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Blockchain for SMEs and entrepreneurs in Israel

Marco Bianchini and Insung Kwon

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Blockchain for SMEs and entrepreneurs in Israel

By: Marco Bianchini and Insung Kwon

This report investigates the development of the Blockchain ecosystem in Israel, against the background of the SME and entrepreneurship structure and trends in the country. The report analyses in particular the characteristics and trends of companies introducing blockchain-based services in the Israeli market, opportunities and challenges to their business development, sectors and firms being targeted, and relevance for enhancing digitalisation and productivity in the SME population at large. The report also illustrates recent trends in regulation and policy, and provides policy recommendations.

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The lead authors of this report are Marco Bianchini (Economist, CFE) and Insung Kwon (Junior Analyst, CFE), under the supervision of Lucia Cusmano, Head of the SMEs and Entrepreneurship Division at CFE.

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Acronyms

A.I.	Artificial Intelligence
BERD	Business Enterprise expenditure on R&D
BoI	Bank of Israel
CBDC	Central Bank Digital Currency
CMISA	Capital Market Insurance and Savings Authority
DLTs	Distributed Ledger Technologies
ERP	Enterprise Resource Planning
GDP	Gross Domestic Product
GFIN	Global Financial Innovation Network
GVC	Global Value Chain
ICO	Initial Coin Offering
ICT	Information and Communication Technologies
IIA	Israel Innovation Authority
ISA	Israel Securities Authority
ITA	Israeli Tax Authority
POC	Proof of Concept
R&D	Research and Development
SAFT	Simple Agreements for Future Tokens
SMBA	Small and Medium Business Agency of Israel
SMEs	Small and Medium Enterprises
STO	Security Token Offering
VC	Venture Capital

Executive Summary

Labour productivity of Israeli SMEs is lower than in other OECD countries on average, but the country's large tech sector offers a favourable environment for the development of new technologies that may contribute to strengthen productivity of small businesses. Israel has an uncommonly large share of young and highly innovative high growth firms, especially in the tech sector, coupled with one of the largest Venture Capital (VC) markets in the world (as a share of GDP), which offers financing opportunities for innovative entrepreneurs. The largest R&D expenditure in the OECD (as a share of GDP) confirms the importance placed on innovation by public and private actors, with a particular focus on the tech industry. Challenges remain, such as in terms of ICT investment and mobile broadband coverage, but the Israeli business environment appears to be conducive for the development of new technologies and for the increased digitalisation of SMEs.

In Israel, the blockchain industry has experienced a rapid growth in the past few years and could have a large impact on the business sector in the future. The technology, which was built on decades of cryptographic research that provided the foundations of the architecture of Bitcoin, is now being tested in many different sectors and areas of application. An increasing number of players are testing new blockchain-based applications targeted to SMEs and entrepreneurs.

The present study aims at analysing the main characteristics of the Israeli companies developing blockchain solutions and the impact that such solutions might have on SMEs in the country. The analysis extends as well to the policies put in place by public decision makers in government and regulatory bodies, and to the emerging international experiences in this policy area.

As the report illustrates, the technology is at a very early stage of development and time will be needed for the market to select the most effective solutions. Nevertheless, the potential applications of the technology are already attracting much attention. Israel has played a disproportionally large role in the development of the global Distributed Ledger Technology (DLT) industry, including some of world's largest Initial Coin Offerings (ICOs). With the recent evolution of the regulatory framework, the number of ICOs has sharply reduced, while alternative forms of investments as Security Token Offering (STO), Simple Agreement for Future Tokens (SAFTs) and "traditional" equity rounds are becoming the main forms of financing, usually accessible only to professional investors.

Almost half of the start-ups bringing new blockchain-based applications to the market are targeting sectors outside of financial services and system architecture, with products at an early stage of development. Most of the companies surveyed for this study are still piloting their products, while cooperating with other businesses, accelerators/incubators, mentors and consultants often coming from venture capital funds or other private investors. However, collaboration with universities and public research centres is rather uncommon. Nevertheless, some large international groups are investing in blockchain R&D in Israel.

Clients targeted by blockchain companies are mostly micro, small and medium-sized enterprises (in sectors such as healthcare, agriculture, logistics et al.), but they also focus on governments and large firms, who can make the most out of what is essentially a database technology.

Some of the barriers to the creation and development of blockchain firms are common to the business sector at large, while challenges specific to the industry also exist. Access to finance as wells as cumbersome administrative and tax payment procedures represent common challenges to SMEs operating in Israel. However, additional challenges related to the lack of understanding of the blockchain technology and to the specific regulatory requirements could be addressed with targeted policy initiatives.

The Israeli government is attentive to the development of the industry and there is ample cooperation among relevant authorities and Ministries. The initiatives of the Bank of Israel, Israel Tax Authority (ITA), Ministry of Finance, Israel Securities Authority (ISA), Israel Innovation Authority, Small and Medium Business Agency, Digital Israel and others are going in the direction of clarifying the regulatory boundaries for the development of the technology to ensure investor protection while supporting directly and indirectly the development of the industry. Examples are the two circulars published by the ITA in 2018 and the initiatives led by the ISA: the March 2019 report summing up the work of the ISA committee on digital assets, the establishment in July 2018 of a Regulatory Innovation Hub for the Fintech sector, the launch of the Global Financial Innovation Network (GFIN) with 28 other Financial Regulators Worldwide and the establishment of a new ISA committee on building a regulatory architecture for digital market in Israel in June 2019.

Knowledge exchange at the international level is perceived to be important to stay ahead in the development of the blockchain sector. International experiences are still relatively limited in this nascent policy area, but interesting and wide-ranging initiatives have been undertaken in some OECD countries, such as devising whole-of-government blockchain strategies, developing DLT-based business registries and organising hackathons to identify effective policy solutions.

The analysis of recent trends and emerging international experiences offers insights on policy approaches and instruments that, in the Israeli context, could create conditions for the blockchain sector to consolidate and grow. The present study discusses some policy opportunities in this regard. For example, initiatives aimed at raising awareness about the potential of DLT among SMEs could be implemented through existing networks. Cooperation with international players, universities and research centres as well as with national and international financial institutions could be facilitated. In addition, the government could assess the possibility of using the technology for internal operations as well as for the delivery of services to SMEs (e.g. business registry). An incremental approach to regulation, including through the introduction of a regulatory sandbox with lighter requirements for entrepreneurs and start-ups, seems a promising way forward and could specifically target blockchain companies. Nevertheless, given the cross-sectorial nature of the technology, the continued and increasing cooperation among Ministries and public agencies remains a crucial feature for effective policy making in this area.

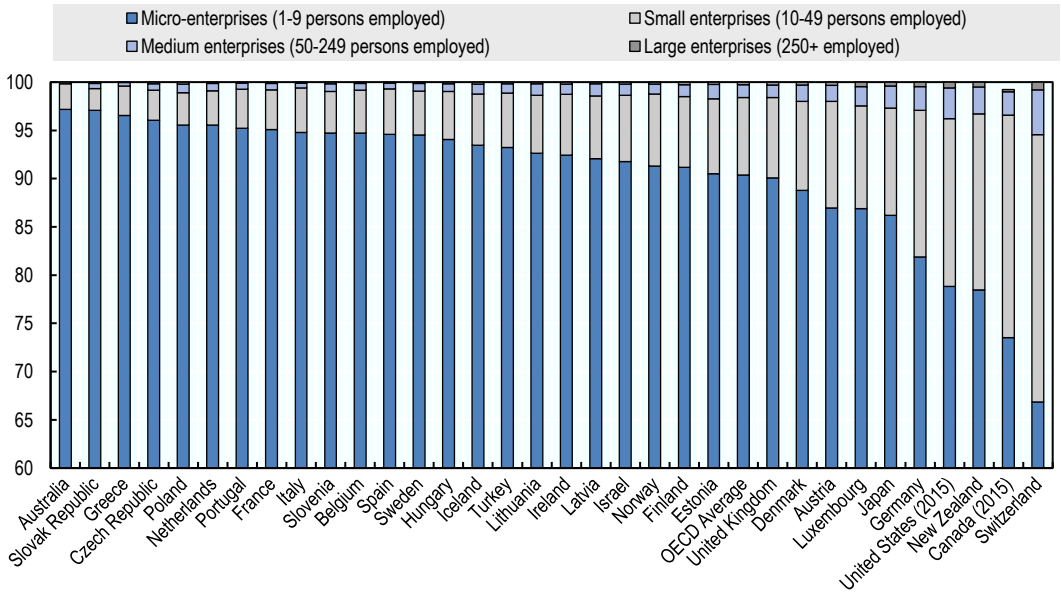
Chapter 1. The entrepreneurial landscape in Israel

Structure of Israeli MSMEs sector

Israeli SMEs are slightly weighted towards micro-enterprises with respect to the OECD average. Small and medium-sized enterprises (SMEs) constitute 99.8% of the business enterprises in Israel (Figure 1). Large enterprises with more than 250 employees account for 0.2% of the Israeli businesses (around 850 companies), slightly below the OECD average of 0.3%. Micro-enterprises (1-9 employees) comprise 91.8% of the Israeli businesses compared with an OECD average of 90.4%. Small enterprises (10-49 employees) comprise 6.9% of the businesses compared with an OECD average of 8.0% and medium enterprises (50-249 employees) constitute 1.2% of the businesses compared with an OECD average of 1.3%.

Figure 1. Number of enterprise by size, business economy, except financial and insurance activities

Percentage of total number of enterprises, 2016 or latest available year

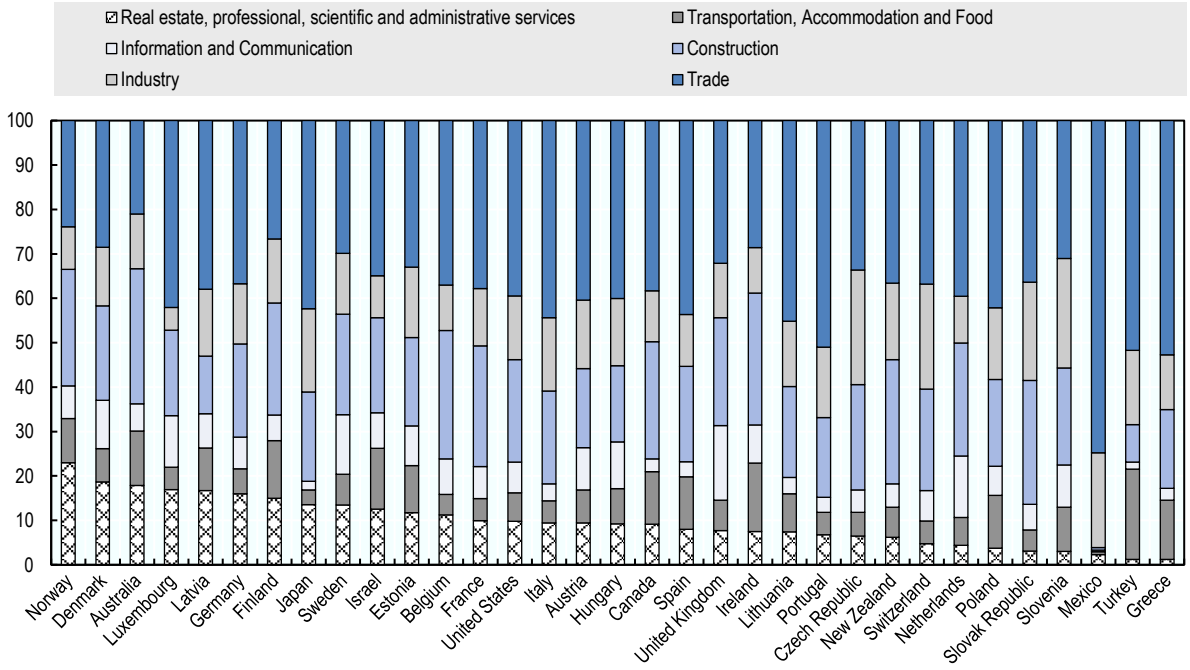


Source: OECD Structural and Demographic Business Statistics ISIC Rev. 4

In Israel, there is a large presence of SMEs operating in the services sector compared to the OECD average. Similar to most OECD countries, trade is the most important area of activity for SMEs in Israel, with one in three Israeli SMEs doing business in the trade sector (Figure 2). "Business activities related to real estate, professional, scientific and administrative services" account for 12.5% of the Israeli SMEs, compared to an OECD average of 9.5%. SMEs involved in "Transportation, accommodation and food activity and information" and "Communication activity" constitute 13.7% and 8.0% of the Israeli SMEs respectively, compared to the OECD average of 8.5% and 7.0%.

Figure 2. SMEs by economic activity

Percentage of total number of SMEs, 2014 or latest available year



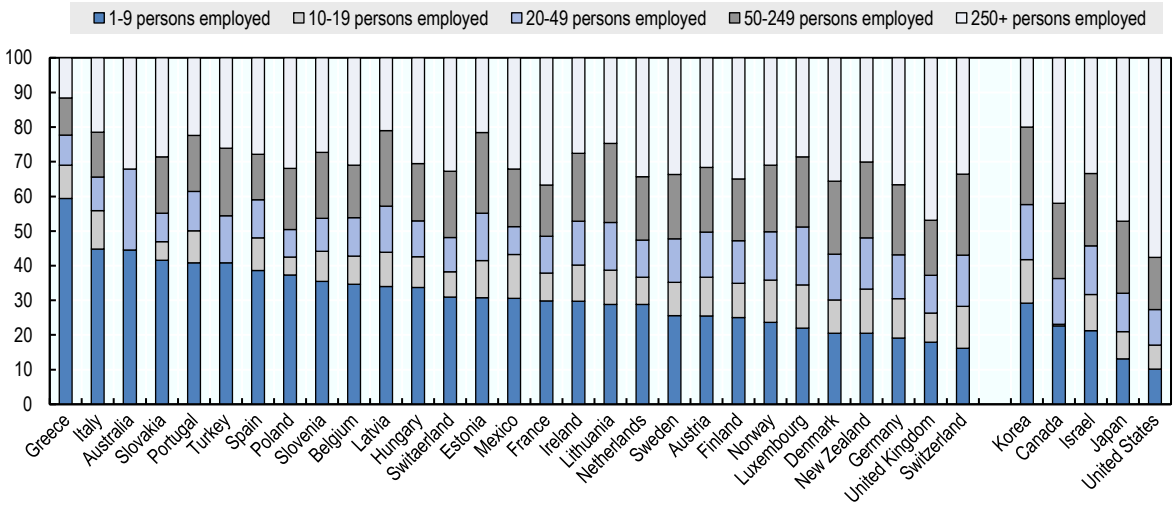
Source: OECD Entrepreneurship at a Glance 2017.

In 2016, SMEs employed 66.6% of the workforce in Israel, which is below the OECD average (69.1%). Between 2010 and 2016, SMEs in services and construction sector have been contributing to the employment growth as they grew both in number and in average size.

Average size of micro-firms in Israel is relatively small compared to other OECD countries. Micro-enterprises account for 21.2% of the employment, compared to an OECD average of 29.0%. As seen from above, while there is a predominance of micro-enterprises in Israel being higher than the OECD average, their contribution to employment is lower than most of the OECD countries (Figure 3).

Figure 3. Employment by enterprise size, business economy

Percent of total employment, 2016 or latest available year

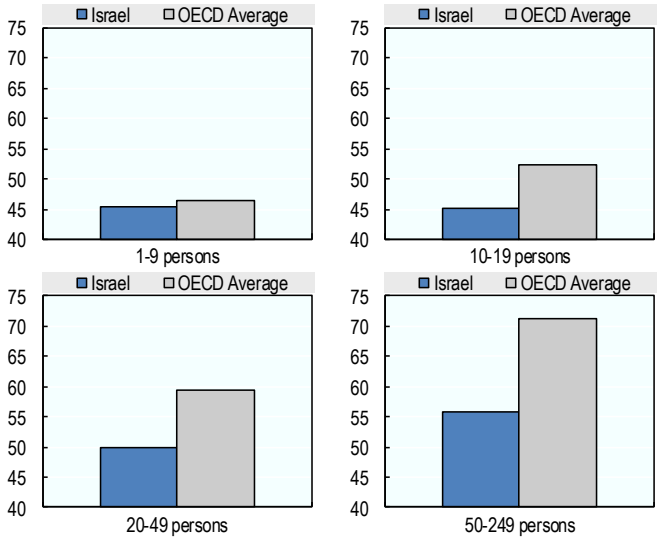


Note: Countries are grouped based on different employment measures, which are percentage of number of persons employed (left) and employees (right).
Source: OECD SME and Entrepreneurship Outlook 2019.

Overall, labour productivity of Israeli businesses is low compared to the OECD average. This is the case among all sizes of enterprises, including large businesses with more than 250 employees. The gap is especially large for medium-sized enterprises; value added per persons employed in Israeli medium-sized firms is around 22% less than the OECD average.

Figure 4. Labour productivity by firm size, business economy

Value added per person employed, thousands of USD, current PPPs, 2016 or latest available year.



Source: OECD Entrepreneurship at a Glance Highlights 2018

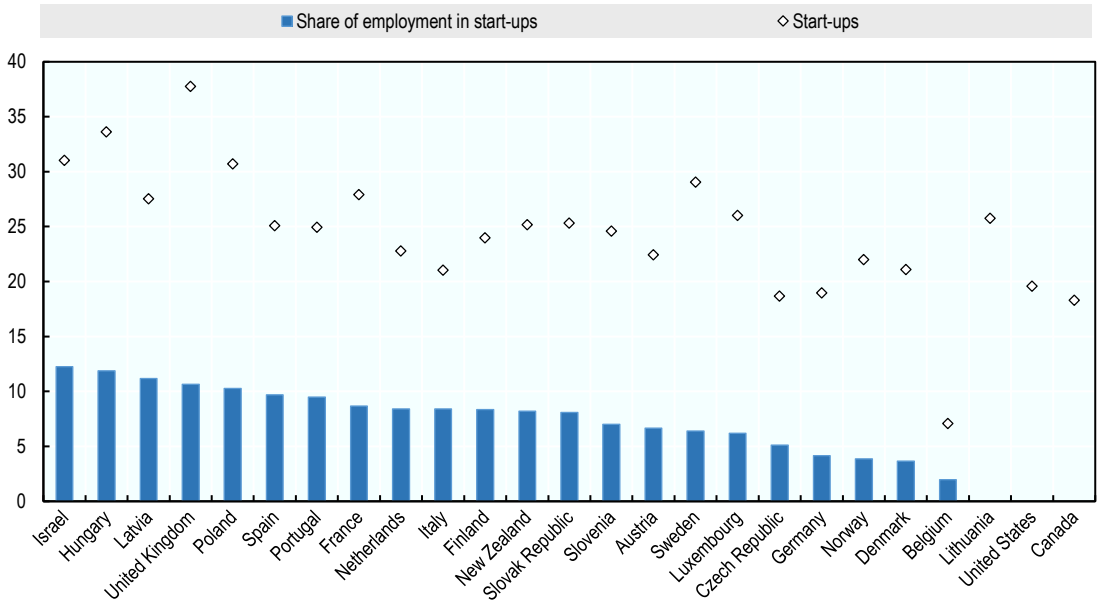
The "start-up nation"

The role of young businesses and high growth enterprises

One of the distinct characteristics of Israel business demography is the country's high share of young enterprises, which contribute importantly to employment. Israel is one of the OECD countries with highest business birth rate, which can be explained by the strong culture of entrepreneurship in the country. Israelis perceive high opportunities in starting one's own business and are more willing to take part in entrepreneurial activities, compared to other countries (Ehud Menipaz and Avrahami, 2019[1]). As a result, the churn rate[1] in Israel is also high among OECD countries, despite a modest enterprise death rate (OECD, 2017[2]). In addition, young firms[2] make up around 30% of all businesses in Israel and contribute to 12.2% of total employment, which is the highest share among the OECD countries (Figure 5).

