



BANKING INDUSTRY DETAILED VIEW

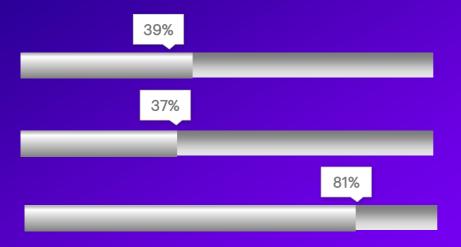
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1. Identifying the perceived digital maturity of the Greek Banking Industry

Faced with a set of digital challenges, major European banks appear ready to embrace digital as a potential solution for maintaining and shoring up both revenues and relevance. In fact, Accenture research demonstrates they will need to work a lot harder to close the gap between aspiration and application.

Top European financial services firms see digital as a key component of their growth strategies, and, in many cases, have devised a partial plan on how to integrate digital activities into their businesses. But this often translates into a number of dispersed initiatives instead of a structured and holistic action plan to capture value from the digital market. For example:



Communication

Firms have built online and mobile presence for engaging with clients via social media, but only 39% have C-level executives participating

Digital Strategy

Most firms include digital as part of their overall corporate strategy, yet only 37 % have a dedicated budget for digital transformation

Digital Ecosystem

81% of firms highlight their work with start-ups and universities on digital topics, but fewer than 60 percent have open innovation initiatives or use digital technologies in their product development process

Source: Accenture's European Financial Services Digital Readiness Report

A study run by Accenture among banking Chief Strategy Officers, revealed that digital is transforming the industry and more disruptions will follow. 96 percent of surveyed banking executives agree that new technologies will rapidly change their industry in the next 5 years and 85 percent of banking CSOs agree that new technologies have rapidly changed their company's industry over the past 5 years. Therefore, embracing digital becomes a necessity for banks to remain competitive. In this context, their Greek counterparts who were surveyed by Accenture believe that their companies are making steady steps towards the digitalization of their industry but further initiatives have to be taken on the way forward to sustain their position as digital leaders².



Figure 1: Overall Perceived Digital Maturity – Banking Industry (Current State – Ambition)

Surveyed executives perceived their companies to be executing their digital transformation on par with their industry's global market (Figure 1). As stated in our workshop, the institutional banks and other financial services bodies are already in the process of implementing a set of digital initiatives and progressing towards digitalization.

¹ "Thriving on Disruption", Accenture Institute for High Performance, 2016

² The performed analysis and the respective conclusions were based on data recorded through the "Questionnaire of Perceived Digital Maturity", launched on December 19, 2016 and remained open until January 30, 2017



Source: Questionnaire of Perceived Digital Maturity, Accenture Analysis
Figure 2: Perceived Digital Skills Maturity – Banking
Industry (Current State - Ambition)



Figure 3: Perceived Digital Technologies Maturity -Banking Industry (Current State - Ambition)



Figure 4: Perceived Digital Accelerators Maturity -Banking Industry (Current State - Ambition)

Zooming into the perceived digital maturity score into its underlying levers, it appears that the Greek banks appear to be performing below par regarding the *digital skills* area (Figure 2). In the future, the Greek banks aim to gain momentum and adopt leading practices empowering their workforce with digital capabilities.

With regards to digital technologies (Figure 3), Greek banking executives ascertain to have already adopted several technological capabilities that will help them rotate to digital. They recognize the value of digital technology and are ready to invest in big data and cybersecurity capabilities to improve their internal operations and maintain the high levels of trust by their customers.

Finally, as indicated by our survey results, the Greek companies view their maturity related to the industry's digital accelerators to be performing above par relative to international competitors (Figure 4). The marked ambition of those surveyed indicates a commitment to working hand in hand with the government and regulatory bodies to improve the overall banking business environment.

1.1 Evaluating the Greek Banking Industry's digital maturity

Taking our analysis one step further, we cross-referenced and analyzed secondary data against the executives' opinions, in order to attain an additional layer of granularity in our analysis. To evaluate the Greek banking industry's digital maturity and identify the primary factors that can drive economic growth in their digital economic output, we have applied the Digital Economic Opportunity Index (DEOI) for the banking industry.

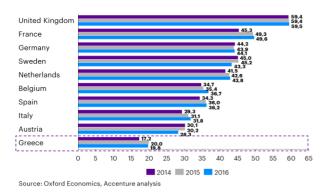
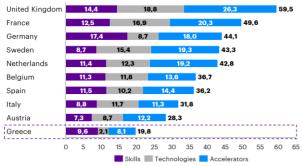


Figure 5: Banking Digital Economic Opportunity Index from 2014 to 2016

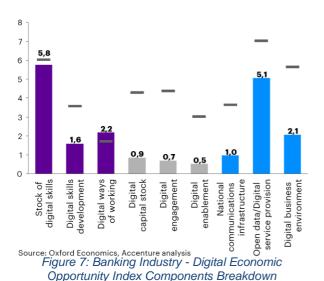
Our analysis for the Greek banks with regards to their digital maturity suggests that the Greek companies score at the bottom compared to their European peers over the last three years (Figure 5). However, since 2014 the Greek banking industry's digitalization seems to be gaining momentum. This has resulted in a higher Digital Economic Opportunity score by 2,6 points. Nonetheless, the pace of improvement is moderate as we are seeing more evolved banking industries, like the one of France, evolving faster.



