European Research Studies Journal
Volume XXI, Issue 2, 2018

pp. 3 - 22

The Payment Services Directive II and Competitiveness: The Perspective of European Fintech Companies

Inna Romānova[1], Simon Grima[2], Jonathan Spiteri[3], Marina Kudinska[4]

Abstract:

Changing regulation and business environment as well as development of information technologies in finance is rapidly modifying the financial services industry. This consequently puts the financial services industry under additional pressure and constant growing competition from the financial sector participants, from large technology companies such as Google, Apple, Facebook, Amazon, from large FinTech companies such as PayPal, Moven, TransferWise, mobile network operators and other existing and potential market players. The implementation of the new EU Payment Service Directive (PSD2), which allows non-financial companies to provide access to financial services for bank customers, is expected to disrupt the financial services industry as we know it, and make traditional financial services providers and banks, in particular, think of new creative business models to remain competitive. In the process of doing this, changing the landscape of payments and creating new risks for banking business.

With this study we aim to assess the new EU Payment Service regulation in the context of industry competitiveness. The study is based on the examination of the PSD2 Directive exploring the opportunities as well as the risks that it will bring to this industry in the near future, and the possibilities of cooperation of the financial services industry with financial technology developers. Moreover, we analyse structured data, collected from a questionnaire based on 4 themes of perception of techs on the importance they have on ensuring competitiveness, conducted with European tech companies.

Most of the questionnaire participants believe that the Payment Services Directive 2 will promote competitiveness, innovations and development. Moreover, findings show that comparativeness is related mainly to low costs and customer satisfaction. However, it is also shown that high quality of products/services as well as relatively high speed of transactions and security, privacy and risk are also perceived as important.

Keywords: *Banks, Financial Services Industry, FinTech, Innovations, PSD2, Risks*

JEL code: *G21, G29*

[1] *University of Latvia, Latvia*
[2] *University of Malta, Malta, simon.grima@uom.edu.mt*
[3] *University of Malta, Malta*
[4] *University of Latvia, Latvia*

1. Introduction

Financial technology or FinTech is seen as a new market that integrates finance and technology (Arner, Barberis and Buckley, 2015), replacing traditional financial structures with new technology-based processes (Hochstein, 2015). Nowadays artificial intelligence, robo-advisors, smart contracts are gradually becoming an integral part of the modern financial world, changing the existing banking business model. The surge of FinTech seems to be inevitable, as new technologies in finance bring many potential benefits for both providers and users of financial services. In-house introduction of financial technologies and/or close cooperation with FinTech companies can provide banks the possibility to improve business efficiency, reducing costs of selected financial products and services through higher standardisation, to improve risk assessment approaches based on modern data analysis methods as well as to improve quality and ensure better individualization of non-standardizable knowledge-intensive products (Romānova and Kudinska, 2016).

Users of financial services would benefit through lower rates and fees, better functionality and quality as well as innovative financial products and services. On the other hand, FinTech bears additional risks related to e.g., cyber security and data protection. Thus, development and wider use of financial technologies in financial services create additional risks for banks. Besides, evolutionary banking regulation puts banking business under additional pressure, increasing competition in financial services. A substantial driving force for the further development of FinTech and consequently changing Financial Services providers' landscape will be the new EU Payment Service Directive (PSD2).

Blind (2012), notes that research gaps still exist in the development of appropriate indicators of the impact of regulatory change on innovation and competition. He notes that one specific regulation can influence innovation and competitiveness in various ways differentiating between inputs, i.e. research and development, and outputs, e.g. incremental or radical innovations, often depending on how it is implemented. Moreover, he highlights, that the process within companies to react to regulations deserves more attention in order to determine and understand their heterogeneous affects, which are not only exogenous to the companies, and there should be more interaction between the regulators and the regulated to understand further the existing ambivalence. This is also because, the number of empirical studies on impact of different regulations usually present a rather heterogeneous picture on the type of regulation, the sector, the companies and the time horizon.

With this study we aim to assess the new EU Payment Service Directive 2 (PSD2) in the context of financial services industry competitiveness from the perspective of European FinTech companies. Therefore, we are taking a different approach from the usual perspective of the regulators and Financial Services Providers and looking at the perspective of novice players in the financial services industry (FinTech

Companies). It is important to understand how FinTech companies perceive the effect of this regulation, since the scope of the financial services regulators, economists, educators and strategists is now much wider than just the investors, bankers and compliance staff. It now includes other players, namely FinTech companies, who were previously out of the game. This technological transformation has changed the financial services playing field as we knew it yesterday and the industry players and regulators need to align to these perceptions, which affect competitiveness if the industry is to survive the next generation and beyond. It is important to understand whether the perceived impacts of regulations identified by academics, regulators and current field players are in line with what the newcomers (FinTech Companies) perceive, if these are as seen to be as important and if there are any impacts that have not been identified or given so much importance. The study is based on the analysis of structured data collected from a questionnaire conducted with European tech companies offering their services to the financial industry or to the clients of the traditional financial service industry providers.

We first analyse theoretical aspects of competitiveness and innovation in regard to the financial services industry. Later we determine and examine the main features of the PSD2 and its possible impact on the financial services industry competitiveness and explain the research methodology and the results of the questionnaire conducted with European tech companies offering their services to the financial industry, non-financial industry or both.