Figure 5. Share of start-ups and their employment, business economy

Percentage of all employer enterprises and of employment in all employer enterprise, 2014 or latest available year



Note: Data on share of employment in start-ups for Canada, Lithuania and United States not available.
Source: OECD Entrepreneurship at a Glance 2017.

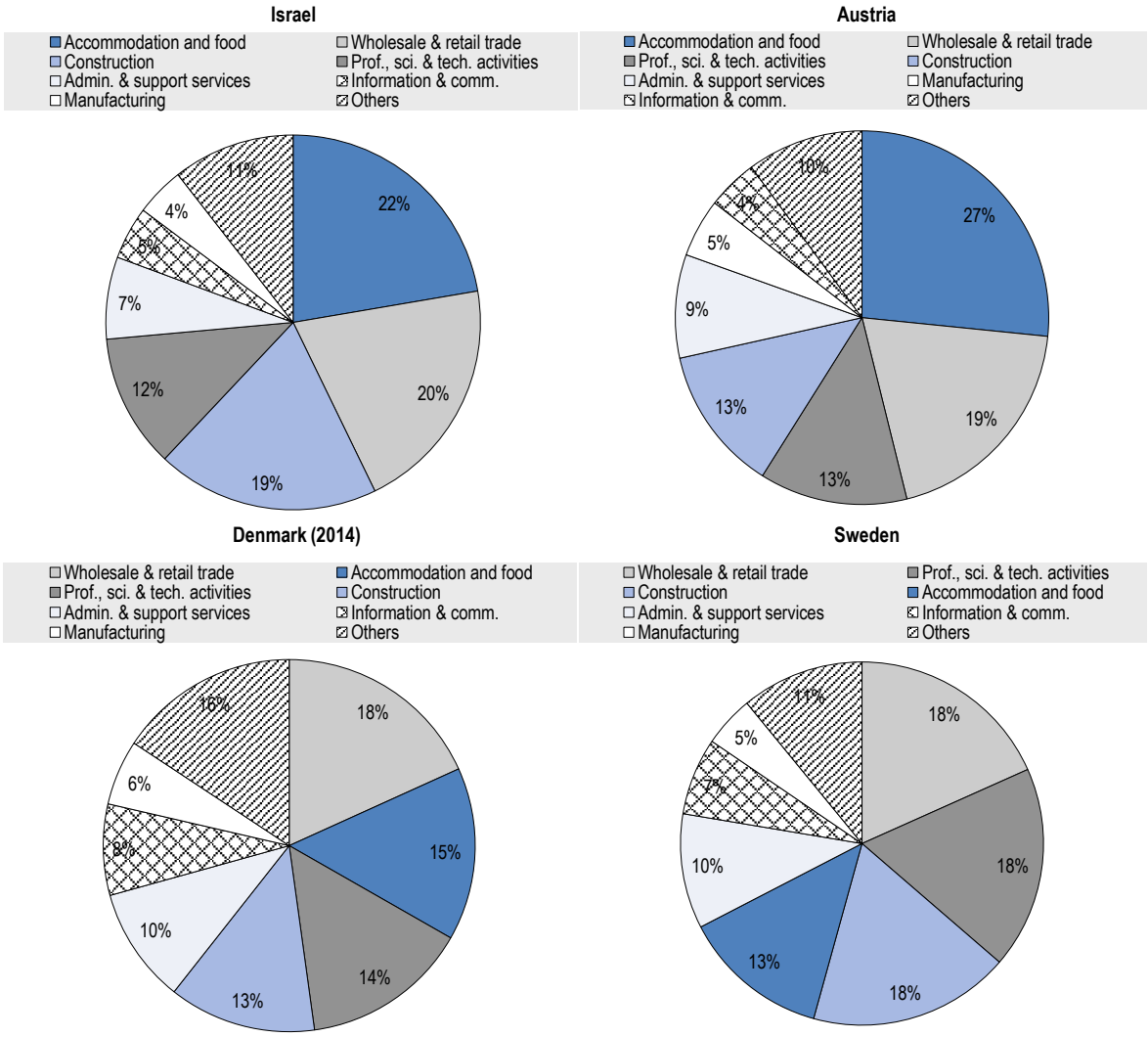
However, new jobs created by young firms are mostly in low productivity sectors. "Accommodation and food," "Wholesale & retail trade," and "Construction" are the three largest sectors in which new jobs are created by young firms. The three sectors account for more than 60% of the job creation, which is relatively high among OECD countries with comparable economy size (Figure 6). On the other hand, job creation in higher productivity sectors, including "Professional, scientific and technical activities" and "ICT services," is for example similar to Austria, but lower than in Denmark and Sweden.

[1] Churn rate is the total of employer business births and deaths as a percentage of the number of active employer enterprises.

[2] Young firm refers to enterprises up to two years old.

Figure 6. Job creation by new enterprises, selected countries

Sector share in total job creation by new enterprises, 2016 or latest available year

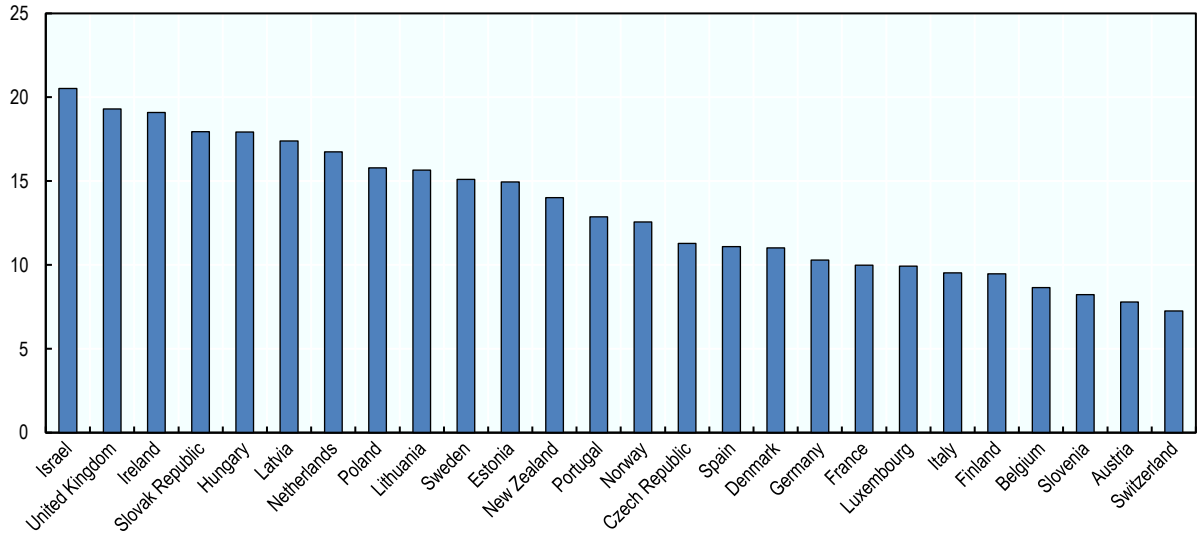


Note: The figure compares Israel with other three OECD countries that are roughly similar in size in terms of GDP and population
Source: OECD SME and Entrepreneurship Outlook 2019.

Israel also has high proportion of High Growth Firms (HGF)[3]. Excluding micro-enterprises, HGFs in Israel employ slightly over 20% of the total employment, compared to an OECD average of 13% (Figure 7).

Figure 7. Share of employment in high growth enterprises (more than 10% employment growth)

Percentage of employment in enterprises with 10 or more employees, 2014 or latest available year



Source: OECD Entrepreneurship at a Glance 2017.

R&D activities

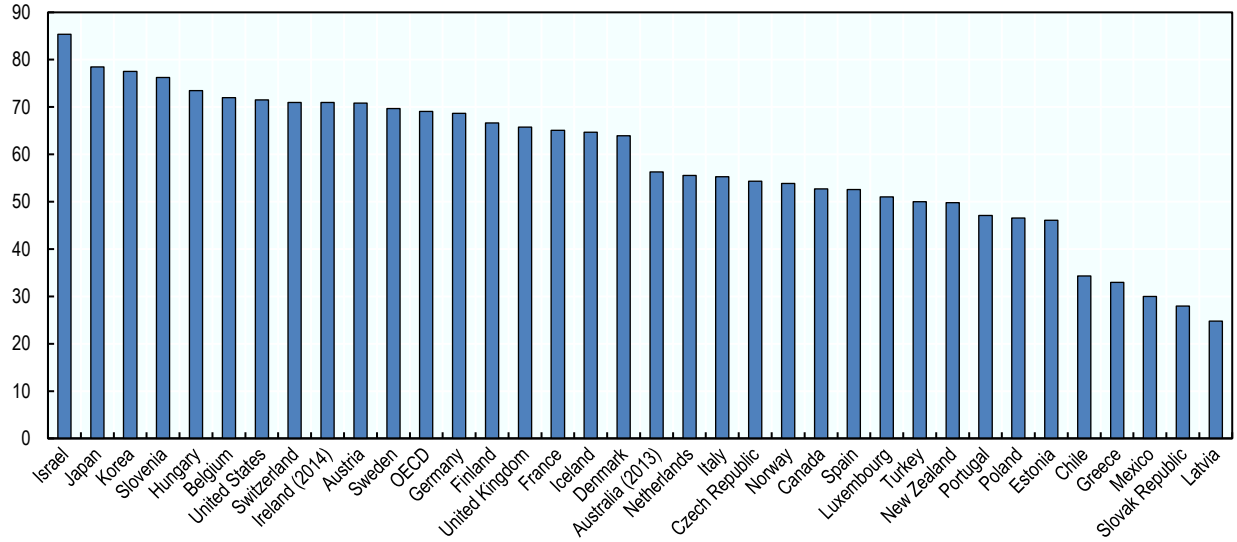
Israel invests heavily in research and development (R&D) and is one of the only two OECD countries whose R&D expenditure to GDP surpasses 4.0%. In 2017, R&D expenditure of Israel was 4.5% of the GDP, compared to the OECD average of 2.4%. Government policy has also been aiming at supporting entrepreneurship and facilitating incubation of innovative ideas. More than 80% of the R&D activities came from the business sector, the highest share among OECD countries (Figure 8). In terms of Business enterprise expenditure on R&D (BERD), SMEs account for 46.2% of the expenditure in Israel, which is relatively high compared to other OECD countries (OECD, 2017[3]).[4]

[3] HGF indicates enterprises with ten or more employees that has average of more than 10% of annual workforce growth over a three-year period.

[4] Data obtained from OECD microBeRD project. See “Notes and references” section of chapter 1 from the OECD STI Scoreboard 2017.

Figure 8. Business R&D expenditure

As a percentage of GDP on R&D, 2015 or latest available year

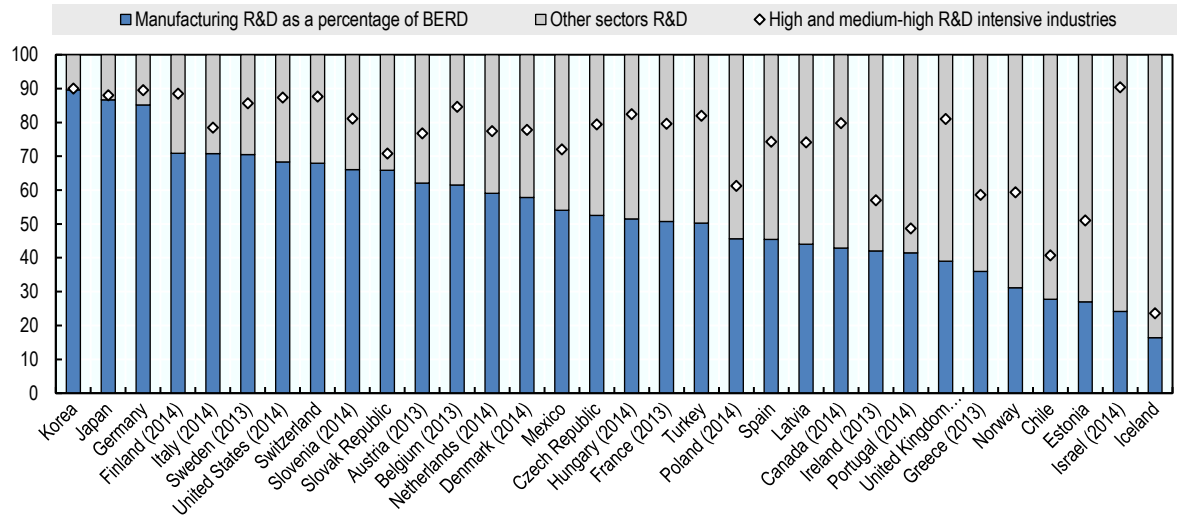


Source: OECD Science, Technology and Industry Scoreboard 2017.

Interestingly, a significant portion of business R&D expenditure (BERD) in Israel is coming from non-manufacturing sectors. These sectors, including services, account for 75.8% of expenditures, half of which is generated in the scientific R&D services industry (Figure 9). On the other hand**,** R&D spending by manufacturing businesses accounts for 24.2% of BERD, which is among the lowest share in OECD countries. In addition, R&D activities in the manufacturing sector are highly concentrated in the high and medium-high R&D intensive industries group (90.3%), which includes “Chemicals and pharmaceutical products” and “Computer, electronic and optical products, electrical equipment, machinery, motor vehicles and other transport equipment.”

Figure 9. Business R&D in manufacturing, by R&D intensity group

As a percentage of manufacturing R&D, 2015 or latest available year

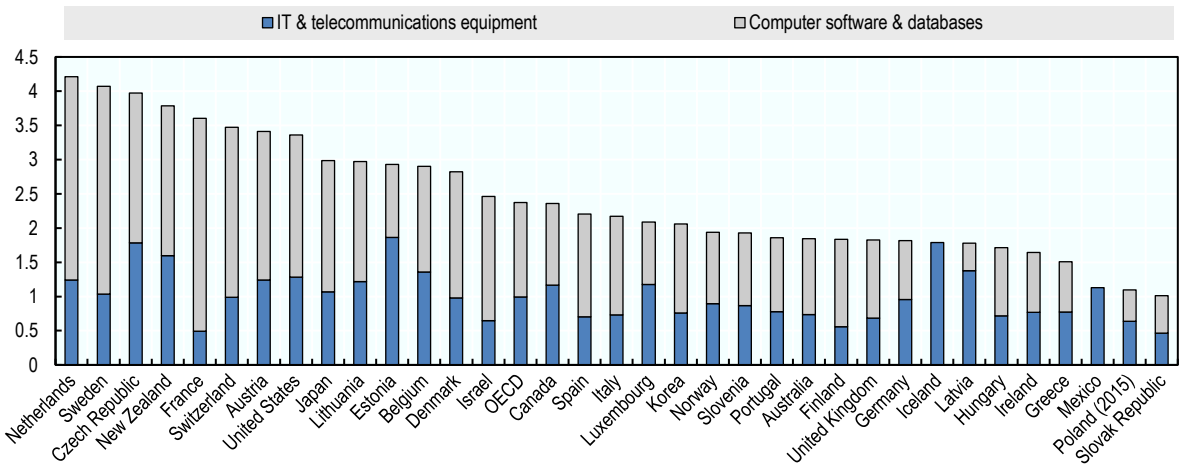


Source: OECD Science, Technology and Industry Scoreboard 2017

While investment on business R&D has been active on both national and enterprise level, most of the innovative activities have been concentrated in the high-tech industry (Israel Innovation Authority, 2019[4]). Furthermore, there is less activity concerning development of general ICT capacity in Israel. In terms of ICT investment activities in proportion to the country GDP, Israel (2.5%) is just above the OECD average (2.4%; Figure 10). Israel invests 0.6% on "IT and telecommunications equipment," compared to the OECD average of 1.0%. In case of "Computer software & database," Israel (1.8%) invests slightly more than an OECD average (1.4%).

Figure 10. ICT investment, by asset

As a percentage of GDP, 2017 or latest available year



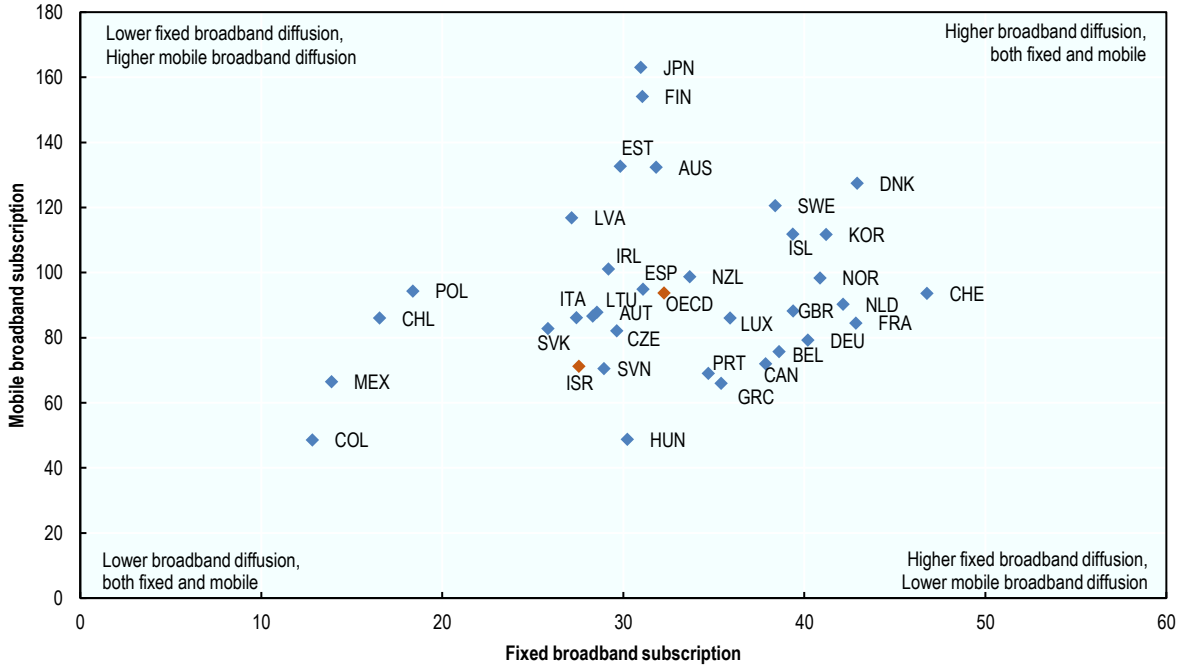
Source: OECD Measuring the Digital Transformation.

