Assessing the Professional Standing of IT Specialists in the Polish Financial Sector. A Report from a Qualitative Study[1]

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Abstract

This study had two basic goals: (1) to identify challenges facing the financial sector over the next 3–5 years, due to changes in its environment; (2) to set out the directions for the development of the sector's human resources. The research was focused on three thematic areas: recruitment criteria, working conditions, prospects for professional development. Five in-depth interviews with IT specialists working for banking cooperatives and for entities from the insurance market were conducted. The scenario of the interview consisted of three module in order to verify three hypotheses: 1. 'hard' rather than 'soft' competences are more important for a potential employer; 2. higher the organization's development potential results in better assessment of working conditions by IT specialists; 3. better ratings of Polish economy was linked more positive personal predictions related to prospects of professional career. The article includes some recommendations

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on the design of a quantitative study of specialists in IT/cyber-security. Generally, the position of IT specialists on the Polish labour market seems to be well grounded in their skills and structural demand for their work in Poland's financial sector.

Introduction

According to reseachers who study the social determinants of technological progress, the establishment – after the Second World War – and growth of computer science represents one of the main factors which contributed to the creation of structural underpinnings for the emergence of a new type of society – the information society – and a new type of economy – the digital economy.

In the words of Manuel Castells, a unique 'revolution of information technologies' was possible because in the 1970's computers became equipped with the microprocessor and then (thanks to technologies already employed in military communication networks), they were connected, within the framework of a global information web (the internet), into a worldwide information ecosystem, which is constantly evolving (Castells 2008: 52–64).

As a conceptual approach, information society is multi-dimensional, which makes it rather difficult for theoreticians to reach a clear agreement of opinion in the matter. Depending on where they choose to stand theoretically, researchers focus their attentions on economic, cultural and technological factors.

As a general assumption, it can be said that the term information society signifies 'a society which produces, stores, transfers, draws and makes use of specific information' (Nowina-Konopka 2006: 18).

From this it follows that, for the growth of such a society, of key importance are the ways in which both individuals and social groups make use of information to achieve their aims. Without steady access to information, their actions and interactions become dysfunctional to the whole social system.

As for digital economy, it is characterised by the use of information and communication technologies (ICT) in the economic activity of individuals, groups and organisations.

Based on a review of the existing versions of the concept, Rumana Bukht and Richard Heeks propose to define digital economy as 'that part of economic output

derived solely or primarily from digital technologies with a business model based on digital goods or services' (2017).

Thus, digital economy represents merely a certain section of the whole economic system, rather than constituting a new, comprehensive model of economic activity. As the authors of this definition correctly point out, the structure of such an economy is defined by the characteristics and composition of the ICT sector, which encompasses the making of IT equipment, provision of IT services, production of software, consultancy services, telecommunication services (Bukht, Heeks 2017).

The pace at which the digital economy grows is measured by the scale of the phenomenon known as 'digitisation'. According to the European Agency for the Improvement of Living and Working Conditions (Eurofound), digitisation 'refers in a broad way to the transformation brought about by the widespread adoption of digital technologies'. It 'refers to the process of converting [information] into a digital form which can be processed by the computer (or vice versa)'.

The process of digitisation of the European economy is underway, with its scope, dynamics and directions being dependent on technological, as well as legal conditions. The European public is growing increasingly aware of this process, in both its positive and negative aspects.

In March 2017, the European Commission gauged the sentiments of the citizens of European Union countries, in a special edition of its Eurobarometer survey. The poll showed that 1) half of respondents view digital technologies as having a positive impact on the economy, quality of life and society; 2) almost three fourths of those asked agree with the following statement: 'Due to the use of robots and artificial intelligence, more jobs will disappear than new jobs will be created (*Special Eurobarometer 460* 2017)'.

Such distribution of opinions with regard to digitisation – specifically its impact on the labour market – suggests that there exist potential psychological barriers, when it comes to acceptance of the implementation of technological solutions which lead to automation and digitisation of various aspects of profit-generating economic activity.

The concerns of the European public are partly justified. For example, according to the Organisation for Economic Co-operation and Development (OECD) – which analysed data from 32 countries – the mean probability of job automatability stands at 48 percent (It varies from 42 percent for New Zealand to 57 percent for Slovakia, with Poland on 50 percent) (Nedelkoska, Quintini 2018).

In order to ensure that this process is accepted by employees and successfully carried out by employers, the education system – at all its levels – must provide

learners and students with the opportunity to acquire and develop ICT skills, also referred to as digital skills. These skills are grouped in five categories: 1) the ability to use information and data, 2) communication and co-operation, 3) creating digital content, 4) security, 5) problem-solving (Pulwarski 2016).

In what directions the digital economy grows – and how dynamically – depends both on technological factors and on the characteristics of the labour market. People whose economic activity revolves around the making of software, consultancy in IT matters, and related activities, are referred to as IT professionals (or interchangeably as IT specialists). They possess specialised IT skills which may be divided into six basic groups, depending on the type of position in the organisation: 1) business management (e.g. Business Information Manager), 2) technical management (e.g. ICT Security Manager), 3) design (e.g. Systems Analyst), 4) development (e.g. Test Specialist), 5) operation and maintenance (e.g. Database Administrator), 6) support (e.g. ICT Security Specialist) (Szyjewski 2018). It is worth noting that an organisation's size and profile of activity determines its demand for the above-mentioned categories of IT specialists.

In 2014, a Poland-based qualitative study – featuring persons familiar with the specifics of what an IT specialist does – found that there are three types of skills which distinguish this category of employees. These types of skills relate to: computer programming and the making of equipment; management of the www network; functioning of the IT infrastructure (Wojtczuk-Turek 2014). Given the ever wider-ranging digitisation of work in various sectors, it is not only the IT specialists who are drawing on the IT sector's characteristic competencies in the performance of professional tasks. These competencies are gradually becoming universal.

In 2018, Eurostat published a report on the ICT sector, which revealed the following about the employment situation of ICT specialists in EU countries: (1) Finland had the highest proportion of ICT professionals in 2017 (6.8 percent of the workforce), Greece the lowest (1.7 percent), while the figure for Poland stood at 2.8 percent; (2) the number of ICT specialists in the whole EU had total ed 6,162,000 in 2007, and by 2017, it already reached 8,385,100; (3) between 2007 and 2017, the number of people employed as ICT professionals in the EU grew 11 times faster than the bloc's total workforce (Eurostat 2018a).

It must be emphasis ed that the Polish labour market is relatively well positioned to recruit ICT specialists, as in 2017 only 37 percent of Polish firms declared they had such vacancies to fill, while the figure for the whole EU was 53 percent. Companies reported problems in this regard most frequently in the Czech Republic, Austria, Malta and Luxembourg, where the figure surpassed 70 percent(Eurostat 2018b).

IT vacancies in Poland's provincial cities – according to the annual survey, the Barometer of Professions for 2019 – concerned the following jobs: analysts, testers and engineers of ICT systems, database designers and administrators, programmers (*Barometr zawodów 2019*). This gap in the labour market, between the supply of employees in IT professions, and the demand for them, suggests that over the coming years, both pay-rises and pressure on salaries appear inevitable.

1. The ICT Sector and the Financial Sector in Poland

The available statistical data reveal that Poland's ICT sector has undergone significant changes. The number of employed ICT specialists (professions in Section J – Information and communication) has increased significantly – from 237,800 in 2010 to 366,500 in 2017. This means as many as 128,700 new ICT employees over 7 years (GUS 2018). Such a surge suggests that over the coming years, the demand for IT specialists in the Polish labour market will continue to grow.

This forecast seems justified also in the light of data on the average gross salary received by these professionals. It stood at PLN 5,538.06 in 2010 and at PLN 7,468.83 in 2017 (GUS 2018). Over this period, salaries for Section J jobs were higher, by several tens of percentage points, than the average gross salary for the whole Polish economy[2].