2. Literature Review

Competitive financial services industry and banks in particular, traditionally are seen as one of the main engines contributing to the successful development of a country. Financial industry provides services that are crucially necessary for the continuous development and overall functions of the economy, by enabling the efficient delivery of payments, savings, lending and other products. According to the annual Global Competitiveness Index (GCI) measuring national competitiveness (WEF, 2016), financial market development (including affordability of financial services, financing availability, soundness of banks, regulation etc.) is one of the 12 pillars forming competitiveness of a country, thus stressing the key role of a sound and well-functioning financial services industry for the economy as a whole. Besides, the GCI index reflects the financial market development as an efficiency enhancer. Therefore, development and competitiveness of the financial services industry has a strong impact on the competitiveness of the country as whole, forming the foundations for its further development. Development of economy in turn implies a more sophisticated banking sector (Cetorelli and Peretto, 2001).

The theoretical and empirical literature on competitiveness provides different definitions of competitiveness. It can be seen as an indicator of productivity (Porter, 1998) or the set of causes of broad total factor productivity (Zinnes, Eilat and Sachs, 2001). Besides, competitiveness is associated with some existing advantages

(Barney, Clark, 2007), based on both economic (Ezeala-Harrison, 1999) and political advantages (Prestowitz, 1994).

Among the factors identified as influencing competitive advantages of the traditional financial service providers are customer service, competitive pricing of financial products, access to services, range of products and services offered. Besides, competitiveness is influenced by quality of service and management, strategy formulation, (electronic) marketing innovation and creativity, among other things (Kasasbeh *et al.,* 2017).

The central role of financial innovation in the 21th century is attributed to the development of information and communication technologies (ICT). Nowadays an important aspect of competition in financial services is technological progress. Technological progress allows both better processing of information and improved data availability, thus eroding informational advantages (Marquez and Hauswald, 2001). Moreover, easier and better access to financial information contributes to lower costs as well as informational spillovers. In the context of the ICT progress, development of financial technologies could have a crucial impact on the competitiveness of the traditional financial service providers as FinTech allows replacing traditional financial structures with new technology-based processes (Hochstein, 2015; Vovchenko *et al.,* 2016).

Structural changes in the financial services industry in turn will further stimulate financial innovations. The research literature on innovation in finance sees financial innovation as product innovation regarding new financial products, markets etc., risk-shifting innovation implying separation of particular characteristics or risks, as well as process innovation related to process improvements regarding distribution, processing etc., (Llewellyn, 2009). All these dimensions are covered by FinTech as it can imply new products, service channels, security and privacy issues etc.

Another important aspect of financial competition is regulation of the financial services industry. Stability of traditional financial service providers like banks became especially topical after the global financial crisis (Thalassinos *et al.,* 2013; 2014; 2015a; 2015b). Therefore, the financial market authorities have intensified regulation of the financial sector, introducing new or strengthening existing standards. Products/services offered by traditional banks must comply with regulatory requirements that are linked to increased costs and expertise. In general, more rigorous regulation implies higher funding costs and/or reduced profitability (Ulltveit-Moe *et al.,* 2013). At the same time, one of the major factors that allow FinTech companies to enter the market is substantially lower regulation of financial services provided by non-banks (Dapp, 2014). Some authors believe that increased competition from the non-bank financial service providers should be encouraged to avoid dominance of the banking sector (Mirzaei and Moore, 2014) as increased competition in the financial market improves access of companies and households to financial services (Claessens, 2009). Besides, new regulations regarding the

developing Fintech industry open additional opportunities in promoting global financial centres that was already used by Hong Kong (Artie and Benny, 2017). Therefore, technological progress and increased competition stimulate banks to shift the business strategic focus to customer satisfaction and service quality, introducing new product, service channel and cooperating with tech companies, thus maintaining continuous innovation to remain competitive.

3. Payment Service Directive

The financial services landscape will experience further changes after the implementation of the new EU Payment Service Directive (PSD2), which allows non-financial companies to provide access to financial services for bank customers. The first Directive on payment services in the internal market (Directive 2007/64/EC of the European Parliament and of the Council) came into force in December 2007 and was fully or partially transposed into national law by the member states by November 2009. The aim of this Directive is to establish an efficient market for payment services in the European Economic area[5], setting up a common requirements for electronic payments, covering credit transfers, direct debits, card payments as well as mobile and online payments. Besides, the Directive introduced a new category of payment service providers allowing non-banks (the 'payment services') provision of payment services to increase competition and ensure wider choice for consumers.

Already in June 2010 consultations started on the revision of the initial Directive, followed by formal official proposal in July 2013. The new Payment Service Directive6 (Directive 2015/2366/EU of the European Parliament and of the Council) was approved in November 2015 and has entered into force in January 2016. It should be applied by the member states by January 2018. The PSD2 allows non-financial companies ("Third Party Payment Providers", TPPP) to provide access to financial services for bank customers, stimulating creation of innovative IT solutions for payments, savings, lending and other services traditionally covered by banks. According to the PSD2 Directive "payment initiation service providers" (e.g., online stores, vendors) can access customer's payment accounts and initiate payments/bank transfers in the name of their customers. Moreover, the directive permits the TPPP to aggregate payment account information of their customers (e.g., from all current and savings accounts the customer holds by different account providers/ banks), providing them such services in one place (e.g., mobile application).

Despite the fact that the new regulation should be fully in force by the end 2018, the practical application of the Directive raises a number of questions regarding

[5] *https://ec.europa.eu/info/business-economy-euro/banking-and-finance/consumer-finance-and-payments/payment-services/payment-services_en*

[6] *https://ec.europa.eu/info/law/payment-services-psd-2-directive-eu-2015-2366/law-details_en*

technical, security and data protection issues. More clarity to the market participants is expected to be provided by the regulatory technical standards (RTSs) by the European Banking Authority (EBA). In May 2017 EBA has launched a consultation on the first draft guidelines[7] on security measures for operational and security risks. Public consultation was still ongoing until 18 September 2017 and technical standards are under development.

