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New technologies and the transition to formality: The trend towards e-formality

Juan Chacaltana
Vicky Leung
Miso Lee

Development
and Investment
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Foreword

Two billion people – more than 61 per cent of the world’s employed population – make their living in the informal economy. A transition to the formal economy is a condition to realize decent work for all. Given the magnitude and decent work deficits associated with the informal economy, there is an urgency to tackle informality with an integrated approach which can bring more robust results.

New technologies are continuously transforming the world of work. Technology is transforming not only the way we work but also how we work and even why we work, for workers and economic units. The role of new technologies and its relationship with informality has been addressed from different perspectives. For policy makers, it is important to know how new technologies are affecting the public sector, in particular policy-making.

This paper focusses on how technologies can enhance the impact of institutional public policies addressing informality. Today, an increasing number of governments are promoting the application of new technologies to simplify and facilitate the transition from the informal to the formal economy. These “e-formality policies”, as in some cases, are related to e-government initiatives.

This paper analyses some emerging public policies or public-sector practices and tools where technologies have already been implemented directly or indirectly for the transition to formality. This raises the questions if these policy innovations will transform the way formalization policies will be implemented in the future.

Finally, the paper aims to serve as a basis for further discussions for policy makers around the world who are searching for innovative policy solutions for facilitating the transition to the formal economy and other actors who are concerned with this topic.

Mito Tsukamoto
Chief
Development and Investment Branch
Employment Policy Department

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Abbreviations and acronyms

ADB	Asian Development Bank
AFIP	Administración Federal de Ingresos Públicos (Federal Administration of Public Revenues, Argentina)
ANSES	Administración Nacional de la Seguridad Social (National System of Social Security, Argentina)
BPS	Banco de Previsión Social (Social Security Institute, Uruguay)
CCF	Cajas de Compensación Familiar (Family Compensation Fund, Colombia)
CONALEP	Colegio Nacional de Educación Profesional Técnica (National College of Technical Professional Education, Mexico)
DOL	Department of Labor (USA)
EGDI	E-government development index
EP	Electronic payroll (Peru)
e-Receipt	Electronic receipt
fintech	financial technology
GDP	Gross Domestic Product
GPS	Global Positioning System
HCI	Human Capital Index
IACML	Inter-American Conference of Ministers of Labor (USA)
ICBF	Instituto Colombiano de Bienestar Familiar (Colombian Family Protection Institute, Colombia)
ICT	Information and Communications Technology
ILO	International Labour Office, International Labour Organization
INADEM	Instituto Nacional del Emprendedor (National Institute of the Entrepreneur, Mexico)
INSS	Instituto Nacional do Seguro Social (National Social Insurance Institute, Brazil)
LISA	Labour Inspection System Application
MSME	Micro, Small and Medium Enterprises
NFP	Nota Fiscal Paulista (Brazil)
NHIA	National Health Insurance Authority (Ghana)
NTS	National Tax Service (Republic of Korea)
OECD	Organization for Economic Cooperation and Development
OLS	Ordinary Least Squares
OSI	Online Service Index
PILA	Planilla Integrada de Liquidación de Aportes (Integrated Contribution Register, Colombia)
PLAME	Planilla Mensual de Pago a los Trabajadores (Peru)

PNRT	Plan Nacional de Regularización del Trabajo (National Plan for the Regularization of Labour, Argentina)
RFB	Secretaria da Receita Federal do Brasil (Brazilian Federal Revenue Office, Brazil)
SAT	Servicio de Administración Tributaria (Tax Administration Service, Mexico)
SENA	Servicio Nacional de Aprendizaje (National Learning Service, Colombia)
SIPA	Sistema Integrado Provisional Argentino (Argentine Integrated Provisional System, Argentina)
SME	Small and Medium Enterprises
SMS	Short Message Service
SUNAT	Superintendencia Nacional de Administración Tributaria (National Superintendency of Tax Administration, Peru)
TII	Telecommunication Infrastructure Index
TPV	Terminal Punto de Venta (Sales Point Terminal, Mexico)
UNDESA	United Nations Department of Economic and Social Affairs
VAT	value-added tax
VUE	Ventanilla Única Empresarial
WHD	Wage and Hour Division (USA)

1. Introduction

New technologies are one of the most forceful drivers of the future of work. Technology is transforming not only the way people work (how) but also the very nature of work (what) and even its purpose (why).

Technology comes in waves. In recent decades, the world has witnessed the appearance and evolution of computers, then the revolution of information and communications technologies (ICTs), then mobile and smart phones, and then the surge of automation technologies. There are, of course, differences and especially lags in the way different countries or regions incorporate these innovations.

The literature points out that these technological developments, as any technological change in history, have tremendous effects on the labour markets.¹ And much of the recent international discussion on technology and work has centred on the risk of losing jobs or on the future of labour relations. More recently, there has been some discussion on the potential of technology to support growth, employment creation and labour market policies.²

The relationship between new technologies and informality has been addressed from different perspectives. Some studies focus on the appearance of new forms of informality – in particular, non-standard forms of work (ILO, 2016a). Others focus on the process and difficulties of the informal sector units to incorporate new technologies in their business or activities (Chen, 2016). Some others analyse the effect of technologies on productivity and on informality (Barrantes Cáceres et al, 2012; Galli, 2017). And others see the definitions of formal or informal as becoming increasingly indistinguishable (Smith, 2012).³

Technology is likely to have both positive and negative effects on informality. Productivity and economic structure influence the income distribution and labour outcomes, including informality. Technology can increase informality via the probable increase in the productivity gaps among economic units, especially when access to technologies is not equal, or via the spreading of new forms of work, especially those where informality is higher. But the question is, can it also reduce informality?

In this paper, we focus on how technologies can enhance the impact of institutional public policies addressing informality.⁴ Today, an increasing number of governments are promoting the application of new technologies to facilitate the transition from the informal to the formal economy. We call these policies *e-formality* policies, as in some cases they are related to e-government initiatives.⁵

In order to extract some cross-cutting policy lessons, we analyse some emerging public policies or public-sector practices or tools where technologies have already been

¹ Hart, K. 2000. The memory bank. Money in an unequal world. (London, Profile books).

² See for example Balliester, T. and Elsheikhi, A. (2018).

³ Smith, S.: “The future of informal economies”, in Thesigers. 20 December 2012. <http://thesigers.com/analysis/2012/12/20/the-future-of-informal-economies.html>

⁴ We leave aside the discussion on new technologies and other labour market policies, such as active labour market policies, for example, that could also have a link with the transition to formality.

⁵ Note that a previous study uses the concept of “e-informality”. Lugo, J.; Sampson, T. 2008. “E - Informality in Venezuela: the other path of technology”, in Bulletin of Latin American Research, Vol. 27, No. 1.

implemented directly or indirectly for the transition to formality. We then ask if these policy innovations will transform the way formalization policies will be implemented in the future.

The experiences we selected are based on a non-exhaustive web search, trying to show the spread of these experiences around the world – especially in middle or lower income countries – and the diverse approaches taken.

The paper aims at serving as a basis for further discussions for policy makers around the world who are searching for innovative policy solutions for facilitating the transition to the formal economy and other actors who are concerned about this topic.

2. Policy approaches for the transition to formality

After almost five decades of focusing on informality, its concepts, magnitude and characteristics, the related international discussion is currently turning its attention to the transition to the formal economy. An important threshold in this discussion has been the Transition from the Informal to the Formal Economy Recommendation, 2015 (No. 204), adopted by the tripartite constituents at the International Labour Conference in 2015.

The Recommendation indicates the threefold objectives of the transition to the formal economy, which are to:

- (a) facilitate the transition of workers and economic units from the informal to the formal economy, while respecting workers' fundamental rights and ensuring opportunities for income security, livelihoods and entrepreneurship;
- (b) promote the creation, preservation and sustainability of enterprises and decent jobs in the formal economy and the coherence of macroeconomic, employment, social protection and other social policies;
- (c) prevent the informalization of formal economy jobs.

Recommendation 204 states that the effective way to achieve these objectives is through applying the integrated approach that covers an array of policy areas, including strategies for inclusive growth, formal job creation, social protection, regulatory frameworks, enterprises development, compliance and enforcement and so on.

2.1 Policy pathways to formality

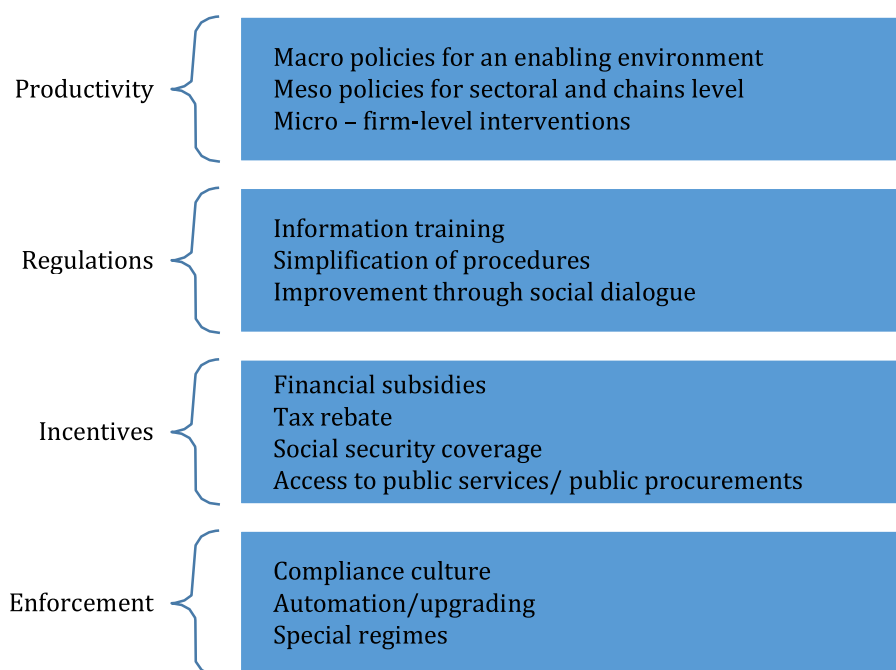
In the last decades the International Labour Organization (ILO) has seen an increasing number of countries implementing deliberate policies for the transition to formality around the world. These policies, together with economic growth and structural transformation processes, have contributed to a reduction in informality in some regions or countries.⁶

In practice, the experience shows that countries have explored different pathways to formality, mainly related to the increase in economic capacity (productivity);⁷ the improvement of norms or regulations; the design and implementation of incentives; and the improvement of enforcement systems and measures (figure 1).

⁶ For more details on this experiences, see, for example, the ILO. 2014a. FORLAC notes on Formalization in Latin America, a region with several documented experiences of formalization. See also Berg (2010), Bertranou et al. (2014) and Chacaltana (2016) for detailed country cases analyses of Brazil, Argentina and Peru, respectively.

⁷ Note that the link between productivity and informality can be both ways. See, for example, Kanbur (2017).

Figure 1. Main strategies used for the transition to formality



Source: Authors.