In 2017, the firm Sedlak & Sedlak prepared a report on salaries in the Polish IT sector, based on interviews with over 9,000 staff employed in around 90 companies (Okopień 2018). These firms differed in terms of core business, but for the majority of them, it was the production of computer software. The report covered salaries of those in managerial positions, but also those lower down the career ladder.

The study also confirmed that jobs in the financial sector are better paid. The average salary here was higher by more than PLN 3,000 compared to the pay in the services sector, and PLN 4,000 higher than in the software-making sector. Even junior specialists were better remunerated.

According to a 2017 report by INVESTIN, a consultancy, for the Ministry of Development, the financial sector is the most advanced section of the Polish economy,

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[2] In the Polish labour market in 2018, it was computer scientists who reported the highest levels of satisfaction with their remuneration (see: *Satysfakcja zawodowa Polaków 2018…*).

in terms of the level of digitisation of products and services – when measured against the EU average (Perspektywy rozwoju polskiej branży ICT… 2017).

Similarly, a study by Deloitte Digital, 'Digital Banking Maturity 2018', (which included 15 companies from Poland's banking sector), found that Polish banks – together with counterparts from Russia, Spain, Switzerland, Turkey – belong to a group of 'digital leaders', who are characterised by a focus on maintaining digital advantage over competitors (*Digital Banking Maturity 2018…*). Thus Poland's financial sector makes for an attractive employer for IT specialists, who are among those on the domestic labour market, whose professional standing can be expected to continue to improve over the coming years[3].

Under Poland's official classification of activities, PKD, the sectors of finance and insurance comprise Section K, which is divided into the following categories: (1) financial services, except insurance and pension funds; (2) insurance, re-insurance and pension funds, except obligatory social insurance; (3) activities in support of financial services, insurance and pension funds.

When it comes to employment and pay, in 2016 the situation was as follows (GUS 2017a): (1) 353,800 people working in the sector; (2) 600 workers provided (employed) by temporary-employment agencies; (3) 297,400 employees (of which 241,300 employed full time); (4) the rate of hirings at 22.5 percent and the rate of dismissals at 21.9 percent; (5) 54,300 hired and 53,500 dismissed; (6) the percentage of vacancies was 0,64 (compared to 0,66 for the whole labour market); (7) the average gross salary was PLN 6,659,24 (compared to PLN 4,052,19 for the whole Polish economy); (8) the average monthly cost of work per one employee was PLN 8415,99 (compared to PLN 5,489,14 for the whole economy). Overall, in 2016 Section K's stability of employment was roughly on the level of the whole labour market, while both pay and costs of work were above the average. In 2015 a similar situation was recorded.

In terms of institutions, the condition of the financial sector – as of 2018 – can be summed up as follows: (1) there were 612 entities in the Polish banking sector in December 2018 (32 commercial banks, 549 banking cooperatives and 31 offices of credit institutions); (2) also in December 2018, employment total ed 162,568 (of which 31,000 in banking cooperatives); (3) terms of assets, PKO BP, a bank, was the biggest

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[3] In a report by the Association of Polish Banks (ZBP) from September 2018, the growth prospects of the Polish banking sector in terms of its digitisation received an unequivocally positive assessment: 'The Polish field of electronic and mobile banking is one of the fastest-growing sectors of the European banking sector' (see: *Raport ZBP: Polska i Europa – wyzwania i ograniczenia 2018*).

institution, with PLN 324,255,000,000 worth of assets in December 2018; (4) at the end of 2018, there were 60 active domestic insurance companies[4].

The professional standing of IT specialists in the Polish financial sector has not yet received closer attention from the country's researchers. It is being monitored on an ongoing basis by the domestic banking community, whose representatives strive to keep abreast of the technological conditions underpinning the operation of the financial sector. To this end, they gather annually at a conference organised by the Gdańsk Banking Academy (GAB), titled 'IT in financial institutions'. In recent years, discussion centred around the following main themes: e-administration, verification, security issues, the role of IT in limiting operational risk (2012); New technologies and security (2013); The role of IT in a company (2014); Optimising the costs of the banks' IT-related activities by co-sharing activities within a group (2015); New regulations and operational risk: what challenges for IT departments? (2016); The impact of digitisation on the creation of innovative business models in the insurance sector (2017); Big Data as a source of well-performing customer service and automation of processes (2018); Human or machine: the future of cybersecurity in the 21st century (2019)[5].

Such choice of topics at the conference shows that the Polish financial sector is taking a pro-active approach to technological change, which is subsequently reflected both on the level of expert debate and in the development strategies of Polish banks[6].

In summary, one must agree with the observation that the Polish banks are currently undergoing digital transformation, whereby a bank's business model is being adjusted to the changing needs of its customers (Druszcz 2017: 237). In discussions within the banking community, a new view is gaining popularity, namely that banks have ceased to be mere managers of financial resources, and have become the guardians of their customers' private data, which must be adequately protected, as this determines a bank's credibility (See: Klub Polska 2025+ 2018).

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[4] Own calculations based on: *Publikacje i opracowania,* Komisja Nadzoru Finansowego 2019.

[5] Own overview based on: *IT w instytucjach finansowych* 2019.

[6] Examples of such strategies: Alior Bank's strategy for 2017–2020, Cyfrowy buntownik [Digital rebel] (March 2017) https://www.aliorbank.pl/am/jcr:98cf582f-527b-4e37-81a6-7f1a0fcb627d/ALR_Strategia%202017-2020_FINAL_POL.pdf [June 19, 2019]; Strategia 2020 Banku Millennium. Prezentacja dla analityków i inwestorów [Millennium Bank's 2020 strategy. A presentation for analysts and investors], October 30, 2017, Warszawa, https://bankmillennium.pl/documents/10184/123526/Millennium_Strategy_POL.pdf/ea060e2f-7d7b-47fd-9268-44543da25e6a?mv=3 [June 19, 2019].

It is a paradox that, given the ubiquity of telecommunication networks and the universal access to them, it is easier to obtain and utilise customer data stored electronically, than the paper-based records (which require only physical safeguards). As entities in the Polish financial sector place growing emphasis on making sure the digital data at their disposal is appropriately protected, over the coming 3–5 years, they will increasingly create the following positions, among others: Cybersecurity Specialist, IT Specialist, Digitisation Specialist, Risk-management Specialist (Górniak et al. 2018). With the financial sector's working environment becoming ever more digitised, such posts should be filled by employees who possess the ability to harness modern technologies as they accomplish professional tasks. This assumption is borne out by an analysis of job offers available online (see also: Szkwarek 2018).

2. Methodology of the Study

A review of Polish qualitative studies of work in ICT and finance shows that, so far, the issue of the professional standing of IT specialists in the financial sector came under only selective analysis. Certain aspects were chosen for presentation, with no attempt at taking a comprehensive view of the factors affecting the work of such professionals, in the particular environment of the financial sector. Three such research projects merit mention here.

A comparative analysis of the situation on the Polish labor market (the reference country is Germany – due to geographical proximity and structural connections) in the years 2007–2018 indicates that the probability of a situation in which the Polish labor market will reach the natural level of unemployment for the first time since the beginning is increasing the system transformation process in 1989. Total unemployment rate in Germany (DE) and Poland (PL) in a period of 2008–2018: (1) in 2008 7.5% (DE) and 7.1% (PL), (2) in 2009 7.8% (DE) and 8.2% (PL), (3) in 2010 7.0% (DE) and 9.7% (PL), (3) in 2011 5.8% (DE) and 9.7% (PL), (4) in 2012 5.4% (DE) and 10.1% (PL), (5) in 2013 5.2% (DE) and 10.3% (PL), (6) in 2014 5.0% (DE) and 9.0% (PL), (7) in 2015 4.6% (DE) and 7.5% (PL), (8) in 2016 4.1% (DE) and 6.2% (PL), (9) in 2017 3.8% (DE) and 4.9% (PL), (10) in 2018 3.4% (DE) and 3.9% (PL) (Eurostat (2020a). In Germany, it remained at a comparable level for the first years (7%). Since 2010, and in Poland since 2013, it has been falling, and currently the difference between the two countries is only 0.5 percentage points (Germany – 3.4%, Poland – 3.9%). The dynamics of the increase in the gross domestic level in Poland in the years 2007–2018

was still higher than the dynamics of the GDP growth of the entire European Union, which is a stimulus to the improvement of the situation on the Polish labor market. My request: here a description of the data from the Eurostat table on the annual GDP growth rate. If we compare Poland's economic growth with the European Union average, then the Polish economy is developing much better. The European Union has had periods of negative results, and for several years economic growth has been at the level of 2 percentage points. Poland had a slowdown in growth during the crisis years, but still recorded positive results. In recent years, it has been growing at a rate of 3–4%, and in the previous year even above 5%. First, there was a qualitative element in a wider study of the Polish IT market, *IT@PL*, consisting of 8 in-depth interviews with managers of multinational corporations. The interviews were carried out in April 2013. The whole report had two aims: 1) to inform – to provide employers with knowledge about what IT professionals expect from those who may potentially hire them; 2) to give insights that can be applied in practice – to propose career-development paths for such specialists (see: *IT@PL – rynek pracy IT w Polsce* 2013).