The PSD2 directive as well as the regulatory technical standards and guidelines provided by the supervisory authorities will have significant implications for the financial industry. Also, the adoption of the PSD2 into national legislation by the member states might create additional advantages to some market participants as soon as the directive provides some discretion in transposing to the national legislation. Implementation of the new directive (PSD2) will substantially change the financial services landscape, increasing competition and creating new risks for banking business.

Based on the analysis of the directive as well as the latest trends in FinTech, we believe, that the new PSD2 Directive creates, for the financial services industry and banks, in particular, additional risks and responsibilities regarding legal and consumer issues, security and data protection as well as reputational risks.

FinTech has already created additional pressure on bank margins, causing partial loss of the market share (especially in such services as payments). Besides, growing bank dependence on financial services technology solutions, this has increased operational risk and risk of fraud for banking. A substantial adoption barrier of modern financial technologies and the new regulation are ICT-related risks. According to the EBA "Risk assessment of the European banking system" (December 2016), ICT is considered to be a key operational risk. The main problem refers to the use of ageing core IT systems by a significant number of banks. Therefore, the introduction of the new directive would ask for a huge additional investment. Banks have already started to invest heavily in new IT infrastructures. According to the statistical data, in 2017, European banks are expected to spend 21.9% of their IT budget on new investments (Celent, 2015). That is a substantial rise, when comparing to the investment of 13.7% made four years ago.

Another risk brought in by the directive, is the potential security risk in sharing data with the 'Third Party Payment Providers', as well as the related reputational risks and grey areas with regards to accountability for any data breaches at third party providers/administrators.

A substantial risk is related to the bank business strategy. Further extension of FinTech services and products would signify a change in the Financial Services

[7] *https://www.eba.europa.eu/regulation-and-policy/payment-services-and-electronic-money/guidelines-on-security-measures-for-operational-and-security-risks-under-the-psd2*

business model. According to the PriceWaterhouseCoppers (PWC) (Global FinTech Report 2017), a loss of 24% of banking business is expected in 5 years.

Based on the analysis of the PSD2 directive and its impact on the competitiveness of the financial industry we believe that traditional financial service providers, banks, in particular, have a range of strengths in comparison to the financial technology developers as TPPPs:

- long standing experience in finance and trust;
- multiform access to services including not only remote access, but also personal contact and consultancy services through wide range of bank branches;
- wide range of products and services offered to clients enabling cross-selling and access to services provided by bank subsidiary companies ("one stop" service);
- since, the obligation of the PSD2, to provide access to account information of their customers to TPPPs is only directed to banks, banks are at an advantage because they alone are allowed to provide clients with mobile access, within a regulated environment, to their financial information covering not only bank accounts, but also information on asset portfolio, insurance contract and other products and services provided by bank subsidiary companies.

Also, the directive creates additional opportunities to the traditional financial service providers:

- possibilities of cooperation of the financial services industry with financial technology developers, outsourcing IT solutions to improve quality of own products and services and/or expand range of products creating innovative financial products and services;
- improved business efficiency through higher standardization, and thus reducing costs of selected financial products and services;
- improved risk assessment approaches based on modern data analysis methods allowing advancement in assessment and management of risks.

On the other hand, the PSD2 aggravates peculiar weakness of traditional financial service providers, banks, in particular:

- additional pressure on bank margins through increased competition in the financial services industry as well as due to stricter regulatory standards;
- potential partial loss of market share especially in such services as payments, loans;
- growing bank dependence on financial services technology solutions that require additional investment in bank in-house IT infrastructure or asks for closer cooperation with financial technology developers.

Moreover, the new regulations also bring with it potential threats as:

- necessity to change the business model to enable innovations in line with the changing conditions;
- increased operational risks due to necessity to allow access to customer payment account information;
- security risk in sharing data with the third-party payment providers;
- risk of fraud in case of dishonourable third-party payment providers;
- need for continued increased investment in core IT systems to minimize ICT-related and data protection risks.

Thus, on the one hand, development of FinTech is an additional challenge for the financial services industry; on the other hand, this challenge can be turned into an opportunity that will support further growth of the industry. Therefore, it is important for the financial services industry, and banks, in particular, to commence cooperation with FinTech companies especially where the business fields FinTech companies provide are complimentary services to bank services. Recent developments require banks to increase investment in financial technologies, rethink service distribution channels, increase further standardisation of back-office functions and services, etc. A timely integration of FinTech into business can allow traditional financial services providers and banks in particular, to gain comparative advantages in this growing competition.

4. Research Methodology and Results

There are various approaches to illustrate the impact of regulation on competitiveness. This study is based on developing an Inventory of the Contributing Factors (ICF) affecting the perception of Fintech firms on the impact on competitiveness of the financial services following the new PSD2 requirements and the participants perception on whether PSD2 promotes or hinders, innovation development and competition.

To develop such an inventory and hence to design the questionnaire, we participated in various forums and sub-groups relating to technology and the impact it is having on the competitiveness of the Financial Services Industry. We also carried out one to one interviews with techs involved in the development and maintenance of application software and discussed the factors which in their opinion are contributing to the changing world of Financial Services. This information together with that gathered from the research literature resulted in a set of 4 main factors which affect the perception of competitiveness following the introduction of this regulation. These factors were categorized under the following sub-headings:

- ***Theme 1 Cost***: This refers to the costs incurred for Financial services firms to comply with the directive and implement and maintain the necessary technological solutions. In turn, this will invariably influence the affordability of the service to clients. Crafts (2006), in fact notes that if regulation is

introduced into the equilibrium scheme, one has to consider that the compliance cost of regulations reduces. In the short run these expenses are expected to be higher due to resources for investment in research and development. However, in the longer run these can be translated into lower capital intensity and "smart" regulations allowing flexible solutions reducing the regulatory burden and increasing resource availability (Stewart, 2010).