Productivity

Countries have operated at three main economic levels: the macroeconomic, the meso economic and the microeconomic.

First, at the macroeconomic level, reductions in informality have occurred during periods of high growth and in the presence of an enabling environment for sustainable enterprises to create formal jobs.

Second, productivity has also been stimulated in specific sectors, at what could be described as the “meso economic” level. Interventions are needed here even in a context of strong economic growth. The resulting formalization of employment and economic units will depend on the labour intensity in the sectors that drive it, on the existence of productive chains that activate the labour demand, or public policies for developing certain sectors or regions.

Third, action has been taken at the microeconomic level, by strengthening technology, human capital, or ways of production organization, tackling out-of-date technology – above all in smaller businesses – and addressing the issue of training deficits in workers’ and employers’ organizations.

Regulations

There are initiatives in various complementary fields. The first aim is to improve quantity, quality and access to information and the knowledge of rights and obligations of employers, workers and the general public. Sometimes economic units are not fully aware of what it means to have a formal business or formal workers, the benefits of being formal or the registration procedures for that.

A second area is the adaptation or simplification of regulations or procedures. There are various initiatives of this kind, often combined with other tools – sometimes incentives and support programmes and sometimes sanctions. Simplifications generally concern tax declaration, labour procedures, affiliation and contribution to social security, registration of enterprises, or unification of procedures. Procedures are often optional and for a specific segment, such as small and micro enterprises, therefore not applicable generally.

A third complementary approach identified in this area is dialogue, negotiation and consultation processes to promote improvements in the design and compliance with standards and regulations to ensure that they provide adequate and effective protection to all. The use of social dialogue in all its forms is key for changes in standards and regulations to be legitimate and sustainable.

Incentives

They vary in type. Some are associated with taxation, mainly for small and micro-economic units, and sometimes including own-account workers. Some countries – such as Argentina, Brazil and Uruguay – have linked their tax incentives to social security contributions, integrating various payments in a single tax.

Some unconventional mechanisms have been used for these cases, such as collective insurance schemes in Argentina and Costa Rica, or subsidized programmes in order to increase social protection coverage. The use of unconventional affiliation methods is more common in groups that are hard to reach, although more evidence is needed to assess the scale of its final impact on formalization levels. In many cases this is due to the fact that the experiences are very recent.

The challenge, as ever, is that growing affiliation should be accompanied by improvements in the services, such as health services, pensions or both. The health benefits may be visible in the short term, but pensions are a long-term benefit. This does not only involve access but quality and coverage, as informal workers and business owners are not in the system and clear and visible incentives must be provided for them to move into formality.

Measures to encourage formalization by assigning benefits to specific groups must consider the timeframe and the process for gradual transition to the general system and the scope of regulation. Discrimination in the law against one group of citizens and weakening labour relations by reducing standards should always be avoided. The appropriate timeframe for becoming formalized should ensure that improving working conditions is the natural result and the main objective of formalization.

These systems should not be seen primarily as vehicles for raising revenues but as mechanisms for the inclusion or incorporation into transition to formality of a broad sector of workers and economic units that carry out their economic activities in the informal – and even the subsistence – economy. In some cases, access to public services can be an incentive, for example, introducing targets for public procurement through Micro, Small and Medium Enterprises (MSMEs) or allocating public space for informal workers and economic units to operate.

Enforcement

Finally, various governments have taken action to increase the State's capacity to deliver services to all the population, or to ensure that standards are met. In some cases this requires improving the information about the population's duties and rights, strengthening the structures, qualities, transparency and accountability of the responsible institutions, or applying sanctions or promoting agreements and alliances between workers and employers.

In other cases, governments have strengthened their inspection capacity by increasing the number of inspectors or modernizing/adopting new technologies and databases for better supervision and monitoring. And in further cases, governments have adopted specific inspection procedures to facilitate the transition to formality.

These approaches have been used for the formalization of employment and economic units, with more or less emphasis on specific dimensions depending on regional or country context. Experience also shows that formalization policies require multiple interventions and policy coordination and an integrated approach in order to facilitate the transition to the formal economy. The transition also requires innovative solutions as informality is not homogenous and not all informal workers or economic units are in that situation for the same reason. For example, for groups that are hard to reach – such as own account workers, domestic workers, or contributing family workers – some unconventional approaches have been used either to increase their registration or to extend social protection to them.

2.2 E-government applied to formalization policies: E-formality

With the advent of new technologies, many countries around the world have embarked on e-government processes. Although there is some discussion on the definition, e-government is usually defined as the use of ICTs to improve the activities of public-sector organizations. Through advanced technological tools:

“E-government aims at improving the relationship between people and their government ... making public services delivery more effective, accessible and responsive to people’s needs... increasing participation in decision making and making public institutions more transparent and accountable.”⁸

The United Nations Department of Economic and Social Affairs (UNDESA) monitors progress in e-government through periodical surveys and constructing an index to measure the effectiveness of e-government in Member States.⁹ Its e-government development index (EGDI) comprises three sub-indices, each of which assesses key dimensions of e-government:

- Status of the development of telecommunication infrastructure (Telecommunication infrastructure index).
- Scope and quality of online services (Online service index).
- Inherent human capital (Human capital index).

According to UNDESA, e-government has grown rapidly around the world over the past 15 years. It argues that the EGDI values have improved for many countries (29 countries

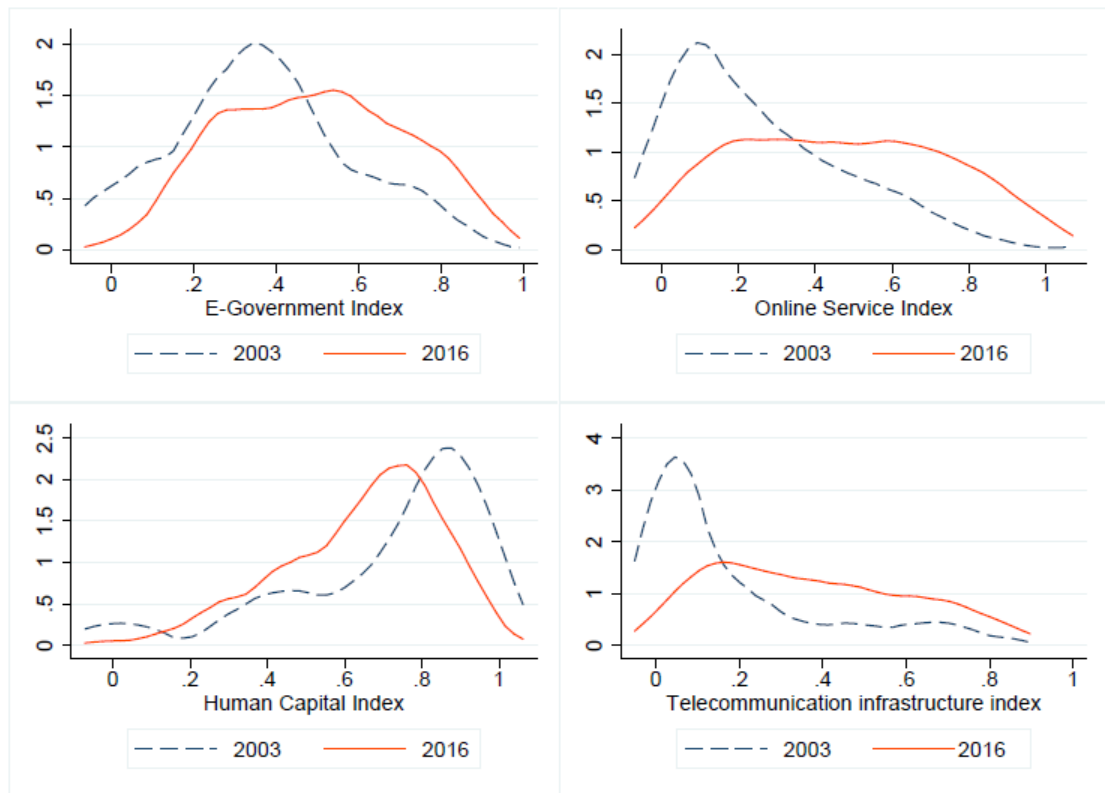
⁸ United Nations Department of Economic and Social Affairs (UNDESA). 2016. E-Government Survey 2016: E-Government in support of sustainable development, (New York).

⁹ A discussion on measuring digital government can be found in Ubaldi, B; Lafortune, G. “Towards a new generation of indicators: Measuring digital government”, Presentation by OECD (6 Sep. 2016).

scored “very-high”¹⁰ in 2016 compared with 10 countries in 2003), even though the significant regional gaps remain.¹¹

As can be seen in figure 2, which shows the evolution of the empirical distribution of countries according to the corresponding index scores, there was significant progress in most of the indices between 2003 and 2016, especially in those related to digital infrastructure and online services, as these are relatively new in many parts of the world. The Internet, mobile phones and other innovative devices to share information and to deliver public services have spread widely in recent years.

Figure 2. World. Evolution of e-government indices.



Source: * UNDESA, 2016.

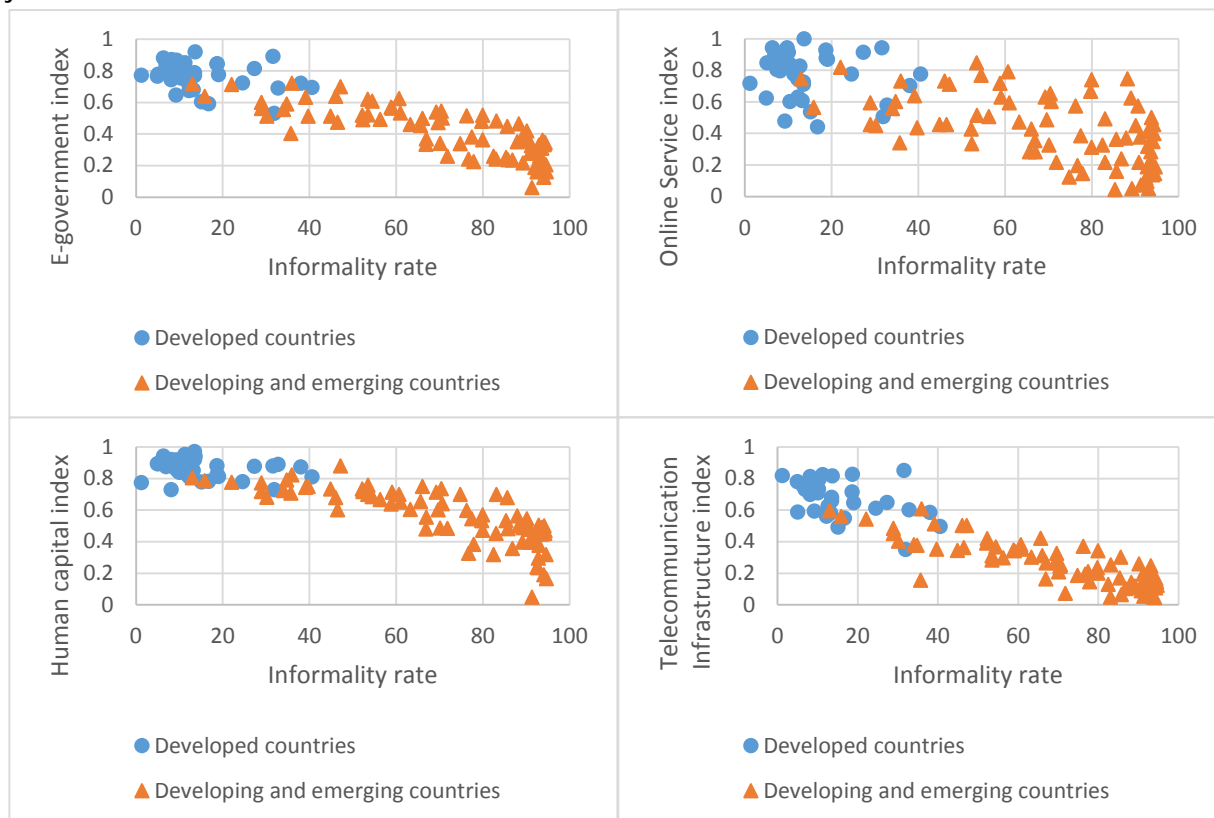
Note: The components of the human capital index were updated in 2014. See E-Government Survey 2016, table A.2 for further details. Also note that this assessment rates e-government performance of countries relative to one another, as opposed to being an absolute measurement.

