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REGIONAL DEVELOPMENT OF FINANCIAL INNOVATION IN EASTERN EUROPEAN COUNTRIES

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Abstract. *The paper analyses the development of fintech industry in a regional context in an attempt to explain the unequal development of financial innovation in various markets. The development of crowdfunding, digital payments and digital commerce development, but also the development of asset management via robo-advisers will be analysed using economic and social drivers of the phenomena, particularly for the Eastern European countries that are now members of the EU, but shared a common communist history without a proper developed financial market. The analyses and the conclusions are useful both for policy makers and business developers but also for academia and researchers.*

Key words: *financial innovation, regional development, EU countries.*

1. Introduction

The world economy experienced a major financial and economic crisis between 2007 and 2011. According to some reputable specialists (Reinhart and Rogoff, 2014), another is predicated within several years. The financial risks experienced during this period by the world's economies have materialized, among other things, in drastic reduction of access to finance for SMEs, the slowdown in trade transactions, the decline of the asset market (Reinhart and Rogoff, 2009) and drastic reduction of imports (Abiad et al , 2014). Reducing bank liquidity during the crisis has led, in many cases, to reducing investment by firms (Kalemli-Ozcan et al, 2016). Banking and commercial credit have replaced each other during the crisis to allow SMEs to continue their investment programs (Carbó-Valverde et al, 2016; Bastos & Pindado, 2013). Sannajust (2014) found that during crisis "small and young firms in Europe have more problems than the others" and Jacques et al revealed that "financial turmoil had a substantial negative impact on lending to small businesses" (2016). Faced with difficulties in coping with current debts and payments, SMEs have sought new methods of risk mitigation, requiring banks to offer new tools and new financing technologies. Referring to the special financial needs of these entities and the explosive development of IT, some entrepreneurs ventured into developing new financial products and services that later materialized in the emergence of new, non-

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banking financial intermediaries. Thus, a whole new field, known as fintech, has emerged, which has recently given rise not only to the interest of entrepreneurs but also to researchers.

The present paper presents a comparative analysis of the fintech field evolution, especially in the Central and Eastern European countries, EU member states since 2004 (Bulgaria-BG, Croatia-HR, Czech Republic-CZ, Estonia-EE, Hungary-HU, Latvia-LV, Lithuania-LT, Poland-PL, Romania-RO, Slovakia-SK, Slovenia-SI. The group will be referred to as New EU countries - NEU). We believe that the results of this study are beneficial to policy makers, entrepreneurs, and researchers.

2. Fintech – the new trend in finance

Fintech is the new term to describe new financial technologies, products and services dedicated to serve a new generation of customers that are born with digital skills, or at least educated in this respect. But when and how did this term emerge? Contrary to the belief that this is a recent term, fintech was first mentioned as an acronym in 1972, when Bettinger (1972, pp. 62) defined it as "financial technology, combining bank expertise with modern management science techniques and the computer ". Initially, due to its appearance, fintech was seen as belonging rather to the IT domain, through which some start-ups tried to offer an alternative to the traditional payment system. Later, because of the development of alternative financing systems and models for entrepreneurs, it was considered a border area between entrepreneurship, finance, and IT (Alt et al, 2018). In fact, according to Arner et al (2015), we are even talking about the existence of several stages in the fintech field development. A first step, the transition from analogue to digital technology (fintech 1.0), was followed by the development of traditional digital financial services (fintech 2.0), as we are currently talking about version 3.0 of fintech of democratized digital financial services, defined not by the financial products or services delivered but by who delivers them".

According to Blomstrom (2018) the main information technology enablers involved in changing the face of financial domain (and particularly banking) refer to cloud computing, AI, blockchain and data analytics. Recent developments evolve further clarifications not only on the notion but also on its coverage. The European Parliamentary Research Service (EPRA, 2017) defines it as being used to refer to “firms that use technology-based systems either to provide financial services and products directly, or to try to make the financial system more efficient” and specifies that it includes payment systems, aspects of innovative research in financial, insurance, deposit & lending, investment management and crowdfunding (see figure 1).

Other authors (Dorfleitner et al., 2017) believe that credit & factoring issues should also be included, as well as Search Engines & Comparison Sites or Technology, IT & Infrastructure.

