

Chapter 9

Towards Measurement Framework of Digital Skills in Finance



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Abstract The ongoing technological transformation and increasing the areas of application of digital tools are naturally also observed in finance. The development of new e-finance solutions increasingly requires the digital competence of customers of the financial sector. This article aims to propose and discuss digital financial competence framework that together with a prospective statistical measurement system may help to identify problems posed by emerging digitalisation of society and economy. It attempts to systemise the measurement through the proposed framework, also dealing with conceptual and practical issues related to digital competences and skills. The article attempts to define critical competences of individuals, for the financial sector. There have been many propositions so far of generic digital skills frameworks and digital literacy assessment tools. However, there has been no proposition of digital skills framework for financial services. This paper adds to the existing works by proposing the relevant scheme of digital competences for digital financial services that subsequently may be used as a reference framework for statistical measurement.

9.1 Digital Society and Economy

The development and dissemination of information and communication technologies give rise to the digital economy and information society [1]. The economy and society become increasingly dominated by technology and automation. Big data, artificial intelligence, machine learning, digital privacy, digital government, remote sensing, one might continue to enumerate all the similar terms that were never before used in the public discourse, yet are ubiquitous now.

Recent trends shaping the development of modern states are the digital economy and the information society. Along with the widening uptake of IT tools and the

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increase in the number of users, a new type of society has evolved, whose functioning to the greatest extent determines the broad application of IT achievements. Progress in the development of advanced computer technologies has led to a revolution in the field of collecting, processing, storing and transmitting information. Undoubtedly, new technologies are currently one of the fastest growing sectors of the economy in developed countries, characterised by an increasing share in generating GDP. The process of digitisation in the entire economy fundamentally changes the way consumers, businesses and public and private institutions operate, including education and administration. Digital technologies are more and more integrated into the economy.

The development of modern enterprises is related to the use of IT achievements. Modern digital technologies are revolutionising the way of running a business. ICTs allow companies to expand the scope of their operations, speed up and facilitate access to information, data processing and help to use resources more efficiently. The use of the potential of digital technologies requires, on the one hand, the creation of an appropriate supply offer (i.e. access to broadband infrastructure and an attractive offer of e-services and e-content), on the other, creating demand for them through dissemination of knowledge about the benefits and practical ways of applying new technologies and also building user competence. Companies that see the impact of technological solutions on the efficiency of their operations build strong foundations of digital business. They commit to it more often and willingly than other companies. They decide to test new digital solutions. They are active in social media. They develop and implement new products and services based on the potential of digital technologies, which allow them to sustain a competitive advantage. There is a dynamic growth in the use of the Internet in business, in the exchange of information, making purchases and sales, financial settlements, promotions and searching for suppliers. Some studies predict that a business based on digital technologies will account for 25% for the whole world economy in 2020.

The use of new technologies creates more significant opportunities, brings positive effects and is ubiquitous and necessary for everyday life, in communication, learning, work, access to information and knowledge. We observe the growing importance of computers and the Internet in all spheres of life. ICTs diffuse into many areas of life, resulting in all new areas of e-learning, e-services, e-shopping, e-banking, e-government. Intensive development of the Internet and digital networks has resulted in minimising the time needed for information flow, increased opportunities in business contacts and improved the quality of life of the society. The full use of the potential of digital technologies is one of Poland's development priorities for the coming years. The dissemination of information and communication technologies is the subject of observation of academic research and statistical surveys. There is a wide range of studies at national and international levels regarding the measurement of the development of the information society, prepared by national statistical institutes and international organisations [5]. These publications regularly show continuous progress in the use of newer and more advanced information and communication technologies in the economy and society. The statistics on the information society are presented by National Statistical Institutes. These studies are carried out follow-

ing methodological recommendations used in OECD and Eurostat. They concern aspects of the development of the digital economy and development of the ICT sector and its use in the economy and households.

9.2 Digitalisation and Finance

Information processing and management systems and activities related to digital technology have been developing intensively since the 1980s. Today, the digital revolution radically changes almost every business environment, and the financial service industry is no exception. The development of modern computer technology and telecommunications is an essential force in the transformation of the finance sector. Innovative solutions in the field of financial services appear, and the accelerating pace of changes makes it necessary to keep up to date with the latest achievements. Keeping up with the pace of change is a great challenge for people. There is a vast need to quickly adapt to changing conditions and challenges, as well as show high flexibility. Innovative applications of digital technologies for financial services alter communication between financial consumers and service providers and at the same time require an appropriate level of experience to use them.