- ***Theme 2 Service Channels*****:** This refers to the importance that PSD2 does not put barriers and promotes innovation in products and services using technology and allows for the appropriate communication, marketing and sales. Stewart (2010), highlights that it is important to ensure regulations reduce the regulatory compliance burden, by replacing physical compliance checks with automation, leaving more resources to be available for research and development of new services and products and innovation. He notes further, that new regulations change the incentives for investments in research and development and argues that regulators should be careful not to impose requirements that may reduce these incentives and thereby competition in the industry.
- ***Theme 3 Privacy, Security and Risk*****:** This refers to the fact that the PSD2 should ensure that information and data of transaction and persons/companies transacting are held securely, and privacy is maintained. Also, that security when carrying out transactions is guaranteed. Blind (2012) notes that if the impact of regulations reduces the risk on the demand side, then the incentives to innovate and for competition increases. Kemna, (2015), discusses the importance that regulation ensures privacy, security and stability in a way that this creates more innovation and competition.
- ***Theme 4 Quality and Efficiency*****:** This refers to the need to ensure that the PSD2 keeps the customer in the picture and does not hinder the quality of service and efficiency. In fact, Blind (2012) notes that regulation should ensure quality and efficiency so as to ensure innovation and competition. Moreover, Kemna (2015), highlights that it is important to have a regulation which is flexible enough to allow for quality and efficiency, which are important for ensuring competition.

The questionnaire consisted of 6 main headings. The first heading 'Demographics' consisted of 2 questions which related to demographics, wherein participants were asked, 'to indicate the country in which their firm was located' and 'whether the firm provided services to financial or non-financial firms or both'.

The second heading 'PSD2 Regulation' related to a statement on the perception participants have on the introduction of the PSD2. Participants were asked to indicate using a five-point Likert scale ranging from "1" for 'PSD2 is perceived to significantly hinder the competitiveness', "5" for 'PS2 significantly promotes competitiveness'. The next questions asked participants to rate their perception on the importance of the 4 factors identified, Cost, Service Channels, Privacy, Security and Risk and Quality and Efficiency to competitiveness of Financial Services

following the introduction of PSD2. This was individually operationalized via 3 statements per factor with a five-point Likert scale of the participants' perception ranging from "1" for 'very low importance' to "5" for 'significantly higher importance'. All those subscribers on LinkedIn and tech companies were invited to participate in an online questionnaire via a web-link and responses were collected through the web. The URL was set to limit only one response per participant, but respondents had the option of going back to edit or update their questionnaire until they finished it. Confidentiality of responses was guaranteed. A total of 263 completed questionnaires were received between May and October of 2017.

The following Figures 1 and 2 are a summary of the demographic characteristics of the sample:

Figure 1: **The Country In Which The Participant's Technology Company Is Located**

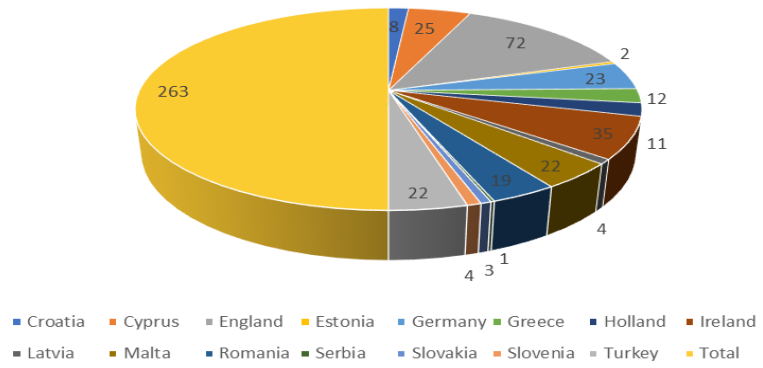
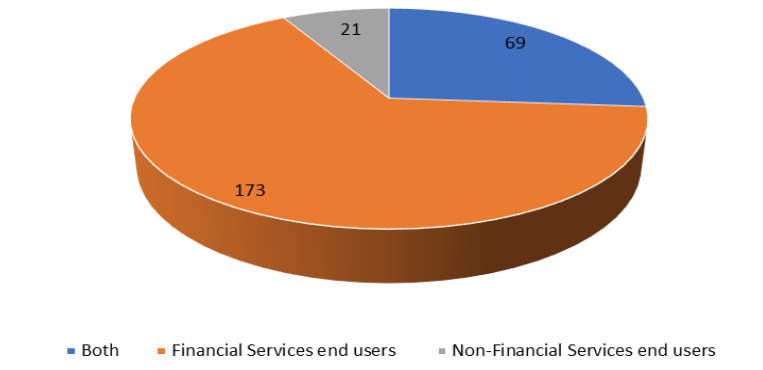


Figure 2: FinTech Companies Provides Services to Financial Services End Users, Non-Financial Service End Users or Both



Since no information about the demographic characteristics of the population in question is available, we could not use goodness of fit tests to test whether the sample and population distributions differed significantly from each other with respect to the demographic groups.

5. Data Analysis Procedure, results and discussion

We used descriptive statistics in SPSS (Version 20), to determine the perception of participants on whether the introduction of the PSD2 hinders or promotes competitiveness'. Participants believe that the PSD2 promotes competitiveness (M=4.29). Therefore, there is a positive outlook from the part of techs towards the introduction of this new regulation (Box Plot Figure 3).