The breakdown into the three levers that make up the Digital Economic Opportunity Index, namely, digital skills, digital technologies and digital accelerators expresses the following picture, as seen in Figure 6.

Source: Oxford Economics, Accenture analysis

Figure 6: Banking Digital Economic Opportunity scores by country



To further understand the key drivers of the Digital Economic Opportunity Index, we then zoom into the nine underlying components to get a more detailed view of the aspects that factor into to the poor performance of the Greek banking industry (Figure 7).



By first examining the *digital skills* lever, the Greek banking industry appears to be behind its European peers. The "stock of digital skills" pillar contributes higher to the overall score, indicating that ICT skills within the sector are closer to the average of other European industry peers. While the "stock of digital skills" scores well, the same cannot be said about the "digital skills development" component,

which reflects a limited emphasis on digital worker training. On the contrary, Greek banks perfom above average in the "digital ways of working" component, highlighting the marked importance of applying digital tools and capabilities to facilitate its mobility, knowledge-sharing and drive innovation, scoring about 0,5 point above the European sample average.



The low score across the board with regards to the *digital technologies* lever suggests that although Greek banks may have made some digital investments, there is much to do to bring them up to speed and boost their "digital capital stock" component. Furthermore, the Greek banks demonstrate a low adoption rate of emerging technologies (i.e. IoT, cloud, analytics), scoring approximately 3 points

lower than the sample's average across "digital engagement" and "digital enablement" components. By putting additional emphasis on engaging more actively with their customers through digital channels they could potentially achieve marked progress on this lever.



Finally, by analyzing the *digital accelerators* lever, it is evident that Greek banks are lagging behind their European peers, suggesting that the market conditions and business environment in Greece today is severely limiting the companies' digitalization. While the government's prioritization of digital is considerable, it is not high enough to improve the overall accelerators score. Driven down by

additional inhibitors that decelerate banks' digital transformation and contribute to the low maturity score like the poor "Ease of doing business", Greek banks score almost 4 points below their European peers.

1.2 Defining the contribution of digital to the Banking industry's economic output

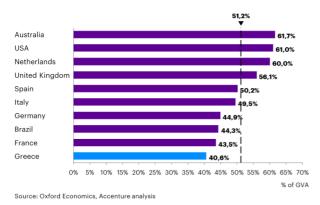


Figure 8: Percentage Contribution of Digital to Banking Industry's GVA

The Greek banking industry's low digital maturity appears to be further validated by the moderate contribution of digital to the industry's economic value. More specifically, Accenture's analysis demonstrates that digital inputs currently contribute to 40,6 percent of the industry's Gross Value Added (GVA)³, and are equal to €2,63 billion. This scores 10,6 percentage points below the sample average and positions the Greek banking industry at the very botton of the list of international peers that we examined.

At the top of our analysis we find the Australian banking industry, which currently exhibits the highest

contribution of digital to its GVA, with a digital output estimated to comprise 61,7 percent of the industry's GVA. Looking at the rest of the European counties, it appears that the Netherlands and UK banking enterprises are ahead, performing at a 60 percent and 56,1 percent of their digital potential.

1.3 Analysing the high digital maturity of the Banking industry, as one of the Greek "Multipliers"

The Greek Banking Sector, together with the Communications and Business Services & Technology industries are considered the "Multipliers" for the digitalization of Greek industries and in effect the country. Organizations that belong to the "Multiplier" subset are expected to enact a double role with regards to Greece's digital transformation: they shall progress their own digital transformation and to that end, increase their digital maturity, whilst, at the same time, they shall accelerate "Traditional", "In Transition" and "Customer facing" industries' rotation to digital.

6

³ Gross value added (GVA) is a productivity metric that measures the contribution to an economy, producer, sector or region. Gross value added provides a dollar value for the amount of goods and services that have been produced, less the cost of all inputs and raw materials that are directly attributable to that production. The relationship between GVA and GDP is defined as:

GVA + taxes on products - subsidies on products = GDP, or restated as:

GVA = GDP + subsidies - (direct, sales) taxes

According to Figure 9, the digital "Multipliers" appear to drive indeed both Greece's and its EU neighbors' overall digital maturity.