More studies and information would be required to assess if this progress promoted more inclusion in all dimensions of society. For the labour market, a key indicator to measure exclusion is the proportion of workers in informal employment. Figure 3 shows the simple correlation between e-government indices and informality rates around 2016, which can be affected by many other variables.

¹⁰ UNDESA defines “very-high” where e-government development index values are in the range of 0.75 to 1.0.

¹¹ The index has improved significantly, especially among developed countries (see figure A.1. in Annex).

Figure 3. World. Simple correlation between e-government indices and informality, circa 2016 or the latest year available.



Sources: *E-government indices, UNDESA, 2016. **Informality, ILO, 2018.

Note: Developed countries are considered as high-income countries as defined by the World Bank (\$12,236 or more; 34 countries) and emerging and developing countries as middle-income and low-income countries (\$12,235 or less; 77 countries). E-government indices are from the year 2016 and informality rates are from year 2016 or the latest year available.

We observe, as expected, a negative correlation between informality rates and the e-government development index scores, as well as all its sub-index scores. In other words, countries with high e-government indices show lower informality rates. The average e-government development index score in 2016 for countries with low informality rates is more than double that of countries with high informality rates.¹² These differences increased in absolute terms during the period 2003-2016, and countries with high informality still have very low e-government capacities (figure A.2 in Annex).

In all cases, we observe some variation in this relation, but it is particularly high in the online service index. The online service index scores of countries with a more than 80 per cent informality rate varies widely, from the score value 0.1 to 0.8.

Since both informality rates and the e-government index scores are influenced by countries' level of development or income, we perform cross-section ordinary least squares (OLS) regressions of informality rates on e-government indices – not to identify causality but to verify if these simple correlations still hold after controlling for per capita GDP (table A.1 in Annex).

¹² In the calculation, countries with high formality include countries with formality rate above 66 per cent (38 countries) and countries with low formality include those with formality rate below 33 per cent (47 countries) (see figure A.3 in Annex).

The results confirm significant negative correlations in all cases, except in the online service index. One possible policy implication is that some countries may not be using all their already acquired online service potential or capacity, with a specific target on labour market issues or on informality. This means that much can be improved in this area in many countries. E-formality is an item in that agenda.

3. Emerging experiences in the application of new technologies for the transition to formality

New technologies not only can affect the way economic units and workers interact in the labour market, but they can also drastically transform how public policies work. This is the main purpose of e-government initiatives, for example. In the case of the transition to formality, technologies are not only changing the way these types of policies work but they can even affect the very definition of “formality” – often described as “registration” – of economic units or workers or even transactions.

The registration act, for any of the dimensions of formality, changes drastically in complexity and time required, depending on whether it is done manually, personally or electronically, virtually or in general with any of the new technologies, including algorithms, big data, or artificial intelligence.

Technologies can also affect any of the policy pathways to formality that countries are implementing through the following channels:

- increase productivity, for those who have access;
- help in improving regulations, as they disseminate information or simplify legal procedures;
- help in designing and administering incentives in any of the tax, social security or labour dimensions that increase considerably the capacity of enforcement and oversight.

Policy emphasis will vary from case to case and from one region to another. Sometimes it focuses on the formalization of economic units; in others, it focuses on the formalization of employment. In some cases, it combines both dimensions. In others, it focuses on the registration of transactions as a means to formality of economic units and employment.

In this paper, we review some innovative experiences – mainly in developing and emerging countries – that show that these governments are embarking on this new trend, although there is still much to be done. We focus mainly on experiences related to public policy, based on a review of secondary sources, mainly in English and Spanish. We first explore experiences related to the formalization of economic units and then describe experiences in the formalization of employment.

3.1 Formalization of economic units

Formalization of economic units deals with economic capacity but also with registration, procedures, taxes and so on which are usually set up by governments. In many cases, different institutions establish different sets of requirements and in most cases, they do not coordinate. The application of technology provides solutions that can reduce the costs of registration – often with the case of a virtual one-stop shop – simplify time-consuming procedures and increase compliance with tax obligations. More importantly, it bridges the gap of different institutions in coordination for translating formalization of economic units into formalization of employment – for instance, registration of workers and making social security contributions.

3.1.1 Electronic registration or payment mechanisms for enterprises

Since transaction costs were considered as a barrier for formalization of economic units (De Soto et al., 1986), one-stop shops offer a solution, as they simplify procedures. Many countries had tried to implement this type of initiative. Unfortunately, there can be complications, as public institutions need to coordinate and align their systems and procedures, especially if they have to operate in a single physical location with one interface.

New technologies have allowed the appearance of electronic registration tools, including these one-stop shops. The objectives of one-stop shops are to reduce the time and cost for business registration as well as to improve access for smaller economic units operating at a distance from the registrar's offices (in some countries, entrepreneurs must still travel to the capital city to register a business). One-stop shops generally include services such as registration procedures in local governments or sectorial government bodies.

There is a trend towards virtual one-stop shops. According to the World Bank,¹³ in 2016, eighty-two economies offered electronic registration services for businesses, but while this was possible in more than 80 per cent of high-income countries, it was only about 13 per cent in low-income ones. The report also mentions interesting cases in Canada, Cyprus, Ecuador, New Zealand and the former Yugoslav Republic of Macedonia.

In some cases, all the countries do is make registration records electronic. In others, this tool has eliminated some requirements for example the notarizing documents. In the Republic of Korea, entrepreneurs can register their businesses online at a State-run website,¹⁴ as long as they attach the necessary documents, such as the registration form and the lease agreement. The mobile application is also available to check the current status of the registration process, which usually takes up to three days.

In 2017 the Government of Colombia created the Ventanilla Única Empresarial (VUE), a one-stop shop mechanism that includes a web platform that is expected to progressively incorporate all procedures related to the entrepreneurial activity. In time this web platform will be mandatory for opening and closing businesses and for information flows on the firm's activities.¹⁵

The evidence on the use of one-stop shops on formalization is scarce. However, some studies have shown that one-stop shops indeed facilitate the registration of new firms, but not necessarily the formalization of their workers (Deelen, 2015). More evidence on the use of virtual one-stop shops is therefore needed.

Sometimes but not always, these developments are accompanied by complementary tools such as portals to register and pay taxes, and portals to register and pay the social contributions. The quality and simplicity of portals for taxes and social contributions, however, are very important.

In Estonia, the e-Business register is an advanced and secure tool that allows entrepreneurs to register new businesses online in just minutes without having to go to a notary or some other official. From 2011, most companies have been established over the

¹³ www.doingbusiness.org/data/exploretopics/starting-a-business/good-practices-Using

¹⁴ www.hometax.go.kr

¹⁵ Decreto 1875 - 2017. Interestingly, the Decree 639 of 2017 exempts a small business owned by young persons from the payment of the commercial licence (matrícula mercantil) and its renovation for the first year.

Internet using the e-Business register and this process has come down from five days to 18 minutes.

The e-Residency programme also allows non-Estonian citizens to access the e-Business register and use the digital solutions when establishing a company in Estonia. The online register makes the process of registering a company and submitting documents, such as annual reports, easy and efficient for users no matter where they are.¹⁶

For taxation collection, Estonia developed the e-Tax, which is the electronic tax filing system set up by the Estonian Tax and Customs Board. Each year, around 95 per cent of all tax declarations in Estonia are filed electronically. Using a secure ID, a taxpayer logs onto the system, reviews their data in pre-filled forms, makes any necessary changes, and approves the declaration form. The process typically takes three to five minutes. Even one-click tax returns have been possible since 2015 – the data that is already in the system is displayed for the user along with the calculated result, then all the users have to do is click on the confirmation button. All this can take less than a minute. An enterprise can also make their declarations for income tax, social tax, unemployment insurance and contributions to the mandatory pension fund.¹⁷

3.1.2 Registration of financial transactions: payments and bills

Operators in the informal economy tend to use cash, partially because of their difficulty to have access to formal financial services or in attempt to avoid paying taxes. For this reason, an important emphasis of some governments is to register transactions, under the idea that digitizing financial services and/or procedures could generate incentives and possibilities for the formalization of economic units and its workers.¹⁸ Tracking transactions can be considered an important tool for the transition to the formal economy as they increase transparency and accountability in the transactions dimension.

The advent of mobile technology along with increasing smartphone penetration has generated and facilitated new possibilities, for facilitating electronic transactions, and creating an ecosystem to initiate financial inclusion.

Some countries explicitly incentivize the transition to a cashless economy, or disincentive for the use of trackless cash. For example, they incentivize the use of electronic money via the use of credit or debit cards or other solutions.¹⁹ The idea is not only to track transactions. Some argue that this could change the payment habits to be more secure and efficient, generate a financial track record which may facilitate access to finance, and create opportunities for start-ups in the electronic payment area as there is a number of non-cash payment options in the market.

Table 1 shows some examples. In the Republic of Korea since 1999 the Government gives an incentive – a tax deduction in income tax – if people reach a certain amount in credit card transactions. In Vietnam, the recently approved “no cash policy”, includes the

¹⁶ <https://e-estonia.com/solutions/business-and-finance/e-business-register>

¹⁷ <https://e-estonia.com/solutions/business-and-finance/e-tax>

¹⁸ Ketterer, J.A. 2017. “Digital Finance: New Times, New Challenges, New Opportunities”, Discussion Paper No. IDB-DP.501, Inter-American Development Bank, Institutions for Development Sector.