Figure 3. *Box Plot – Belief on whether the PSD2 promotes or Hinders Competitiveness*

The respondents' data was inputted into an SPSS (Version 20) spreadsheet and subjected to statistical analysis. Since the items used the ordinal scale of measurement, we used the median (Md) as measure of central tendency and the inter-quartile range (IQR) as a measure of spread. Where an item could be grouped into a construct (or theme), we assessed the internal consistency reliability of the measures via the Cronbach α. After the items were combined into a single Likert scale, we computed the mean (M) as measure of central tendency and the standard deviation (SD) as measure of spread. Finally, in determining whether items were ranked consistently higher or lower than others, we used the Friedman test – a non-parametric statistical test that examines differences across mean ranks (MR).

In order to determine which groups differed significantly from each other, we used the Wilcoxon test in post-hoc analysis. To counteract for the problem of multiple comparisons among subgroups inflating the Type I error, the Bonferroni correction was applied (Miller, 1991).

Theme 1 Costs: As summarised in Table 1, participants perceive that costs are significantly important, ranking 'implementation costs' as the most important factor. This may be because the implementation cost is the foundation on which the price to the customer has to be built on. However, it is quite surprising that they perceive servicing and maintenance costs as of lower importance.

Table 1: *Participants Perception on the Importance of Costs*

	Median	IQR (Range)	Mean rank	Wilcoxon signed ranks test summary [a]
The Implementation Costs	5	5-5 (3-5)	2.35	A
The Costs to Customers	5	5-5 (3-5)	2.25	B
Servicing and Maintenance	4	4-4 (3-5)	1.41	C

Notes: *n=263; scales are ordinal and range from Low Importance ("1") to High Significant ("5"); [a] different letter indicate statistically significant differences in importance across factors at $p \leq 0.005$ (after applying Bonferroni correction); Friedman test: $\chi^2(2) = 291.82$, $p \leq 0.001$.*

Theme 2 Service Channels: Table 2 depicts the perception of participants on the importance of service channels. Participants perceive that Service Channels are significantly important, ranking 'availability of innovative products and services' and 'marketing, sales and good communication of products and services'; as the most important factors. This is not surprising since to be competitive one needs to regenerate and offer innovative products and services and needs to create the need and the awareness. New legislation that promotes the use of technology is likely to create a drive on this innovation and regeneration of service channels.

Table 2: *Participants Perception on Service Channels*

	Median	IQR (Range)	Mean rank	Wilcoxon signed ranks test summary [a]
Availability of innovative Products and Services	5	5-5 (4-5)	2.10	A
Use of Modern Technology	5	5-5 (4-5)	1.81	B
Marketing, Sales and Good Communication of Products and Service	4	5-5 (4-5)	2.09	A

Notes: *n=263; scales are ordinal and range from Low Importance ("1") to Significant Importance ("5"); [a] different letters indicate statistically significant differences in importance across factors at $p \leq 0.005$ (after applying Bonferroni correction); Friedman test: $\chi^2(2) = 84.72$, $p \leq 0.001$.*

Theme 3 Privacy, Security and Risk: Table 3 summarises participants' perception that privacy, security and risk are significantly important, ranking security as the

most important factors. With the growing demand for logical delivery channels and the entry of innovative products and services to match this demand, puts an increasing pressure to ensure the same security offered for physical delivery channels. The PSD2 itself (and related legislation such as for example data protection) place responsibility of determining risk and ensuring privacy and security, on the payment system service providers. Ensuring that the payment system delivery is carried out exactly as per request is paramount to the survival of any Financial Service provider.

Table 3: *Participants Perception on Privacy, Security and Risk*

	Median	IQR (Range)	Mean rank	Wilcoxon signed ranks test summary [a]
Privacy	5	5-5 (3-5)	1.91	C
Security	5	5-5 (3-5)	2.11	A
Risk	5	5-5 (3-5)	1.98	B

Notes: *n=263; scales are ordinal and range from Low Importance ("1") to Significant Importance ("5"); [a] different letters indicate statistically significant differences in importance across factors at $p \leq 0.005$ (after applying Bonferroni correction); Friedman test: $\chi^2(2) = 30.24$, $p \leq 0.001$.*

Theme 4 Quality and Efficiency: Table 4 summarises participants' perception, showing that for them Quality and Efficiency are significantly important, ranking customer satisfaction and best and latest technology as the most important factors. This shows that Techs are concerned with using the best and latest technology for delivery and are very customer centric. They are concerned with regenerating themselves and offering the most innovative products and services to ensure customer satisfaction.

Table 4: *Participants Perception on Quality and Efficiency*

	Median	IQR (Range)	Mean rank	Wilcoxon signed ranks test summary [a]
Customer Satisfaction	5	4-5 (3-5)	4.56	A
Speed of Transaction	4	4-4 (3-5)	4.17	B
Best and Latest Technology	5	4-5 (3-5)	4.48	A

Notes: *n=263; scales are ordinal and range from Low Importance ("1") to Significant Importance ("5"); [a]different letters indicate statistically significant differences in importance across factors at $p \leq 0.005$ (after applying Bonferroni correction); Friedman test: $\chi^2(2) = 67.73$, $p \leq 0.001$.*

We later supplemented this analysis by exploiting the categorical nature of our dependent variable 'the participants perception on whether PSD2 hinders or promotes development and competition'. We therefore run an ordered logistic

regression in order to estimate the relationship between each factor and the dependent variable using STATA. The 3 variables relating to perception on service channels were dropped from the regression due to lack of variation in the participants' responses. We use robust standard errors in order to correct for the presence of heteroscedasticity in our residuals. The results are shown in Table 5.