The technological advances have significantly improved the quality and speed of data processing. To a large extent, it helped to reduce information costs and other transaction costs. These changes have undoubtedly affected both suppliers and users of financial products and services. The new financial technologies include distributed accounting technology, big data, Internet of things, cloud computing, artificial intelligence, biometrics and an extended/virtual reality. These technologies are associated with applications such as payments, planning, saving, lending and financing, trade and investment, insurance, security, operations and communication. Emerging new technologies can affect many aspects of the financial landscape, including new business models and product designs, competition, operational efficiency, brokering, accessibility, consumer engagement, speed, automation, analytics, privacy and transparency, digital security.

The notion of digital financial services is fundamental in this context. This very general term covers the broad range of financial services accessed and delivered through digital channels, like payments, transfers, savings, credits and insurance, but also bookkeeping, analytics and financial management. Digital channels include new solutions such as smartphones and other NFC-enabled devices, electronically enabled cards, biometric sensors and devices, tablets, phablets and all other relevant digital systems. It also comprises “old-fashioned” channels like the Internet, ATMs or POS terminals (which anyway become more and more advanced).

Modern solutions for the provision of financial services are adapted to the changing needs of clients. They provide a different standard, a higher level of service and customer relations. Other sources of changes come from specific needs and new expectations of digital customers who become immersed in the world of the Internet and mobile applications. These customers know how to search the network to find

the best-suited product and service. Modern technologies boldly enter the financial sector. The financial sector's digitisation is done through digital sharing solutions and products, thus changing the standards of services offered, among others regarding payments.

9.2.1 User Experiences, Innovations and FinTech

Consumers want financial institutions that can respond quickly to their needs with products tailor-made to them. Large technology players, for example, have a very successful experience in taking the friction out of business processes. Consumers require then the same level of commitment, quality and ease of use from financial intermediaries. In an era where retail products can be ordered and delivered on the same day, people want their financial transactions to also occur in real time. The same expectation applies to other financial products. Consumers want services that make sense within their day-to-day lives. The expectations and needs of digitally savvy individual clients have changed radically.

Enhancing the customer experience is the most important objective of financial institutions that are aware of the importance of FinTech strategies. Systematic push for innovation is also triggered by the need to transform current operations, safeguard against threats and broaden existing and entering new markets. New technologies change the functioning of the financial system, bringing further benefits to the users, like providing services that are tailored to individual needs or offering faster and secure transactions. They allow for more effective communication channels, improve access to the services and broaden the range of providers.

Naturally, digital technology is not magic enough to increase financial inclusion by itself. It is important that also people with low skills use digital financial services. The services must be well adjusted to their needs and capabilities. The digitalisation of financial products and services results in the need to strengthen digital financial literacy.

One of the strong trends observed recently is the formation of FinTechs [6]. FinTech, or financial technology, is an innovative financial service based on information technology. They may not necessarily be strictly financial institutions but also entities that want to operate in the financial sector. Actually, by providing disruptive financial services, FinTech can boost financial inclusion. They aim at using the latest technology achievements in providing financial services to the user. Products and business models that have worked for decades are no longer relevant to the digital economy. The pressure from customers and the proliferation of technology have moved FinTech to the top of the growth agenda. Actually, recent years have been an impressive march of companies from this sector through the markets of Asia, Europe and the USA. Innovative companies from the FinTech sector are doing better and better on the market.

With a proliferation of mobile Internet, FinTech has exploded, introducing a wide variety of technological innovations into personal and commercial finance, as well

as business models. Emerging technologies like artificial intelligence and machine learning, the blockchain and the Internet of things combined with quickly changing customer needs are transforming how financial institutions deliver services. The scope of FinTech activities is extensive: from tools supporting investors in searching the market or making decisions, through algorithms verifying creditworthiness, to various facilitations in the payment process, and from innovations in financial literacy and financial education to redefined retail banking and crypto-currencies. Most often, the focus is on developing a single product, which makes the services they provide highly specialised and user-friendly at the same time. What is important, these companies usually have access to a vast amount of data about their clients, extending the potential of extensive data analytics. FinTech companies generally offer better customer service than the traditional financial sector.