Another qualitative study, which has already been quoted, was conducted by a team of researchers at the Warsaw School of Economics (SGH), the Faculty of Human Resource Development. Again, it was part of a bigger project, commissioned by the Institute for Education Studies (IBE) in 2014. The qualitative part comprised in-depth interviews with representatives of the providers of education (both formal and non-formal), companies, and institutions which make up the business environment, as well as with people in specific professions/posts (Wojtczuk-Turek 2014: 32). The findings of this study were used in making recommendations on how to create a Sectoral Qualifications Framework for the IT industry.

Finally, there is a qualitative component in the Human Capital Balance Sheet, an established survey which was re-introduced in 2016 (Górniak et al. 2018: 49). Thus 10 expert interviews were carried out with representatives of the financial sector (that is, the capital market, the banking industry and the insurance sector) and of institutions which make up the environment for businesses. The interviews were designed to broaden the knowledge gathered from an analysis of existing data, during the project's explorative phase.

This study has two basic purposes: (1) to identify challenges facing the financial sector over the next 3–5 years, due to changes in its environment; (2) to set out the directions for the development of the sector's human resources. It must be noted that the published findings failed to furnish the kind of qualitative data which would demonstrate the nature of the work performed by IT professionals in the financial

sector – by discussing the individual work experiences, opinions, expectations and forecasts of the respondents.

The collected data are intended to provide answers to the following Research Questions: RQ1 – whether the current situation of the Polish economy (expressed by macroeconomic indicators) determines the assessment of the personal professional situation of IT employees in the financial sector; RQ2 – is the recruitment of IT employees in the financial sector based on criteria that are not dependent on technological progress in the IT industry; RQ3 – whether the assessments of the working conditions of IT employees in the financial sector are conditioned by an assessment of the development potential of the organization in which they work; RQ4 does the assessment of the economic situation in the country affect the perception of career opportunities for IT staff in the financial sector? The first research question is of a general nature, and the next three questions relate to specific research issues.

After conceptualizing these research issues in the question phase, the next stage is operationalization in the form of research hypotheses, which will be verified based on qualitative empirical data obtained through individual in-depth interviews. The theoretical content of these hypotheses is as follows: H1 – 'hard' rather than 'soft' competences are more important for the potential employer in the recruitment process of financial sector IT employees; H2 – the better the development potential of the organization, the better the assessment of working conditions; H3 – the better the assessment of the economic situation in the country, the better the assessment of the possibilities of developing own professional career by the respondents.

This conclusion served as the cognitive inspiration for making a qualitative study which would produce data illustrative of how the professional careers of such specialists look at the micro-level. Another aim was to obtain empirical data which would help in the design of a quantitative study on the subject.

The IT professionals employed in the financial sector play a key role in ensuring the security of payments, which are carried out under a specific system, namely a system of transferring money, which is based on formal and standardised rules and shared principles for the processing, settlement or accounting for of payments[7]. Out of the three entities which influence the security of a transaction – the provider of payment services, the user of payment services, the system of payment – it is the service provider (e.g. a bank), who is primarily responsible for the security of payments, because it offers a wide array of services and performs the role of an

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[7] In line with Para. 2 point 27 of the Polish Law on Payment Services of August 19, 2011, Dziennik Ustaw 2011, No. 199, item 1175.

institution of public trust. The EU's Agency for Network and Information Security (ENISA) noted in a 2014 report that the bigger a bank, the more comprehensive its approach to ensuring the security of IT processes (Dupre 2014).

This systemic approach includes, for example, the employment of cyber-security specialists[8]. They form a notably diverse professional category, because of the highly specialised nature of the knowledge and skills involved[9]. This group is growing in numbers in Poland, yet – as already noted – its professional standing has not been diagnosed in a systematic way before. This is the reason behind the present qualitative study. The biggest organisational challenge consisted in reaching representatives of the target group, in order to compile a research sample involving employees who perform highly specialised professional tasks[10].

Because initial attempts to reach potential respondents employed by commercial banks – through the organisation of banking self-government – had been ineffective, authors decided to interview IT specialists working for banking cooperatives and for entities from the insurance market. Eventually five interviews were conducted: three with representatives of the former group and two with professionals from the latter category. Given the size of the financial organisations employing them (low level of functional specialisation of work positions and the consequent wider scope of professional duties), it was assumed the respondents would combine responsibility for the operation of the IT infrastructure, with tasks related to cyber-security. This assumption was proved correct in the course of the interviews.

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[8] Cyber-security is defined – in the Para. 2 point 4 of the Polish Law on the National System of Cyber-Security of July 5, 2018 (Journal of Laws 2018 item 1560) as 'the resistance of information systems to actions which violate confidentiality, integrity, accessibility, and authenticity of the processed data or of the services connected with these data and offered by those systems'.

[9] Here are examples of the English-language titles of the posts filled by this kind of specialists: Cyber Security Engineer, Cyber Security Analyst, Cyber Security Manager/Administrator, Network Engineer/Architect, Systems Engineer, Software Developer/Engineer, Systems Administrator, Vulnerability Analyst/Penetration Tester, Cyber Security Consultant. See: 'Top Cybersecurity Job Titles'.

[10] This is indicated, among other things, by the titles of the different kinds of jobs for this professional category. In June 2019, Pracuj.pl, the Polish web portal for recruitment, published 10 job offers for specialists in cyber-security from the financial sector. The offered jobs were as follows: Bank Cyber Security Architect, Auditor in the IT Systems Team, Director for Cyber Security, Expert in Cyber Security Solutions for SOC, Expert in Cyber Security (Mainframe), Junior Specialist for the Monitoring of Cyber Threats (CERT/SOC), Staff Member in the Cyber Security Department, Specialist for Cyber Security Audits, Specialist for the Security of IT Systems, Senior Specialist for IT Security – Security Defender/CSIRT Team.

The choice of the in-depth interview (IDI) as a research technique rested on three premises. First, this technique works well when the interaction features people who possess specialised knowledge – who are experts. Secondly, because on the Polish labour market, the type of professionals under study proved highly difficult to reach, it was easier – from the organisational standpoint – to plan the recruitment process in a way which made allowances for the nature of their work (especially how much time they could set aside for participation). Finally, the category of specialists under study comprises a limited number of employees, and – in light of the quantitative data available – the overall figure is difficult to estimate.

It was decided that qualitative data would be obtained by means of a heuristic strategy (under the constructivist approach), which consists of the following stages: (1) choosing the research topic; (2) setting out the approach for conducting the research; (3) formulating a list of suppositions and intuitions on the part of authors; (4) carrying out the research on the sample; (5) obtaining qualitative data; (6) formulating conclusions; (7) setting out the research problem; (8) formulating research questions and hypotheses (for the quantitative study) (Miński 2017: 47).