However, Israel is experiencing a deficit of ICT infrastructure, which could have a negative impact on the firms' adoption of digital technologies, including blockchain application. Fixed broadband penetration in Israel is at 27.8%, which is lower that the OECD average (32.2%). Having access to fixed broadband is important as it supports faster and more intensive data exchange, which serves as an infrastructure for R&D, on-line sales and other business related activities.

The situation is similar with the diffusion of mobile broadband, which is particularly low in Israel. Mobile broadband provides a flexible solution for both the consumers and the businesses to access the internet and is a basis for proliferation of mobile applications and services (OECD, 2019[5]). The OECD average of mobile broadband subscription, combining both data and voice, is at 99.3 subscriptions per 100 inhabitants, while the figure is 68.9 subscriptions per 100 inhabitants in Israel (Figure 11).

Figure 11. Fixed and mobile broadband diffusion

Fixed and mobile broadband subscriptions per 100 inhabitants, 2017 or latest available year



Source: OECD SME and Entrepreneurship Outlook 2019.

Digitalisation of SMEs in Israel

Access to digital infrastructure is closely related to the issue of accessing innovation assets. Innovation assets include not only technology, but also firm-specific expertise, data, and organisational processes. Usage of digital tools, such as Enterprise Resource Planning (ERP) and cloud computing, allow SMEs to enhance efficiency of their business operations and activities (Bianchini and Michalkova, 2019[6]). Digital technologies also enable broader market access and facilitate SMEs' integration into global value chains (GVCs).

Access and usage of innovation assets are important for both SMEs and large firms alike, but SMEs face greater challenges in understanding and implementing technologies, information and networks. Furthermore, SMEs experience difficulties in integrating themselves in innovation networks at

various levels from local to global, which would help them benefit from knowledge spill overs (OECD, 2019[5]).

As adoption of digital tools and applications can increase SMEs' productivity, it is important for countries to gather data on digital diffusion among SMEs. By keeping track of the degree of digital divide between large businesses and SMEs, the government could understand the status of SMEs' digital adoption, which would serve as a fundamental for conceiving evidence-based policies. Israel could improve its mapping of the digital transition in the country, as many of the main indicators used by policy makers in other OECD countries are not available (OECD, 2019[5]; OECD, 2019[7]).

There are a number of government agencies providing assistance on digital adoption for SMEs. The Small and Medium Business Agency (SMBA) under the Ministry of Economy and Industry provides courses on using online marketing platforms targeted at entrepreneurs of micro and small businesses. The agency also offers consultation services for SMEs through its network of Maof business centres, which are one-stop shops for SME business development services located throughout the country (see last section on policies). While the counselling does not focus solely on digitalisation of SMEs' business process, provision of supports on adoption and training of business related technologies are integral part of the service (see also the section related to policy actions at the end of the document).

The Digital Israel National Bureau is an Israeli government's digital initiative, also referring to the government office within the Ministry of Social Equity. With focus on harnessing the digital economy, the agency provides national level support for digital technology adoption for various actors including SMEs. Digital Israel assists SMEs in utilising the digital tools and provides open data for businesses. The agency's projects enhance SMEs' access to innovation assets, helping SMEs identify business opportunities and make better-informed business decisions.

Another core public agency supporting the digitalisation of SMEs is the Israel Innovation Authority (IIA). Established in 2016, the Israel Innovation Authority oversees government-sponsored R&D activities and establishes strategic objectives for the country's innovative activities. While the authority mainly focuses on providing R&D grants and supports for high tech sectors and young businesses, it also has projects aimed at strengthening competitiveness and productivity of Israeli business sectors.

Box 1. Sector-based digitalisation strategy: Advanced manufacturing

The Government of Israel has developed sectoral approaches aimed at helping SMEs digitalise their business processes, with noticeable inter-ministry efforts targeted at advanced manufacturing. In 2018, the Ministry of Economy and Industry established the National Strategic Plan for Advanced Manufacturing Industry aimed at strengthening Israel's local manufacturing companies through technological upgrading of existing factories. It also includes measures to encourage establishment of companies based on innovative technology innovation, such as including additive manufacturing. Advanced manufacturing refers to implementation of technology in traditional manufacturing, some of which include big data, machine learning, cyber security, cloud computing and Internet of Things, while blockchain technology is not explicitly included (but also not excluded) in the current strategy. Israeli government categorises advanced manufacturing into;

1) Production of advanced products such as silicon Nano products and computer processors
2) Manufacturing using advanced processes and technologies including 3D printing
3) Manufacturing using advanced information technologies, where the production system is based on information system, from data collecting to supply chain management

The IIA operates a division dedicated to advanced manufacturing, with a budget of around NIS 125 million (approximately USD 34.8 million). The division focuses on encouraging R&D processes and technological innovation of the manufacturing industry. The division's programmes include MOFET ("Model" in Hebrew), which aims at providing R&D support to corporations or industrial factories in all technology sectors, from traditional to high-tech.

By supporting digital adoption of traditional manufacturing companies, the government expects that the companies will be able to improve their productivity and increase added value of their production. In addition, competitiveness of the manufacturing SMEs will be strengthened via differentiation of both their products and manufacturing processes. In the longer term, the government expects creation of high-quality employment from the advanced manufacturing and increase of the country's GDP.

Source: (Foreign Investments and Industrial Cooperation Authority, 2018[8])

Chapter 2. The development of the Blockchain ecosystem in Israel

Introduction

The well-developed high-tech industry in Israel constitutes a favourable starting ground for the development of blockchain solutions. The country offers a strong entrepreneurial culture, a large talent pool for R&D activities and abundant financing for high-tech entrepreneurs. The venture capital investment as a percentage of GDP in Israel is the second highest among OECD countries with 0.38%, right behind the United States at 0.4% and consistently higher than all other OECD countries (all at or below 0.1%; (OECD, 2019[7])) Israel is also the OECD country with the highest number of researchers per thousand persons employed (17.43) and the second highest for R&D investments as a share of GDP (4.54% in 2017, closely after Korea with 4.55%; (OECD, 2019[9])).

Israel is an important player in the development of the global Distributed Ledger Technologies (DLTs) industry. This prominent role has been fuelled both by the many innovative blockchain entrepreneurs that decided to start their business in Israel as well as by major international technology groups that have decided to locate their R&D facilities in the country. An example in this regard is the IBM's Research Centre in Haifa, the largest lab of IBM Research Division outside the United States, which recently was selected to lead the IBM's Global Blockchain Research Strategy (IBM, 2019[10]; Ctech, 2019[11]).

The technology was developed to underpin an innovation in the financial sector and in Israel, as elsewhere, the first initiatives were in this sector. The first and most renown application of the technology was in the Bitcoin "Peer-to-peer electronic cash system", which aspired (and aspires) to create a new global payment system that would settle transactions completely bypassing traditional financial institutions (Nakamoto, 2008[12])[5]. A large number of alternative cryptocurrencies have been launched since[6]. In Israel, considerable funds have been raised since 2017 through various channels, including ICOs, to finance a range of new financial services. At a global scale, the subsequent emergence of various forms of "Virtual Assets", whose property rights are cryptographically secured into the chains and can be accessed, shared and leveraged by corporations and citizens across jurisdictions, is opening the way for important innovations but also presents risks. Regulators at international level are working on limiting such risks, in particular regarding Anti-Money Laundering (AML) and Combating the Financing of Terrorism (CFT) practices (FATF, 2019[13]).

The Israeli blockchain industry is developing rapidly in many sectors beyond financial services and has the potential to spread across the economy. Start-ups in Israel are developing Proof of

[5] Key components of Bitcoin's architecture have been developed in cryptographic research decades ago (e.g. Merkle Trees, Hash functions, public-key cryptography and digital signature).

[6] The discussion on how such cryptocurrencies should be recorded in the System of National Accounts is still open at international level (OECD, 2018[72]).

Concepts (PoCs), Alpha and Beta version of blockchain-based applications in multiple sectors, such as healthcare, environment, cybersecurity, supply chain management, international trade, digital identity, creative industry, and voting. These projects are B2C (Business to Consumer), B2B (Business to Business) as well as B2G (Business to Government). For example, DLTs offer distinct features, such as transparency, immutability and auditability, which are particularly interesting for the cybersecurity industry, in which Israel already enjoys a strong competitive position. Being at its core a secure database technology, blockchain-based products can become a major tool to ensure protection of sensitive data, as well as accountability and trust among parties.

Both technical and policy challenges need to be faced for the technology to reach technical maturity and to deliver productivity enhancing solution to SMEs. Use cases of the technology are still considered to be at a very early stage of development, even if key concepts on which the technology is based date back decades (e.g. time stamping (Haber and Stornetta, 1991[14]). Most of the new solutions developed by Israeli entrepreneurs are still at PoC or Beta-test phase of development, with just a few exceptions. A number of challenges (e.g. regulatory compliance, technical scalability, mistrust among consumers, and acceptance in well-established business practices) must be overcome to allow the ecosystem to grow.

Israeli policy makers across Ministries and government agencies can play an important role for the diffusion of blockchain-based applications. Recent actions have aimed to provide clear guidance to firms and resolve uncertainties (for example in terms of taxation and financial regulation), but there is still room for improvement.

The potential of the industry in Israel

Traditional Israeli SMEs would benefit from a higher level of digitalisation in their business processes and blockchain-based business solutions could help boost their productivity in the future, largely through enhanced transparency and traceability. There is a rather broad consensus in the literature about the positive effects digital technologies have on productivity. However, the adoption of digital technologies by firms is not immediate nor automatic: factors as organisational capital and management skills play a decisive role (Brynjolfsson and McAfee, 2014[15]; Draca, Sadun and Van Reenen, 2009[16]; Sorbe et al., 2019[17]). In this context, most of the new blockchain-based business applications present features that make them particularly viable for applications by SMEs. Table 1 lists some relevant examples of Israeli companies building SME-tailored blockchain solutions, to give a more practical understanding of the type of activities performed and type of the value created by the use of DLTs.

The Israeli ecosystem offers a unique mix of financing opportunities for the development of the blockchain industry. As for most of the innovative sectors, financing for new ideas comes from either personal funds, VCs, traditional financial institutions, public bodies, or from combination of the sources mentioned above. In case of enterprises working on blockchain, there has been a very specific alternative way of raising finance from the public during the last couple of years, through a method called Initial Coin Offerings (ICOs). The instruments sold to the public were considered (by their issuers) as "(crypto)-currencies", thus in a different category with respect to securities. However, regulators have increasingly challenged this interpretation, and now in Israel (as in most other countries), tokens issued in ICOs are highly likely to be considered by the relevant authority securities, thus being subject to traditional regulation. Not surprisingly, as this interpretation took hold (starting in the middle of 2018), the number of ICOs has drastically reduced and a rise of Security Token Offerings (STOs) is being observed (ISA, 2019[18]). The main difference of the two methods is that while ICOs generally refer to sales of blockchain-based tokens that could be exchanged for goods or services, tokens issued during STOs provide a right of ownership to engage in corporate governance and entitlement to receive dividends. Nonetheless, the present section provides an overview of all these forms of financing.

Table 1. Examples of SME-tailored blockchain solutions

Blockchain companies based in Israel

	Service	Clients' sector	Rationale for use of blockchain	Added value for SMEs
Wave	Document exchange network for international trade	Logistic-trade	Decentralisation, immutability	Exchange of bill of lading between importers and exporters
Security matters	Supply chain integrity solution	Logistic-trade	Immutability, transparency	Verification of provenance of goods and resources
Halo Digital	Machine-generated data management solution for manufacturing	Manufacturing	Immutability, security	Implementation of IoT network for advanced manufacturing
OUNA	Employment assessment and recruitment platform	HR	Security, transparency	Hiring competent candidates without bias and discrimination
Avenews-GT	Trade platform for agricultural produce	Agriculture	Security, transparency	Less transaction costs and risks from direct transaction between producers and buyers of agricultural produce
QED-it	Enterprise solution for data privacy using Zero-knowledge proof technology	ICT	Decentralisation, security	Implementation of privacy solution for supply chain management system
LogChain	Platform for maritime shipping transaction	Logistic-trade	Decentralisation, immutability	Less transaction risk due to automatically executed smart contracts
Lendoit	Smart contract-based P2P lending platform	Financial service	Decentralisation, immutability	Lending with lower interest rate compared to traditional institutions
Vinsent	Trade platform for wine futures	Agriculture	Immutability, transparency	Less transaction costs and risks from direct transaction between the producers and buyers of wine
Geneyx	Human health and social work activities	Healthcare	Immutability, security	Enhanced access to high quality genomic data

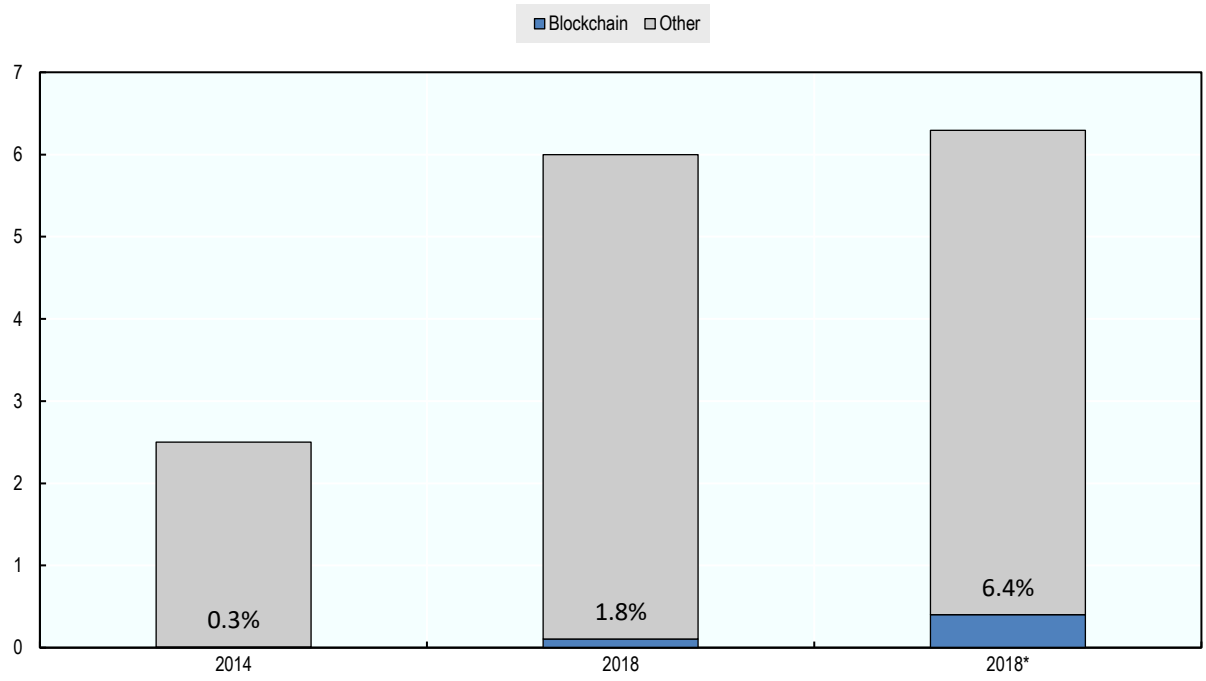
Note: The list presents some relevant examples to give a practical understanding of services targeted at SMEs, but it is not to be considered exhaustive
Source: Authors' analysis

Private financing and venture capital

The VC industry in high technology start-ups in Israel has offered important financing opportunities to blockchain entrepreneurs. This flow of private funds into innovative enterprises constitute a peculiar advantage of the Israeli system that is allowing the blockchain industry to develop at a fast pace. Companies with strong potential are able to find financing at various stages, from seed to growth (successive rounds). It is estimated that in 2018, blockchain companies raised USD 107 million in venture-backed rounds, which shows a strong increase from USD 8.5 million raised in 2014. Even in an expanding VC market in Israel, it means that funds went from 0.3% to 1.8% of the total capital invested by VCs in the country. If we consider also the capital that supported ICOs in 2018, adding to numerator and denominator the approximately USD 250 million raised through that blockchain-specific instrument (see next section), the percentage raises to 6.1% (Figure 12).

Figure 12. Venture capital investments in the blockchain industry in Israel

USD billion



Notes: 2018* considers also the USD 295 million invested in 2018 through ICOs in Israel
Source: OECD analysis based on (SNC, 2019[19])

The activity of venture capitalists in the country is facilitated by the access to updated, comprehensive data on new innovative enterprises, including in blockchain industry. In this regard, the most important source of information is Start-up Nation Central (SNC). The association works at the nexus between venture capitalist funds and start-ups, gathering data regarding all the start-ups operating in the country. Data are sourced directly from the entrepreneurs (most of which have an obvious incentive to be "visible" in a database open to investors), from the venture capital funds (that benefit from a comprehensive database where they can find interesting opportunities) and complemented by the analysts of SNC (SNC, 2019[20]). This kind of database bodes well for how in recent years venture capital funds have shifted to a "spray and pray" investment strategy, providing a little funding (and limited guidance) to a very large number of projects. A strategy that for some creates a bias in favour of innovation projects

where information on future prospects is easily revealed, damaging more complex technologies (Ewens, Nanda and Rhodes-Kropf, 2017[21]).

Some commenters suggest as well that the continuous quality improvement of the teams and entrepreneurs operating in the sector is another positive aspect for the investors. . Various observers note how in 2017, during the "Crypto-hype" period, most projects were launched and supported by visionaries with little to no operational and organisational experiences. In 2018, there was a considerable shift, with a number of renown entrepreneurs and investors flocking to present new projects, attracting top talents and posing the basis for the rapid evolution of the sector (Levy Weiss, 2019[22]). This process indicates as well the path to maturity of the blockchain industry, which is still to be achieved.

Public investment

An increasing number of blockchain companies are looking for public support and financing, in particular through IIA's programs. During 2019, an increasing number of blockchain-related projects have tried to secure funding from one of the technology neutral programme of the IIA. To date, the IIA has supported around 10-15 blockchain projects, of which more than half since the beginning of 2019, with an investment of around NIS 30 million (USD 8.5 million). The support was granted to companies at all company lifecycle stages. This is still a very small share of IIA's total investments (in 2018 the agency invested USD 480 million in 1 500 projects in 900 companies) but its rapid growth from close to 0 in 2017 deserves attention.