9.2.2 The Need for Digital Skills for the Financial Sector

Living in the digital, however, creates the need to acquire new digital competences and skills. Only mastering the ability to use the potential of digitalisation appropriately gives full opportunities for the development of both society and individual citizens [2]. Digital competences are increasingly necessary for everyday life, but also more and more desirable in the labour market [3]. Lack of these skills, skill gaps or mismatch may constitute a significant barrier to the development.

It should be emphasised that the full potential of modern technology requires not only infrastructure and services but also the competence of the digital society. The competences are necessary to be able to participate in an increasingly digitalised society. It is, therefore, necessary to examine the digital competences of society and their impact on the ability to use emerging new e-government services.

More and more individuals across EU use the Internet every day. Most of them have smartphones. Many of them use it to for banking operations, conducting daily payments, including contactless. The number of active users of online banking is systematically growing, of which many use mobile banking. We may observe the rise of a digitised consumer. However, there are limits. The critical problem may be the relatively low level of digital competence of still many people. This poses a serious obstacle to the digitisation of the economy. Following this, it is relatively easy to identify other related risks, like a lack of trust in digital financial services, the digital financial system or technological innovation in general. This leads to new types of exclusion for certain groups of the population, as in the general case of digital skills, mainly the elderly and those on with low education. They might not be able to afford the use of digital devices to access financial services. The interesting part of the problem is the so-called self-exclusion. The most frequent answer among individual to the question on the reasons for not using the Internet is the lack of need. The true reasons, however, may include low levels of digital literacy or income or worries related to privacy and security.

The notion of digital literacy is one of many terms used to describe the area of competence related to the ability to use information, media and ICTs. The fundamental concepts of this area are digital competences, digital literacy, digital skills, e-skills. These terms are vastly used in policy-related documents, programmes, strategies, scientific literature, international organisations and institutions. Digital competences relate not only to digital skills but also to the attitudes and social aspects of skilful use and comprehension of digital devices. For example, the application of digital technologies to personal finance management may provide new tools to support consumers in improving their well-being. However, it is important to note that new challenges and risks are created by the digitalisation.

The ongoing technological transformation and increasing the areas of application of digital tools are naturally also observed in finance. Increasing the availability of new technologies translates into the development of new services. The development of new e-finance solutions increasingly requires the digital competence of customers of the financial sector. Employees are also faced with increasing demands. Working on large data sets, using sophisticated software and practical usage of communication tools are now desirable or even necessary skills in the financial sector. The appropriate level of these skills can also positively contribute to the efficient implementation of modern financial services. On the other hand, customers, users of modern solutions and services in the financial market will need to have appropriate competences as well.

Many proposals for general digital qualifications, competences and skills frameworks have been developed in recent years, to support socio-economic policy making, including policies tackling the problem of digital and social exclusion. It seems, however, that there is a strong need to develop more focused and detailed frameworks for selected specialised areas of social and professional activity, crucial for sustainable development. Adoption and dissemination of modern digital solutions in finance, bearing so many different names, like FinTech or emerging PropTech, but still sharing the same technological backgrounds, depend heavily on the digital readiness and skills of the society. Therefore, it seems that there is a need to develop an appropriate framework for assessing the competences of individuals regarding the potential to the uptake of the digital financial services.

9.3 Proposition of the Competence Framework

9.3.1 Measurement, Monitoring and Competence Frameworks

The role of financial innovation should not be underestimated. Many of the international organisations and individual governments are committed to assessing the effects of technological change in the financial landscape. Evidence-based policies need, however, robust statistical data to properly design the policy responses to the

problems. Data collection to produce statistics may be organised by the national statistical institute. In this case, the data would have the value of official statistics. The measurement system may be based on different data sources including traditional questionnaire-based survey. In order to design the whole process correctly, there is a need for a conceptual framework that may be the basis for identification of the most relevant issues and problems, and tackle them with appropriate questions. In the case of the measurement of digital skills, the conceptual framework might be guided by relevant competence framework for digital finance. The paper aims to address this issue by proposing the relevant competence framework, tailor-designed for the need to analyse the issue of skills necessary to increase the uptake of digital financial services.