As for the analysis of data, it was decided there would be no attempt to create specific categories and their features [which is characteristic of the methodology of grounded theory (Konecki 2000: 29)], and instead the analysis would mainly serve to determine the methodological and conceptual framework for the preparation of an approach for the quantitative study.

Because in carrying out a qualitative project, claims Steinar Kvale, 'much importance is attached to the context and concrete cases as factors which explain the topic under study' (Kvale 2010: 12), it had to be assumed that, in designing the thematic structure for the IDI scenario, it will be necessary to include several levels of social reality. The first is the micro-level, namely a participant's individual professional path. The second level concerned the operation of their financial-sector employer, in terms of management of all organisational resources. Finally the macro-level referred to the standing of the whole category of IT specialists in the banking sector, with the latter treated as a functionally and legally separate segment of the Polish labour market.

Consequently, the research scenario consisted of three modules which corresponded thematically to the levels of social reality presented above: (1) micro-level – module titled 'Recruitment criteria' (7 questions); (2) organisational level – module titled 'Working conditions' (10 questions); (3) macro-level – module titled 'Prospects for professional development' (9 questions). Each of the modules contained

introductory questions, follow-up questions and detailed questions (Kvale 2010: 12). This methodological separation of level on analysis was meant to capture the molecular approach to the person-environment relationship in which we can try to estimate the level of individual's expectations about the object of the research (Tomer, Mishra 2019: 5).

3. Analysis of the Research Results

The analysis of the research results was organised into three thematic areas, in line with the structure of the scenario for the in-depth interview, which had been divided into three thematic modules.

First, qualitative data obtained thanks to questions from the module titled 'Recruitment criteria' were meant to identify phases and key factors in the process of recruiting candidates for the posts of IT professionals/cyber-security specialists in the financial sector. The second thematic area, comprising research topics operationalised through questions from the module titled 'Working conditions', diagnosed the working conditions encountered by the category of specialists under study in the financial sector. This assessment included both the aspect of time (a comparative assessment of individual working conditions) and the structural aspect (an assessment of organisational factors affecting working conditions). The final thematic area, reflected in questions from the module titled 'Prospects for professional development', concerned research issues of a prospective and predictive character. Here, an attempt was made to determine factors affecting the stability of jobs of the professionals under study, both in relation to their respective employers and the projected growth of the sector as a whole over the next five years.

The 'Recruitment criteria' module consisted of following research issues (which were operationalized in a form of research question): main phases of education (both formal and non-formal), phases of professional career, motivating factors behind the decision to take up employment in the financial sector, criteria and phases of the recruitment process, similarities and differences in recruitment criteria changes in recruitment criteria, subjective hierarchy of recruitment criteria.

The first in a series of research issues making up the first module of the scenario for the in-depth interview (the module titled 'Recruitment'), concerned the main phases of the interviewee's educational path, between graduation from high school

and their current position in the labour market. All the respondents noted that completing higher education was the key phase. Three participants graduated from public universities (one received a degree in economics, two studied at an institute of technology), and the remaining two interviewees graduated from private higher-education institutions. Besides the economics graduate, four participants had a degree in computer science[11]. Two interviewees declared having also completed post-graduate studies. Two IT professionals noted having completed various specialised training courses.

The second research issue was linked with recounting professional careers of respondents, in phases, from the beginning of labour market activity to where they are professionally at present. In the case of four participants, professional activity can be subsumed exclusively under PKD's section J (Information and Communication), while in the remaining case, professional activity was of a diverse nature. All the interviewed people emphasised that professional experience had been accumulated in a sequential manner, by achieving successive positions in the organisational hierarchy, which meant growing complexity of work duties and acquisition of new knowledge in the field of information science. Two interviewees spent over ten years of their professional activity at posts with a single company. The remaining ones changed employers more often. Only in one case did the interviewee spend almost the entire duration of their professional career so far in the financial sector. Qualitative study on the Polish the social roles of Polish IT professionals in years 2002–2004 revealed that they present a high degree of self-identification related to their present occupational status (Kostera, Postuła 2011: 89).

The third issue which was placed in the 'Recruitment' module concerned the subjective aspect of the work situation of the interviewees, and had been included in order to identify factors which had enticed them to take up employment in the financial sector. Based on the obtained data, these factors can be divided into two main groups: (1) endogenic – connected with the participant's personality traits; (2) exogenic – connected with the external environment. The first group comprises the following factors mentioned by the participants: a high level of professional satisfaction derived from performing the duties of a computer scientist, a higher

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[11] According to the International Standard Classification of Education, ISCED-F 2013, among the educational paths which involve telecommunication and information technologies, may be included, for example, those which concern the design and administration of databases and networks, namely: Computer Science, Cryptology and Cyber Security, Information and Communication Technology. See: GUS 2017: 220.

need for stimulation. By contrast, the second group consisted of factors of a social and economic nature: social prestige, stability of employment, financial needs. It must be emphasised, however, that interviewees did not directly mention salary levels as the main reason which enticed them to take up employment in this particular sector. The empirical analysis of work motivation from the quantitative research on 1200 IT professionals in Latvia revealed that three types factors are related stimulating them to work: (1) factor related to the ability to the level of independence of their professional role; (2) professionalism as the method to get satisfaction from work and develop own skills, (3) present job is the method of obtaining new skills and knowledge for changing job in the future (Gribanova, Abeltina 2019: 168).

The next research issue in the first module concerned selected parts of the recruitment process: its phases and criteria of selection. Data from the interviews suggest that each of the participants underwent a recruitment process composed of multiple phases, whose level of complexity depended on the nature of the professional duties to be undertaken. In all cases, practical knowledge of the job candidate was more important than their theoretical knowledge. Three participants underscored the significance of the job interview, which had been designed primarily to verify technical skills. None of the respondents mentioned competence tests as an important recruitment criterion. In all cases except one, participants did not mention the source from which they learned about the date and criteria for the start of the recruitment process. None of them indicated that the process was stressful. Participants did not describe in precise terms the duration of the whole recruitment procedure. Two interviewees noted that their formal education was taken into consideration in the course of the recruitment process.

The fifth research issue problem was meant to enable respondents to compare the recruitment processes they had taken part in, in the course of their professional activity to date, in terms of the degree of similarity of recruitment criteria.

Replies of IT professionals varied according to two factors: (1) the total length of an interviewee's professional activity; (2) the duration of employment with a given company. These respondents who have been professionally active for more than 20 years pointed out the evolution of hiring criteria – in the early 1990's they had a general character. By contrast, at present their degree of complexity is higher, which reflects technological changes. According to interviewees, the criteria are broadly similar, and the specific character of professional duties carried out in a given enterprise does not influence the technical content of these criteria. Due to the rising

bargaining power of employees (as supply of labour falls), the criteria of recruitment are becoming easier to fulfill.

The sixth issue in the first module of the scenario sought to encourage respondents to make a retrospective assessment of the variability of recruitment criteria which they had faced as people applying for the job of IT specialist. Answers were diverse, reflecting both the age of the interviewees and the paths of their professional careers. First, these criteria evolved due to technological and demographic change. Secondly, a more important role is being played by psychological factors, which are significant in the process of adaptation of an employee in a new working environment – it is becoming ever more important to achieve quick feedback in a given system of organisational communication, which facilitates the process of sharing knowledge and information during the implementation of professional tasks of a project nature.

The last research issue which was included in the first module concerned the identification of a list of central recruitment criteria, arranged in a hierarchical order – from most to least important. Based on the remarks of the interviewees, the following thesis can be formulated – at the top of this hierarchy are the technical criteria, because it is they which determine the way in which the new employee can complete the process of adaptation to new professional duties. The higher the level of technical competences, the shorter the duration of this process. As a result, the employee is able to assume their role in the team in a capable way, use the equipment, react to new situations which arise from the dynamics of the processes of managing a given organisation. In the literature on psychological determinats of IT professionals' performance this syndrome of predispositions is called 'the practical intelligence of IT professionals' which can be defined as 'the managerial, intrapersonal, and interpersonal skills that are used to resolve IT– related work problems' (Joseph, Soon, Chang, Slaughter 2010: 149). From the statements of the interviewees, it can be deduced that, in order to obtain a sufficiently high level of technical skills, it is necessary to specialise in the knowledge of the IT software and hardware used in the financial sector. These are often of a highly specialised character, tailored to the individual needs – of an organisational and legal nature – of entities in this sector.

