues in three categories:

- systemic issues, which require regulatory solutions, such as amending legislation
- technical issues, which require improving the software
- ongoing issues, which taxpayers face in their interaction with the system.

## *Reference*

OECD (2013), *Electronic Sales Suppression: A Threat to Tax Revenues*, [www.oecd.org/ctp/crime/ElectronicSalesSupression.pdf](http://www.oecd.org/ctp/crime/ElectronicSalesSupression.pdf).

# **Implementing Online Cash Registers: Benefits, Considerations and Guidance**

Cash registers provide the key source of original information on the sales of goods and services in the retail sector needed to support tax reporting, payment and verification. In their efforts to improve compliance, reduce burdens and support honest taxpayers, tax administrations have made many attempts to ensure timely and uncompromised access to this source of information. Advances in digital technology have opened up new opportunities to reduce the tax risks that were traditionally associated with the vulnerability of cash register data. For some jurisdictions, the adoption of a specific type of electronic cash register, online cash registers connected to the tax administration's systems, has been an important part of their compliance strategy. Drawing on the experiences and lessons learnt by a number of tax administrations, the goal of this report is to provide advice and guidance to tax administrations considering the adoption and implementation of online cash registers.