ICO and STOs

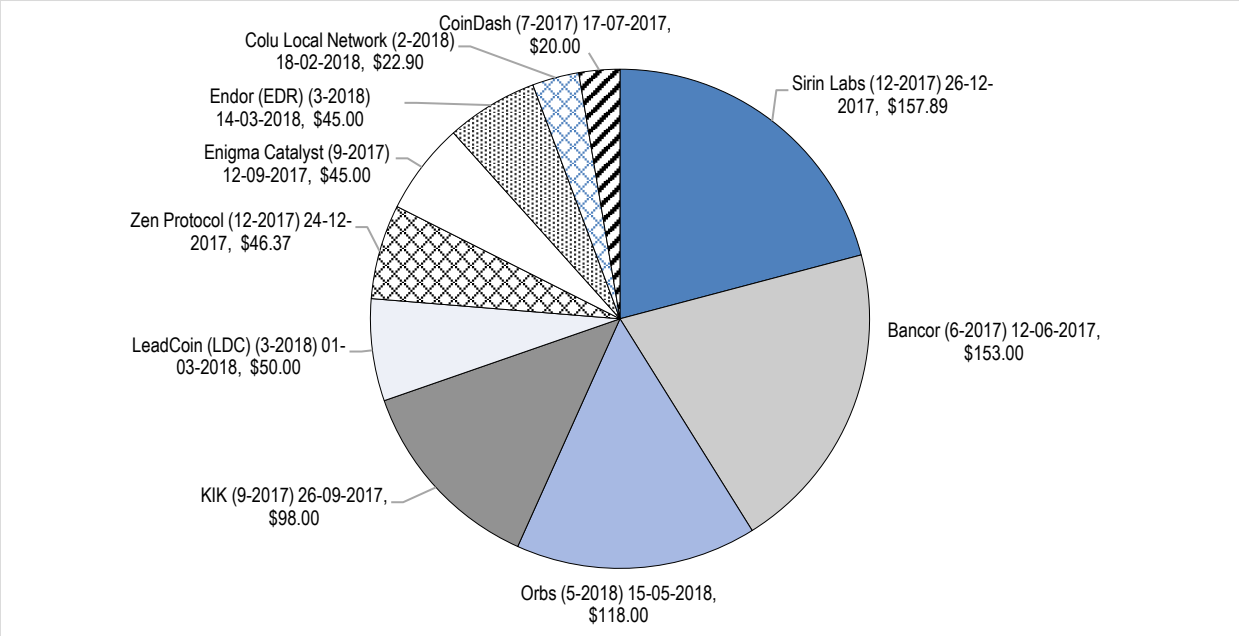
ICOs are a special form of funding that backed the rapid growth of the blockchain industry, in particular between 2017 and 2018. ICOs are one of the most renowned applications of blockchain technology in finance, as they have allowed SMEs and start-ups to obtain abundant funding from non-traditional sources. They have also allowed investors to access semi-unregulated investment opportunities starting from the very early stage.

The ICO "hype" in the second half of 2017 and first half of 2018 included many Israeli companies. In order to raise capital, an increasing number of enterprises started issuing their own tokens, which took different forms[7]. Israeli start-ups had a very prominent role with a share of approximately 4% of global ICOs and some large ICOs attracting worldwide attention: for example Sirin Labs and Bancor were among the top 10 ICOs worldwide for funds raised (respectively 8th and 9th), followed by Orbs (13th) and KIK (16th) (CoinDesk, 2019[23])). Figure 13 illustrates the main ICOs and the funds raised in this period.

[7] For a full classification of tokens type please refer to Euler's Token Classification (Euler, 2018[60]).

Figure 13. Main Israeli-based ICOs

USD million, 2017-2018



Note: Some of these companies, even if fully or mostly operating from Israel and based in Israel at the time of the ICO, are now located in different administrations (e.g. Sirin Labs is now based in Switzerland)
Source: OECD elaboration based on (CoinDesk, 2019[23]) and (Elementus, 2019[24])

However, starting in the second half of 2018, ICOs declined both worldwide and in Israel, opening the field for STOs, SAFTs and normal equity rounds. Various factors contributed to the increasingly scarce use of this instrument. On the one hand, many projects were not able to deliver on the promises of their white paper, as the technology was not still at the necessary level of maturity. On the other, regulations caught up, clarifying the necessary compliance for different type of tokens and initiatives[8] (see chapter 2.3). Even if it appears that institutional investors have not opened large positions in the crypto-assets space, stakeholders as venture capitalist and hedge funds started using different means to securing early access to promising blockchain project. One example of such instrument are the SAFTs that ensure the conversion of the investors' assets in tokens once the company issues them. Another are STOs, which are a regulated version of ICOs in which the issue of tokens is considered a security event that falls under traditional regulations and taxation. Together with usual equity rounds, financing of innovative start-ups in the blockchain space is going back to the more traditional start-ups investment patterns where early access is open only to professional investors (OurCrowd, 2019[25]; ISA, 2019[18]).

The companies introducing blockchain-based services in the Israeli market

The number of start-ups and companies working on blockchain solutions is high considering the relatively small size of the Israeli market. Most estimates place the number of "blockchain-businesses" between 150 (Start-Up Nation Central, 2019[26]) and 200 (Israeli Blockchain association, 2019[27]). This figure is inherently unstable for the loose definition of "Blockchain start-up" and their high churning rate

[8] Many early ICOs played around the fact that their "cryptocurrency" would not be considered as securities and so was not regulated or taxed as such.

(new businesses entering and exiting the market), but it gives an idea of the number of projects that are being developed in this area in Israel.

Box 2. Definition of "Blockchain company"

The present report refers interchangeably to blockchain company or blockchain-based application provider/developer. The firms analysed are based (fully or in part, see next section) in Israel and are developing such services in the Israeli market. Particular attention is accorded to firms developing blockchain-based applications aimed at serving SMEs in their business processes.

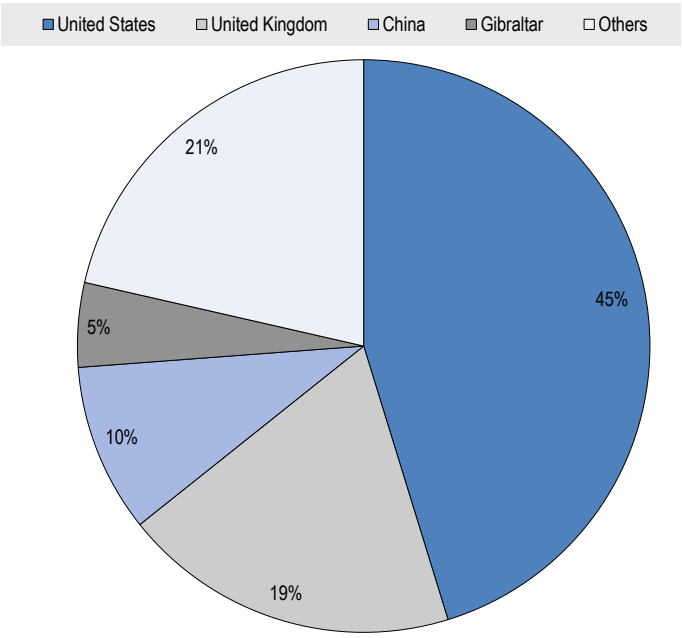
Landscape of businesses offering blockchain-based applications in Israel

The present analysis focuses on a total of 115 companies providing or developing blockchain-based application, excluding pure crypto-exchanges. The database includes companies that are present in both the Start-up Nation Central database and/or in the list of the Israeli Blockchain Association, integrated with direct research and insights from interviews.

Just over three fifths of the companies in the database have their entire operation in Israel. Most of the companies (63%) have their entire operations in Israel, another 32% are headquartered in Israel with branches overseas and the remaining 6% are companies based overseas with a team operating in Israel. Figure 14 illustrates the main connections with other countries of the blockchain companies.

Figure 14. Overseas presence of companies headquartered in Israel

100% = 42*



Source: OECD analysis based on Start-Up Nation Central and Israeli Blockchain Association data

More than half of the overseas operations took place in the US (45%) or in the UK (19%), followed by China (10%). Another evidence of the deep linkages between the U.S., U.K. and Israeli VC industries. Then after Gibraltar (5%), there were a number of other countries with a single cross-border company: France, Estonia, Malta, and Austria. It is also interesting to not how at least six companies headquartered in Israel have operations in multiple countries around the world. All these companies had at least one team in the US, plus additional operations either in the UK, in Germany, France, Hong Kong, Denmark, Cayman Islands and/or Virgin Islands.

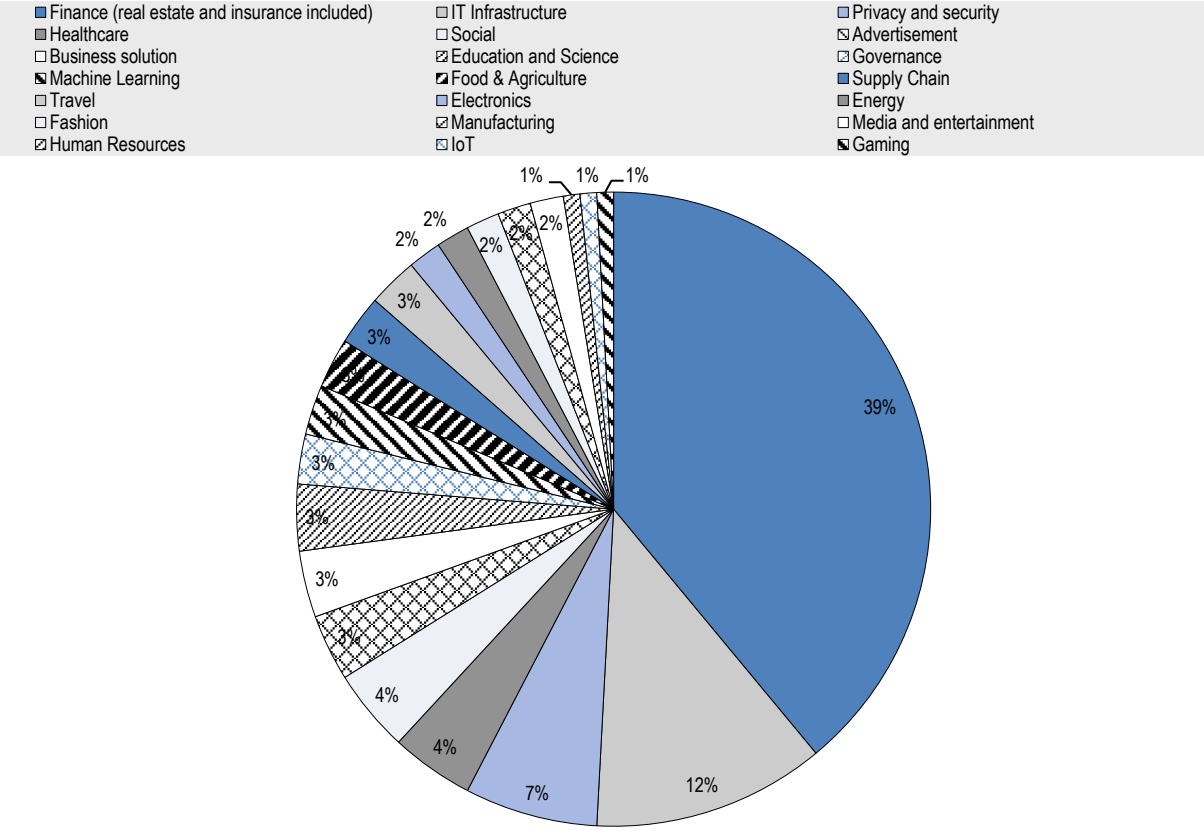
An additional nine companies are present in Israel only as a regional branch of companies based elsewhere. In particular, these companies are based in the UK (4), US (3), China (3) and others. Most of these companies, even if headquartered elsewhere, have an Israeli CEO, Founder or Co-founder.

These companies are serving or plan to serve clients in a large number of sectors in the economy. As shown in Figure 15, financial services is the largest sector, being the industry in which blockchain-based applications are more mature, but it is clear that blockchain is not solely a financial technology. By classification, most of these companies are in the ICT sector, as they are developing blockchain-based solutions. Nevertheless, the SMEs they are targeting as clients operate in healthcare, gaming, advertisement, public sector, travel, logistic and many more.

Most of the services are developed for the financial industry (including insurance and real estate) or for IT infrastructure, but in Israel, there is also quite a large activity for Privacy and Security and a number of other sectors. About 50% of the new applications are developed in either finance (39%) or IT infrastructure (12%), but the other half are distributed across many sectors in the economy. The third most important sector is Privacy and Security, a sector in which Israel is a global centre of excellence (it is estimated that approximately 20% of global VC investments in cybersecurity was in Israel in 2018) (Press, 2019[28]; IIA and SNC, 2018[29])). However, a number of businesses are creating solutions for healthcare, social media, advertisement and business support, among others (Figure 15).

Figure 15. Sectors targeted by developers of blockchain services

100% = 119 companies



Source: OECD analysis based on data from Start-Up Nation Central, Israeli Blockchain Association and own research

Most of these projects are still at early stages of development and only a few of them have already hit the market. However, even at this early stage, the technology shows a large potential for "pervasiveness", as entrepreneurs, programmers and scientists are experimenting with applications in many diverse areas of the economy. It can be expected that many of these experiments will not achieve the commercialisation stage but the innovation process will possibly select a few winners that might have a large impact in the future. Indeed some authors indicate blockchain as the next General Purpose Technology[9].

[9] A technical development is considered a "General Purpose Technology" when it presents the following properties: it can be improved overtime, it can become pervasive and it can open up the field for complementary innovations (Bresnahan and Trajtenberg, 1995[63]).

Results of the survey

An online survey was developed to gather direct information from CEOs, founders and/or co-founders of Israeli blockchain companies. The survey was conducted between May and June 2019. The sample was restricted to the 105 blockchain-companies identified in our database. The response rate was around 20%, which allowed gathering of some interesting evidence even with a relatively "light" survey that required approximately 10 minutes to be completed. Respondents were for the most part either CEO, Founders or Co-Founders of the firms. For some companies of particular interest – i.e. firms offering services specifically targeted at SMEs – the team conducted direct phone or in-person interviews to obtain information that is more specific and complement the survey results.

The survey was divided in five sections, to assess different relevant aspects: company information, product, business process, clients, and policy barriers. Firms were asked to discuss their operational structure and their strategy, providing a few technical details to understand the product they are developing or deploying and the type of clients it is directed to. To conclude, entrepreneurs were asked to identify the main challenges they are facing in doing business in Israel and how policy could help.

Company information

Respondents were small companies with an average of about eight full-time employees, with a minimum of two and a maximum of 25. Some of the companies had also part-time employees on the payroll (3 on average). Often these companies employ mostly programmers and researchers working on product development. 95% of respondents have their headquarter in Israel and 90% did not have any subsidiary abroad.

The distribution of surveyed firms across sector is relatively similar to the distribution of the general sample. To be more precise, while the financial services sector is under-represented (11% in the sample, 39% in the population) and the IT infrastructure over-represented (21% in the sample, 12% in the population), the remaining target sectors are evenly distributed, just as in the general population.

Most of the companies have been founded within the past 2-3 years, which reflects the relatively recent development of the technology and its early stage of development. As illustrated in the next section, a large share of these companies are start-ups that have not yet gone to the market with their product yet.

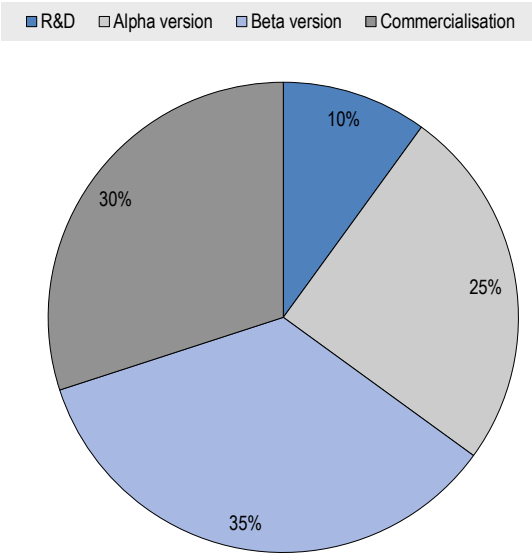
Product

Most of the products developed by the companies are still at a development stage or at early commercialisation. This is consistent with the general stage of the industry at global level, as most applications are still being tested before the full rollout in the market. Figure 16 presents the share of products (software) that are being developed dividing them in four synthetic stages:

- R&D – still researching the best way to deliver the service;
- Alpha version – first trial of the software, usually available for testing only to the employees of the firm or few selected stakeholders. Usually this version is unstable but is useful to show what the product could deliver at later stages;
- Beta version – after the Alpha version, the developers share and allow access to the software to a larger group of controlled stakeholders outside the company, to receive feedback and understand the issues related to scale, before its general release;
- Commercialisation – when the software is ready and officially released to the public, involving as well other operations in the company (e.g. sales, marketing etc.). Still, even the 30% of companies that reported to be in the commercialisation stage were at a very early stage (not reporting any profit in the previous year).

Figure 16. Development stages of blockchain-based applications in Israel

100% = 20 CEOs of Israeli blockchain firms (respondents to the OECD survey)



Source: OECD Survey

An important aspect to understand the evolution of the industry is to look at which kind of blockchain software architecture have been chosen in the development of new products in Israel. For a business offering blockchain-based application, the choice of which type of blockchain protocol to use is crucial, as different protocols entail markedly different properties. Analysing in detail the technical differences of these protocols would go beyond the scope of this paper[10]. Thus, the present section describes only the core features that can help understand the relevance of this technical aspect in the Israeli context. The analytical framework proposed by Hileman & Rauchs identifies four possible types of blockchain (Hileman and Rauchs, 2017[30]):

1. "Public permissionless": anyone can become a node of the network, being able to "read" any transaction registered on the blockchain and to "write"/modify it, contributing to its development. Modification of the blockchain would be in any case regulated by a "Consensus protocol" embedding Byzantine Fault Tolerance (BFT) and impeding "double-spending" (e.g. Proof of Work, Proof of Stake, and Delegated Proof of Stake) which guarantees the integrity of the open chain.
    a. Main properties: openness; full decentralisation of decision-making power; outstanding security (at scale); full transparency; immutability.
    b. Examples: Bitcoin, Ethereum
2. "Public permissioned": open to be "read" to the public, but only authorised stakeholders can become "nodes" and "write" in the blockchain (e.g. generate a transaction).
    a. Main properties: lower decentralisation, as a central operator would be able to control who can write on the chain; relative openness and transparency; faster

[10] For a more comprehensive overview, refer for example to (OECD, 2018[64])

than permissionless as validation does not necessarily need a complex consensus protocol.

b. Examples: Supply chain of a brand that wants to be transparent about the sources of its products – experiments in Walmart and Carrefour; logistics

3. "Consortium": open to "read" and "write" only to partners in a consortium. It might help create trust among the participants but still the decision-making would be centralised.

   a. Main properties: centralisation (administrator with decision making power overt the chain); high speed as all participants would enter the consortium only if trusted, thus not needing further validation for their activities in the blockchain, that would in any case remain transparent; efficient; reliable (as there is an administrator to refer to in case of problems); easily scalable.

   b. Examples: Hyperledger Fabric, Hyperledger Sawtooth, Quorum

4. "Private permissioned": usually corporate databases internal to a group, where the central administrator confers both the possibility to "read" and "write" on the blockchain.

   a. Main properties: speed (see above); tailored solutions; timely system management, updates and needed modifications;

   b. Examples: external bank ledger shared with between parent company and subsidiaries

Of these four categories, the "public permissionless" blockchain is the most disruptive in terms of innovation potential. Advocates of "pure" blockchain often sustain that only permissionless blockchains can be considered actual blockchains. While Byzantine Fault Tolerance (BFT) can be achieved as a useful method to enforce trust also in some of the Permissioned version of blockchain, permissionless are the only ones to be fully decentralised (while all other systems need a central administrator), and thus truly "revolutionary" in their decentralisation of decision power across the network. The decentralisation of decisions has also led to cathartic moments that put in discussion the decentralised structure of the system, the most famous example being the DAO case in 2016 in the Ethereum network[11] (De Filippi and Wright, 2018[31]; Werbach, 2018[32]). Nevertheless, the use of these blockchain is particularly interesting as an evolution of Peer-to-Peer (P2P) and is therefore particularly apt for B2C (Business –to-Consumer) and C2C (Consumer-to-consumer) applications.