The 'z' scores obtained provide an indication of the statistical significance of each coefficient. As seen from Table 5, three explanatory variables yield statistically-significant coefficients, namely 'the participants' perception of importance of the implementation costs' (z=1.73), 'the participants' perception of importance of servicing and maintenance costs' (z=3.33) and 'the participants' perception of importance of customer satisfaction'(z=3.12). Pseudo R squared is 0.49, therefore the factors are collectively explaining almost half of the variation in perceptions; the Wald statistic is significant at the 1% level, meaning that our regression coefficients are jointly different from 0.

Table 5: *Ordered Logistic Regression Results*

	Coefficient	**Robust Std. Err.**	**z-statistic**
The Implementation Costs	2.6472*	1.5321	1.73
The Costs to Customers	-0.3470	1.4502	-0.24
Servicing and Maintenance Costs	3.5901**	1.0790	3.33
Privacy	0.9365	0.8403	1.11
Security	-0.3692	0.4930	-0.75
Risk	0.2120	0.6143	0.35
Customer Satisfaction	1.1528**	0.3691	3.12
Speed of Transaction	0.5382	0.4430	1.21
Best and Latest Technology	0.0971	0.4298	0.23

Pseudo R^2 = 0.4882

Wald = 130.85

N=263

Notes: **denotes that the coefficient is statistically-significant at the 10% level; **denotes statistical significance at the 1% level.*

All other participant perception factors were not significant. A possibility for the non-significant coefficients for the other variable could be the multicollinearity between them as can be determined from Table 6.

Table 6: *Correlations*

		The Costs to Customers	Servicing and Maintenance Costs	Privacy	Security	Risk	Customer Satisfaction	Speed of Transaction	Best and latest Technology
The Costs to Customers	Pearson Correlation	1	.915**	.958**	-.020	.939**	.547**	.385**	.651**
	Sig. (2-tailed)		.000	.000	.747	.000	.000	.000	.000
	N	263	263	263	263	263	263	263	263
Servicing and Maintenance Costs	Pearson Correlation	.915**	1	.876**	-.021	.858**	.524**	.366**	.622**
	Sig. (2-tailed)	.000		.000	.736	.000	.000	.000	.000
	N	263	263	263	263	263	263	263	263
Privacy	Pearson Correlation	.958**	.876**	1	-.021	.939**	.524**	.366**	.622**
	Sig. (2-tailed)	.000	.000		.736	.000	.000	.000	.000
	N	263	263	263	263	263	263	263	263
Security	Pearson Correlation	-.020	-.021	-.021	1	.179**	-.011	-.015	-.019
	Sig. (2-tailed)	.747	.736	.736		.004	.860	.813	.763
	N	263	263	263	263	263	263	263	263
Risk	Pearson Correlation	.939**	.858**	.939**	.179**	1	.513**	.357**	.608**
	Sig. (2-tailed)	.000	.000	.000	.004		.000	.000	.000
	N	263	263	263	263	263	263	263	263
Customer Satisfaction	Pearson Correlation	.547**	.524**	.524**	-.011	.513**	1	-.042	.426**
	Sig. (2-tailed)	.000	.000	.000	.860	.000		.498	.000
	N	263	263	263	263	263	263	263	263
Speed of Transaction	Pearson Correlation	.385**	.366**	.366**	-.015	.357**	-.042	1	.662**
	Sig. (2-tailed)	.000	.000	.000	.813	.000	.498		.000
	N	263	263	263	263	263	263	263	263
Best and latest Technology	Pearson Correlation	.651**	.622**	.622**	-.019	.608**	.426**	.662**	1
	Sig. (2-tailed)	.000	.000	.000	.763	.000	.000	.000	

N	263	263	263	263	263	263	263	263

**. Correlation is significant at the 0.01 level (2-tailed).

Based on this analysis of the questionnaire data we conclude, that the FinTech companies see that the PS2 regulation will promote competitiveness and that 'implementation costs', 'the costs to customers', 'servicing and maintenance costs' and 'customer satisfaction' are of paramount importance to ensure this. These findings are in line with the impacts identified in the studies of Crafts (2006), (Stewart, 2010), Kemna, (2015) and Blind (2012), when capturing the views from current players in the fields on the impact of regulation on innovation and competitiveness. However, from comments received we could understand that although, the absolute majority of FinTech companies haven't experienced any problems related to regulatory requirements, the effect that the proposed legislation will have on the competitiveness of the financial markets is still unclear, and we suppose that this results mainly because of uncertainties it creates until it is enacted.

Also, most techs (70%) commented that although the basic possible impacts are expected to be the same every time a new regulation is imposed, one should be careful about the subject it is dealing directly or indirectly with, since this may have a specific underlying requirement which is different and/or more important. Example in the case of PSD2, transaction security and speed are of utmost importance. Moreover, most (80%) commented on the fact that the PSD2 may impact or counter other regulations and requirements, which are expected to change in the near future or are currently changing, (example the General Data Protection Regulation (GDPR) and the Prevention of Money Laundering and Funding of Terrorism Regulations) and in doing so may create confusion and posing unintended barriers to innovation and competition. Others (40%) have commented on whether the PSD2 will be looking at the impact of BlockChain and Cryptocurrencies.

6. Regulatory Implications

As we can note from the above and in line with what Yeoh, (2017) highlights, "the existing modern financial system is governed by a combination of technical and legal codes, though more so by the latter". Soon many applications will have an effect on the costs, but there is an argument whether these could be increased or decreased, lowering costs were compliance is involved, decreasing the Human involvement and increasing costs where enforcement are concerned, and at the initial stages of implementation, where significant computational codes are needed to ensure compliance, integrity, privacy and security and testing them (Walport, 2016, Albert, 2016, Taylor, 2015). This highlights the significant importance of the impacts of regulations on the competitive edge of the current financial system.