The second module of the scenario contained questions about working conditions on an individual level (an interviewee's personal experiences) and in the public dimension (perception of working conditions in view of the current situation on the labour market). The second module 'Working conditions' included a set of research issues which were linked directly with the present perception and assessment of

working conditions made by interviewed IT professionals: a general assessment of the working conditions in the financial sector, working conditions at the current employer – a comparative perspective, the scope of current professional duties, the advantages of the current place of employment, the shortcomings of the current place of employment in a comparative perspective, the formal and actual scope of professional duties, the method of performing professional tasks (from fully individual to fully team-based), expectations for professional duties, professional duties in view of the digitisation of the financial sector, the information and communication skills of employees in the financial sector.

The opening research issue of this module had a context-setting nature, as its purpose was to obtain a general assessment of working conditions in the financial sector. All respondents produced similar answers on the subject raised by the question related to that issue. They noted that the conditions of work are good in this sector and have improved in comparison with the past situation. The interviewees offered a positive assessment of salary levels, benefits, the ability to have a say in how the work is carried out. Generally, the emotional resonance of these statements was distinctly positive; the respondents were convinced that their employers are treating them as partners.

The second research issue placed in this module of the scenario encouraged interviewees to make a comparative assessment of their present working conditions and those which obtain at other entities of the financial sector. These assessments varied, which was mainly a reflection of the individual experiences of the respondents. To a lesser extent, differences resulted from an attempt to make a generalisation on the basis of information about the state of the entire sector. The interviewees were well-informed about the current market standing of their employers. As they noted, this standing is determined by the scale of the company's activity, its current strategy, as well as legal regulations which set out the conditions for the operation of the whole financial sector. In the respondents' view, conditions at their own places of work are similar to those which obtain at other financial entities.

The next research issue had been designed to produce answers concerning the scope and content of duties performed by the respondents, in terms of the major tasks they are carrying out in their jobs. There was marked diversity in the scope of these duties – each of the interviewees described the nature of their duties in a different way. Generally, these duties may be arranged according to their technological character – from those which are individualised (preparing reports, supervising the work of other

employees, administering the IT infrastructure), through mixed ones (overseeing the way in which legal regulations are implemented in a specific organisational context) to team duties (making sure the infrastructure functions in the appropriate manner throughout the organisation). The obtained data reveals that managerial posts require the performance of a higher number of tasks than the jobs of specialists.

The fourth research issue in the second module was meant to encourage respondents to express their private thoughts about the factors which, in their view, represent the strengths of their employer and increase the motivation on the part of respondents to perform their tasks. Most frequently, the interviewees noted that current jobs allow them to deepen and update their knowledge in the field of IT infrastructure. Consequently, they are able to influence the adaptation of the whole organisation to changes in the external environment, which emerge as a result of technological change. One can discern the existence of parallel trajectories – of personal and organisational development. They are connected to changes in equipment and software, but also determined – in terms of their directions – by the changing legal environment. There was less frequent mention – as employer strengths – of those factors which make the interviewees' jobs more comfortable from the psychological point of view (the duration of the commute, positive emotions in the group).

The fifth research issue in this module is directly related to the previous one. It concerns these factors which represent weaknesses of the entities from the financial sector, where the IT professionals under study are employed. In contrast to strengths, when it came to weaknesses, no factor was cited as a weakness by the majority of respondents. Whereas the strengths mentioned had a rather universal character, the weaknesses invariably concerned the concrete organisational situation, in terms of the legal requirements (bank reporting), the organisation's financial resources (benefits), the location of the headquarters (the time it takes to reach work). The flaws are treated as structural limitations, which concern the organisation as a whole, rather than the specific professional situation of each of the respondents.

The sixth research issue allowed us to obtain provided material for an assessment – in the individual opinions of the participants – of how efficiently the financial entities in Poland are using their organisational resources, in order to achieve their official strategic objectives. In the case of the two respondents who were specialists, the formal scope of their professional duties (as set out in the employment agreement/contract) corresponded – in their opinion – to the actual one (shaped by the dynamics of the processes of management). The managers, by contrast, indicated that the two sets of duties diverged from each other. This is because those respondents did not

have enough human resources or time at their disposal. One interviewee noted that the scope of duties was dynamic. This means that new duties flow from the changing market situation.

The seventh research issue had been included in order to establish if professional duties of the interviewees reflect the individual features of the position or if their content is determined by the group context in which they are performed. It is worth pointing out that none of the respondents performed their duties through regular participation in projects. Their duties were linked to replicable inter-organisational processes, which concerned the implementation, streamlining, supervision of certain IT technologies or software. Interviewees who work as specialists declared a more individualised manner of carrying out their duties, while persons who are managers emphasised that their duties are being performed in a given group context and concern the management of a team of people, where suitable communication skills are required.

The next research issue focused on how the respondents would like to modify their current work duties. It was assumed that the expectations of interviewees in this respect would concern mainly the technological aspects of their tasks. As it turned out, each respondent had slightly different expectations. In one case, they were not formulated as the interviewee had been working at the bank for less than half a year. One person repeated a reference to the necessity of supervising the processes of reporting carried out at an organisational unit within the bank, which was subordinated to them. Two respondents expressed a need to deepen their knowledge through participation in meetings. One person indicated that they would seek change in the scope of supervision of a subordinate part of the company's IT infrastructure.

The ninth research issue in the second module was meant to make respondents consider factors affecting the stability of their work duties, in the light of the digitisation of the financial sector. The concept of 'digitisation' itself had been deliberately left unspecified, on the assumption that such an approach would succeed in producing individual interpretations of the term, which will have various aspects, depending both on a respondent's current position as well as their practical and theoretical knowledge in the field of the information society and the digital economy. Generally, all interviewees took a positive view of the impact of digitisation on the whole financial sector. The content of their statements suggests that they do not see it as a process which will exert a negative influence on the entire labour market. As the interviewees noted, this process should have an organised character and improve the quality of the work duties performed by them, as well as have a legal basis determined by lawmakers.

The closing research issue of the second module concerned the view held by respondents of the information and communication skills of employees in the financial sector, and the usefulness of such skills in carrying out work duties. The interviewees all said such competences were significant, although the extent to which they were necessary in everyday professional activity, depended on the tasks assigned to a given post in the company. Two respondents referred to the basic level of such skills, which is meant to allow employees access to a bank's IT infrastructure. One person noted that this type of skills may form an element of professional development. Another interviewee, who works as a manager, pointed out the psychological aspect of such competences.

The third module of the scenario was devoted to the prospects for professional development on the part of employees in this sector, in the individual perspective (the expectations of the respondents for the direction of development of their own professional career) and in terms of the whole sector (factors affecting stability of employment, predictions about the direction of development of the whole sector). That module was focused on some aspects of personal and sectoral development of IT professionals' career: the individual and sectoral aspect of professional development, demand for specialists in IT/cyber-security (over the next 5 years), retention of employees – the individual aspect, expectations towards employers, self-assessment with regard to professional competences ('hard' versus 'soft'), perception of employer duties, factors affecting stability of employment, factors affecting employee turnover, the assessment and forecast of the state of the financial sector (over the next five years).

This research module's first issue was about how the interviewees perceive the factors which determine the growth of the financial industry in Poland, in terms of how these factors influence the possibilities for their own professional development. All the respondents expressed a conviction that the growth of the financial sector will be beneficial to their position. How they viewed the factors affecting their professional career was clearly linked to their respective roles in organisational hierarchy. The managers exhibited a higher degree of optimism than the specialists. For the interviewees, the growth of the sector as a whole is being shaped by technological factors.