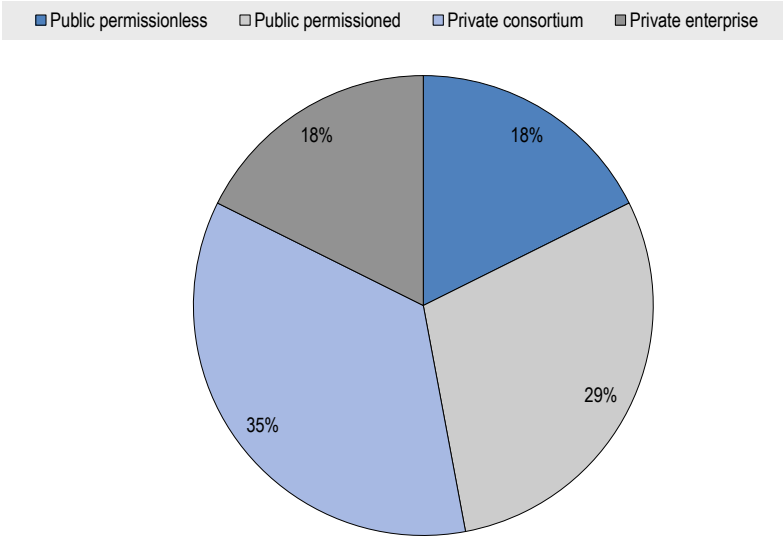
However, across the globe and in Israel we are seeing a number of projects are observed that focus on permissioned system. The presence of a central administrator guarantees higher speed and the possibility to modify the records, which are attractive features for corporations approaching this technology or willing to use it in B2B (Business-to-business) or B2G (Business-to-Government) markets. Moreover, some academics are actually advocating the greater importance of Permissioned blockchain, as a way to reach more achievable decentralisation by pushing forward edge computing - as a development of the current system of cloud computing dominated by a few giants' data centres (Lopez, Montresor and Datta, 2019[33]).

[11] The DAO (Decentralised Autonomous Organisation) was an attempt in 2016 to build a smart contract whose code would embed the bylaws of the decentralized organization, using token governance rules to take decisions. Built on the Ethereum blockchain, the smart contracts was exploited a vulnerability in the code to syphon out as much as 3.6 million ETH. The hack brought to a "hard fork" pushed by the Ethereum foundation, opening a heated discussion about the actual decentralisation of decision power. For a comprehensive discussion of its implication, see for example (De Filippi and Wright, 2018[31]) and (Werbach, 2018[32]).

In Israel, it appears that the approach is quite balanced, with more or less half of the respondents using "public" blockchain and the rest using "private" ones (Figure 17). About half (47%) of the businesses are using public blockchain, of which 18% permissionless and 29% permissioned. The remaining 51% opted for private blockchains, either in the form of consortia (35%) or intra-enterprise blockchain (18%).

Figure 17. Types of blockchain architectures used by Israeli blockchain-based application providers

100%=20 respondents



Source: OECD Survey

Blockchain-based products are particularly valued for their augmented security, but also for their novelty, efficiency, price, enhanced access to international markets and transparency. When asked about the most appealing feature of their product to their customers, most entrepreneurs pointed at "Security", followed by "Novelty" (new solution to an existing problem), "Efficiency" (simplifying the business process), "Convenient Price" and "Easier access to international markets". Some companies also indicated specifically "Increased transparency" as a core feature desired in their product, together with the possibility to have more control on data sharing. Nevertheless, "Enhancing digital security" was by far the most important factor bringing value added to clients. As a database technology, new DLTs system are often proposed to store, gather and manage sensitive information for businesses and consumers. The decentralised nature of blockchain-based solution brings considerable advantages in terms of system security, and new applications include the possibility for the owner of the information to give access to only a specific sub-set of them. For example, a business willing to show only the compliance to standards of its suppliers without divulging the structure of its supply chains; or patients willing to transmit only data relevant to a specific situation without sharing their complete medical history.

Business process

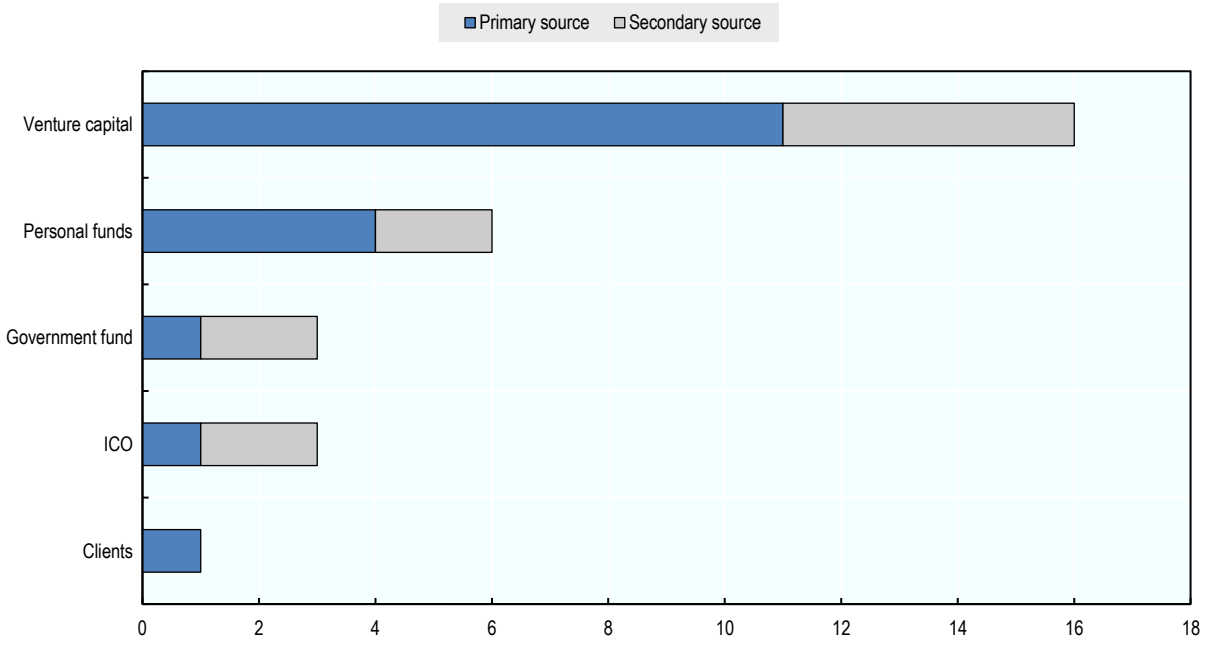
Venture capital was by far the most used form of financing for Israeli start-ups working on blockchain-based applications, according to the OECD survey. This is a very distinguished feature of the Israeli market. Innovative enterprises can rely on one of the most dynamic venture capitalist market in the world for both seed and growth financing. It is an outstanding opportunity for businesses as Israel is one of the only two OECD economies (together with the United States) where the venture capital industry represents more than 0.35% of GDP, against an OECD average of 0.05%, and growing (OECD, 2019[34]; OECD, 2017[35]).

It is interesting to note that firms that went through ICOs also received venture capital financing. This suggests that ICO procedure are not only a standalone procedure but could also be seen as a way to "get on the map" and raise interest among traditional investors (and in one case even obtaining a grant from the Ethereum Foundation).

A few companies active in the security and healthcare sector received also government grants to finance their activity. As illustrated in Figure 18, this was by no means a major financing channel, but an increasing number of companies are looking at public programmes to obtain financing, for example from the IIA.

Figure 18. Financing sources for Blockchain businesses

Absolute number of responses



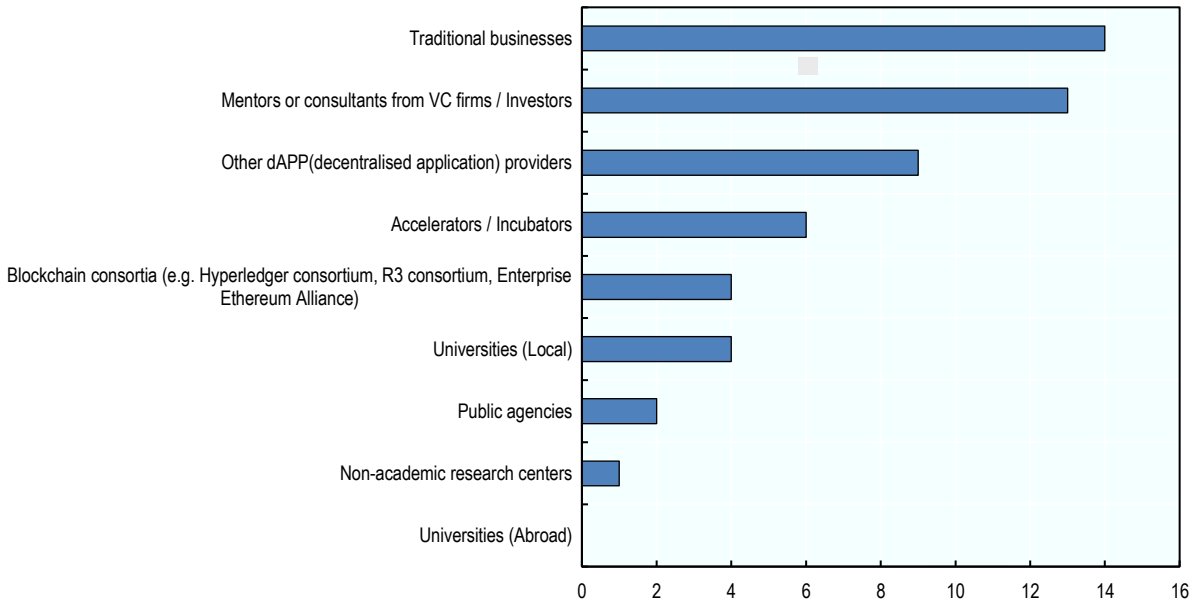
Note: Secondary sources were included only when relevant
Source: OECD Survey

Blockchain firms mostly cooperated with traditional companies (suppliers and clients), and with mentors or consultants introduced by venture capitalist funds and other investors. Understandably, companies at an early stage of development of new products need to have particularly deep links with potential clients to tailor the product to their needs. From the data, it is also apparent the other important function of venture capitalists in industry: other than equity investments, funds usually provide counselling and mentoring to companies in their portfolio, bringing value to the business process and supporting their growth.

Intra-industry cooperation seems still relevant in the Israeli blockchain ecosystem, while connection to Universities, public agencies and research centres is limited. Firms seem relatively keen on cooperating with other decentralised application (dApp) providers, Accelerators and Incubators, and international Blockchain Consortia. Cooperation with research centres and universities appears quite limited, but there are some cases of joint work with Israeli universities and public agencies in security, healthcare, agriculture, and infrastructure.

Figure 19. Forms of cooperation of Blockchain firms in Israel

Absolute number of responses



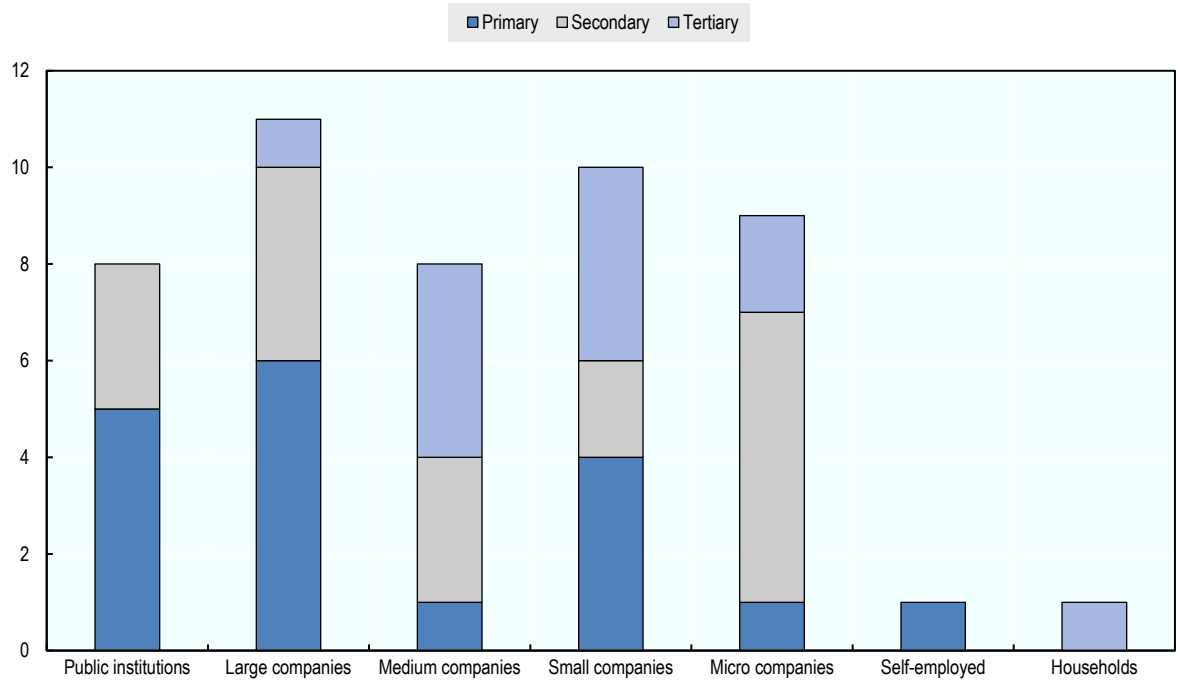
Note: Respondents could indicate up to 3 responses
Source: OECD Survey

Clients

Most Israeli start-ups are developing blockchain-based application for public institutions and large companies as a primary client, but also for other SMEs, while only a few are targeting households. Companies developing blockchain solutions often identified their primary clients as either large companies (250+ employees) or public institutions (see Figure 20). This is understandable, as it is more likely that large players will have more resources to experiment and pilot the integration in their systems of a new technology. Small businesses, having fewer resources in terms of time and financial capacity, usually wait for the technology to be more mature and tested before they adopt it. An intuitive evidence confirmed by multiple recent surveys (Violino, 2018[36]; Pickup, 2017[37]; Caramela, 2018[38]). In addition, some of the most interesting use cases emerged up to this moment of this database technology (e.g. supply chain, health data) are particularly interesting for larger players with structured value chains and complex systems to manage.

Figure 20. Target clients for blockchain-based solutions in Israel

Absolute number of responses



Note: Respondents could indicate from 1 to 3 responses
Source: OECD Survey

Interestingly, most of the companies targeting large companies as primary clients are also targeting SMEs. Many of the companies interviewed were creating products based on blockchain that would help large companies in their relations with suppliers, typically SMEs. Blockchain applications are particularly well versed for this kind of task, as what is needed is a reliable, secure, transparent, and up-to-date database ensuring trust among different economic stakeholders. A good example is trade: the activity of Wave (see Box 3), an Israeli start-up, and the case of TradeTrust (see Box 4), a blockchain system implemented by the Government of Singapore to increase the efficiency of trade related activities.

Box 3. Example of logistic management through blockchain - Wave

Wave, a start-up based in Israel, provides a blockchain-based peer-to-peer network for exchanging digitised documents. The decentralised network, also called Wave, connects banks, carriers, traders and other trade-related parties through blockchain technology. As blockchain is immutable, verification of electronic documents is made possible without the need of having servers nor a central entity in the network. Documents stored on blockchain are exchanged and tracked without making electronic duplicates between the sender and the receiver, which could guarantee important efficiency gains for SMEs.

The network is interoperable with legacy systems, which facilitates integration. SMEs can manage document ownership with ease through the network. In addition, disputes from inaccurate data and risk of fraud are significantly lowered when compared with paper-based trade, as there is no need for

manual data input in different systems. Aimed at facilitating document exchanges, the network is expected to reduce trade-related costs for companies and expedite trade transactions.

The start-up received supports, including USD 2.5 million seed investment, from "Barclays Accelerator, powered by Techstars," a jointly established acceleration programme between Barclays and Techstar, which operates both accelerator programme and ventures. The company worked with various actors including banks, regulators and accelerators in developing the network. From the academia, Interdisciplinary Center (IDC) Herzliya provided assistance in examining legal aspects of its service regarding the international trade law.

The first transaction in the network was conducted in 2016 with one of Barclays' clients, where a trade process was shortened from 7 days to less than four hours. Wave is one of the first companies to commercialise blockchain-based trade transaction, and shipping carriers including Zim Integrated Shipping Services, Mediterranean Shipping Company (MSC) and Maersk are using the network, exchanging trade documents including bills of lading, bills of exchanges, promissory notes and bank guarantees.

Sources: OECD Phone interview, Wave's website (http://wavebl.com [Accessed on July 11th, 2019]), Start-up Nation Central's Start-up Nation Finder (https://finder.startupnationcentral.org/company_page/ogy-financial-services, [Accessed on July 17th, 2019]).

Box 4. TradeTrust, Singapore

Rationale and objective of the programme

Singaporean government identified paper-based trade as one of the significant non-tariff barriers in trade activities. Traditional systems using paper documentation require hundreds of pages to be printed and shared among numerous parties. As exchange of physical documents takes time, it not only delays shipments, but also incur costs to the parties. There is also a higher risk of fraud, loss and damage of document, resulting in lower trust in the system.

In 2018, Infocomm Media Development Authority (IMDA), a statutory board under the Ministry of Communications and Information (MCI), conceived TradeTrust framework as a means of facilitating cross-border trade. The objective of the framework is to develop a blockchain-based digital infrastructure that would expedite exchanges of trade documents while maintaining interoperability with other systems.

Implementation of TradeTrust is expected to increase efficiencies of trade related activities while lowering operation costs for businesses. By reducing time and cost related to import/export activities, it is predicted that the country could improve its ease of doing business.

Challenges

By utilising blockchain technology, TradeTrust aims to solve the problem of the inherent lack of trust among various actors involved in trade activities. The distributed ledger technology will ensure authenticity and origin of the documents exchanged between various actors, as the system will be tamperproof.