¹⁹ In Estonia, for example, the non-cash solutions include: card payments; standing orders; bank transfers or payment orders; e-invoice standing orders, and mobile payments.

possibility of reduced fees on electronic payments. In 2016, India launched a demonetization programme. And in Estonia, a state-issued digital ID and a mobile app facilitate the use of secure electronic transactions. Thailand launched mobile payment services with low fee as a part of national e-payment initiatives. In addition, the real estate sector in Italy provides reimbursement and other advantages only when payment is made electronically.²⁰

Table 1. Country experiences in incentives for electronic transactions

Case	Description	Results
Incentives for the use of credit card in the Republic of Korea ²¹	<p>The Credit Card Income deduction scheme began in 1999. Taxpayers can receive a deduction on their year-end tax settlement of up to 3 million KRW (some 2,800 US\$) depending on the amount spent in credit cards purchases. If the aggregate personal expenditure billed within Korea of a taxpayer or his/her dependents exceed 25 per cent of his/her gross income, 15 per cent of eligible amount is deducted from income tax.</p> <p>The deduction limit is the lesser amount between the 20 per cent of gross wage and salary income and KRW 3 million.²²</p>	As credit cards allow the disclosure of the transaction history to a third party, the system enhances transparency in all commercial transactions. It also helps to reduce the tax burden on salary income earners.
No cash policy in Viet Nam	<p>The purpose of the policy²³ is to reduce the number of cash-based deals saving cost and time, and improve overall electronic payment methods (increasing transparency and improving documentation) and control tax evasion. This includes:</p> <ul style="list-style-type: none"> • Point of sale systems and automatic teller machines would be established and use of multi-purpose magnetic cards would be encouraged. • Fees on cash payments could be increased while those on electronic payment for credit organizations and commercial banks could be reduced. 	<p>Expected results. The Plan expects that by 2020 cash transactions would total less than 10 per cent of total transactions; all sellers and distributors would accept cards.</p> <p>It also expects that many businesses specializing in online payments, such as MoMo mobile payment, eMonkey, Payoo, VTC Pay or BankPlus, would be increasingly accessible to many.</p>

²⁰ Organisation for Economic Co-operation and Development (OECD). 2017. Technology tools to tackle tax evasion and tax fraud (Paris).

²¹ <https://home.kpmg.com/xx/en/home/insights/2011/12/korea-income-tax.html>

²² But in case the amount exceeding the deduction limit, the amount spent in the traditional markets or transportation can be additionally deducted within limits of KRW 1 million per annum respectively. (Maximum limits of KRW 5 million)

²³ The scheme on development of non-cash payment in Viet Nam during 2016-2020 has been signed by the Prime Minister, Vuong Dinh, in Dec 2016. <http://vietnamlawmagazine.vn/decision-no-2545-qd-ttg-approving-the-scheme-on-development-of-non-cash-payment-in-vietnam-during-2016-2020-5853.html>

Case	Description	Results
Digital payment wallets in India	<p>In 2016 India launched a demonetisation initiative in order to take over 80 per cent of banking notes out of circulation. This experience increased rapidly in digital payment wallets, enabling people to continue transaction.</p> <p>Many fintech (financial technology) companies set out to take on the wider foreign exchange market narrative. With significantly smaller overheads, bulk handling, and intelligent transferring, fintech companies can offer real-time rates and negligible transaction surcharges.</p>	<p>Fintech companies can be a solution to the world's unbanked problem.</p> <p>Technology developed to enable currency exchange can now be used to help the billions of people excluded from traditional banking institutions.</p>
Pocopay App in Estonia	<p>This is part of the Digital Agenda 2020 for Estonia.²⁴ Every Estonian, irrespective of location, has a state-issued digital identity. Banks encourage customers to use their e-ID for secure transactions and internet banking services. One e-banking solution called "Pocopay app"²⁵ allows customers to open and use a bank account from their mobile phone and to request and make payment in a cashless way.</p>	<p>Today, over 99 per cent of all banking transactions in the country are carried out online.</p>
PromptPay in Thailand ²⁶	<p>Thailand launched a new interbank mobile payment system in January 2017, allowing money transfers that are cheaper and easier than those offered by conventional bank. It is one of the government's national e-payment initiatives.²⁷ Customers will be limited to one PromptPay account for each national ID number or mobile phone number.</p>	<p>It aims at nudging people into the formal economy by bringing more of the country's financial transactions into the formal economy.</p>

Alternatively, some countries impose penalties to discourage cash transactions. In Greece, instead of an incentive, taxpayers incur a penalty if they do not make enough electronic payments. As of January 2017, if they do not spend a certain percentage of their annual income through electronic payments, they will have a penalty of 22 per cent imposed on the missing difference between the minimum required payment and the actual payment. For a taxable income up to 10,000 euros (€), at least 10 per cent of their income must be spent via electronic payments. For a taxable income between €10,001 and €30,000, and above €30,000, the minimum percentage increases to 15 per cent and 20 per cent respectively. Also, tax allowances and tax deductions are available only for electronic payments. On the other hand, the cap for cash transactions fell from €1,500 in 2016 to €500 in 2017. Any purchase of goods or services should be paid electronically now if it accounts for more than €500.²⁸

²⁴ www.mkm.ee/sites/default/files/digital_agenda_2020_estonia_engf.pdf

²⁵ <https://pocopay.com/en/>

²⁶ Ono, Y. "Thailand rolls out PromptPay money transfer service: Mobile payments scheme aimed at nudging people into formal economy" in Nikkei Asian Review, (27 Jan. 2017).

²⁷ Bhunia, P. "New mobile payment system launched in Thailand as part of National e-payment initiative" in Opengov newsletter (7 Feb. 2017). Available at: <https://www.opengovasia.com/articles/7342-new-mobile-payment-system-launched-in-thailand-as-part-of-national-e-payment-initiative>

²⁸ https://www2.deloitte.com/content/dam/Deloitte/gr/Documents/tax/gr_tax_alert_electronic_transactions_en_noexp.pdf and <https://home.kpmg.com/xx/en/home/insights/2017/04/flash-alert-2017-073.html>

In Sweden, businesses have a legal right to refuse to accept cash payments, for example in restaurants, public transportation and hotels.²⁹ In Argentina, the Monotax System includes mandatory e-billing (electronic invoicing) for all own account workers with higher incomes. These laws are expected to increase tax revenue and fiscal transparency while reducing under-declared or undeclared activities.

On the other hand, another approach is to increase the registration of cash transactions. Many countries are already using electronic instead of paper receipts³⁰ to track cash transactions. Some countries provide incentives for using e-bills while others sought to establish a mandatory electronic invoice (table 2).

Table 2. Country experiences in registering cash transactions

Case	Description	Results
Cash receipt income deduction scheme in the Republic of Korea ³¹	<p>It is implemented from 2005, allowing all residents of Korea to get tax credit for purchases paid in cash, as long as they are registered to National Tax Service (NTS) Cash Receipt System. People can either present a membership card (Tax Save Card) or their cell phone number at the time of purchase to issue cash receipt.</p> <p>Taxpayers can receive a deduction on their year-end tax settlement of up to 3 million KRW depending on the amount spent in cash purchases. The deduction works out to 30 per cent of the total cash you've spent that exceeds 25 per cent of the yearly income you have reported. The total of the cash purchases can be those made by the taxpayer and/or the taxpayer's dependent(s). As of 2008, the cash receipt system applies to all cash purchases without any minimum amount (initially, it applied to cash purchases of 5,000 KRW or above).</p>	<p>When a cash receipt is issued, the purchase information is sent directly to the National Tax Service. The system helps to enhance transparency in all commercial transactions with the objective to achieve high levels of equity within the context of taxation.</p>

²⁹ Krogerus, M. "Sweden: "We don't accept cash"" in *Credit Suisse* (6 Mar. 2015). <https://www.credit-suisse.com/corporate/en/articles/news-and-expertise/sweden-we-dont-accept-cash-201503.html>

³⁰ In Estonia, for example, the Estonian Electronic Receipt (e-Receipt) project launched in June 2017 enables end users to manage their receipts, as well as documents related to those, such as letters of guarantee and product manuals, in a single convenient web environment. For businesses, this tool will enable them to pursue the new Accounting Act that account based documents can also be digital.

³¹ www.korea4expats.com/article-cash-receipt-tax-credit-card-registration.html

Case	Description	Results
Anti-tax evasion programme in São Paulo, Brazil – Nota Fiscal Paulista (NFP)	<p>The programme created monetary rewards for consumers to ensure that firms report final sales transactions:</p> <ul style="list-style-type: none"> • It provides tax rebates and monthly lottery prizes for consumers who ask for receipts, and • It establishes a direct communication channel between the tax authority and consumers through an online account system, where consumers can verify receipts reported by establishments and can act as whistle-blowers by filing complaints. <p>Along the supply chain, the tax credit and debit system of the VAT generates third-party reporting in transactions across firms. At the final consumer stage, however, these self-enforcing incentives break down since consumers typically derive no direct monetary benefit from asking for receipts. The NFP policy introduced incentives similar to the VAT for final sales: it aims to affect both the likelihood that a transaction is reported at all, and the accuracy of reporting, since rewards to consumers are an increasing function of the value of receipts.</p>	<p>According to Naritomi (2016):</p> <ul style="list-style-type: none"> • The programme increased revenue reported in retail sectors by at least 22 per cent over four years. • The estimated effect is stronger for sectors with a high volume of transactions, consistent with shifts in detection probability due to whistle-blower threats. • The enforcement effect triggered by consumers blowing the whistle: firms report 14 per cent more receipts and 6 per cent more revenue after receiving their first complaint. • Consumer's condition of their participation on past lottery wins. Even small prizes generate a significant and steady increase in the number of receipts that consumers request and in the number of different businesses in which they ask for receipts.
Online cash register in Hungary ³²	<p>In 2014, Hungary introduced an online cash register. It records the data in a Fiscal Control Unit, embedded in the machine at the point of sales, and then transmit the data to the tax authority in high frequency, using mobile phone network operators. Mobile phone network operators have benefits, as they are identifiable and reliable. Small businesses receive subsidies for up to five changes of cash machines.</p> <p>The tax authority has mobile inspection devices, which enable them to analyse and verify whether shops register their transactions correctly.</p>	<p>In the first year of introduction (2014), VAT revenue increased by 15 per cent in the sectors concerned.</p> <p>There was also an increase in the number of employees registered for tax.</p>
Cash register connected to a fiscal control unit in Sweden	<p>Cash registers must be connected to a fiscal control unit, which must be certified by the Swedish tax authority. Many specific information including total sales amount, VAT amount, and a unique control code is recorded in the fiscal control unit. Only tax authority can access the information. Sweden targeted all sectors that are selling goods or services, as they have higher cash transactions.</p>	<p>When it was first introduced, the reported revenue increased by 5 per cent. They estimate that the reform has brought the increased tax revenue of at least 3 billion SEK.</p> <p>Statistics from the Swedish Tax Agency show that the reported VAT output rose by 7 per cent in the restaurant sector and 11 per cent in the hairdressing industry in 2010.³³</p>

³² Organisation for Economic Co-operation and Development (OECD). 2017. Technology tools to tackle tax evasion and tax fraud.