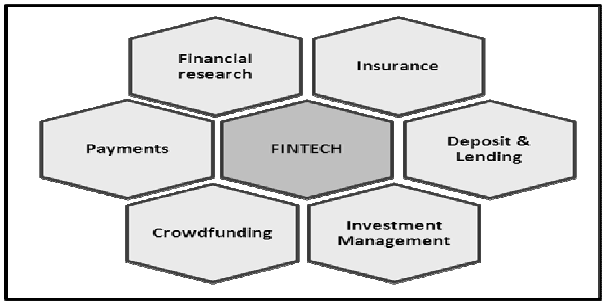

Fig. 1. *Fintech main components*

Innovative payment systems refer to digital commerce, marketplace lending, mobile POS payments, P2P money transfer, blockchain & crypto-currencies, while investment (or asset) management includes investment & banking, robo-advisors, robo-trading, personal financial management, and social trading. Crowdfunding is a broad term that encompasses finance offered to companies via electronic platforms that can function as donation-based, reward-based, equity-based (crowdinvesting) or debt-based (crowdlending) ones. Reward-based crowdfunding campaigns can be initiated for a wide range of different purposes (product launches, art-, music- and film-financing, software development, scientific research etc.) and almost everyone can participate as an investor, under the prerequisite condition of having a valid payment account. Well-known platforms for this type of financing are Kickstarter and Indiegogo.

Equity-based crowdfunding (crowdinvesting) platforms gather together an unspecified number of investors that can buy shares of a start-up who is looking for equity to finance some well-defined projects. The method is similar with venture capital financing in its final goal, but is different in terms of investment decision empowerment (anybody can invest, not just the venture fund manager).

When SME's need loans they can use crowdlending platforms instead of going for bank loans, because they can borrow quick and easy, just meeting the requirements of an internal scoring system of the platform. Lenders can see the loans requests listed on the crowdlending platform and can pick those that they offer money to, for a specified return rate. The most popular such platforms are Funding Circle, Kabbage, Mintos, and Lending Club. Similar to this marketplace there are lending platforms where private investors are offered the possibility to finance private users that meet the requirements of the platform credit score. The conditions are more flexible than those imposed by banks. When it comes to money transfer, customers are looking for entities that are doing it faster, cheaper, and safer than the traditional players, the banks. Cross-border payments and remittances are offered by Transferwise, WorldRemit and some other entities that are helping people send money on-line at lower costs than banks while meeting secure conditions. The product is called P2P money transfer and it's based on mobile apps or portals rather than physical agents. Likewise, mobile apps (such as ApplePay, Google Wallet or Samsung Pay) can be used to make mobile POS payments via wireless standard NFC (Near Field Communication) or by scanning a QR code to initiate the payment. The user is paying for the purchases via a mobile wallet application or by using a digitally stored credit or debit card.

3. Fintech development in NEU countries

3.1. Socio-economic context

World Bank data shows that although there was an EU GDP growth of almost 3.5 times in the period 1997-2017, the pace was not uniform, NEU countries having a slower rate of only 299%. If in 2007, at the moment of joining the EU, the GDP of Romania and Bulgaria, the poorest two countries in the EU, accounted for 1.24% of the total EU, this share increased by very little to 1.56% in the next ten years. The socio-economic disparities between the countries of "old Europe" and those that have joined the EU since 2004 are still visible, although declining (Darvas & Wolf, 2016, 5; World Bank, 2016). Between 2010 and 2017, of the 11 NEU countries, although five recorded Gini index values over the EU average (Baltic countries, Bulgaria and Romania), however the relationship between growth and inequality is not straightforward, nor static (Eurostat, 2018; Bubbica & Freytag, 2018). To explain the phenomenon, a newly built index of the World Economic Forum, called the Inclusive Development Index (IDI) considered 7 pillars of development related to: (1) access, quality, and equity of education and skills, (2) basic and digital infrastructure and health-related services, (3) corruption and rents (business and political ethics, concentration of rents), (4) financial integration and intermediation of business investment, (5) small business ownership and home and financial asset ownership, (6) employment and labour compensation, and (7) and social protection. (Samans et al, 2017). IDI values ranked from 1 to 7 (worst to best) both as an aggregated index, and as for each of its components (see table 1). Globally, the top positions are Europe's advanced economies (Norway, Luxembourg, and Switzerland, followed by Iceland, Denmark, Sweden, and the Netherlands), while US ranks 23 out of 109, and China just 44th. Of the newly admitted countries to the EU, Lithuania is best placed, followed by Hungary and Poland (Samans et al, 2017).