The discussion about digital competences is not easy, the first impediment being the very notion of competence, to which several meanings are assigned. The same applies to digital competences. It is not easy to define their semantic scope, since they are interdisciplinary in nature, referring rather to the practical ability to use the richness of tools and methods offered by modern technologies. The explanations regarding the terminology used in terms of digital competences can be found in many national and international strategic documents and scientific literature. These terms are widely used by research institutes, public organisations and international institutions. The variety of definitions and approaches to digital literacy is undoubtedly related to the dynamic development of information and communication technologies and the increase in their use in society and the economy.

Usually, the competence frameworks are presented in terms of three layers of a specification, i.e. competences, including awareness, knowledge and understanding, then skills and behaviour and finally attitudes. Some define competences as a “harmonious set of knowledge, skills and attitudes that allow effective use of digital technologies in various areas of life” (...). Similarly, other authors refer to defining digital competences as a set of skills conditioning the effective use of electronic media and therefore both IT skills (hardware, software and application support) and information (searching for information in various sources to process them and use them in accordance with need). The digital literacy, therefore, covers a very wide set of skills determining the efficient and conscious use of new technologies and active participation in the life of the information society.

The directions of the development of digital competences in the broadly understood financial sector should be analysed on the side of both employees of the financial sector and its recipients. In this paper, however, competence framework for users of services is considered and proposed. The development of digital competence of employees in the sector is enforced by technological changes as well as customer expectations. For employees of the broadly defined financial sector, there is a need to develop new digital skills related to working on large data sets, modern software, business processes in the big data model and cybersecurity. They should be able to use e-tools in finance, sell online financial products and participate in the development of electronic banking, which results in a change in the nature of existing work. What's more, automation is used for back office tasks, risk management, big data analytics. The emergence of artificial intelligence provides the opportunity to create

support and chatbots, but it is also used for automatic trading and advice. Technology is changing the employment structure, leading to the digitisation of routine tasks and enabling the creation of new, different types of jobs.

As innovation and modern technologies change the financial sector, the need for human skills also changes. Service beneficiaries should have appropriate competences to be able to use emerging modern solutions and capabilities. Broad digital competences will provide users of the financial system with an active use of electronic channels of access to financial services (provided electronically by finance and insurance), e-banking solutions, opportunities offered by e-investment.

9.3.2 Digital Competence Framework for Financial Services

Digital financial competence framework proposed is presented below. The framework has been developed based on a thorough critical analysis of similar frameworks with related scope, as well as stocktaking exercise and profound examination of available digital financial services. In particular, the existing frameworks of digital and financial competences were analysed. It is the DigComp, the Digital Competence Framework for Citizens [7] developed by the Joint Research Centre, Core Competencies Framework on Financial Literacy for Adults [4] developed under the auspices of the OECD. It consists of six thematic areas and thirty-five competences. The proposed competence areas consist of information and communication, the financial landscape, service uptake, managing finances, safety and risk management, problem-solving. The competences were defined in terms of title indicating a rather but well-established scope, then followed by identification of knowledge elements and accompanied by awareness and understanding. In this form, the competence framework will be supplemented in future with two more layers, refining the semantic scope, i.e. concerning skills and attitudes corresponding to the knowledge layer.

1. Information and communication

- 1.1 **Browsing, searching and filtering information.** Understands how information is produced, processed, managed and made available. Aware of different search engines and how and why they operate, especially how they index and classify information. Understands which digital tools, like search engines or databases, best answer to own information needs. Understands how information can be found in different sources.
- 1.2 **Evaluating information.** Aware of the varying quality of available data and information. Aware of the risks of misinformation and the concepts of post-truth and fake news. Understands the varying reliability of information sources, regardless of the communication channels. Understands the need to evaluate digital media content. Knows how to gather, process, evaluate, cross-check and interpret information, including the information acquired through digital platforms.

- 1.3 **Interacting through technologies.** Aware of different digital communication channels (e.g. email, chat, VoIP, video conference, SMS). Aware of the benefits and limits of different means of communications. Knows how digital communication means work. Knows the functionality of communication apps (on mobile devices) and (desktop) applications. Knows how to choose the most appropriate means of communication for the context. Knows how to interact through a variety of digital devices, apps and applications.