³³ Eurofound. Cash register legislation, Sweden (2 Jun. 2013). <https://www.eurofound.europa.eu/data/tackling-undeclared-work-in-europe/database/cash-register-legislation-sweden>

Case	Description	Results
Introducing the “black box” cash register in Belgium ³⁴	<p>In 2015 Belgium introduced the so called ‘black box’ cash register in the hospitality sector, which similarly to so-named devices on airplanes records and sends to the social security authorities transaction made on it. This technically precludes companies from not declaring or under-declaring their revenues, thus reducing the resources for paying undeclared work.</p> <p>Employers have been incentivised to introduce the “black box” by granting them social security breaks from the salaries of their declared employees.</p>	

In the Republic of Korea the income tax deduction scheme also applies for cash transactions³⁵ as long as it is recorded in the national tax service cash receipt system. In São Paulo, Brazil, the local government provides incentives either with tax deductions or lottery based rewards to consumers to report final sales. A recent study finds that the enforcement effect triggered by consumers blowing the whistle was both significant and also beneficial to firms: firms report 14 per cent more receipts and also six per cent more revenue after receiving their first complaint.³⁶

On the other hand, in Hungary and Belgium, an online cash register is adopted, which automatically sends the data to tax authority and the social security authorities. Sweden also has similar system that it is mandatory to use the cash register which is connected to a fiscal control unit. And the fiscal control unit must be certified by the Swedish tax authority.

In Ghana, the draft legislation to make it obligatory for certain categories of taxpayers to use a fiscal electronic device is being discussed. The device will allow transactions to be transmitted to the tax authority in real time. It is expected to increase the revenue mobilisation by 20 per cent and bring some informal sector entities into the tax regime.

³⁴ European Platform Undeclared Work, Report from the two meetings of the Working Group on 11 May 2017 and on 29 September 2017, Working Group on Success Stories to the European Platform Undeclared Work.2017. ec.europa.eu/social/BlobServlet?docId=18479&langId=en

³⁵ More recently, the government gives higher benefit to cash or debit card usage (30 per cent) than credit card usage (15 per cent) as excessive credit card usage can increase the debt of households and can create burden to SMEs due to transaction costs.

³⁶ Naritomi, J. 2016. “Consumers as tax auditors”, London Schools of Economics.

3.1.3 Increasing SME productivity and formality at the same time – the case of *Tabletas Concanaco* in Mexico³⁷

Most of the academic and political discussion accepts that technology increases productivity in certain circumstances. There is ongoing discussion whether through that channel informality is indeed reduced.

There are cases in which productivity and informality are targeted at the same time. In Mexico, commerce and services are the main economic activities and employ the largest share of workers. SMEs represent 98 per cent of the total number of enterprises in these sectors. The problem is that of these SMEs almost 83 per cent are informal and 6 out of 10 employees are informal. Only 33 per cent of the SMEs use ICTs, and there is low standardization in services and low performance in the supply chains.

The *Tabletas Concanaco* project in Mexico

The National Committee of Productivity created an alliance between the tax authority (SAT), the national institute for entrepreneurship (INADEM) and Concanaco, the Confederation of Chambers of Commerce, Services and Tourism. This alliance generated the project *Tabletas Concanaco* (Concanaco Tablets) to increase the productivity of the SMEs in these sectors by including them in the formal economy and modernizing them with the inclusion of ICTs in their businesses.

How does it work? A *tableta Concanaco* is a tablet that includes a technological solution specifically designed for SMEs. It offers a year of free Internet connection, helps the recording and provision of sales reports, enables electronic sales and electronic billing, and includes a sales point terminal with a slot for credit and debit cards.

How much does it cost? The total price of the tablet plus the services is some \$5,600 Mexican pesos (equivalent of around US\$ 350). The programme is subsidised by Concanaco with 360 pesos and by INADEM by 4,640 pesos. Therefore the final price to the SME is around 800 pesos (less than US\$ 50). The Sales Point Terminal (TPV) does not generate monthly fees nor billing minimums and has a bank commission of 2.86 per cent plus VAT. The tablet is equipped with Android OS, as well as with an Intel processor and a one-year warranty.

The project also provides coaching in the operation of the TPV. For this, an agreement was signed with CONALEP (National College of Professional Technical Education) so that the students would be in charge of training, and in compensation a grant was awarded to them for this service.

The inclusion of information technologies in an SME is vital in today's globalized world, not only to increase sales but also to increase productivity and competitiveness. This is expected to lead to a better and more competitive economic environment for firms, and therefore to formality.³⁸ The tablet facilitates labour formalization by helping the SMEs register their employees.

The project successfully reached 15,086 beneficiaries of a special tax regime for SMEs (*Régimen de Incorporación Fiscal*), which is Mexico's main formalization public programme. Some 2,000 young people were also included. The project has verified that 89 per cent of the beneficiaries made tax declarations.

The project involved the participation of 147 chambers of commerce, and it is estimated that 25,646 workers benefited from it. Some 45.5 per cent of the total beneficiaries were male and 54.5 per cent were female. Most of them were between the ages of 18 and 45, and 44 per cent had upper high school education.

³⁷ The authors thank Mr Octavio García, Confederation of Chambers of Commerce, Services and Tourism of Mexico (CONCANACO SERVYTUR).

³⁸ This link between technology and increased sales is not necessarily direct however as other aspects of business organization and functioning are also needed. Some private solutions are being developed for that like the example of TiendaTek (Tech-Corner store) that developed app that helps with inventories, cash flow, etc. for small business in Colombia, www.tiendatekweb.com

3.2 Formalization of employment

Formalization of employment has been approached most of the times, through incentives (for example combining access to social protection with tax deductions) or by enforcement measures. New technologies are being already used in these areas.

3.2.1 Electronic registration of workers

The inspection system and the capacity of the labour authority can also be improved with the use of better databases. Table 3 shows some country examples.

In the case of Brazil, in 2007, the government launched the project “eSocial” in order to unify the sending of employer and employee data, and it is part of the Federal Government initiative called SPED (Public System for Digital Bookkeeping). eSocial replaces the separate reporting to the social security institution, the internal revenue service and the Ministry of Labour and Employment. Therefore it involves the participation of agencies such as the *Caixa Econômica* (Federal Bank) (responsible for the *Fundo de Garantia do Tempo e Serviço* (severance indemnity fund)), the National Institute of Social Security (INSS), the Ministry of Planning, Ministry of Labour and Employment and the Internal Revenue Service of Brazil (RFB).

Table 3. Electronic registration of workers

Case	Description	Results
eSocial in Brazil	eSocial is the Brazilian government's project to unify the sending of employer and employee data. This unified system will replace the need to send separate reporting to social security institution, the internal revenue service and the Ministry of Labour and Employment. Until recently, the use of the eSocial portal was optional while mostly used by domestic employers. From July 2018, eSocial will apply to all companies, including small businesses.	
Electronic employment registration in Estonia	<p>The Estonian Tax and Customs Board launched the electronic register in July 2014 to enable employers to easily register all employees with the Board prior to an employee starting work.</p> <p>The electronic solution eliminates the need for in-person visits to a service bureau for registration. Registration can now occur in a variety of ways: 1) Web registration through the e-Tax Board/e-Customs websites by entering data manually or uploading a file; 2) Registration via a machine-to-machine (M2M) interface, using XRoad technology, the standard for integrating public registers and information systems in Estonia and 3) Mobile registration via a phone call or SMS message.</p> <p>Besides, employers no longer need to submit employment information to the Estonian Health Insurance Fund or the Estonian Unemployment Insurance Fund, as that information is made available and easily accessible from the national register.</p>	<p>As of November 2014, approximately 70,000 companies, registering nearly 600,000 employees, are using the national employment register. Due to increased visibility by the Board into disbursements and tax declarations, labour tax collections are estimated to increase to €5.1 million within the first four months of the register being live (July to November 2014). Additionally, more than 9,000 first time workers have now been registered after the employment register was launched.³⁹</p>

³⁹ Estonian Tax and Customs Board: Improving employment verification and increasing tax collections.

https://www.cgi.ee/sites/default/files/files_ee/casestudies/cgi-case-study-estonia-employment-register-pdf.pdf

Case	Description	Results
Electronic Payroll in Peru	<p>In 2006, the Peruvian government implemented the Electronic Payroll (EP). Before, payroll information had to be sent physically to the Labour Ministry. With the EP, this information can be sent virtually and to the tax authority.</p> <p>The legal mechanism was an inter-institutional agreement between the Labour Ministry and the National Superintendency of Customs and Tax Administration (Superintendencia Nacional de Administración Tributaria) (SUNAT).⁴⁰ The Ministry regulates what information is included in the Payroll but SUNAT can make amendments and also sets the conditions in which the information is delivered.</p>	<p>A study (Diaz, 2014)⁴¹ finds that the EP has allowed the Labour Ministry to reach a larger number of firms thus strengthening the inspection system. It also finds that employment registered at the payroll – the most formal – has grown fastest than total occupation in particular since 2006.</p> <p>In 2008 there were 2.17 million workers registered in the EP. That number increased to 2.73 million in 2011 and 3.13 million in 2013.</p>

eSocial reduces bureaucracy and increases corporate responsibility in providing information, and that this makes labour regulation both clearer and more individualized. The unified system will also help various institutions find irregularities or inconsistencies such as missed deadlines and under or no declaration.

It started in 2007 with just the tax system. Companies were required to provide, in a digital and unified form, accounting and tax information that had previously been recorded in separate programmes, books and forms. Later it was broadened to include information on social security and registration of workers, including employee health, workplace safety, and workplace accident data. In practice, users input their employment information, including incomes and activities, and then transmit them electronically to the government. The integration of companies' computer systems with the eSocial national system enables automated communication with employers; with standardization and integration for registering individuals and legal entities under the participating agencies.

Until recently, eSocial was optional and it was used mostly by domestic employers. As of July 2018, eSocial will increasingly apply to all companies. The latest timeline with mandatory dates for using the system was published in the Official Diary on 2 September 2016, through Resolution no. 5/2016. In practice, eSocial does not place additional obligations on companies. It only changes the way information is delivered. The single file with standardized data and updated records facilitates monitoring, and accelerates clearance processes in certain procedures.

In Estonia the Taxation Act of 2014 created a national registry of employees and their employment information – the electronic register – to enable employers to easily register all employees with the Board before an employee starts work.

In Peru, the government (Labour Ministry) requires private business to report payroll information, including for each worker, details on pay, sex, occupation and so on. Traditionally, this procedure was done manually. Of course, as this is the only procedure to register workers, those business and those workers reported to the Labour Ministry are the most formal of all. These payrolls form the basis for calculating the index of registered employment, and the work of the labour inspection system. In 2006, the government created the Electronic Payroll, an electronic solution to replace the manual reporting of private business payrolls. The objective was to seek more efficiency regarding the information on

⁴⁰ SUNAT is the tax authority in Peru.