Inclusive Development Index components for NEU countries – 2017 Table 1

Country	IDI	Education and skills	Basic Services and Infrastructure	Corruption and Rents	Financial Intermediation	Asset Building and Entrepreneurship	Employment and Labour Compensation	Fiscal Transfers
BG	4.37	4.62	4.88	3.59	3.25	4.16	4.46	3.82
HR	4.28	4.97	5.32	3.33	3.40	3.86	4.37	3.71
CZ	4.78	5.29	5.24	3.76	3.62	4.21	4.50	3.72
EE	4.52	5.72	5.30	4.51	3.78	4.82	4.78	3.39
HU	4.57	4.50	5.19	2.97	3.31	4.21	4.37	4.14
LV	4.52	5.32	5.39	3.36	3.36	4.16	4.51	3.58
LT	4.73	5.15	5.51	3.81	3.25	4.06	4.67	3.67
PL	4.57	5.41	5.21	4.08	3.65	4.02	4.22	3.69
RO	4.53	4.49	4.86	3.47	2.71	4.25	4.28	3.63
SK	4.88	4.79	4.91	3.37	n/a	3.93	4.26	3.31
SI	4.75	5.61	4.98	4.22	3.94	4.50	4.64	3.86

If we analyse IDI components, we will see that, while in terms of financial infrastructure, NEU economies have values above the global average, in terms of

perception of business ethics (fighting corruption and efficient allocation of resources), financial intermediation and tax transfers, the scores are at most at the average in most of these countries, suggesting that local financial markets need better access to financial services and products. And all these elements can create the premises for the development of companies that offer fintech products and services.

3.2. Drivers of fintech development

For understanding the prerequisites of the emergence and evolution of fintech in NEU countries, we first need to look at issues related to the pillar of ICT education and employment, as new ventures in NEU countries have to face not only "limited financial resources but also relatively low human and social capital" (Nowinski & Rialp, 2013). The tools, products and services developed by fintech companies require the existence of digital skills of both employees and customers, because they not only allow, but even encourage the involvement of all of them in increasing the value of fintech businesses.

Data provided by Eurostat for 2018 show that in terms of the share of people with basic or above basic digital skills (aged 16-74), although the average in the EU28 is 57.18%, however, only 3 countries score above it (Czech Republic, Estonia, and Slovakia), while Romania is on the last position, at 29.04%, up from the previous years, but much behind other countries which have the percentages between 46.38% and 59.84%. The age structure of the population also shows a worrying trend for the aging of the active population, in line with that of the EU, but more pronounced. Only Croatia and Lithuania have the most dynamic age group (15-24 years) above the European average, while the Czech Republic, Lithuania, and Romania are below the EU average for the 55-64 age groups. Therefore, in the near future, it is possible that these countries have to deal with a challenge in the fintech business field that will also be due to demographic change. With regard to the share of persons employed with ICT specialist skills, the only country whose percentage of total employees is well above the EU average is Estonia, with the rest of the countries having values below the European average. Combined with the number of STEM graduates aged 20-29, this means that the countries under consideration will be confronted in the present and near future with a problem of labour and talent shortage. As a result, IT integration is not a strong asset in these economies, most of which being below the EU average in the field of business digitization and e-commerce (see Table 1).

Integration of Digital Technology – 2018 (%) Table 1

Country	Business digitization	e-Commerce	Country	Business digitization	e-Commerce
BG	18.36	6.069	LT	27.23	20.23
HR	20.57	14.87	PL	14.94	8.59
CZ	18.17	22.27	RO	11.55	6.20
EE	21.85	15.21	SK	22.58	14.85
HU	13.21	11.88	SI	30. 80	17.07
LV	16.79	10.23	EU-28	24.55	15.54

Likewise, "when it comes to competitiveness, Europe is a story of contrasts, with four distinct groups: a very competitive north-west, including Switzerland; a relatively competitive south-west, led by France; a rising northeast region, led by Poland, Czech Republic, and the Baltic countries, which rank on par with or higher than several Western European economies on several aspects of competitiveness; and the south-eastern region—in particular, the Balkan countries—which lags behind the other groups" (Schwab, 2018; 28). Regarding the innovation capacity of the NEU economies, the situation is also a contrasting one, between the Baltic countries (Estonia with an index over 50) and those in the East and South of Europe (Romania having the lowest index values among them), all of which are far away from Sweden and the Netherlands, the leaders of innovation in Europe (with GII values close to 70). These gaps tend to grow further in the information society, where commercial transactions are increasingly being made online and/or via mobile phones and the Internet. A World Fintech report (2018, p16) stated that "FinTechs use a variety of technologies to increase the accessibility and speed of their services (real-time updates, mobile connectivity) that appreciably enhance customer experience." As Table 2 shows, in 2017, Romania and Bulgaria are far behind the European average in terms of the percentage of the population aged 15 and above that is using the Internet and mobile phones for commercial and banking transactions, while Estonia is the area leader in the field (Demirguc-Kunt et al., 2018; EC, 2018).