2. Financial landscape

- 2.1 **Understanding digital environment.** Answers that money and financial assets may take digital forms, and related transactions may be conveyed digitally.
- 2.2 **Understanding consumer protection system.** Aware of digital financial services consumer protection regulations. Knows where to find relevant information regarding the extent of the protection for various digital financial products and contexts. Aware of redress mechanisms for unsatisfactory service or products. Knows how to complain about financial products and services to a relevant body.
- 2.3 **Understanding rights and responsibilities.** Knows and understands the rights and responsibilities of digital financial services consumers.
- 2.4 **Gathering information and advice on digital financial services.** Knows where to find information and advice on digital financial services. Aware of existing sources of information on digital financial services and the availability of independent financial advice.
- 2.5 **Staying up to date with digital financial services offerings.** Aware of the variety of available digital financial services. Aware of available digital financial services providers offering relevant products. Knows that the right choice of the digital financial product depends on many factors.
- 2.6 **Understanding digital financial services landscape.** Aware that digital financial products may be offered by non-financial organisations including big tech companies and small FinTech start-ups. Understands the mechanisms of services used and knows organisations involved.
- 2.7 **Keeping up with innovations and changes.** Aware that digital financial services evolve over time and sometimes can change rapidly and radically.

3. Services uptake

- 3.1 **Making digital payments.** Aware of various digital payment methods. Knows how to assess the potential benefits and risks of various payment methods. Understands the advantages and limitations of different methods of making digital transactions.
- 3.2 **Making money transfers.** Understands different digital payments and money transfer methods; knows how to make a payment or transfer money using digital platforms (including mobile).

- 3.3 **Doing currency exchange.** Aware of various exchange practices on digital platforms; knows how to convert currencies using digital services; understands the differences between digital services of currency exchange used in different contexts.
- 3.4 **Managing financial records.** Understands the importance of systematic reviewing of digital financial records and assuring access to them if necessary, also through making copies or backups.
- 3.5 **Using digital financial management services.** Aware of integrated digital personal financial management services. Understands the differences between functionalities offered.

4. Managing finances

- 4.1 **Managing the budget.** Aware of the need to create budgets, taking into account incomes and expenses. Knows how to monitor them. Understands the importance of planning for expenses.
- 4.2 **Managing savings.** Aware of different savings options available on digital platforms, that may differ in terms of interest rates, fees, and taxes. Knows about savings options available through digital finance services.
- 4.3 **Managing an investment portfolio.** Aware of digital financial investment services. Knows how to invest using digital services. Aware of the difference between different investment instruments available digitally when making long-term investments, especially for retirement.
- 4.4 **Managing liabilities and contracts.** Aware that in some cases it may be possible to renegotiate the terms for digital financial services. Knows when and how the terms can be renegotiated.
- 4.5 **Managing debt.** Aware that digital financial products can affect personal debt. Understands why it is essential to manage the ratio of the individual or household debt to income. Knows that digital financial services may be used for debt management.
- 4.6 **Managing credit score.** Aware that financial decisions on digital platforms as on traditional channels may be assessed and taken into account in future, for example by the third-party credit provider for assessment of a borrower's ability to repay the credit purposes. Knows which digital transactions and related factors are taken into account in a credit score, and how it is assessed.

5. Safety and risk management

- 5.1 **Identifying risk of information deficiencies.** Aware of the risks linked to making uninformed financial decisions, especially on digital platforms.
- 5.2 **Identifying risks associated with excessive advertising.** Aware that in the digital environment, advertising and similar activities targeted at engaging clients may be even more effective than in the real world. Understands the consequences of compulsive or excessive buying.
- 5.3 **Identifying emotional risks.** Aware that emotions can have an impact on financial decisions, primarily related to investments.

- 5.4 **Identifying risks related to ease of use of the platform.** Aware that simplified lending processes on digital platforms make it easy to access credit without considering consequences or to spend more than initially planned or necessary, especially that all forms of deferred payment are also a form of credit.
- 5.5 **Identifying mistakes.** Aware that when using digital financial services, mistakes can be made. Knows how to reveal them.
- 5.6 **Identifying market risks.** Aware of the risks related to digital financial products, related to, among other things, making inappropriate product choices including excessive exposure to market interest rates or currency exchange risks. Aware of how internal or external shocks may impact financial markets and possible consequences for digital financial services users and providers.
- 5.7 **Safeguarding against scams and frauds.** Aware of the risk of scams and frauds. Understands why it is important to report them to the relevant bodies even if not personally a victim. Knows whom to report suspected scams and frauds. Knows how to report scams and frauds.
- 5.8 **Protecting personal data.** Aware of personal data protection importance and existing regulations. Aware that digital service providers may use the personal data of users. Aware of online fraud, cyberbullying and threats in the digital world. Understands basic concepts like confidentiality, privacy, data security and data protection. Understands the risk of identity theft and related credentials' thefts. Understands the importance of keeping all the personal data and financial information secure (including security-related information like passwords and PINs). Understands how others can see user's digital footprint. Knows that most of the digital services collect and use information about users, also for commercial reasons. Knows about appropriate behaviour in the digital domain.
- 5.9 **Managing digital identity.** Aware of the connections between the online and the offline worlds. Understands the benefits of having one or more digital identities to be able to secure against risks and threats, to protect reputation.
- 5.10 **Protecting devices.** Aware of the risks and threats associated with the use of digital technologies. Knows about current and up-to-date strategies to avoid risks and deal with threats.