⁴¹ Diaz, J.J. 2014. "Formalización empresarial y laboral" in Infante, R.; Chacaltana, J. (ed.): Hacia un desarrollo inclusivo en Perú, CEPAL and ILO. (Santiago), pp.173-260.

workers registered.⁴² Through a specific agreement signed between the Labour Ministry and the tax authority (SUNAT), three major changes were introduced:

- The payroll information has to be sent virtually, not physically.
- As they are virtual, the information can be sent monthly instead of annually.
- The information would be sent not only to the Labour Ministry but also to the tax authority, together with information of the firm usually required by the tax authority (sales, profits, etc).

The electronic payroll has two components:

- T-Registro (“I register you”) is the registration of the labour information of employers, workers, retired workers, service locators, young people in training and third parties involved.
- The Monthly Payroll (PLAME) is mandatory and includes information on income compensation for those people registered in the T-Registro, including third-party providers of services, information on days worked, hours worked and tax deductions.

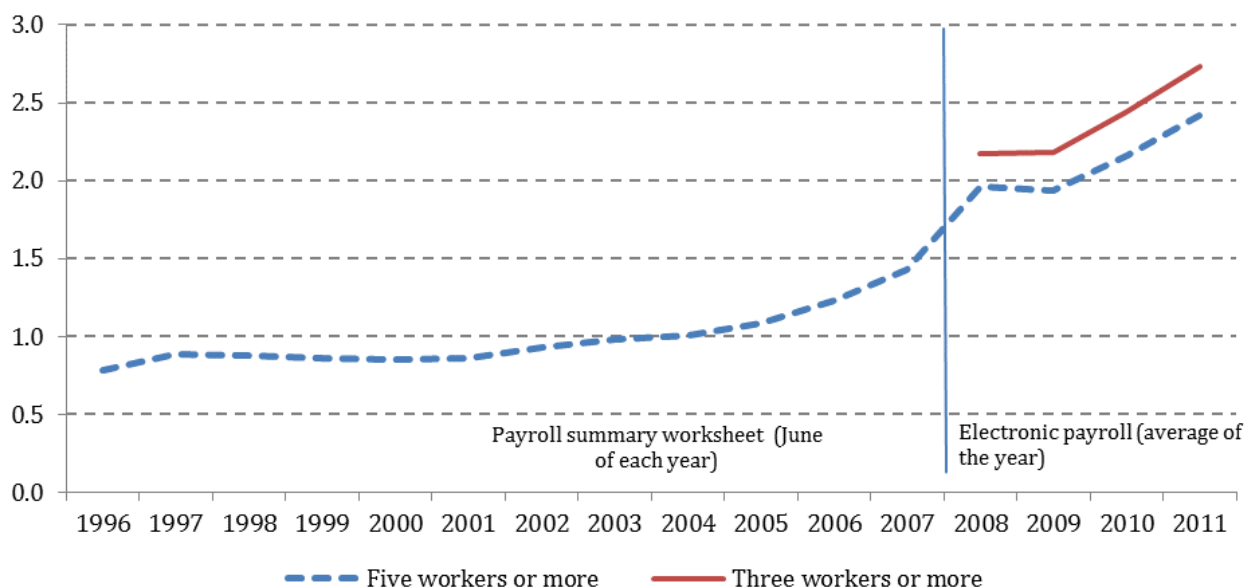
This tool eliminates the transaction costs in the previous procedure that included payroll books, and it also eliminates storage costs and reduces the risk of losing documents. In addition, workers can more easily prove their labour relation. All employers hiring at least one worker are obliged to report their electronic payroll. Failure to do so, on time, represents a fault for each worker involved in the payroll. The same applies if the information is not correct.

According to a recent study (Diaz, 2014), the use of the Electronic Payroll (EP) has allowed the Labour Ministry to reach more businesses than before. In the old system, some 26,000 firms would report payrolls every year to the Labour Ministry. After the EP was introduced, that number increased to more than 200,000, which was the number of firms traditionally reporting to the tax authority.

The study also shows that after the introduction of the EP, registered employment increased: the records indicate that registered employment in firms of five or more workers increased from 930,000 in 2002 to 1.1 million in 2005 and 2.4 million in 2011 (figure 4).

⁴²Law No. 27711 (29 May 2002).

Figure 4. Peru. Registration of workers (millions)



Source: Diaz, J.J. 2014. "Formalización empresarial y laboral", in Infante, R.; Chacaltana, J. (ed.): Hacia un desarrollo inclusivo en Perú, CEPAL and ILO (Santiago de Chile).

In Hungary, under the Simplified Employment Act (2010/LXXV), a simplified employment model lowered administrative procedures for both employee and employer. The employment status has to be stated in a mutually agreed simplified work contract, which can be declared either by a Short Message Service (SMS) or electronically via the so-called "client gate" system. It covers two categories of simplified employment: (a) seasonal agricultural work, which includes seasonal tourism services and (b) other casual/temporary work, including domestic work. For domestic work, the employer pays a flat rate daily tax regardless of hours worked and actual wage paid. By entering codes into a text message or into the Internet-based client gate system, all obligations can be fulfilled at once – notification, reporting and payment (ILO, 2016b).

3.2.2 Upgrading labour inspection

According to a recent ILO study (ILO, 2017), although the use of new technologies in labour inspection raises many new challenges such as the security and confidentiality of data, the sometimes high cost of innovations, the risk of work overload, etc., it also offers many benefits to both inspection bodies and final users (employers and workers), as it creates more transparency, a closer link among users, better monitoring and follow-up of inspections, systematic statistics and more agility in the work of the inspectors.⁴³

For formalization purposes, Argentina has the "Digital inspector" scheme and in 2003 adopted a strategy for reducing labour informality, and established an array of programmes, norms and initiatives for this purpose. This strategy – some analysts call it an "integrated strategy" as it includes multiple interventions and coordination among them – led to a reduction in non-registered employment from 50 per cent to 34 per cent between 2003 and 2014. One of the main programmes in this strategy is the National Plan for the Regularization of Labour (PNRT).

⁴³ ILO. 2017. *Utilización de tecnologías de la información y de la comunicación en las inspecciones del trabajo. Una visión comparada en torno a países seleccionados*. Oficina de la OIT para el Cono Sur de América Latina (Informes Técnicos OIT Cono Sur, N°2).

In the context of that programme, in 2011, the tool “Digital Registered Work” or “Digital inspector” improved the process of detection and sanctions for firms that do not comply with labour legislation. The programme used to manage physical information in its inspections, verifying the firms supporting information and then would go to the Labour Ministry to verify that all workers were declared in the SIPA database (Sistema Integrado Provisional Argentino), administered by the Federal Administration of Public Revenues (Administración Federal de Ingresos Públicos) (AFIP).

The innovation is that through an agreement between AFIP and the Ministry of Labour, Employment and Social Security in 2006 a database was created called Simplificación Registral (or Mi Simplificación) which is managed by AFIP where the employer is obliged to register all workers. For these workers, the employer pays and determines the contributions to AFIP and that information is registered in the SIPA (also handled by AFIP). The digital inspector system managed to put online both databases (updated daily) so that the Labour Ministry could verify in real time the registry status of workers and the corresponding contributions.

In sum, the idea was to link the labour inspection to the Simplificación Registral registry so that inspectors could consult this platform online during their field visits. Labour inspectors are provided with Netbooks with a wireless Internet connection so that they can consult in real time those databases of National Social Security Administration (Administración Nacional de la Seguridad Social) (ANSES) and AFIP to verify if all workers in the inspected firm are registered at the time of inspection. An application (interface) was generated for that tablet (Digital Inspector) so that the inspector can enter the identification number of the worker and verify if they are registered and if their contributions have been paid.

With this innovation, according to the Labour Ministry the inspection procedure was reduced from 40 days to just one.⁴⁴ If the inspector detects an infraction, they immediately sanction the firm for not registering the workers and if there are outstanding contributions, they alert AFIP and estimate both the debt and fines. The PNRT does not inspect other labour conditions (for example, collective agreements) as this is a task for the provinces. However, it does explicitly have competence in detecting child labour.

Sri Lanka has the “Labour Inspection System Application (LISA)” – an application on a tablet to support labour inspection, helping to monitor cases and ensuring compliance with labour laws.⁴⁵ Inspectors can take pictures using their tablets when they observe a problem at the workplace, and upload them directly on LISA. Using LISA, they can also write inspection reports on the site. In the past, inspectors had to carry more than 10 different forms with a bulky record book, which costs them much more time and energy.

LISA has also simplified the work at the Complaint and Legal Department. Grievances submitted by workers or employers are now put into LISA online database, and the information is sent to labour officers online. It has made the procedure much faster than before, when officers had to transfer all the information from record books to another notebook. LISA has also made monitoring the follow-up actions easier. By typing the name of the worker or the employer into the LISA system, a person can see all the details about their complaints, court records, and any action taken by labour officers.

The United Arab Emirates uses technologies for labour inspection. The Ministry of Labour has developed a comprehensive enterprises’ and workers’ database, which includes almost all enterprises and all workers in the private sector. The database is updated regularly

⁴⁴ ILO. 2014b. FORLAC Note on Inspection in Argentina.

⁴⁵ http://www.ilo.org/asia/media-centre/articles/WCMS_353256/lang--en/index.htm

through information gathered by inspectors and information received directly from businesses. All labour inspectors have access to computers, the Internet, and this database. As of 2010, the inspection activities were half computerized but some parts of the system, such as municipalities, have advanced and fully computerized systems. For example, in the Municipality of Abu Dhabi, the inspectors use portable data applicators, so all inspection activities, both office and field, are fully computerized.⁴⁶

The United Arab Emirates established a fully computerized hotline service to receive the complaints and enquiries of national and migrant workers in 13 languages, including Arabic. An SMS is sent to the workers concerned to confirm the receipt of the complaints. In addition, a fully computerized comprehensive system for reporting occupation injuries has also been developed. Occupational diseases and work-related injuries are often greatly underreported. The system can improve investigation of occupational accidents.

3.2.3 Increased compliance culture through information technologies

In 2011, the U.S. Department of Labor (DOL) created a free mobile app for employees to independently capture and track the hours they work and determine the wages they are owed. The new tool called “DOL – Timesheet” was developed by the DOL Wage and Hour Division (WHD) as part of its ongoing efforts to “achieve compliance with labour standards to protect and enhance the welfare of the Nation’s workforce”.⁴⁷

Traditionally, workers would manually record and track the hours worked, in order to reconcile work hours with pay, leave, overtime, etc. With the app, this process is now digital. The app allows the worker to set up a separate timesheet for each employer, input their hourly wage, and then use the app like a stopwatch to record their time by pressing buttons marked “Start Work”, “Start Break”, “Stop Break,” and “Stop Work”.

The app allows for manual entry if this functionality is not used in real time. It also allows the employee to categorize or add comments to describe the break in further detail. It automatically computes any hours above the regular 40 per week as overtime hours. The workers are able to obtain weekly and monthly summaries of the hours worked and the corresponding wages, and can also email the summaries to themselves, or, if necessary, to an attorney.