There are claims that regulators should not intervene, but find ways to accommodate new approaches within existing frameworks rather than stifling innovation and competition with overly prescriptive rules (Byrne, 2016; The Economist, 2015),

focusing on designing responses to the behaviors of market participants (Gross, 2012). Regulatory flexibility and ability to change quickly when things go south is a must considering the fast pace of change in technological automation. Others (De Filippi, 2014a, 2014b) are of the view that "excessive reliance on automation of regulations, contracts and information flows could lead to the tyranny of codes" (Lee et al., 2015). "This poses the adaptability challenge for legal frameworks" (Yeoh, 2017). It is suggested that rather than having a prescriptive directive designed to control behaviour, one can combine this with ensuring governance, the later concerning stewardship, collaboration and incentives to act on common interests of the parties involved. It is better to regulate systems cautiously, "functioning as a collaborative peer to other constituents of society rather than as the heavy hand of the law. It might well be a better option to participate as players in a bottom-up governance ecosystem instead of as enforcements of top-down regimes of control." (Tapscott and Tapscott, 2016).

7. Conclusions

In a technological environment, regulations are drawn-up as technical codes which govern activities (RegTech) (Lessig, 2006). However, one must be aware that technical codes ensure that rules are followed rigidly even where compliance generates undesirable or unforeseen outcomes (Yeoh, 2017). The use of financial technologies or FinTech is nowadays becoming an inherent part of the financial services industry. Innovations and development of information and financial technologies have increased the necessity to look for more innovative solutions for traditional financial services providers, banks, in particular. In addition, new EU regulation on payment services will foster further development of FinTech and will consequently change financial services industry landscape asking for significant changes in the business model of the industry participant, banks, in particular. This has created the need and hence this research to look into what are the driving factors that techs of Fintech companies believe will drive competitiveness. However, until the full implementation of the new PSD2 directive, a number of questions regarding technical, security and data protection issues are still open.

Based on the analysis of the PSD2 directive and recent developments in FinTech we conclude that it can be seen as both, a challenge and an opportunity enabling further growth of innovated business of traditional financial services providers. Based on the analysis of the questionnaire results we conclude that the perception of competitiveness is related mainly to low costs and customer satisfaction. However, high quality of products/services as well as relatively high speed of transactions and security, privacy and risk are also perceived as important. Therefore, cooperation of the financial services industry with financial technology developers will ensure an improved quality and efficiency of service and encourage the creation of innovative financial products/services and reduce costs of selected financial products and services through higher standardization.

We need to create the right incentives and at the same time remove barriers that constrain long-term competition and innovation. Unfortunately, regulation often forms barriers. Therefore, although regulation is important and serves as a traffic officer in the crowded streets of the financial markets; when drafted and applied correctly, it can be an effective tool for creating incentives to increase innovation, economic development and competition. However, when regulations do not capture the whole picture, they can unintendedly discourage or maybe create barriers to innovation, close opportunities and competition.

Perceptions of the new prospective players such as techs can help to ensure that regulators have a wider angle picture of the playing field and therefore use regulation to provide stability by restoring and maintaining confidence in the financial markets and enticing innovation and competition.

References:

Albert, J. 2016. What's next for blockchain: technology, economics and regulation, EU Policy Blog. Available at: www.bloags.microsoft.com/whats-next-for-blockchain-technology-ect.

Artie, W., Benny, Ng., Kwok, B.K. 2017. Emergence of Fintech and cybersecurity in a global financial centre: Strategic approach by a regulator. Journal of Financial Regulation and Compliance, 25(4), 422-434.

Arner, D.W., Barberis J. and Buckley, R.P. 2015. The Evolution of FinTech: A New Post-Crisis Paradigm? University of Hong Kong Faculty of Law Research Paper No.2015/047.

Barney, J.B, Clark, D.N. 2007. Resource-Based Theory. Creating and Sustaining Competitive Advantage. Oxford University Press.

Blind, K. 2008. Regulatory foresight: Methodologies and selected applications. Technological Forecasting and Social Change, 75(4), 496-516.

Blind, K. 2010. The use of the regulatory framework to innovation policy. In Smits, R., Kuhlmann, S., Shapira, P. (Ed.), The theory and practice of innovation policy. Edward Elgar: Cheltenham, 217-246.

Blind, K. 2011. The Internet as enabler for new forms of innovation: New challenges for research. First Berlin Symposium on Internet and Society, Berlin.

Blind, K. 2012. The influence of regulations on innovation: A quantitative assessment for OECD countries. Research Policy, 41(2), 391-400.

Blind, K. 2012. The Impact of Regulation on Innovation: Nesta Working Paper 12/02, www.nesta.org/wp12-02.

Blind, K., Bührlen, B., Kotz, C., Menrad, K., Walz, R. 2004. New products and services: Analysis of regulations shaping new markets. European Commission - DG Enterprise: Brussels- Luxembourg.

Blind, K., Georghiou, L. 2010. Putting innovation at the centre of Europe - Suggestions for a European innovation strategy. Intereconomics, 45(5), 264-269.

Byrne, M. 2016. Blockchain: from "what" and "why" to regulating "how". Lawyer, Available at: www.thelawyer.com/…/blockchain-from-what-and-why.

Cetorelli, N., Peretto, P. 2000, Oligopoly Banking and Capital Accumulation. Federal Reserve Bank of Chicago. Available at http://public.econ.duke.edu/Papers/Other/Peretto/banking.pdf.

Claessens, S. 2009. Competition in the Financial Sector: Overview of Competition Policies. IMF Working Paper.

Crafts, N. 2006. Regulation and productivity performance. Oxford Review of Economic Policy, 22(2), 186-202.