6. Problem-solving

- 6.1 **Solving technical problems.** Knows how digital devices are built and the way they function. Knows how to solve possible technical problems or where to look to solve a problem.
- 6.2 **Identifying needs and technological responses.** Understands the potential and limitations of digital technologies and tools. Knows available technologies, their strengths and weaknesses and how to use them to achieve per-

- sonal goals and increase productivity. Knows the most relevant applications of digital technologies.
- 6.3 **Identifying digital competence gaps.** Aware of the broader context of the information society, digitalisation and globalisation. Understands where own digital skills and competences need to be improved or updated, also to keep up to date with new developments. Knows about the important digital technologies used.
- 6.4 **Identifying digital financial competence gaps.** Knows that it is possible to improve an individual's digital and financial literacy.

It seems significant that the most competences were distinguished for the area of security (ten). This confirms the importance of the problem in the context of the degree of use of digital financial services. The issues related to ensuring privacy and security are certainly the greatest concern of users who refrain from using digital channels. These fears are additionally intensified by the lack of appropriate competences and skills in the field of individual protection against threats occurring in this sphere. It is probably even more important, and perhaps even above all, in the case of attitudes. The shaping of attitudes should be at the beginning of all considerations regarding the development of upcoming policies aimed at promoting the use of modern digital financial services.

9.4 Conclusions

Digitalisation is affecting individuals and businesses, and strengthening the digital economy and information society. Mobile devices and the Internet have given rise to a new generation of financial services. The digitalisation of financial products leads to a need to increase digital financial literacy. Following this, appropriate policies should be developed to address the issues of digital and financial exclusion. This requires substantial empirical evidence based on a robust measurement framework in the form of data collection systems for statistical production processes. Policy-makers need timely and relevant statistics to better understand this crucial area of digital economy development.

competence, skills and attitude frameworks are an essential prerequisite facilitating the production of meaningful statistics. This paper proposes the competence framework for digital financial services. The proposed competences, grouped into six major areas, have been identified and defined in terms of the first layer of usual description, i.e. awareness, understanding and knowledge. The work presented here should be continued in the form of making the framework more granular by adding skills and attitudes corresponding to identified competences. It may, however, already be used as a guide in design of set of indicators necessary to monitor and evaluate policies targeting digital financial exclusion. The framework proposed identifies critical core competences that should be developed to ensure the everyday and safe use of digital financial services by consumers.

References

1. Bell, B.: *The Coming of Post-Industrial Society*. Basic Books, New York (1973)
2. Erstad, O.: *Educating the digital generation*. Nord. J. Digital Literacy 1 (2010)
3. OECD: *Skills Matter: Further Results from the Survey of Adult Skills*. OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264258051-en> (2016a)
4. OECD: *G20/OECD INFE Core Competencies Framework on Financial Literacy for Adults*, OECD, <http://www.oecd.org/daf/fin/financial-education/Core-Competencies-Framework-Adults.pdf> (2016b)
5. OECD: *OECD Digital Economy Outlook 2017*. OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264276284-en> (2017)
6. OECD: *Financial Markets, Insurance and Private Pensions: Digitalisation and Finance* (2018)
7. Vuorikari, R., Punie, Y., Carretero Gomez S., Van den Brande, G.: *DigComp 2.0: The Digital Competence Framework for Citizens. Update Phase 1: The Conceptual Reference Model*. Luxembourg Publication Office of the European Union. EUR 27948 EN. <https://doi.org/10.2791/11517> (2016)