When it comes to issues which, in the opinion of the respondents, affect their own professional development, they can be divided into three groups: (1) the needs of the organisation for which they work; (2) the amount of time at their disposal; (3) the level of economic stability of the organisation. Only one respondent displayed an extremely individualistic approach to their professional development.

The second research issue of the third module had been designed with a view to learning about the medium-term (5-year) predictions of the respondents with regard to the changes in demand for specialists in IT/cyber-security on the Polish labour market. The interviewees were unanimous in their conviction that this demand is going to rise.

As for the determinants of the exact level of the demand, each respondent pointed to different factors: (1) a bigger need for analysis in organisations; (2) demographic change in the labour market; (3) a growing level of specialisation due to technological development; (4) expansion of companies in the sector in terms of their products; (5) psychological factors - a growing level of readiness on the part of employees to change their place of employment. Answers to this question were among replies with the highest degree of inter-group agreement on the part of interviewees. The emotional aspect of their statements was notably positive.

The third research issue served to diagnose the type and scope of action undertaken by employers in order to create the conditions which would stimulate the professional development of the respondents. The measures mentioned in this connection by the interviewed managers and specialists can be grouped in three categories: (1) institutional measures – financial and material incentives offered on the basis of internal regulations; (2) knowledge-creating measures – training courses, conferences; (3) technological measures – learning about and monitoring equipment changes. In the literature on the issues related to retaining IT professionals five types of actions were identified: financial or non-financial compensation, working arrangements, career development opportunities, change of department, varying work tasks (Pflügler, Becker, Wiesche, Krcmar 2018: 298–299).

The next research issue concerned ways in which the respondents formulate expectations towards their current employers, when it comes to personal professional development. Generally, in none of the cases was the respondent adjudged to exhibit an attitude of entitlement. Each interviewee sought to formulate concrete expectations, knowing the financial potential and organisational limitations of their employer. The most frequently recurring theme in the remarks of the interviewees was about access to appropriate equipment and technology. This conclusion confirms other empirical studies which emphasize importance of technology as the environmental factor in the process of obtaining career satisfaction by IT professionals (Tomer, Mishra 2019: 12–13). The content of what the respondents expected was shaped by technological change in this sector. Only in one contribution was there raised an issue of an economic character. The theme of tele-working appeared in the case of just one interviewee.

The fifth research issue was meant to encourage respondents to assess the degree of importance of their own professional skills, divided into two distinct groups[12]. The first comprised 'hard' competences, that is, those whose essence is the ability to correctly utilise knowledge about how to operate IT infrastructure. This knowledge varies from person to person, and its extent depends chiefly on the strength of an individual's motivation for professional development. By contrast, the second group of competences (the 'soft' ones) concern the way a respondent functions in a given work team, the type of organisational culture, the character of professional duties performed by them (which means these skills are shaped by the dynamics of group processes). The positions enjoyed by interviewees in their respective organisational hierarchies influenced the level of importance attached to a given group of competences – in the case of managers, for the correct performance of duties, 'soft' skills mattered more, whereas among specialists, 'hard' competences were of greater significance. In the literature on the topic of IT professionals' skills technical and non-technical skills are described as being important for all IT professionals independently from their occupational status (Gallagher, Kaiser, Simon, Beath, Goles 2010: 147).

The sixth research issue of the third module, a question was planned to discover how the interviewed managers and specialists perceived the policy of their current employers, with regard to the conditions in which they work. One of the respondents firmly declined to answer this question. The remaining interviewees did provide a reply to this question. The answers can be divided into two groups: (1) approval for the current policy of the employer (the size of rooms, financial factors); (2) expectations regarding change of the current conditions (the exact spatial arrangement of rooms where work is performed round the clock, the methods for the supervision of how projects are implemented, the size of the budget). An empirical research conducted from February 2012 to February 2013 on Polish IT professionals revealed that business competency can be seen as the important factor in relations between employer and employees in IT sector (Kowal, Roztocki 2015: 1008–1009).

The seventh issue in the last module was meant to allow respondents to describe the factors which – in their opinion – ensure that such professionals as they achieve

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[12]   For example, One of typologies of IT professionals' skills based on the distinction between technical and non-technical aspects includes following main types and their subtypes: (1) technical skills – foundational skills (e.g. programming), operational skills (e.g. service hosting), essential skills (e.g. systems design); (2) non-technical skills – project management skills (e.g. project planning), problem/opportunity skills (e.g. industry knowledge), relationship skills (e.g. negotiation). See: Gallagher, Kaiser, Simon, Beath, Goles 2010: 145.

stability of employment. The interviewees pointed to three groups of factors: (1) the level of demand in the labour market when it comes to IT specialists (the higher the cost of hiring a new employee compared to satisfying the needs of an existing worker, the higher the level of this stability); (2) the financial dimension from the organisational perspective – financial standing determines the salary policy of the employer; (3) a company's strategy of development as it specifies the level of importance of the IT department's position in the organisational structure. In summary, the contributions of the respondents suggest that the IT department is characterised by a high level of work stability, owing to the long duration and high costs of recruitment.

The eighth research issue in this module of the scenario was oriented towards finding out the factors which influence the mobility of each of the interviewed IT specialists. Due to the general character of this question based on that issue, the persons under study mentioned various kinds of factors in their replies. The respondents described these factors in light of their personal experiences with regard to changing employers: (1) the personality factor – internal locus of control (making own decisions as to the successive goals in one's professional development); (2) the spatial aspect – shortening the time required to reach work; (3) the financial factor – the lower the salary level in the current place of work, the bigger the willingness to consider a change in the place of employment; (4) the technological factor – obtaining access to a more technologically advanced computer-science infrastructure. According to the quantitative study based on the sample of respondents drawn from the National Longitudinal Survey of Youth 1979 (NLSY79) there are three types of career mobility of IT employees: (1) employees move across organizations within occupations, (2) there are movements across occupations within organizations, and (3) IT professionals move across both occupations and organizations (Joseph, Boh, Ang, Slaughter 2012: 430).

The closing research issue from the scenario was meant to encourage respondents to make an attempt at predicting the situation of the whole financial sector over a medium-term time perspective (5 years), in view of the technological change talking place in this industry, summarily referred to as 'digitisation'. According to the interviewees, the situation of this sector will be evolving simultaneously on several levels: (1) the scope of interaction between the employee and the customer will be diminishing; (2) the implementation of new projects and the establishment of a new computer-science infrastructure will drive an increase in demand for specialists in IT/cyber-security; (3) optimisation of business processes in the field of IT (a decrease

in the need for the performance of simple, repetitive tasks with regard to financial data). Generally, technological changes were treated by the respondents as factors which will bring about changes in terms of how human resources are managed in the Polish financial sector.

Conclusions and Recommendations

The above findings of a qualitative study of IT professionals in the Polish financial sector, furnish information which enables the acquisition of knowledge about the professional situation and the factors affecting the position within the organisational structure, of persons who are responsible for the administration, supervision and management of computer-science infrastructure and IT teams, at banking cooperatives and entities in the insurance market. The analytical part showcased passages which are most representative of the contributions made by the specialists under study. This was done in order to set the appropriate analytical context – overly brief quotations could be subject to de-contextualisation (Gibbs 2011: 173). Care was taken to seek balance between a quotation's formal aspect (its length) and the information aspect (the sum of empirical knowledge about the process under study). The acquired qualitative data are sufficient for the presentation of conclusions of an applied character (the practical dimension) with regard to the three main research areas, as well as providing adequate grounds for the formulation of methodological recommendations (the theoretical dimension) with regard to the design of a quantitative study of specialists in IT/cyber-security, who work in the financial sector.