De Filippi, P. 2014a. Tomorrow's Apps will come from brilliant (and risky) bitcoin code. Available at: www.wired.com/2014/03/decentralized-applications-built-bitcoin-great-except-whosreponsible-outcomes/.

De Filippi, P. 2014b. Ethereum: Freenet or Skynet?, Berkman Klein Center for Internet and Society at Harvard University. Available at: www.cyberlaw.harvard.ed.

Ezeala-Harrison, F. 1999. Theory and Policy of International Competitiveness. Greenwood Publishing Group.

Global FinTech Report 2017. PWC. Available at: https://www.pwc.com/jg/en/publications/pwc-global-fintech-report-17.3.17-final.pdf.

Grosse, R. 2012. Bank regulation, governance and the crisis: a behavioral finance view. Journal of Financial Regulation and Compliance, 20(1), 4-25.

Hochstein, M. 2015. Fintech (the Word, That Is) Evolves. The American Banker. Available at: http://www.americanbanker.com/bankthink/fintech-the-word-that-is-evolves-1077098-1.html.

IT Spending in Banking, A Global Perspective 2015. Celent. Available at: http://celent.com/reports/it-spending-banking-global-perspective-2.

Kasasbeh, E.A., Harada Y., Noor, I.Md. 2017. Factors Influencing Competitive Advantage in Banking Sector: A Systematic Literature Review. Research Journal of Business Management, 11(2).

Kemna, A. 2015. The Impact of Regulation. MsKinsey and Company Strategy and Corporate Finance Commentary. Available at: https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/the-impact-of-regulation.

Lessig, L. 2006. Code and Other Laws of Cyberspace, Version 2.0, Basic Books, New York, NY.

Llewellyn, D.T. 2009. Financial Innovation and the Economics of Banking and the Financial System. Financial Innovation in Retail and Corporate Banking. Ed. Anderloni, L., Llewellyn, D.T., Schmidt, R.H., Edward Elgar Publishing.

Mirzaei, A., Moore, T. 2014. What are the driving forces of bank competition across different income groups of countries? Journal of International Financial Markets, Institutions and Money, 32.

Marquez, R., Hauswald, R.B.H. 2001. Information Technology and Financial Services Competition. Review of Financial Studies.

Miller, R.G. 1991. Simultaneous Statistical Inference, Springer-Verlag, New York, NY.

Porter, M. 2008. On competition. Harward Business Review Book.

Prestowitz, C. 1994. Playing to win. Foreign Affairs, 73(4).

Risk assessment of the European banking system 2016. EBA, December, p. 56.

Romānova, I., Kudinska M. 2016. Banking and Fintech: A Challenge of Opportunity? Contemporary Issues in Finance: Current Challenges from Across Europe. Emerald Group Publishing Limited, 98, 21-35.

Stewart, L.A. 2010. The Impact of Regulation on Innovation in the United States: A Cross-Industry Literature Review. Information Technology and Innovation Foundation.

Tapscott, D. and Tapscott, A. 2016. Blockchain Revolution: How The Technology Behind Bitcoin is Changing Money. Business, and the World, Penguin Random House, NY.

Taylor, S. 2015. Blockchain: understanding the potential. Available at:

www.barclayscorporate.com/…/blockchain_understanding_the_po.

Thalassinos, I.E., Hanias, P.M., Curtis, G.P. and Thalassinos, E.J. 2013. Forecasting financial indices: The Baltic Dry Indices. Marine Navigation and Safety of Sea Transportation: STCW, Maritime Education and Training (MET), Human Resources and Crew Manning, Maritime Policy, Logistics and Economic Matters; Code 97318, 283-290, ISBN: 978-113800104-6.

Thalassinos, I.E., Liapis, K. and Thalassinos, E.J. 2014. The role of the rating companies in the recent financial crisis in the Balkan and black sea area. Chapter book in Economic Crisis in Europe and the Balkans, 79-115, Contributions to Economics, Springer International Publishing, DOI: 10.1007/978-3-319-00494-5-6.

Thalassinos, I.E., Pintea M., Ratiu, I.P. 2015a. The Recent Financial Crisis and Its Impact on the Performance Indicators of Selected Countries during the Crisis Period: A Reply. International Journal in Economics and Business Administration, 3(1), 3-20.

Thalassinos, I.E., Stamatopoulos, D.T. and Thalassinos, E.P. 2015b. The European Sovereign Debt Crisis and the Role of Credit Swaps. Chapter book in The WSPC Handbook of Futures Markets (eds) W. T. Ziemba and A.G. Malliaris, in memory of Late Milton Miller (Nobel 1990) World Scientific Handbook in Financial Economic Series Vol. 5, Chapter 20, 605-639, DOI: 10.1142/9789814566926_0020.

Ulltveit-Moe, K.H., Vale B., Grindaker, M.H., Skancke, E. 2013. Financial Stability Competitiveness and Regulation of Norwegian banks, 18.

Vovchenko, G.N., Tishchenko, N.E., Epifanova, V.T., Gontmacher, B.M. 2017. Electronic Currency: The Potential Risks to National Security and Methods to Minimize Them. European Research Studies Journal, 20(1), Special Issue "Russia and EU: Development and Horizons", 36-48.

Walport, M. 2016. Distributed Ledger Technology: Beyond Block Chain, Government Office for Science, London.

WEF. 2016. The Global Competitiveness Report, 2016-2017. Available at: www.weforumorg.

Yeoh, P. 2017. Regulatory issues in blockchain technology. Journal of Financial Regulation and Compliance, 25(2), 196-208.

Zinnes C., Eilat Y., Sachs J. 2001. Benchmarking competitiveness in transition economies. Economics of Transition, 9(2).