Recent progress

In January 2019, IMDA signed a MOU with Maritime Port Authority of Singapore, Singapore Customs and the Singapore Shipping Association, establishing a partnership to conduct TradeTrust pilot in maritime trade industry. During the pilot, electronic bill of lading (eB/L) is to be developed and tested. To facilitate development of the new system, MCI introduced its plan to amend the country's current Electronic Transactions Act (ETA) to recognise bill of lading in digital form.

While conventional digitalisation efforts have resulted in fragmented digital ecosystems, each with its own silo groups of users, IMDA, in its Request for Information, places emphasis on creating an interoperable framework, where electronic trade documents can be exchanged between various digital ecosystems with only one membership, without data discrepancies.

In order to ensure interoperability and compatibility of the framework with current systems, the first node of the TradeTrust will be hosted on the Networked Trade Platform, which is a one-stop platform for trade information management currently in operation in Singapore. In addition, to achieve interoperability across borders, IMDA requires the framework to comply with United Nations Commission on International Trade Law (UNCITRAL) Model Law on Electronic Transferable Records, and the standards established by United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT).

Relevance for Israel

- Digitalisation of customs' processes and systems managing cross-border trade in an inter-operable system open to trading SMEs, could benefit SMEs by cutting trade-related transaction costs and shortening the process.
- Ensuring interoperability of blockchain-based system with current systems both domestic and abroad need to be considered from the conception stage.

Further information

- MCI (2019) [Factsheet] TradeTrust: A Trusted Global Network for Digitally Interconnected Trade Documents: https://www.mci.gov.sg/~/media/mcicorp/doc/budget%20workplan/cos%202019/cos%202019%20factsheet%20-%20tradetrust.pdf?la=en [Accessed on June 13th, 2019].
- IMDA (2019) Request for Information: TradeTrust Digital Infrastructure: https://www.imda.gov.sg/-/media/imda/files/industry-development/call-for-proposals/trade-trust-rfi_002_final_march21.pdf?la=en [Accessed on June 13th, 2019].

A bit less than a third of companies (29%) are focusing on the Israeli market, while all the others are targeting either specific foreign markets or global markets as a whole. Some of the entrepreneurs targeting specific markets have received funding from investors in these markets, while other companies are by design creating products that are thought to leverage the digital reach of blockchain technology to be accessed all over the world. Discussion with entrepreneurs highlighted that there are significant barriers in developing a product specifically for the Israeli market, as the market is relatively small (~9 million people) and has a unique language. Nevertheless, the main barrier in developing products for the Israeli market appears to be the need to comply with specific regulation that would not apply to larger markets (as the U.S. or Europe), thus obliging the start-ups to incur high compliance costs. This fact leads many companies to focus on products that are compliant to U.S. and/or European regulation first so that they have a better chance of scaling up.

Barriers to business development

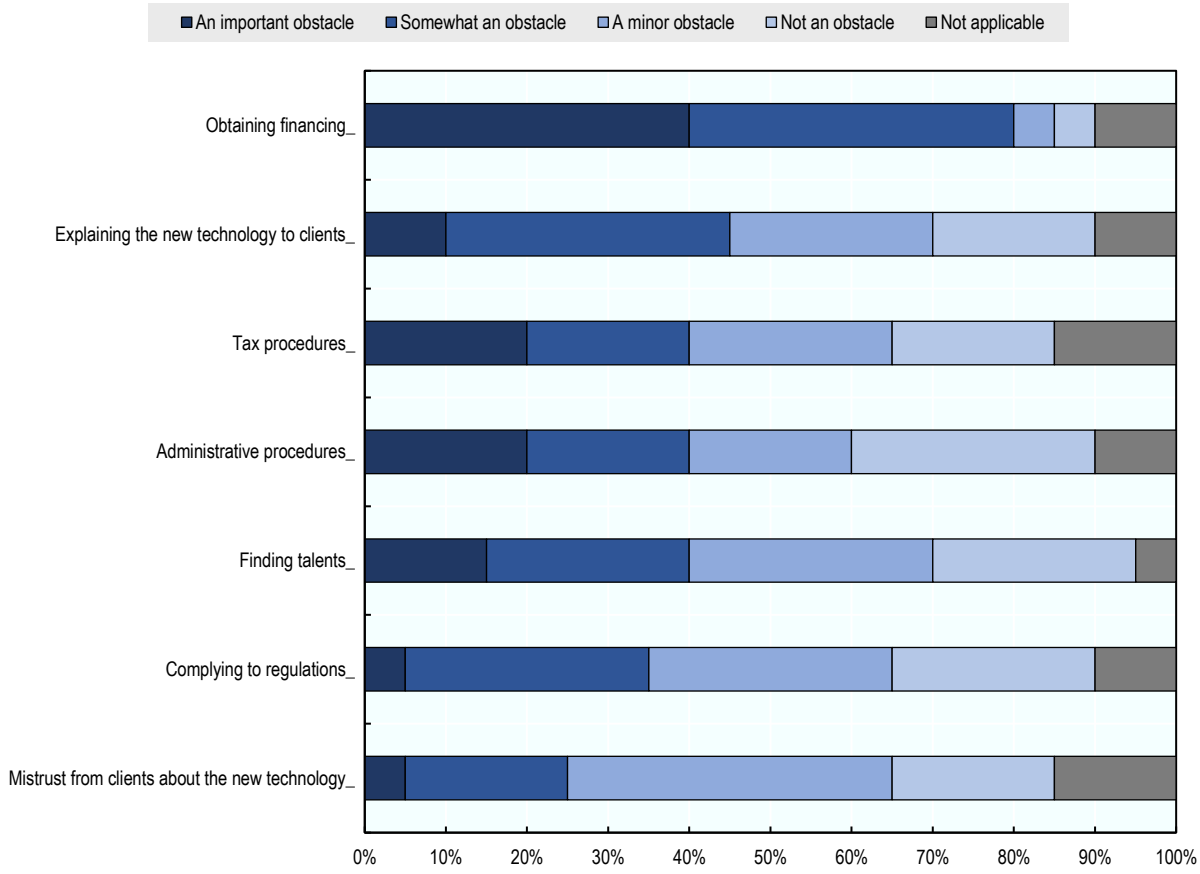
Asked to select among some of the most common barriers to business, Israeli blockchain entrepreneurs indicated both traditional and technology-specific barriers, the major being "obtaining financing". Despite active VCs and alternative financing options mentioned above, most of the businesses found that access to finance was either an important or somewhat an important barrier to business (see Figure 21). Several entrepreneurs pointed more explicitly to the difficulties in engaging with Israeli banks. Although access to credit does not seem to be a significant issue for Israeli SMEs in general[12], this is a major concern raised often by blockchain companies. Under then Israeli financial regulation, banks can only open accounts to licensed operators that can guarantee AML standards. However, this may not be obvious for innovative start-ups operating in a specific niche that might not fall under existing categories.

With lack of clear regulation, financial institutions tend to perceive companies issuing or dealing with digital tokens, as too risky to cooperate, thus turning down requests. This was also the case for blockchain companies that are not involved in cryptocurrency-related activities, due to lack of distinction between cryptocurrency and blockchain technology. The early stage of the technology development, and its intrinsic potential to be disruptive, especially in the payments and financial industry, adds to these challenges as this differentiates DLTs from other technologies at a similar stage of evolution. This is not an issue specific to Israel, as most financial institutions and blockchain SMEs in advanced economies face the same difficulties. Northern European countries (Box 6) offer an interesting example, as the implementation of clearer AML/KYC regulation is helping to overcome this issue.

[12] Israel scored 65 out of 100 in the "Getting Credit" dimension of the World's Bank Doing Business indicator, which is above the average of OECD high income countries (64 out of 100; (World Bank, 2019[41]).

Figure 21. Barriers to business for blockchain start-ups in Israel

Share of surveyed companies



Source: OECD survey

The second most important barrier for blockchain businesses is the difficulty of explaining the new technology to clients. The lack of awareness and understanding of the technology is an obvious barrier to its adoption. While this is less of an issue for large companies, it is particularly true for small and medium enterprises, as it is more difficult for them to adopt a new technology that has not been tested from the market, even if it could grant a competitive advantage. However, in many countries the misunderstanding of the technology extends also to public officials that could leverage blockchain-based applications to deliver public services and manage citizens' data more efficiently (Berryhill, Bourgery and Hanson, 2018[39]).

The complexity of administrative procedures and of tax compliance are impediments to business that are beyond the blockchain ecosystem. 40% of respondents indicated that tax procedures, administrative procedures and complying to regulations (35%) were somewhat or an important obstacle to their business operation. This is hardly a specific feature of the blockchain ecosystem, although there has been progress in recent years. According to the OECD Product Market Regulation (PMR) analysis, "administrative barriers for start-ups" in Israel are above OECD average (OECD, 2019[40]). Israel also scores below the OECD average in terms of "Simplification of regulatory procedures" and "Time to comply with tax obligations", and presents above average "Cost of starting a business" (OECD, 2019[5]; World Bank, 2019[41]).

Finding talents has not been indicated as a major barrier, which might be related to the early stage of growth of the companies interviewed. A recent study pointed at the fact that the Israeli tech industry is growing faster than its talent pool. Workers in the sector grew from 240 000 to 280 000 in the last five years, but representing still only 8% of the labour force. This would fuel an estimated shortage of approximately 15 000 skilled workers in the years to come. In 2018, an estimated 15% of positions in the Israeli tech sector remained vacant, with the largest share being software and product infrastructure roles[13] (IIA and SNC, 2018[29]). However, entrepreneurs highlighted during interviews that, being at an early stage of development, their need for skilled workers is still relatively limited, which makes it easier for them to find the few talents they need with targeted researches.

Finally, only 25% of companies found that clients were mistrusting the technology. This might point at a general positive attitude towards new technological solutions by Israeli SMEs and other clients. Considering that the technology enjoyed an early popularity due to the hype around cryptocurrencies, which were often associated by the general public with illicit activities and money laundering, the fact that the technology itself does not appear to be misperceived is an interesting attribute of the Israeli market.

Respondents to the survey have also provided indications of priority areas for action, spanning from the need for regulatory clarity to the establishment of structured process for discussion with industry representatives. As it is often the case, regulation is trailing behind the development of the technology. However, the current uncertainty causes very high costs for small companies, which need to spend heavily for the support of law and accounting firms, which are in turn still not able to bring clear-cut answers. Industry players pointed at what they see as priority areas to help deliver a balanced regulatory framework for this technology:

- The necessity of building a regulatory sandbox to experiment in a controlled environment before engineering policies[14], not to stymie innovation while providing safety and security for consumers and market players;
- The willingness to engage in a structured and time-bound dialogue with regulators in order to bring clarity to the main issues faced by entrepreneurs and the areas of cooperation;
- The need to create education programmes for public officials and regulators about the technology, to make the dialogue more productive and effective;
- The need for international standards to act in a well-defined regulatory environment, as the need to comply with international regulations (e.g. KYC and AML, GDPR to manage data in the European market) causes high cost but does not guarantee compliance at national level.

The approach of interviewed companies was quite open to dialogue with policy makers, which constitutes an opportunity for both. Policy makers have the opportunity to cooperate with a very responsive business sector in order to create optimal conditions to unlock economic opportunities in the Israeli market. This is timely given the early stage of development of this emerging technology and its rapid evolution.

[13] To address the challenge, the Council for Higher Education developed a five-years plan to increase the number of graduates from computer science and engineering program by 40%. The IIA also launched “coding boot camps” to support the effort (Halon E., 2018[65]).

[14] The activity of Israeli policy makers in this area will be discussed in the next section

Regulation and policies: recent trends

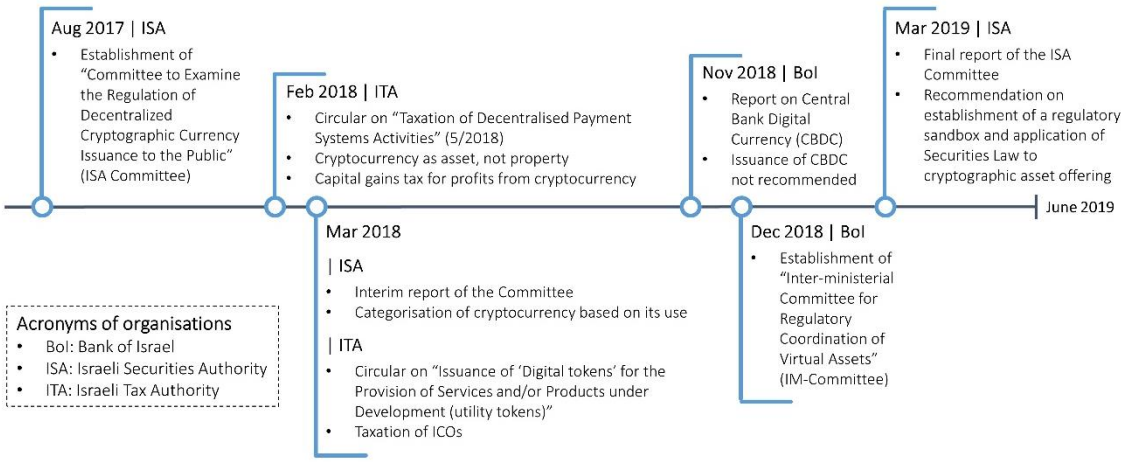
This section describes the main actions undertaken by Israeli public authorities and regulators in relation to the development of the blockchain industry in the country. Since its conception, this technology has attracted much attention from regulators in financial markets at global level, then to become an area of interest also for governments' agencies dealing with industrial policy and delivery of public services.

The analysis is based on official documents, phone and in-person interviews with different Israeli policy makers. Interviews were conducted between March and May of 2019 and respondents had the chance to provide feedbacks on the information included in this report.

Figure 21 provides a timeline of all the main official documents regarding virtual assets issued by Israeli authorities over 2017-19. It provides in particular an overview of initiatives from the Bank of Israel (BoI), the Israel Securities Authority (ISA) and the Israel Tax Administration (ITA). Often such initiatives and roundtables included other relevant authorities, as for example the Ministry of Finance and the Ministry of Justice. Nevertheless, these were the three main public bodies that issued official circulars, recommendations and reports to steer the activity in the blockchain ecosystem, especially focusing on application of the technology in the financial sector but with consideration of other activities based on the technology.

Figure 22. Main activities regarding blockchain technology within Israeli government

2017-2019



Source: OECD Analysis integrated by phone and in-person interviews

The "first hype" period (end of 2017-beginning of 2018)

The ISA started looking into the development of the crypto-world before the investment hype formulated around cryptocurrencies. In 2014, the agency published a working paper examining cryptocurrencies titled "Cryptocurrencies – Bitcoin as a case study." The agency became more active in regulation discussion of cryptographic currencies during the second half of 2017, before the full swing of the "Crypto hype". In August 2017, the ISA established a "Committee to examine the Regulation of the Decentralised Cryptographic Currency Issuance to the Public" (ISA-Committee). The ISA-Committee was composed by representatives of most departments within the Authority (International Affairs, Corporate Finance, Stock Exchange and Trading Platforms, Legal) and chaired by ISA's Chief Economist. The main

objective was to analyse the application of Securities Law to public offerings and issues in Israel based on DLT.

Shortly after, in January 2018, when global attention on crypto-assets was at its peak, the BoI established the Inter-Ministerial Committee for Regulatory Coordination of Virtual Assets" (IM-Committee). As different regulatory bodies were facing similar problems, the BoI established the committee to monitor market development in Israel and abroad, to examine the issues concerning application of regulation on product technology uses and their implications for economic activity, financial market and financial stability. The BoI had already been working with representatives from the industry, as questions were raised concerning the possibility to open bank accounts, transfer funds and acquire virtual assets. The BoI highlighted its interest to innovations that can make the financial sector more efficient, weighting carefully risks and opportunities, but in some areas of development decisions needed to be taken collectively with other regulatory authorities. In addition, the IM-Committee included the public agencies in charge of supporting the technological development of the economy to consider the relevant technical variable (IIA and National Cyber Bureau).

The Inter-Ministerial Committee (IM-Committee) includes all the relevant public authorities. In particular, the bodies that take part to the IM-Committee are, other than the BoI: the Ministry of Finance, the Ministry of Justice, the Capital Market Insurance and Saving Authority (CMISA), the ISA, the National Economy Council of Israel, the ITA, the Israeli Money Laundering and Terror Financing Prohibition Authority, the National Cyber Bureau, and the IIA. Having all relevant authorities meeting together monthly allows participants to develop a joint strategy to answer rising demands from the national industry, including SMEs and start-ups working on new blockchain-based solutions. Other countries are developing a strategic, structured approach to the development of the blockchain technology (Box 5).

Box 5. Blockchain Technology Development Strategy, Korea

Rationale and objectives of the programme

In June 2018, the Ministry of Science and ICT (MSIT) of Korea designated blockchain as the technology that would be the object of the "annual technology assessment", a comprehensive assessment of a technology, examining its fundamentals and use cases, as well as its implication on the economy and society.

In June 2018, the ministry formulated the Blockchain Technology Development Strategy, aimed at shortening the technology gap with other advanced countries. The strategy highlighted the potential of blockchain as a "general purpose technology"[15] that would serve as the infrastructure for enabling the fourth industrial revolution and bringing about societal innovations.

The strategy places emphasis on the importance of nurturing domestic blockchain players as both the technology and market are market in their early stage. It was further explained that Korea could become highly dependent on foreign multinational enterprises if Korea continues to lag behind the competition on Blockchain development, as was the case with computer OS and cloud computing. The strategy called for proactive policies to acquire national competitiveness.

Challenges

The ministry analysed that the size of domestic blockchain industry remains limited despite the efforts. Most of the blockchain projects carried out by the Korean companies were reported to be at PoC (Proof of Concept) stage, and Korea's technology competitiveness in terms of blockchain development was

[15] See footnote 8, paragraph 42.

estimated to be couple of years behind that of other advanced regions, including EU and US. The main challenges identified include insufficient amount of investment on developing use cases, along with lack of talents (i.e. blockchain specialising businesses and experts).

Programme activities and delivery methods

The strategy consists of three pillars, with emphasis on cooperation between the public and private sector.

1. *Creating an early-stage market for blockchain technology*: The government aims at taking the lead in creating blockchain use cases by implementing the technology in public sector with the goal of streamlining provision of its services. In 2018, Ministry of Science and ICT collaborated with six different ministries to conduct pilot projects with investment of KRW 4 billion (USD 3.5 million). Projects include supply chain tracking of beef production with Ministry of Agriculture, Food and Rural Affairs, and issuance of inter–terminal transportation certificate for transhipments in Busan port with Ministry of Oceans and Fisheries. In addition, the government will provide matching funds for private sector initiatives that have the potential to strengthen blockchain industry and significantly reduce social expenses.
2. *Improving the national blockchain competitiveness*: The government established a five-year blockchain development roadmap that encompasses both fundamental and application technology, focusing on reducing technology gap with advanced countries. Furthermore, the ministry plans to provide supports to developers working on developing industry tailored blockchain-based platforms, along with testbeds for large-scale testing. The MSIT also aims at establishing an evaluation system for Blockchain technology for the objective of testing reliability and trustworthiness of blockchain platforms and dApps.
3. *Laying out foundation for blockchain industry*: To foster the development of the blockchain ecosystem, the government commissioned education institutes specialising in blockchain technology to provide project-based training and match the trainees with businesses looking for blockchain experts. In addition, subsidies will be provided to universities operating master's and PhD programmes on the technology. To facilitate SMEs' blockchain adoption, vouchers for using Blockchain as a Service[16] is planned to be provided to the businesses.