The analysis of qualitative data allows the thesis to verify all three research hypotheses. The formulation of research questions and hypotheses was based on the thematic structure of the research tool, i.e. the IDI scenario. The answers of the respondents obtained thanks to asking questions from the first module 'Recruitment criteria' allowed to confirm the H1 hypothesis – in the recruitment process of financial sector IT employees, 'hard' rather than 'soft' competences are more important for a potential employer. Qualitative data collected thanks to the questions that make up the second module 'Working conditions' confirmed the H2 hypothesis – the better the organization's development potential is assessed, the better their working conditions are assessed by the respondents. The third module of the 'Prospects for professional development' scenario contained questions that allowed the collection

of answers regarding the third hypothesis covering the relationship between the perception of the economic situation at the macro level and the micro level. This third hypothesis was also verified – the respondents rated better the possibilities of developing their own professional career if they rated the economic situation in the country better. There are also some conclusions for application (the practical dimension) with regard to recruitment criteria. The process whereby respondents gain formal education and practical knowledge has comprised various phases over many years. The acquisition of a suitable level of professional experience is mainly attributable to an interviewee's individual psychological make-up, rather than to the possibilities for professional development, offered by the financial entity in question. The recruitment process has evolved over the past 20 years and is marked by an ever growing degree of complexity. The main recruitment criteria include not only those which concern technical knowledge, but also those which reveal an employee's high level of motivation with regard to professional development and compliance with procedures. Other conclusions are linked with working conditions. The conditions under which the persons under study perform their work, must be described as good or very good. The path of professional development is clearly specified. The level of legal regulations in the financial sector bears a direct influence (of a moderately negative nature) on the timeliness with which respondents carry out their work duties. Salary levels are accepted and do not constitute a factor which is directly related to the readiness on the part of interviewees to change their place of employment. The third group of conclusions relates to prospects for professional development. Respondents made a distinctly positive assessment of their individual possibilities for professional growth. The general prospects for the professional development of specialists in IT/ cyber-security also received a positive assessment. The process of digitisation was perceived as bringing more benefits than losses. Interviewees did not exhibit an attitude of entitlement towards their employer.

A set of methodological recommendations for the design of a quantitative study, which can be formulated on the basis of how people from the research sample were reached; the course of the interaction with the specialists under study; the quality and level of detail of the acquired empirical data (the methodological dimension). The completion of a quantitative study requires strict collaboration with entities in the financial sector (in particular its banking segment) and should be preceded by a stage of building a relationship based on credibility and trust. The recruitment process for new employees at commercial banks is likely to be more complex technically and last longer than was the case for respondents from banking cooperatives or entities in the insurance market – a higher level of formalisation in the communication

with the external environment. The structure of the study sample should reflect both the structure of the financial sector (e.g. on the basis of KNF reports) and the organisational structure of the institutional entities under study (the personnel making up the organisational units responsible for IT processes and cyber-security – standard titles in this regard can be borrowed from the American IT sector). A questionnaire study (face-to-face interviews) will ensure the acquisition of a bigger body of detailed information, compared to a survey project – provided that it is carried out by researchers equipped with at least the basic extent of knowledge about the specific way in which the sectors of IT and finance function. Sociological/ economic concepts and specialised terms from the field of computer science and cyber-security should be presented in a defined way, so as to reduce the scale of discrepancy between the study's theoretical goals and the acquired empirical data. The availability of specialists in IT/cyber-security, in terms the amount of time they are prepared to give the researcher, may be more limited than in the case of employees from other sectors of the economy, which means that the process of carrying out the interviews must be appropriately planned (finding a suitable date, location and technical conditions for conducting the interview, due to the need to reach the respondent's place of work).

References

Alior Bank's strategy for 2017–2020, *Cyfrowy buntownik* [Digital rebel] (March 2017) https://www.aliorbank.pl/am/jcr:98cf582f-527b-4e37-81a6-7f1a0fcb627d/ALR_Strategia%20 2017-2020_FINAL_POL.pdf [Access: June 19, 2019]

Barometr zawodów 2019. Raport podsumowujący badanie w Polsce [*Barometer of professions 2019. A summary report from the study in Poland*] (2018), Kraków: Wojewódzki Urząd Pracy [Regional Employment Office], https://barometrzawoow.pl/userfiles/ Barometr/2019/raport_ogolnopolski_pl.pdf [Access: February 15, 2019]

Bukht, R., Heeks, R. (2017), 'Defining, Conceptualising and Measuring the Digital Economy', Manchester Centre for Development Informatics *Working Paper* 68: 13, http://diodeweb. files.wordpress.com/2017/08/diwkppr68-diode.pdf [Access: 19.06.2018]

Castells, M. (2008), *Społeczeństwo sieci* [*The Rise of the Network Society*], Warszawa: Wydawnictwo Naukowe PWN

Digital Banking Maturity 2018: Jak zostać cyfrowym liderem i dlaczego tak niewielu to się udaje [Digital Banking Maturity 2018: How to become a digital leader and why so few succeed

at it] (2018) Deloitte Digital, p. 5 onwards, https://www2.deloitte.com/content/dam/eloitte/pl/Documents/Reports/pl_DBM_2018_Prezentacja_na_sniadanie_24_04_2018.pdf [Access: November 5, 2018]

Druszcz, P. (2017), 'Digitalizacja produktów bankowych jako cel strategiczny uczestników polskiego sektora bankowego' ['Digitisation of banking products as a strategic goal for entities in the Polish banking sector'], *Ruch Prawniczy, Ekonomiczny i Socjologiczny* [*The Legal, Economic and Sociological Movement*], Year LXXIX, Workbook 1, http://cejsh.icm.edu.pl/cejsh/element/bwmeta1.element.ojs-doi-10_14746_rpeis_2017_79_1_17/c/9187-8930.pdf [Access: October 11, 2018]

Dupre L. (2014), *Network and Information Security in the Finance Sector. Regulatory landscape and Industry priorities*, https://www.enisa.europa.eu/publications/network-and-information-security-in-the-finance-sector/at_download/fullReport [Access: June 6, 2019]

Dziennik Ustaw [Journal of Laws] 2011, No. 199, item 1175

Eurofound, EurWORK, *Digital Economy*, https://eurofound.europa.eu/observatories/eurwork/industrial-relations-dictionary/digital-economy [Access: December 17, 2018]

Eurostat (2018a), *ICT sector economic indicators: tables and figures,* https://ec.europa.eu/eurostat/statistics-explaine/images/0/0f/ICT_sector_economic_indicators_ICT2018-upate.xlsx [Access: October 11, 2018]

Eurostat (2018b)*, ICT specialists − statistics on hard-to-fill vacancies in enterprises. Data extracted in December 2018* (2019), https://ec.europa.eu/eurostat/statistics-explained/pdfscache/40327.pdf [Access: June 3, 2019]

Eurostat (2020a), Total unemployment rate, https://ec.europa.eu/eurostat/databrowser/view/tps00203/default/table?lang=en [Access: November 2, 2020]

Gallagher, K.P., Kaiser, K.M., Simon, J.C., Beath, C.M., Goles, T. (2010), 'The Requisite Variety of Skills for IT Professionals', *Communications of the ACM* 53(6)

Gibbs, G. (2011), *Analizowanie danych jakościowych* [*Analysing qualitative data*], Warszawa: Wyd. Naukowe PWN

Górniak J., Kocór, M., Kwinta-Odrzywołek, J., Maźnica, Ł., Worek, B., Wróblewski, J. (2018), *Branżowy bilans kapitału ludzkiego − sektor finansowy* [*Sectoral assessment of human capital − the financial sector*], Polska Agencja Rozwoju Przemysłu [Polish Agency for the Development of Industry], https://www.parp.ov.pl/storage/publications/pf/branzowy%20bilans%20kapitalu%20ludzkiego%20w%20sektorze%20finansowym.pdf [Access: May 13, 2019]

Gribanova, S., Abeltina, A. (2019), 'Work motivation and labour productivity growth among it professionals in contemporary Latvia, Proceedings of the 2019 International Conference', *Economic Science for Rural Developmen*, No 52, Jelgava, LLU ESAF, 9–10 May 2019

GUS (2017a), *Rocznik Statystyczny Pracy 2017* [Statistical Yearbook of Work 2017], Warszawa