Thanks to its accurate and detailed records of working hours, it can be used to challenge an employer’s records in case of disagreement. The app also includes links to information on the DOL’s website describing, for example, federal minimum wage and overtime requirements and a “Contact Us” tab, which makes a phone call, email, or appointment with the DOL just a touch away.⁴⁸

⁴⁶Data is provided by the government in the framework of the assessment.

⁴⁷Zins (2011) and Davidson, P. (2014).

⁴⁸The U.S. Department of Labor has also launched an application in 2012, called *Eat. Shop. Sleep. app*, that consumers can find out about worker safety and wage violation records of a particular business. The app helps consumers to make the social decisions, by rewarding businesses that treat workers fairly. It may give higher incentives to companies to increase compliance. See <https://blog.dol.gov/2012/03/09/dol-challenge-leads-to-consumer-protection-app>. In addition, the U.S. Department of Labor developed new business tool, *Comply chain*, to improve labour compliance in global supply chain. Their website and free mobile application address the issues of child and forced labour in global supply chain and contain best practices guidance to help companies develop social compliance system. See www.dol.gov/ilab/complychain/.

Several other countries are also using electronic tools for compensation calculations. In Uruguay, the Labour Ministry has developed a tool that allows the calculation of compensation in case of dismissal, for people working at least 48 hours a week.

Some companies in the Republic of Korea are also using high-tech methods to measure the working hours, by tracking their GPS, Wi-Fi connection, or staff cards that they need to place on a card reader to get in and out of the companies.

On the other hand, some countries adopted a system or law to promote electronic payments to workers. Deduction or delays in payments are hard to track when workers are paid in cash. Electronic payment to workers have its advantages as it can help ensure that the minimum wage is respected and inspect labour abuses.

In Egypt, the Ministry of Finance introduced prepaid payroll card to expand the use of electronic payments and increase payment transparency. The payroll cards can be issued to anyone including the under-banked who do not have access to bank accounts. Between 2010 and 2013, more than 1.5 million cards have been issued. It is significant figure, considering that Egypt is a highly cash-based society and only about 9 million people hold a bank account.⁴⁹

The United Arab Emirates also introduced prepaid payroll card with similar purposes. Other countries made it mandatory to pay workers electronically for certain industries. In Austria, payments for wages for work in the construction sector must not be paid or accepted in cash as long as employees have a bank account or legitimate claim for one. The Thai government released a Ministerial order requiring the seafood and fishing industries to pay their workers electronically on a bank account in 2017 to ensure transparency and fairness to workers.⁵⁰ Impact studies show positive effects on financial inclusion, efficiency and transparency.⁵¹

3.2.4 Facilitating social protection and formality

Technologies are contributing to expanding social protection by simplifying payment of social security contribution and developing innovative tools and these changes can help reaching out to marginalized groups as well.

Some countries are working on electronic payment of social security contributions, which can benefit both provider and beneficiaries of social protection. In Colombia, there is a tool called *Planilla Integrada de Liquidación de Aportes* (PILA). This is an electronic solution that allows any worker to make their social security contributions (health, retirement fund, professional risks) and parafiscal contributions (Cajas de Compensación Familiar (CCF), Servicio Nacional de Aprendizaje (SENA) and Instituto Colombiano de Bienestar Familiar (ICBF)) through a system of electronic transfers.

⁴⁹ Hossam, M. “Employee payroll cards education programme is achieving financial inclusion in Egypt: General Manager of Visa Egypt”, in Daily News Egypt, (1 June 2016) and MasterCard. 2013. MasterCard, Government Services & Solutions case study: Egypt ministry of finance prepaid payroll card.

⁵⁰ Ship to shore rights. 2018. *Moving to electronic payment in the Thai fishing industry*. https://shiptoshorerights.org/wp-content/uploads/ilo-shiptoshore_banking-final-report_EN.pdf

⁵¹ Breza, Kanz and Klapper (2017); Better than cash alliance (2017).

This tool not only makes this process electronic but also unifies several subsystems.⁵² Before the PILA, contributions had to be paid independently by each subsystem into different banks and for each type of worker. Thus PILA improves efficiency, reduces transaction costs and time, and allows the contributors to know exactly their situation in each subsystem or regime. The Health and Social Protection Ministry has put in place some orientation operators to guide the user in the system. There are two ways to make payments:

- Electronic payroll: the operator has a website to make payments, in this case a bank accounts is needed.
- Assisted payroll: The operator provides guidance and even coaching in order to make the contributions. This modality is only for firms with below 30 workers or for “own account” workers that do not have access to Internet.

Once the payment is made, the system provides a certificate. In Colombia all persons with an income equal to or above the minimum wage are obliged to join the social security system, including own account workers. This also includes households hiring domestic workers and even social organizations such as the system of community mothers (*madres comunitarias*).

Furthermore, some countries have developed innovative tools to enable cost-effective social protection programmes. For example, in Viet Nam, a multifunction smartcard holds a variety of information about its owner, in lieu of the social protection notebook. The card can contain biometric information for identity authentication, the participant’s contribution history, information on health insurance and health records, user identity for banking services, money for payment, etc. Another example is the use of biometrics and smartphones for in-person authentication and verification. A built-in fingerprint scanner can capture and store a digital image of the fingerprints of the user. The Asian Development Bank (ADB) is currently considering the possibilities of expanding support for these interventions.⁵³

Technologies help expanding social protection to hard-to-reach groups. In 2014, in Uruguay the Social Security Institution (Banco de Previsión Social (BPS)) launched a free mobile app for employers to ease the registration and compliance concerning domestic workers, *BPS Trabajo Doméstico* [domestic work]. Besides, recent years have seen an active dissemination campaign providing advice and information to both workers and households. The mobile app developed by the BPS allows employers of domestic workers to do the following online:

- Consult on billing, due dates, last payment.
- Register and deregister workers.
- Modify information on workers (wage, personal data).
- Pay the corresponding bill for the pension system.

In Ghana, the National Health Insurance Authority (NHIA) and the ILO are working on digitalization of the health insurance renewal process. Traditionally, the renewal had to be done in person at a District Office, which is time-consuming for everybody involved. With digitalization, it can be done remotely using digital devices such as mobile phones. It

⁵² The existence of the PILA does not modify responsibilities and obligations of the actors of the social protection system in respect of the payment. The tool only intends to unify all the subsystems in a single payment to facilitate payment from the payer’s side.

⁵³ Asian Development Bank (ADB). 2017. Improving the delivery of social protection through ICT: Case studies in Mongolia, Nepal, and Viet Nam, (Manila).

may attract more people, including those in the informal sector, to renew their memberships. As of January 2018, the project was at the final stage before the launch.⁵⁴

Besides, Ghana has a voluntary pension contribution through mobile money for informal workers. As of January 2017, the National Pensions Regulatory Authority had granted approval to 78 companies to operate as pension fund managers. Pension products have been developed mainly for workers in the formal sector in an economy that is largely informal. It is estimated that about 70 per cent of Ghana's workforce is informal and does not have access to any pension scheme. As a result, the People's Pension Trust has partnered with Vodafone and Dusk Capital to develop a mobile-enabled pension product for informal workers. This innovative pension product allows workers in the informal sector to make voluntary pension contributions through Vodafone Cash.⁵⁵

Kenya, too, has a mobile payment services, called M-PESA, which allows the self-employed to make their voluntary contribution to the National Health Insurance Fund and the National Social Security Fund.⁵⁶

After hard-to-reach groups have been included in the social security system, facilitating the payment of their contributions is equally important to ensure the sustainability of the benefits, especially as these groups often find it hard to access formal financial services. In 2011, Uganda's National Social Security Fund introduced a SMS platform to allow members to access services on their mobile phones, thus reducing time and cost to travel to the offices. Members can now send an SMS to the Fund and query their balance via their mobile phones. Today, over 270,000 registered members use the platform, which has led to a reduction of 30 per cent in the number of walk-in customers in 2013-2014 (ILO, forthcoming).

⁵⁴ Impact insurance. "Supporting the expansion of population coverage through m-Renewal—NHIA" (Jan. 2018). <http://www.impactinsurance.org/practitioner-lessons/afd/nhia>

⁵⁵ Amoah, R.; Bansal, R.; Kasebele, A.; Plaitakis, A.; BFA. 2017. *Building an inclusive digital payments ecosystem: The way forward, better than cash alliance*.

⁵⁶ <https://www.safaricom.co.ke/business/sme/m-pesa-payment-solutions/lipa-na-m-pesa-paybill>

4. Conclusions

New technologies are continuously transforming the world of work. Most of the recent discussion has focused on how currently new technologies – characterized by an impressive speed of change – are affecting the behaviour of labour market actors, workers and employers, and the consequences in terms of volume of employment, its composition, wages and working conditions.

Less attention has been paid, however, to how new technologies are affecting the public sector, in particular policy-making. And yet, many governments are gradually adapting to new technologies. In this paper we have been exploring what some countries are already doing in relation to the use of new technologies in the labour market – particularly in policies oriented to facilitate the transition to formality of economic units and employment.

We have found that there is indeed an emerging trend towards the use of technologies for the transition to formality of employment and economic units via an increasing number of innovative, information-intensive and connectivity-based tools or approaches that we call e-formality policies, which contrast sharply with the traditional manual, physical presence or time-consuming practices.

Of course, these developments are sometimes concentrated on specific policy areas or instruments, but the diversity and innovative nature of the experiences show a promising avenue for further study and research. And while evidence shows that business registration procedures are usually separated from employment formalization due to, among other things, the absence of coordination between different institutions, new technologies based on information and intelligence could also help bridge this gap and link enterprises and employment formalization. Indeed, these practices facilitate inter-ministerial coordination, through making it easy to share information and actions among tax, social security and employment institutions.

However, even at this early stage in the evolution of this new generation of formality-related policies, several issues arise for further discussion. Although, for example, these e-solutions are not always directly or explicitly linked to the transition to formality, they bring more transparency, information and new approaches that can be considered steps in this gradual transition. But do these policy goals necessarily imply or translate into full formalization? More evidence is needed, as impact studies are significantly scarce.

The transition to formality would be incomplete if economic units are registered but their productivity and working conditions remain the same, or if workers are registered in the social security systems and those systems provide poor quality services. In other words, although in itself important, registration of economic units and employment is only one part of the story of formalization. The story needs to be completed with the most important part, which is the objective of full and productive employment and decent work for all.

Many remaining questions and challenges will probably lead the discussions in the future. On the one hand, will these policies be able to deal with the fact that a large proportion of the population in the world still does not have access to new technologies? In some countries, the discussion about digital citizenship, for example – oriented to grant citizens minimum access – may gradually move to the centre of the inclusion agenda in the near future.

Also, if information, systematic or even algorithms-based policies will be at hand for any government or authority, what would be the limit in their use, especially if this information is private or personal? In time and using new technologies, governments will be able to identify individuals in any information system, as consumers, workers or economic

units. This capacity should be used not only for registration but for labour and social inclusion purposes, and social dialogue among social partners in the labour market could play a key role for assuring this.