Recent progress

As a follow up to the strategy, the MSIT established a Blockchain Regulation Enhancement Study Team. The team consists of experts from the public and private sector and academia. The objective of the study team is to identify and examine current national regulations that could impede application of blockchain technology in different sectors.

During the first phase, from September to December 2018, the study group focused on examining legal implications of blockchain technology and on understanding how current regulations could be interpreted to incorporate blockchain, in cooperation with law firms and consulting firms. The topics included 1) deletion of personal information stored on Blockchain, 2) comparison between traditional contracts based on civil code and Blockchain-based smart contracts, 3) legal validity of electronic documents and electronic signatures based on distributed ledger system 4) analysis of law and regulations that hinders implementation of distributed ledger system.

For the second phase of the study, the ministry identified five strategic sectors for Blockchain adoption, which are 1) logistics and distribution, 2) public service, 3) health care, 4) finance and 5) energy. From

[16] Blockchain as a Service (BaaS) refers to an offering of cloud-based solutions with blockchain infrastructure for developing blockchain applications. Examples are IBM's IBM Blockchain Platform and Microsoft's Azure Blockchain Service.

May 2019, a new study team has been established, which will collaborate with various actors including large IT firms, start-ups and universities, to implement pilot projects within each strategic sector.

Relevance for Israel

- Israeli government could consider developing a "Blockchain strategy", considering that various inter-ministerial committees are already operational and that a whole-of-government approach seems needed in this area;
- Israeli government could consider adopting blockchain-based system to create non-financial use cases, such as supply chain tracking or document authentication, to encourage wide-spread adoption of the technology. Cooperation between various ministries would be necessary.
- As a large number of Israeli start-ups working on blockchain are at their PoC stage, MaofTech could consider adopting similar approach to support incubation and help young firms upscale and test their products.

Further information

- (MSIT, 2018[42]) Blockchain Technology Development Strategy for Realizing Accountable 4th Industrial Revolution.
- (KISA, 2019[43]) Blockchain Regulation Enhancement Study Team Final Report.

The ITA was probably the first institution to move decisively to offer a clear legal framework for the development of the blockchain industry. The ITA, in accordance with what is becoming the mostly accepted international standard, refers to three different types of tokens: the "decentralised currencies"; the "utility tokens" and the "security tokens". On the first two the ITA published two comprehensive circular at the beginning of 2018, while the discussion on the third category (security tokens) is still ongoing.

In February 2018, the ITA published the first circular on "Taxation of Decentralised Payment System Activities" (5/2018), called "Virtual Currency taxation circular". The circular distinguished between Bitcoin and a few others "decentralised method of payment" and all other tokens, considered "decentralised smart contracts" often based on the Ethereum platform. The main point was that "virtual currencies" were not considered "currencies" in the traditional conception, but rather "assets". As assets, any profit made by disposing of them is subject to Capital Gains tax. Unless the activity generating such income constitutes a business, in which case the usual income tax and VAT would apply.

Shortly after, in March 2018, the ITA complemented the regulation by publishing an additional circular on "Issuance of digital tokens for the provision of services and/or products under Development (Utility Tokens)" (7/2018). This circular was meant to complement the first one, focusing in particular on companies that invest in R&D and work on the development of blockchain-based applications and obtained funds through ICOs. In particular, the Tax Circular specified the terms for the revenue recognition for funds received through ICOs and allowed the deferral of such recognition (e.g. until the actual provision of the services). In this sense, income from ICOs was considered as an advance from the customers, as if the company sold in advance the service or product it will deliver in a second time. In addition, the Circular established the precise VAT treatment of "Utility Tokens" issued to staff and service providers as part of ICOs (including for example distinction between Israeli and foreign residents; (Daniels et al., 2018[44]; Ernst&Young, 2018[45]).

The most important aspect for blockchain businesses is probably the ITA allowing companies who finance themselves through ICOs to enjoy, in some cases, the BEPS-Compatible tax incentives of the so-called "Innovation Box" regime. The "innovation box" regime "offers a corporate income tax (CIT) rate of 12% for qualifying companies with global consolidated revenue below ILS 10 billion (~USD 2.5

billion), or of 7.5% if located in Jerusalem or in certain northern or southern parts of Israel; or a CIT rate of 6% for qualifying companies with global consolidated revenue below ILS 10 billion" (Ernst&Young, 2018[45]). This very appealing tax regime, coupled with the numerous incentives for R&D initiatives in the country, creates a favourable environment for local and international enterprises wanting to experiment with blockchain technology.

In March 2018, the ISA-Committee published its interim report, which offered precise definitions and recommendations regarding which digital tokens were subject to Securities law. The approach of the ISA-Committee was, as for most other authorities in Israel, forward-looking, with an eye to the increased efficiency and opportunities that this technology might bring to the Israeli financial market and to its enterprises – while keeping the focus on protecting investors. The report included definition of terms as "cryptocurrency", "mining", "blockchain", "smart contract", "token launch", "security token", and "utility token". In particular, the ISA stated that "*As a general rule, cryptocurrencies that confer rights similar to the rights conferred by traditional securities such as shares, bonds, and participation units, will be deemed securities*" (ISA, 2018[46]). Differently from digital tokens that confer rights to a product of service for the sole purpose of consumption and use, which would not be considered securities. In general the approach was to establish some general guidelines and then examine ICOs and other activities in the crypto-space on a case by case basis (e.g. on determining if an ICO should be considered a security offerings to the Israeli public (ISA, 2018[47]).

The ISA stated as well that given the early stage of development of the industry, it could be considered to integrate the issuance of tokens by SMEs in a special capital raising track. These type of tracks usually allow companies to raise money from the public while complying to lenient regulatory demands. It is interesting to see how this approach was then developed in the following discussion with the Ministry of Finance in 2018 to establish a "Regulatory Sandbox", discussed below (ISA, 2018[47]).

As investor protection is a priority for ISA, the authority also ruled shortly after (mid-March 2018) that cryptocurrency companies should not be listed on the TASE (Tel Aviv Stock Exchange). The authority informed that it would have taken steps to restrict inclusion in the TASE of "public companies whose main activity is the holding of, investment or mining of decentralised cryptocurrencies (such as Bitcoin, Ethereum and others)" (ISA, 2018[48]). The aim was to prevent public companies operating in risky, speculative field to be included in the TASE and thus in the portfolio of passive investors. This could constitute a limit for SMEs proposing blockchain-based applications outside the cryptocurrency world, which are the focus of this chapter. Especially considering the recent proposal of the ISA to establish a Dedicated Stock Exchange market for Small and Medium Enterprises (ISA, 2018[49]).

This two-tier approach of the ISA seems very sensible, as it protects investors from the speculative euphoria of cryptocurrencies while at the same time offering opportunities to SMEs and start-ups to push innovation in the field. The approach of the authority aims at striking a balance between protecting investors and allowing innovation in the Israeli market.

The "winter" of crypto and ICOs (late 2018 and beginning of 2019)

After the beginning of 2018, the speculative bubble on the price of cryptocurrencies that sustained a large number of ICOs popped, and the number of ICOs decreased drastically. This process can be compared with other innovation cycles, where an initial frenzy from investors brings disproportionate financing to the disparate ventures, to then retreat leaving only the few viable business models standing. This selection of the viable models by trail-and-error is considered by some the very advantage of capitalist economies for innovation systems (Janeway, 2018[50]).

Israeli Authorities took stock of the experience accumulated and the various committees at work published additional guidelines and reports by the beginning of 2019. In parallel with the continuous monitoring by the ITA and other authorities, the activities of the IM-Committee and of the ISA-Committee

were concluded with the publication of two important reports, considering the evolved landscape of blockchain industry.

In November 2018, the BoI published a "Report of the team to examine the issue of a Central Bank Digital Currency (CBDC)". This topic is strictly related to monetary policy and financial stability and it goes beyond the scope of this paper. The introduction of CBDC would of course affect also SMEs, but this possibility seems still quite hypothetical, as many central banks around the world are assessing the pros and cons of the idea but still none of them has yet put a CBDC in circulation. In any case, the BoI's main conclusion was that the introduction of a digital currency (e-shekel) was not recommended in the near future, and that the best strategy in this sense would be to continue to examine and monitor the evolution of such phenomena at global level. Representatives of Central Banks are indeed discussing the issue in many international fora, including at the OECD (OECD, 2019[51]).

The IM-Committee issued a request for information to the public and received multiple responses from the industry by December 2018. The IM-Committee was focusing on the policy barriers as well as on the applications of DLT that have the potential to deliver significant benefits for the financial services, the banking system and the payment system. The request for information included questions related to the identification of the main regulatory barriers for offering their blockchain-based product to domestic consumers and to invest and fundraising through virtual assets; the main difficulties for consumers; the main risks inherent to virtual assets; the relevant information for monitoring; the opportunities spanning from the application of this technology and its impact on AML/CFT (IM-Committee, 2018[52]). Addressing these issues at an Inter-Ministerial level was also recommended by independent research organisations in Israel (Israel Internet Association, 2019[53])

In January 2019, the ISA launched the Global Financial Innovation Network (GFIN), together with other regulators from all around the world. It is an international network currently led by FCA, with an objective of establishing a global sandbox program for the promotion of financial innovation. Primary role of the initiative to provide a network for financial regulators from different jurisdictions to collaborate and share experiences of innovation in their respective markets, including emerging technologies and business models, and to provide an accessible regulatory contact point for firms. The network also provides a forum for conducting joint RegTech (Regulatory Technology) projects and sharing knowledge and lessons learned. It would create an environment under which firms are able to test their cross-border solutions. There is ongoing discussion on the possibility of connecting as much as possible the Israeli Regulatory Sandbox to the Global Fintech Network

One important characteristic of the Israeli Sandbox is that it will focus on companies with relatively structured operations. The initiative will first target companies that offer services which directly benefit consumers and have the technological capacity and legal understanding for example to comply with AML (so in general not very early stage start-ups). In addition, the Sandbox Committee decided that large international companies wanting to test a specific project would be explicitly allowed in the regulatory sandbox, as the main objective would be to support innovation, no matter the source.

In February 2019 a Committee created by the Ministry of Finance and the Ministry of Justice, including many financial authorities, proposed the creation of a Regulatory Sandbox (Sandbox Committee[17]). The Sandbox proposal is actually aimed to solve two main issues. The first is the discoordination between regulators, as consistency of the basic concepts and coordination of different legislative framework is needed. Thanks to the program, the regulators will be familiar with the activity and language of the technology. The second point is that in Israel there are very strict rules and there is very limited ability for regulators to lift some burdens or to make amendments to the way that the firms have to

[17] Here we refer to "Sandbox Committee" to differentiate this Inter-Ministerial Committee with the one, with larger scope, organised by the Bank of Israel and discussed above as "IM-Committee". This is to avoid confusion, as the participants in the two committees are largely the same.

comply, for example to the securities law. Enabling regulators to provide those amendments, exemptions or to partially lift in a bounded and restricted way, would offer the opportunity for regulators to learn from the process and become more effective. At the same time, innovative SMEs entering the sandbox would learn about the most relevant regulations. The structure of such sandbox took inspiration from the examples of the Monetary Authority of Singapore (MAS) (MAS, 2019[54]) and the UK's Financial Conduct Authority (FCA) (FCA, 2015[55]), including for the selection criteria.

The ISA launched a regulatory "Innovation Hub" focusing on early stage entrepreneurs. This initiative, separate from the Sandbox mentioned above, is conceived as a complementary tool to support industry. As discussed, very young, unstructured firms at an early stage of development would not be accepted in the Sandbox. Therefore, the ISA developed a program to have open and informal discussion with them on the form their venture would take and the kind of services it would offer, to support the understanding of regulation while at the same time learning about the latest development of the technology.

In March 2019, the ISA published its final report, building on the interim report of 2018. The work of the ISA-Committee had to take into account the sharp decline of ICOs during 2018 and the recognition that funds raised through issuance of virtual "coins" is now mostly restricted to accredited investors and issued as STOs (Security Token Offerings) in western countries. This contribute to the relevance of supervision and the role of regulatory bodies in the development of this industry. Another interesting conclusion is that after carefully analysing the market, the ISA reckoned that under the existing law and existing structure of the tokens, no utility tokens were actually found. This was mainly because for most of the tokens analysed the secondary market was very significant, meaning that they were closer to securities. This is very relevant, as under the "Crowdfunding law" of 2015 there is no possibility of a secondary market, which would then cut out all tokens from the application of the regulation.

The three main recommendations of the report were the following: a tailor made disclosure regime, the ease of restrictions through a regulatory sandbox and a regulatory infrastructure for security token trading platforms. The first recommendation on "tailor made disclosure regime" focused on strict cooperation between the ISA and entrepreneurs considering the issuance of crypto assets. The second on a "regulatory sandbox" confirms the involvement in the working group described in the previous paragraph. The third recommendation proposes a modification to existing regulation in order to optimally address the specific risks that this industry raises, with a reference to the process adopted for the issuance of the Crowdfunding regulation[18]. An interesting example is in France, where in 2016 the regulation allows a secondary market with trading of mini-bonds on the blockchain (Havrylchyk, 2018[56]).

The topic of digital assets exchange platform has been the focus both of the ISA paper and of the IM-Committee. These exchanges are not regulated yet, but their role is crucial for the integration of virtual assets in the real economy. Regulation and issuance of licences for such players is a responsibility of the Capital Market Authority, which plans to deliver a regulation between 2019 and 2020. This would allow also traditional financial institutions to cooperate with licensed exchanges, under an effective supervision. One of the most important barrier at the moment is constituted by the Anti-Money Laundering (AML) and Combating the Financing of Terrorism (CFT) provisions of such bodies, to ensure that virtual assets are

[18] Crowdfunding platforms must be registered in Israel since 2016. The Securities Law and its regulation applies to most crowdfunding activities by corporations, including selling of corporate shares, the raising of debt of a specific corporation, and the raising of corporate debt by spreading risk in an investment portfolio with debt volumes of over NIS 1 million, under the responsibility of the ISA. The Capital Markets Insurance and Savings Authority (CMISA) regulates the mass of small loans below NIS 1 million. Draft amendment to the securities regulation on crowdfunding for P2B are being discussed (end of 2017), and should allow platforms to distribute loan funds across various loans (Havrylchyk, 2018[56])

not used (as they have been in many documented cases) for illicit transactions[19]. In this sense the recent Guidelines published by the Financial Action Task Force (FATF) are crucial in ensuring an internationally consistent approach to the regulation of "Virtual Asset Service Providers" (FATF, 2019[13]). In general, there is a contrast between the idea of "decentralisation" (and thus of decentralised exchanges) and regulation, as regulatory bodies need to be sure that KYC, AML and CFT standards are respected so even if platforms are built on self-executing smart contracts there is still the need to have an owner/physical person behind.

Box 6. The Nordic approach to the application of AML/KYC standards to virtual assets

Exchange service providers offering exchanges between fiat currency and virtual currency in **Norway** are subject to the country's Anti-Money Laundering Act, since October 15, 2018. Companies were given three months to comply with the new regulation. However, the act does not affect virtual asset exchanges that transfer between virtual currencies. Virtual asset service providers need to be registered in the Financial Supervisory Authority (FSA), which requires the providers to submit their information including the provider's name, organisation number type of service offered, and point of contact. There were 6 providers registered in Norway as of June 2019, and more than 20 applications remained pending as their AML policies and procedures did not meet the requirements.

In case of **Sweden**, the Financial Supervisory Authority has recognised Bitcoin and Ethereum as means of payment from 2013. This indicates that exchange service providers are required to go through AML/CFT supervision to obtain a licence. Although there is no explicit AML/CFT regulations concerning virtual asset exchanges, an implicit recognition is that these exchanges need to be regulated and supervised. Licenced virtual currency service providers have submitted Suspicious Transaction Reports to the Financial Intelligence Unit as a part of a thematic supervision, and results suggest that businesses involved in illicit activities have moved their operation to unregulated exchanges in other jurisdictions.

The Act on Virtual Currency Providers, which came into force on May 2019, requires virtual asset exchanges in **Finland** to register and seek authorisation from the Finnish Supervisory Authority prior to starting their business. Virtual asset service providers that were operating before the act were given 6 months to comply. The definition of virtual asset service providers include exchanges between fiat and virtual assets, between virtual assets, as well as between virtual assets and goods such as gold. ICOs were also included in the definition. During the registration process, the AML/CFT procedures and guidelines are reviewed, along with their risk assessment concerning AML/CFT. While the virtual asset exchanges initially disagreed with the regulation, they are now willing to meet the requirements and to have the sector regulated, with some aligning their business models with the regulation. This could partly be explained by the fact that the providers formerly had difficulties in opening bank accounts before the establishment of the regulation.

Source: (FATF, 2019[13])

[19] Discussion is ongoing on a draft of the Prohibition on Money Laundering (The Providers of Financial Assets Services and Credit Providers Services' Requirements regarding Identification, Reporting, and Record-Keeping for the Prevention of Money Laundering and the Financing of Terrorism) Order, 2018.

In June 2019, the ISA Chairwoman announced the establishment of an internal committee for the promotion of digital markets in Israel. The committee is examining the desired regulatory framework for digital securities trading platforms that fall within the ISA's perimeter. Thus, the committee is working to implement a key recommendation of the ICO Committee for creating a regulatory infrastructure that is suitable for the activity of these platforms, addressing their specific risks. The ISA believes that digital trading venues could provide an alternative platform for SMEs who wish to raise capital with reduced costs, as long as they follow securities laws and investor protection requirements.

The committee is holding meetings with entrepreneurs, technology experts, lawyers and professional service providers from the Fintech and DLT industry in Israel to learn about the unique challenges and characteristics of using DLT in financial markets. Specifically, the committee is reviewing the legal implications of distributed networks for clearing and settling transactions in securities and financial assets and if they are coherent with existing regulatory requirements. Members of the committee are also holding discussions with other regulatory agencies and learning from their experience in designing appropriate requirements for these trading platforms (ISA, 2019[18]).