GUS (2017b), *Szkoły wyższe i ich finanse w 2016 roku* [*Higher-education institutions and their finances in 2016*], Warszawa: GUS, https://stat.gov.pl/files/gfx/portalinformacyjny/pl/defaultaktualnosci/5488/2/13/1/szkoly_wyzsze_i_ich_finanse_w_2016_r..pdf [Access: June 17, 2019]

GUS (2018), *Rocznik Statystyczny Rzeczypospolitej Polskiej 2018* [*Statistical Yearbook of the Republic of Poland 2018*], Warszawa: GUS

IT w instytucjach finansowych [*IT in financial institutions*], https://it.projektekf.pl/o-kongresie [Access: June 19, 2019]

IT@PL – rynek pracy IT w Polsce [*IT@PL – the labour market for the IT sector in Poland] (May 2013) Antal International*, Polska Agencja Informacji i Inwestycji Zagranicznych [Polish Information and Foreign Investment Agency], https://www.paih.gov.pl/files/?id_plik=26055 [Access: October 18, 2018]

Joseph, D., Ang, S., Chang, R.H.L., Slaughter S.A. (2010), Practical Intelligence in IT: Assessing Soft Skills of IT Professionals, *Communications of the ACM* 53(2)

Joseph, D., Boh, W.F., Ang, S., Slaughter, S.A. (2012), 'The career paths less (or more) traveled: a sequence analysis of it career histories, mobility patterns, and career success', *MIS Quarterly* 36(2)

Klub Polska 2025+: Cyberbezpieczeństwo w erze gospodarki elektronicznej, robotyzacji, automatyzacji i internetu rzeczy. Tezy Prelegentów [*CLUB POLAND 2025+: Cybersecurity in the age of electronic economy, robotisation, automation and the internet of things. Speaker Theses*] (November 28, 2018) ZBP, https://zbp.pl/public/repozytorium/wydarzenia/images/listopad_2018/kp2025/Tezy_Prelegentow_28_11_2018.pdf [Access: December 2, 2018]

Konecki, K. (2000), *Teoria ugruntowana* [*Grounded theory*], Warszawa: Wyd Naukowe PWN

Kostera, M., Postuła, A. (2011), 'Holding up the Aegis: On the Construction of Social Roles by Polish IT-professionals and the Change in Agency', *Tamara Journal for Critical Organization Inquiry* 9(1/2)

Kowal, J., Roztocki, N. (2015), 'Job satisfaction of IT professionals in Poland: does business competence matter?', *Journal of Business Economics & Management*, October 16(5)

Kvale, S. (2010), *Prowadzenie wywiadów* [*Conducting interviews*], Warszawa: Wyd Naukowe PWN

Miński, R. (2017), 'Wywiad pogłębiony jako technika badawcza. Możliwości wykorzystania IDI w badaniach ewaluacyjnych' ['In-depth interview as a research technique. Possibilities for the use of IDI in evaluation studies'], *Przegląd Socjologii Jakościowej* [*Review of Qualitative Sociology*], Vol. XIII, No. 3

Nedelkoska, L. Quintini, G. (2018), 'Automation, skills use and training', *OECD Social, Employment and Migration Working Papers* 202, Paris: OECD, http://pmb.cereq.fr/doc_num.php?explnum_id=4268 [Access: June 6, 2019]

Nowina-Konopka, M. (2006), 'Istota i rozwój społeczeństwa informacyjnego' ['The essence and growth of the information society'], w: M. Witkowska, K. Cholawo-Sosnowska (red.), *Społeczeństwo informacyjne: istota, rozwój, wyzwania* [*The information society: essence, growth, challenges*], Warszawa: Wydawnictwa Akademickie i Profesionalne

Okopień, P. (2018), *Wynagrodzenia w polskiej branży IT ciągle rosną* [*Salaries in Poland's IT industry keep growing*], iTWIZ.pl, https://itwiz.pl/wynagrodzenia-polskie-branzy-ciagle-rosna/ [Access: March 29, 2018]

Perspektywy rozwoju polskiej branży ICT do roku 2025 [*Prospects for the development of Poland's ICT industry until the year 2025*] (2017), Warszawa: INVESTIN, https://ict.trade.gov.pl/pl/f/download/fobject_id:397578 [Access: June 19, 2019]

Pflügler, C., Becker, N., Wiesche, M., Krcmar, H. (2018), 'Strategies for retaining key IT professionals', *MIS Quarterly Executive* 17(4)

Publikacje i opracowania [Publications and papers] Komisja Nadzoru Finansowego [Financial Supervision Commission], https://www.knf.gov.pl/publikacje_i_opracowania [Access: June 20, 2019]

Pulwarski, J. (ed. of the Polish ed.) (2016), *DigComp 2.0: Rama Kompetencji Cyfrowych dla Obywateli. Etap 1. aktualizacji: Pojęciowy Model Odniesienia* [DigComp 2.0: The Digital Competence Framework for Citizens. Update Phase 1: The Conceptual Reference Model], http://digcomp.org.pl/wp-content/uploads/2016/11/digcomp-2.0-cz.-1.pdf [Access: June 3, 2019]

Raport ZBP: Polska i Europa – wyzwania i ograniczenia 2018 [*A ZBP report: Poland and Europe – challenges and limitations 2018*], Wydanie V [Fifth edition] (Access: September 2018) ZBP, https://zbp.pl/public/repozytorium/wydarzenia/images/wrzesien_2018/krynica/Polska_i_Europa_2018.pdf [Access: October 30, 2018]

Satysfakcja zawodowa Polaków 2018 – podsumowanie badania [T*he job satisfaction of Polish people – summary of a study*] (2018), Kraków: Sedlak&Sedlak, https://badaniahr.pl/files/pf/Satysfacja%20Zawodowa%20Polak%C3%B3w%202018%20Sedlak%20&%20Sedlak.pdf

Special Eurobarometer 460, Summary: Attitudes towards the impact of digitisation and automation on daily life (May 2017), European Commission, p. 5 onwards, http://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/ResultDoc/download/DocumentKy/78998 [Access: 30.10.2018]

Strategia 2020 Banku Millennium. Prezentacja dla analityków i inwestorów [Millennium Bank's 2020 strategy. A presentation for analysts and investors] October 30, 2017, Warszawa, https://bankmillennium.pl/documents/10184/123526/Millennium_Strategy_POL.pdf/ea060e2f-7d7b-47fd-9268-44543da25e6a?mv=3 [Access: June 19, 2019]

Szkwarek, W. 'Specjaliści ds. bezpieczeństwa IT w bankach – duże zarobki i duże wymagania' [Specialists in IT security employed by banks – huge salaries and huge expectations],

https://www.bankier.pl/wiaomosc/Specjalisci-ds-bezpieczenstwa-IT-w-bankach-duze-zarobki-i-duze-wymagania-7515873.html [Access: November 26, 2018]

Szyjewski, Z. (2018), 'Model systemu kwalifikacji informatycznych PTI' ['A model for a system of qualifications in computer science developed by The Polish Society for Computer Science PTI'], in: PTI, *Kim jest współczesny informatyk? Debata środowiskowa* [What is the profile of the contemporary IT professional? A debate in the IT community], Warszawa: PTI, http://pti.org.pl/content/download/7297/52758/file/Debata%20srodowiskowa_elektron.pdf [Access: October 11, 2018]

Tomer, G., Mishra, S. (2019), 'Expectation from Technology and Career Satisfaction: A study among IT Professionals in India', *Australasian Journal of Information Systems*, Vol. 23

'»Top Cybersecurity Job Titles« *CyberSeek*', https://www.cyberseek.org/heatmap.html [Access: June 24, 2019]

Wojtczuk-Turek, A. (2014), 'Podaż i popyt na kwalifikacje i kompetencje w ujęciu sektorowym – w świetle badań jakościowych branży IT' ['Supply and demand for qualifications and competences from a sectoral perspective – in the light of qualitative research on the IT industry'], *Edukacja Ekonomistów i Menedżerów: Problemy, Innowacje, Projekty* [*Education of Economists and Managers: Problems, Innovation, Projects*] 32(2)