Table 2

Use of internet and mobile phones for commercial transactions (%)

Country	Used the internet to pay bills in the past year	Paid utility bills using a mobile phone	Use the internet for on-line shopping	Country	Used the internet to pay bills in the past year	Paid utility bills using a mobile phone	Use the internet for on-line shopping
BG	13	2	26.96	LT	50	5	44.33
HR	45	13	45.22	PL	51	9	55.73
CZ	57	10	56.84	RO	12	3	17.97
EE	72	11	64.12	SK	53	5	68.07
HU	30	3	48.17	SI	45	6	52.70
LV	58	9	54.97	EU area	50	7	65.99

For a good understanding of the whole financial market in NEU countries, it is also of interest to find out the type of traditional financial products and services that citizens are using. A 2016 financial barometer launched for the whole EU-28 discovered that the most popular products among NEU countries are the current bank account, followed by credit cards, and saving accounts, while the least popular are financial investments such as shares, bonds, and investment funds (see table 3).

The less developed financial markets are those of Romania and Bulgaria, where 38%, respectively 26% of the population has experienced no financial products or services at all. The results are correlated with the data about financial literacy from a 2014 S&P report that assessed the population knowledge about business investments and risks, inflation

and financial gains and where Romania and Bulgaria scored the lowest (Klapper et al, 2014).

Table 3

Which of the following financial products and services do you have? (%)

Country	Current bank account	Savings account	Mortgage loan	Credit card	Personal loan	Shares or bonds	Investment fund	None	Financial literacy
BG	52	20	2	16	16	0	0	26	35
HR	82	13	7	32	15	2	1	9	44
CZ	83	28	14	33	14	4	5	7	58
EE	92	22	13	30	11	4	6	3	54
HU	66	10	7	11	9	2	2	18	54
LV	81	18	6	43	5	2	1	7	48
LT	74	18	5	22	8	3	3	8	39
PL	68	21	6	17	11	2	2	12	42
RO	29	8	2	24	10	0	1	38	22
SK	77	24	12	24	11	2	3	10	48
SI	81	24	7	42	6	7	5	1	44
EU-28	76	44	17	43	11	9	6	7	n/a

Finally, to have a good understanding of payments and money transfer dynamics, it is interesting to see the dynamic of remittances in NEU countries. Beginning with 1990, and continuing during the financial crisis in 2008-2011, people from these countries emigrated, mainly towards western EU wealthy countries and needed to send money at home. Among all these economies, Poland and Romania registered the biggest remittance inflows, but economies of Croatia and Latvia are the ones that rely heavily on remittances, as World Bank data indicates.

3.3. Fintech development in NEU countries

Following the global development, fintech market is also characterized by a growing trend in NEU countries, the number and value of start-ups involved in this domain raising and being focused on challenging traditional bank business models. However, fintech development in NEU countries is far more modest than in the western European countries, not to mention the world champions (China and the US). Moreover, the development of fintech components is uneven; both in time and in space, given the variation of country specific parameters (see tables 4 and 5). The total value of the NEU fintech market in 2018 was EUR 35,475 mil, with Poland the largest market, followed by the Czech and Romanian ones. The most popular fintech services in the area are the ones that addressed the customer's need for modern purchases on the Internet (on-line shopping), made by various payment methods (credit cards, direct debit, invoice, or online payment providers). On the Polish on-line market, the young and wealthy females are the most active customers, according to 2018 Statista data.

Table 4

Fintech market components in 2018 in NEU countries (mil. EUR.)