The ISA has a secured messaging system between the ISA and supervised entities called YAEL. In March 2018, blockchain technology was integrated in the Yael system, added an additional layer to the security of information conveyed by the ISA to the supervised entities. The technology confirms the authenticity of the messages, prevents fabrication and prevents the messages from being edited or erased. In addition, the system prevents the possibility of denying that messages were received from the ISA. The incorporation of the technology in the ISA's information systems is aligned with its vision of nurturing financial innovation in the capital market and the adoption of technologies related to financial services and products, by means of creating a regulatory innovation hub in the domain of Fintech. The installation of the application lasted three months and was carried out by third party. The technology also integrated in the "Hatzba-Hon" voting system which was developed by the ISA in order to allow investors to actively participate in investors meetings from any place in Israel and over the world, and in the Magna system, which is used to publish all of the electronic reports filed by the supervised entities. The software was developed and maintained by contractors, but all the specifications were naturally requested by the ISA team. This effort was particularly important as the authority itself gained a very deep understanding of the technology and its potential by using it directly

The ISA is also looking at RegTech innovation, and in particular at how DLT technology solution can ease auditing, through an accounting service to help companies or supervised entities to deal or to comply to regulation. For example, enlisted public company need to track credited investors for a period of time. To do so, tokens or security tokens could be issued (as some companies are already doing). In addition, the ISA has recently integrated the technology in the “Hatzba Hon,” an e-voting system for investors.

Other relevant initiatives by the ISA

Establishment of a capital market for small and medium-sized enterprises

In June 2018, an inter-ministerial committee from the ISA, the Ministry of Finance, Ministry of Justice and the Tax Authority published a report on the establishment of a dedicated SME stock exchange in Israel. The report includes a series of recommendations designed to adjust disclosure, reporting, and corporate governance rules to the companies that will be listed on the dedicated exchange. The report also recommends various incentives to companies and investors of the SME exchange (ISA, 2018[49]).

The committee's recommendations were based on a comprehensive review of the experience of similar exchanges worldwide, as the committee believes that establishing of an SME exchange

based on such an outline will contribute to the further development of the local capital market. Specifically, it will create access to new financing opportunities for growth firms in Israel, which constitute the main growth engine of the entire economy. A bill that enables the establishment of the SME exchange is now waiting for the Israeli parliament's (the Knesset) approval. The ISA is considering the reconciliation of the two committees' recommendations, thus enabling a digital securities platform to operate according to the SME exchange framework, and vice-versa. In July 2019 the ISA Chairwoman announced the ISA's strategic plan for 2019-2022. One, out of the four key goals, is Advancing technological innovativeness in capital markets with focus on emerging and ground-breaking technologies.

Cross Border Fintech Collaborations

In recent years, the ISA has increased its collaboration with regulatory authorities around the world to promote innovation in the financial sector. In September 2017 the ISA, the Bank of Israel, the CMISA and the Swiss Financial Market Supervisory Authority (“FINMA”), have signed an MoU to encourage and enable cross-border innovation in financial services technology. In May 2019 the ISA and the the Autorité des Marchés Financiers (“AMF” France) have signed an MoU regarding cooperation for innovation in the financial sector. In July 2019, New York State Department of Financial Services, the ISA, the Bank of Israel, the CMISA, have signed an MoU to encourage and enable cross-border innovation in financial services technology. In September 2019 the ISA, the CMISA have signed a FinTech collaboration MOU with the Croatian Financial Services Supervisory Agency ("HANFA"). These MoUs include mechanisms for joint innovation referral, information sharing, support for innovators from the other jurisdiction, and continuing dialogue between the authorities. These mechanisms will allow the ISA and other agencies to enhance regulatory collaboration and innovation support for the growth of the fintech industry, including Blockchain firms, in Israel and abroad.

Securitization

The ISA has been working to develop a public securitization market, among other things, to facilitate the ability of institutional investors to finance SMEs. The securitization of loans provided to SMEs is expected to improve the conditions under which these loans are granted. It may, on one hand, lower the interest rates that these businesses are required to pay, and on the other hand, expand the scope of companies that can receive external funding. In the past several years, the ISA, in collaboration with other ministries, has prepared a memorandum of law regarding the regulation of securitizations in Israel. However, this bill has yet to be approved. In the meantime, some securitization transactions have taken place in private markets. The ISA believes that even under current laws and the absence of specific legislation, public securitizations have advantages over private ones.

Against this background, in early September 2019, the ISA published a consultation paper regarding public issuance of asset-backed bonds. ISA is exploring various ways in which securitization transactions can benefit small and medium businesses, given the unique structure of the Israeli market. One of the options being considered is the ability to use blockchain technology to make the securitization lifecycle more efficient, secure, and reliable, while increasing speed, lowering costs, and facilitating regulatory compliance

Relevant initiatives by the SMBA and the IIA

The IIA did not launch targeted programs on blockchain, as the financing and other type of support offered by the IIA are usually technology neutral. This is a common approach that the IIA applies, leaving to the market to select the “winning” technologies. As discussed in the previous section, the number of blockchain companies asking for support from the IIA is still relatively small compared to the overall financing of the IIA (around 1% in 2018) but rapidly increasing. As a technology at an early stage of

development this does not mean necessarily that the trend will continue in the coming years, but it's still interesting to notice. Moreover, the IIA is part of the Sandbox Committee as technological consultant and there is an idea (not confirmed yet) of launching from 2020 a new funding stream specifically for Fintech companies that might be relevant for companies leveraging blockchain technology.

In July 2019, only a few calls for Proposals and initiatives of the IIA referred specifically to blockchain technology, but none of them was exclusive. For example, there were proposed partnership for financing with foreign funds focusing more in general on Fintech; for the creation of a Fintech Innovation Lab that would also deal with DLTs; and cooperation with large research groups looking for innovative ideas in A.I. and blockchain. Nevertheless, as stated before, these initiatives are not coordinated into any explicit strategy to support the development of the technology.

The SMBA in the Ministry of Economy and Industry has monitored the evolution of the sector and could launch specific activities leveraging its existing networks (e.g. MaofTech). The SMBA has been following the development of the sector with research efforts including this study[20]. The very early stage of development of the technology justifies a cautious approach, as the first applications outside the financial markets are being tested but there are not yet services in the market that can have a large impact on the business models of traditional SMEs. Nevertheless, the rapid advancement of the technology suggests that starting to raise awareness and providing specific training could offer an advantage to Israeli companies.

For example, the Maof network offers courses to support the digitalisation of SMEs that could be extended to blockchain technologies. The Maof Network offers a coordinated one-stop shop for business development services across the country, with more than 40 branches. The centres are run by private sector companies, that are responsible towards the SMBA to guarantee the level of service, with the contract awarded through a tender process (OECD, 2016[57]). Their role in workforce skills development and management training is central in the Israeli SME policy system, and these centres could play an important role in furthering the understanding of blockchain technology among SMEs.

In particular, the 20 MaofTech centres situated in the geographical periphery of the state of Israel supporting the uptake of digital technologies by SMEs, could play an important role. MaofTech centres are based on a system of agents, each of which manages 8 to 14 entrepreneurs, offering them support for 6 months in developing the project, finding the right clients and supporting in finding investors, to then follow the entrepreneurs also after. These agents help as well to create a community of entrepreneurs by organising meetings and activities leveraging the HUB, a work-area to provide entrepreneurs the needed space. The mentors work also as a point of connection to the hi-tech industry organising seminars, meetings, practical workshops to understand new technologies and demo for entrepreneurs to present their idea to potential industrial or financial partners. It is relatively straightforward to see how this system could also support a blockchain-specific programme.

Box 7. Supporting the development of the blockchain ecosystem, Latvia

Rationale and objectives of the programme

While understanding the potential benefit blockchain technology can bring to the country's both the public and private sector, the Ministry of Economics of Latvia is engaged in blockchain-related activities and discussions, including the first pilot project, which will continue throughout 2020.

The Ministry of Economics published an informative report that expands the explanation of the blockchain technology. There have been initiatives from other ministries as well, including Ministry of

[20] This OECD study has been performed on the request of the SMBA and of Digital Israel.

Finance's informative report determining the legal status of cryptocurrencies, and the Financial and Capital Markets Commission's guidelines on the possibilities and the applicable regulations of the usage of virtual assets and ICOs. The Ministry of Economics is supporting national-level blockchain working group with Bank of Latvia, which will publish report on the industry and possible solutions for the public sector before the beginning of 2020.

There are more than 25 start-ups in Latvia that are developing blockchain technology solutions and Latvian Blockchain Association was established in 2017. The development and implementation of blockchain technologies is also supported by the industry professionals like "CryptoLab", "Blockvis" that provide professional consulting and education on blockchain and cryptocurrencies. Several events and annual forums are being organized, such as "Techchill", "Riga COMM", "Digital Freedom Festival" that bring blockchain community together to discuss the potential and implementation of the technology.

Latvia is also home to several successful blockchain companies. The "Bitfury Group" is the largest full-service blockchain technology company in the world that develops and delivers cutting-edge software and hardware solutions necessary for businesses, governments, organizations and individuals to securely move assets across the blockchain. "Notakey" is another start-up that provides various identification and authentication solutions. In order to support further blockchain solution development and implementation, start-ups may join specialized pre-acceleration programmes and attract venture capital through "Overkill Ventures" which is funding blockchain projects.

In 2018, the Latvian government joined other twenty-five members of the European Union and Norway to sign a declaration creating the European Blockchain Partnership (EBP), which also includes the establishment of a European Blockchain Services Infrastructure (EBSI) that will support the delivery of cross-border digital public services. Several pilot projects have been started and a number of cross-border digital services have been identified, where blockchain technology could be implemented.

Selection of use cases for improving public services

Latvia, as one of the Declaration signatories, has actively participated within the EBP working group meetings since its establishment. Insights shared from the meetings pushed the Ministry of Economics to bring more attention towards new technological solutions including blockchain and artificial intelligence and on how use of such technologies could improve Latvian public services. Two potential use cases for blockchain have been identified, which were 1) introduction of a blockchain-based Stakeholder Register for Limited Liability Companies to country's Enterprise registrar, and 2) introduction of a blockchain-based solution for Point of Sales devices and cash registers to the State Revenue Services(SRS).

The Ministry of Economics brought together experts from the public and private sector to leverage the understanding of blockchain technology and started modelling the pilot projects. Economic impact assessment of each project was conducted, and it was concluded that the pilot project with the SRS would be the most impactful, as it could help in reducing size of the country's grey economy and expenses that are associated with cash register certification and maintenance. Furthermore, it was expected that implementation of the technology could improve ease of doing business and make it possible for the public authority to obtain real-time tax data from the merchants.

Programme and success factors

The Ministry of Economics launched a hackathon[21] titled ".tax" to develop the blockchain pilot project for the SRS. Tailored to the corporate environment, the hackathon brought together teams from IT

[21] Hackathon is a type of an event with an objective of finding creative solutions of a given problem. Usually in groups, participants are presented with challenges they need to address. In a given amount of time, they devise and propose solutions together with specialists from various backgrounds.

companies and industry professionals, which promoted cross-sectoral dialogue for creating effective and innovative solutions to business problems. In order to participate, IT companies needed to create a team of 5 people that could perform programming, user experience design, business development, marketing and graphic design. The SRS presented its challenges and shared the data to the IT companies and start-up teams, who then were given 48 hours to find the most effective solutions. The teams participating in the hackathon were required to present three steps of validating potential solution idea, identifying existing/emerging problem solving processes and creating prototype solution.

The goal of this hackathon was to launch a cross-industry collaboration between start-ups, IT companies and the public sector by developing a solution that addresses four challenges of eliminating tax fraud, creating an online cash register, using Big data and Modern technologies and undertaking digital transformation, not only on a national but also on a global scale. The hackathon also functioned as a large platform of cooperation, where over 100 blockchain experts from more than 11 countries participated in the event, including experts from large companies such as Microsoft, Accenture, PwC, Startup Wise Guys (incubator) and Swedbank.

Impact

The main prize went to a start-up named Z Book, which developed a solution to eliminate tax fraud of every transaction by adding blockchain electronic signature as QR code on every document to ERP and cash register systems. Following up on the result of the hackathon, the Ministry of Economics is cooperating with the SRS for the implementation of the cash register pilot project by the end of 2020, which includes changes to regulatory requirements. The ministry plans to continue the process of identifying potential use of blockchain in public services for the next 2 years.

Relevance for Israel

- The Small Business Agency and the IIA could consider the possibility of organising a Hackathon open to Israeli entrepreneurs to identify effective DLT-solutions for the delivery of public services

Further information

- Ministry of Economics of Latvia Website: *https://www.em.gov.lv/*.

Initiatives by private sector players

There are also various NGOs and associations that are pushing the policy agenda for the development of the blockchain sector. Some of these groups, as the Israeli Blockchain Forum, are helping industry players (e.g. entrepreneurs, large companies, financial institutions) to bring the most relevant issues to the attention of regulators and to connect them with the relevant stakeholders in the market. Other groups, like the Israeli Blockchain Association, instead work mostly on raising awareness through events, courses, trainings, and hackathons to disseminate information about the technology and its potential.

There are also a number of incubators and accelerators that support start-ups, but none that is exclusively aimed at blockchain companies. Many incubators and accelerators are active in Israel offering space, resources and mentoring to start-ups working on blockchain models. None of these institutions is focusing exclusively on blockchain companies, but a number of them have specific programmes. For example, The Floor in Tel Aviv established in 2018 a “Blockchain Factory”, accepting early-stage start-ups specifically in the blockchain space (modifying the policy of the institution that usually focuses only on start-ups at a later stage of development) (Golstein, 2018[58])). Other examples are the Barclays Accelerator, Innogy SE, Surecomp and Day Day Up.

Conclusions and policy recommendations

The blockchain ecosystem is evolving rapidly at a global level and Israel is well placed to become one of the hotbeds for the development of this technology, in and outside of the financial sector. The country's high level of R&D investments (especially from businesses), vital venture capital industry and profound sectorial specialisation (e.g. security) all constitute elements that make the Israeli ecosystem particularly competitive at international level.

Many Israeli entrepreneurs are experimenting new blockchain-based solutions and, even if the market is at a very early stage of development, there seems to be the potential for important innovation concerning SMEs. Often these businesses are developing their first solutions for the Israeli market, with an eye to international expansion. This mean that traditional Israeli SMEs could benefit from such technological advancements, as many of the services developed are targeted to them, across a range of economic sector (e.g. healthcare, trade, logistic, energy, retail, travel).

Developer of blockchain-based applications are choosing different blockchain protocols and system architectures depending on the market they are targeting. At present, most of the applications are opting for some sort of permissioned blockchain (public, private, consortium etc.). Corporate applications of such system lose to a certain extent the promise of decentralisation of decision-making, but they are in this early stage more appealing to SMEs and large companies as they ensure control over the access to corporate's blockchains. Nevertheless, a few companies are developing solutions based on permissionless blockchain, exhibiting confidence in the resilience and decentralisation potential of consensus algorithm on which this type of open blockchain operate.

Israeli authorities have been working in close cooperation over the past few years to address emerging issues and create favourable conditions for innovation, but more needs to be done to provide clear rules for entrepreneurs. Ministries, Central Bank and all relevant authorities have cooperated closely, through different inter-ministerial committees, to develop a common approach to this evolving technology. Considering the nature of the technology and its potential impact on many different sectors a whole-of-government approach can be effective to deal with the emerging issues. International experience is still scarce given the novelty of the technology, but there are some examples among OECD countries of all-encompassing "Blockchain Strategies" that aim to support the emergence of an ecosystem for blockchain development and application at the national level, including Korea, Germany and Italy (forthcoming).

The attention of Digital Israel on the potential of the technology for achieving efficiencies in the delivery of public services is a strong driver for government's awareness and action in this area. The activity of the agency shows a commitment to explore the potential of new technological solutions and it positively poses the basis for their possible experimentation and implementation. Some countries are already experimenting with blockchain technology to improve the management of citizen's data and request to the public administration (Berryhill, Bourgery and Hanson, 2018[39]). Furthermore, DLTs have interesting potential applications for public registries, in particular to enhance transparency and security of credit registries, which may ease SMEs' access to finance[22] (a solution that would be closely linked with new digital identity systems).

Cooperation between policy makers and the industry has so far been relatively limited, but dialogue is ongoing. Industry association and NGOs have brought interesting points to the attention of the regulators. Moreover, the establishment of a Regulatory Sandbox is expected to better structure the dialogue and create common learning opportunities, especially related to applications in the financial sector. The SMBA can play an important role to train businesses and entrepreneurs in different sectors,

[22] Some start-ups in the U.S. are experimenting solutions based on DLTs precisely to this end (see (Browne, 2018[69]) or (Crosman, 2017[68])).

as well as to gather their feedbacks on policy relevant issues. Some of the programmes managed by the SMBA, such as the Maof system, could integrate activities and trainings to explain the potential of these new technologies, including to a non-specialist audience in traditional sectors.

Box 8. Policy recommendations

The Israeli Government could envisage a comprehensive "Blockchain strategy" to address the different, interconnected aspects of the development of this technology. This could leverage the ongoing cooperation across government agencies through the established Inter-Ministerial Committees (as for example in the case of Korea discussed above);

Education and awareness

- Improve the evidence base by expanding the statistical coverage on data related to digital adoption by SMEs, for example by leveraging the Measurement Framework developed under the OECD Going Digital project;
- Promote awareness and understanding of the technology among SMEs and entrepreneurs through tailored trainings, leveraging the Maof and MaofTech network across the country;
- Raise awareness and improve understanding of the technology among public officials, such as through trainings specifically designed for policy makers;

Delivery of public services for SMEs

- Encourage the identification of effective DLT-solutions for the delivery of public services, such as through Hackathons open to Israeli entrepreneurs as in the example of Latvia;
- Consider projects to test the use of DLTs for public registries, with the aim to ensure higher security and transparency, as in the case of Latvia;

Financing

- Enhance the cooperation between regulators, banks and other traditional financial institutions to remove obstacles for legitimate blockchain businesses to access financing (e.g. opening bank accounts, obtaining loans), such as by implementing clearer rules on AML/KYC standards – as in the example of Finland (Box 6)
- Elaborate a specific "blockchain track" in the upcoming Fintech Regulatory Sandbox, given the very specific regulatory issues in the sector. This would also enhance understanding of the technology and enable to work closely with industry players;
- Raise awareness by blockchain entrepreneurs about the available financing and support options offered by the Israel Innovation Authority to increase their uptake;
- The Bank of Israel could consider adding modules specifically related to blockchain in the existing multiple programs in place to enhance the financial literacy of the population and of SMEs in particular;

Private sector innovation

- Stimulate cooperation between private companies, particularly start-ups, universities and public research centres on blockchain-related projects, including through targeted courses and joint-research projects;
- Consider potential uses of DLTs in industrial production, in the framework of the implementation phase of the Strategy for Advanced Manufacturing elaborated by the Ministry of Economy and Industry;

Regulation (RegTech)

- Promote innovation by the business sector by piloting the use of blockchain technology for regulatory compliance - for instance, with the introduction of self-enforcing smart contracts;

International Cooperation and trade

- Adhere to international standards by implementing the recommendations contained in FATF's "Guidance for a Risk-Based approach to Virtual Assets and Virtual Asset Service Providers" (FATF, 2019[13]);
- Continue the effort to cooperate internationally with other regulators, in particular in the U.S. and Europe (the two largest markets for Israel), in order to devise compatible blockchain regulation and allow business to work seamlessly in Israel as abroad;
- Consider offering blockchain-based services to SMEs that export, for example to reduce non-tariff barriers in trade for SMEs, as in the case of Singapore.

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