Finally, technology is evolving so rapidly that new solutions or alternatives are being developed currently with a new wave based on automation, advanced robotics, big data, artificial intelligence, blockchain technology, etc. And there are actually some tasks of governments that are being automatized in some countries, for example, the automatic issue of fines for speeding. Does this mean that a further stage in policy would adapt formality-related policies to automatic solutions?

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Annex

Figure A.1 World. Evolution of e-government indices by income level



Source: UNDESA, 2016

Note1: The components of human capital index (HCI) were updated in 2014. Please see E-Government Survey 2016, table A.2 for further details. Also note that the assessment rates the performance of countries relative to one another, as opposed to being an absolute measurement.

Note2: Developed countries are considered as high-income countries as defined by the World Bank (\$12,236 or more; 56 countries) and emerging and developing countries as middle-income and low-income countries (\$12,235 or less; 137 countries).

Table A.1 Simple regression (OLS), E-government as a driver of formality

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
ln(GDPpc)	-0.102*** (0.0224)	-0.0555* (0.0215)	-0.0828*** (0.0202)	-0.213*** (0.0210)	-0.136*** (0.0227)	0.0914*** (0.0232)
EGDI	-0.826*** (0.116)					-0.491*** (0.127)
TII		-0.810*** (0.118)	-0.880*** (0.109)			
OSI		0.121 (0.0701)		-0.159 (0.0967)		
HCI		-0.398** (0.134)			-0.683*** (0.148)	
employeeRatio						-0.218*** (0.0370)
emplyoeeRatio *GDPpc						1.333*** (0.346)
constant	1.916*** (0.159)	1.556*** (0.150)	1.642*** (0.151)	2.599*** (0.157)	2.246*** (0.137)	0.402* (0.175)
N	110	110	110	110	110	110
Adj r2	0.829	0.876	0.864	0.777	0.816	0.903

Robust standard errors in parentheses - * p < 0.05, ** p < 0.01, *** p < 0.001

Sources: *E-government indices, UNDESA, 2016. **Informality rates, ILO, 2018. ***Wage and salaried workers, ILO Trends Econometric Models, May 2018. ****GDP per capita, IMF World Economic Outlook database, April 2018.

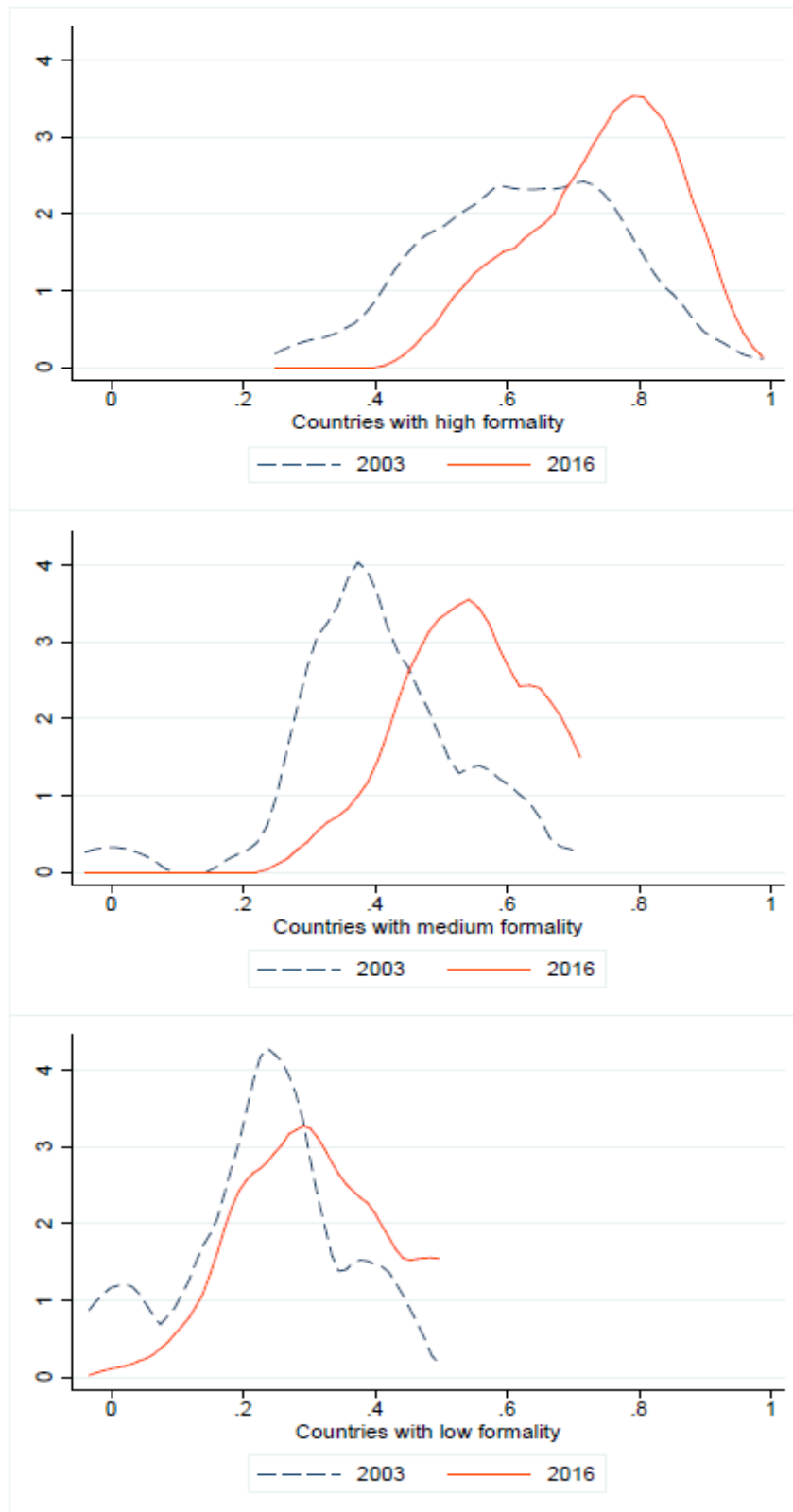
Note 1: The e-government indices, number of wage and salaried workers and total employment, GDP per capita is from the year 2016, and the informality rates are from 2016 or the latest year available (See ILO. 2018 Appendix A.2 for further details).

The e-government development index (EGDI) is a weighted average of normalized scores on three dimensions. Online service index (OSI), Telecommunication infrastructure index (TII) and Human capital index (HCI). The TII is an arithmetic average composite of five indicators: estimated internet users per 100 inhabitants, number of main fixed telephone lines per 100 inhabitants, number of mobile subscribers per 100 inhabitants, number of wireless broadband subscription per 100 inhabitants, and number of fixed broadband subscription per 100 inhabitants. The HCI consists of four components, including adult literacy rate, the combined primary, secondary and tertiary gross enrolment ratio, expected years of schooling and average years of schooling. The OSI was constructed by researchers who assessed each country's national website in the native language, including e-services portal as well as the websites of the related ministries of labour, social services, etc. The researchers also conducted Survey. For further details, please see United Nations Department of Economic and Social Affairs e-government Survey 2016.

Note 2: Our regression model is: $y = \beta_0 + \beta_1 x + \beta_2 \ln(GDPpc) + \epsilon$, where dependent variable (y) is informality rate, x is the value of the e-government index and ϵ is an error term.⁵⁷ The table shows six regression results. For Model 1 – 5, each model includes a different e-government index as an independent variable of interest, while controlling for (log transformed) GDP per capita. Model 1 examines the impact of EGDI. Model 2 examines its three sub-indices simultaneously, while Model 3, Model 4 and Model 5 examine each of them separately. Model 6 examines the impact of EGDI, while controlling (log transformed) GDP per capital, the proportion of employees among total employment and the interaction term.

⁵⁷ The interpretation would be as the following: If an index score increase by 0.01, the informality rate would change by β_1 percentage points. Note that both y and x are ranged between 0 and 1.

Figure A.2 Evolution of e-government

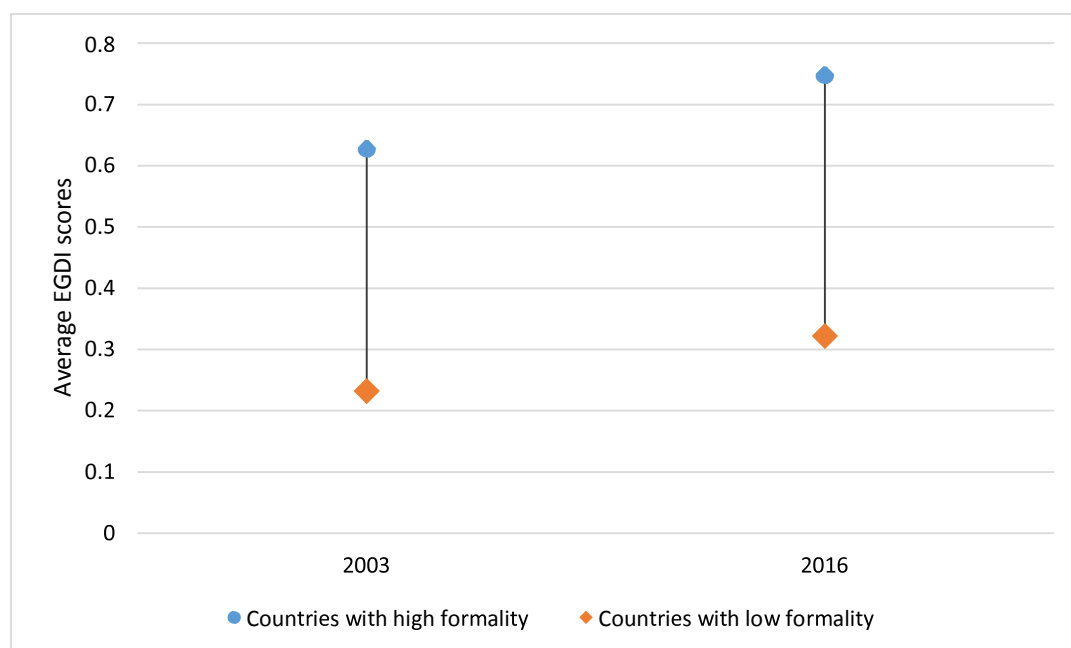


Sources: *E-government indices, UNDESA, 2016. **Informality rates, ILO, 2018.

Note: Informality rates are from 2016 or the latest year available (See ILO, 2018 Appendix A.2 for further details).

Countries with high formality include countries with formality rate above 66 per cent (38 countries), countries with medium formality include countries with formality rate between 33 per cent and 66 per cent (26 countries), and countries with low formality include countries with formality rate below 33 per cent (47 countries).

Figure A.3 Average EGDl scores by formality level, 2003 and 2016



Sources: *E-government indices, UNDESA, 2016. **Informality rates, ILO, 2018.

Note: The e-government indices are from the year 2016, and the informality rates are from 2016 or the latest year available (See ILO, 2018 Appendix A.2 for further details).

Countries with high formality include countries with formality rate above 66 per cent (38 countries) and countries with low formality include those with formality rate below 33 per cent (47 countries).

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