Country	Crowdfunding	Crowdinvesting	Crowdlending	Marketplace lending	Digital commerce	Mobile POS payments	P2P money transfer	Robo-advisors (assets under management)	Country fintech market share
BG	0.9	7.8	N/A	1.8	1,282	4	25	3	3.73%
HR	1.2	3.9	2.6	2.7	1,166	46	41	18	3.61%
CZ	5.1	12.1	12.8	7.2	4,492	112	269	17	13.89%
EE	2.6	11.3	7.2	106.9	741	60	14	12	2.69%
HU	0.4	12.6	7.2	3.5	3,264	37	65	56	9.71%
LV	2.3	12.6	3.9	18.6	837	16	76	41	2.84%
LT	1.5	5.6	6.8	6.2	1,242	18	47	22	3.80%
PL	5.3	5.1	56.6	16.5	12,452	264	1,054	45	39.18%
RO	0.1	8.3	1.1	1.6	4,162	27	103	24	12.20%
SK	0.1	4.2	1.2	0.6	1,869	29	43	30	5.57%
SI	0	1.4	1.9	0.5	865	23	25	65	2.77%
Total	**19.50**	**84.90**	**101.30**	**166.10**	**32,372.00**	**636.00**	**1,762.00**	**333.00**	

Average sums per fintech components in 2018 (EUR) Table 5

Country	- per campaign			- per loan	- per user-			
	Crowdfunding	Crowdinvesting	Crowdlending	Market place lending	Digital commerce	Mobile POS payments	P2P money transfer	Robo-advisors
BG	758	53,485	N/A	759	354.3	42.9	233.5	1,051
HR	1,296	91,619	7,962	1,296	429.9	303.9	70.9	1,636
CZ	1,709	120,140	10,787	1,817	621.1	229.0	654.5	3,116
EE	2,048	144,768	12,638	2,056	814.2	631.7	74.4	4,887
HU	1,277	90,276	8,071	1,281	489.2	123.7	138.4	6,862
LV	1,604	112,725	9,893	1,621	669.0	233.0	314.8	6,754
LT	1,701	119,758	10,471	1,706	684.6	149.9	374.0	4,309
PL	1,396	98,385	8,709	1,378	523.2	180.6	1,747.3	5,122
RO	1,022	72,156	6,396	1,041	412.7	65.0	361.3	2,681
SK	909	64,096	11,234	1,829	485.3	135.3	231.6	2,532
SI	1,107	78,173	13,913	2,273	672.6	299.9	97.5	5,296

It is estimated that the multi-financing through the social network of the NEU will reach a value of 566.1 million euros in the market in 2019 (up 52% from 2018), of which about 22.7 million euros for crowdfunding financing, 164.2 million euros for crowdlending, respectively 154.8 million euros in crowdinvesting, the largest being the market lending market by 222.3 million euros. Among the modalities of multi-funding through social-based electronic platforms, reward-based crowdfunding and crowdlending are the

preferred funding modes in the Czech Republic and Poland in terms of total value of transactions and Estonia, respectively, if we look at the average indicator funding per campaign, while the smallest values register is recorded in Slovenia and Slovakia as total volume, respectively Bulgaria and Romania as the average per funded campaign. In countries like Hungary and Romania, crowdinvesting is the preferred alternative (cumulatively, sums over 20 million euros have been mobilized annually), but less popular in Slovenia and Croatia. The average area leader per campaign financed by crowdinvesting is Estonia (over 144,000 Euros), followed by Lithuania (about 120,000 Euros). Estonia is also a market leader in market lending, both in terms of total value of transactions and average loan per campaign.

4. Conclusions

Nowadays, fintech is a fashionable subject. The existing infrastructure, the business environment development, but also the structure and level of STEM and financial education of the population, as well as the wealth and sophistication level of society have played their part in the development of various fintech components at the level of the economies of the world (Puschmann, 2017). The analysis of the fintech market in NEU countries led to the conclusion that the main drivers of local fintech growth are primarily related to: degree of education sophistication (stem and financial), customers' behaviour, development, and availability of ICT (business digitization) and ability to innovate. If we look at the figures, we'll see that a very small country like Estonia has a much more promising dynamics than, for example, Romania, which has a population of almost 15 times higher but which has lower scores both in terms of financial education and innovation skills, for which it is more reluctant to adopt and use new financial products and services, even if there are no big differences between the two countries at the ICT infrastructure level. If Estonia is already seen as an e-economy, Romania is still a market with untapped potential in the fintech field. In order to align the development of local fintech market to European and global trends, policy makers and entrepreneurs should consider budgets dedicated to improving consumer and employee stem and financial knowledge, as well as introducing training modules into the curriculum in the fintech field (including finance, informatics, but also the development of creativity and innovation).

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