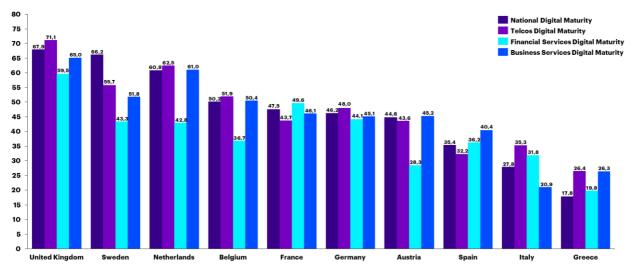


Figure 9: Digital Maturity scores – National, Financial Services, Telcos & Bus. Services digital maturity 2016 (# out of 100)

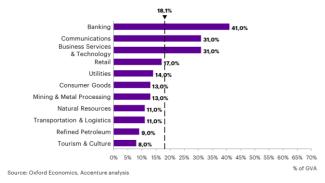


Figure 10: Percentage Contribution of Digital to Banking Industry's GVA As indicated in Figure 10, Greece's Banking sector is by far the most "digital", with 41 percent of the GVA in that sector derived from digital inputs. Communications and Business Services & Technology industries demonstrate also an increased level of digitalization, with 31 percent of their GVA's respectively deriving from digital.

2. Banking Industry - Rotation to Digital

There is wide-spread evidence that all industries are impacted by digital. In fact, as per Accenture research, "every business is a digital business". However, as each industry is also unique, its digital rotation puts the emphasis on different parts of the value chain, which we refer to as "digital pivot points".

What are the digital pivot points?

Companies organize their business activities against value chains that typically consists of strategy, production, sales and customer services and operations. There is widespread evidence that all industries are impacted by digital. However, as each industry is also quite unique, its respective digital rotation places emphasis on different areas of the value chain. These areas are referred to as digital pivot points.

This below mentioned value chain (see Figure 11) will be used as our framework to identify the digital "pivot point(s)" of the Greek industries.

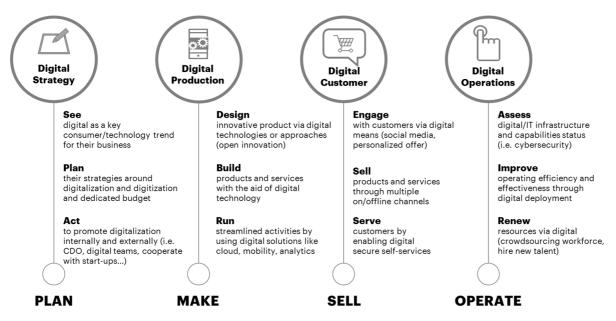


Figure 11: The typical Value Chain

2.1 Industry Clustering

According to our analysis on how digital impacts the Greek industries' value chain, we have placed the Greek Banking industry within the fourth group of the Greek industries, the "Multipliers" (see Figure 12).

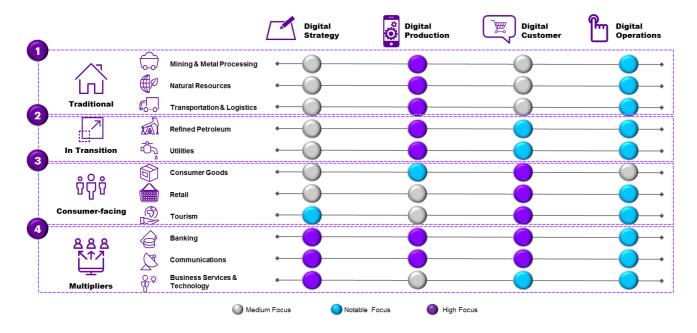


Figure 12: The Clustering of the Greek industries

These industries are primarily service oriented and they demonstrate a double market orientation (both Business to Business and Business to Consumer). "Multiplier" organizations shall have a double role with regards to Greece's digital transformation: they shall progress their own digital transformation and to that end, increase their maturity. At the same time, they shall act as the national "multipliers", in order to accelerate "traditional", "in-transition" and "consumer facing" industries' rotation to digital. Digital technologies have a significant impact across the "Multipliers" value chain. Eleven digital themes influence the "Multipliers" as presented in the Figure 13 below. The description of the digital themes is presented in Figure 15.

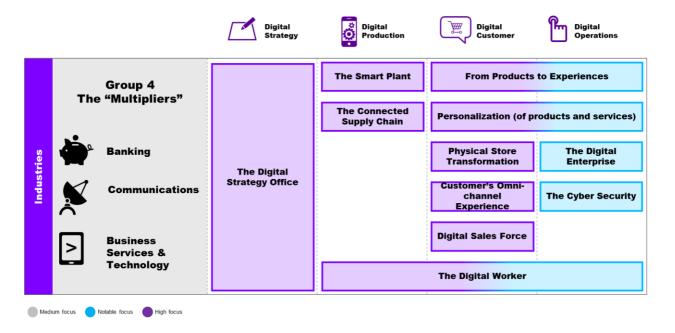


Figure 13: The "Multipliers"

International best practices suggest that, at the core of their digital rotation, banks must primarily improve their protection against cyber threats and use intelligent and real-time analytics which drive personalized products, services and financial advice for their customers. Figure 14 illustrates elements of the above.

Sales Effectiveness

From "teller to retail sales rep" enabled with rich customer preference information and next best action guidance

Mobile Banking App

Delivery of financial services products through mobile handsets to increase access without the high costs of traditional infrastructure

Social

The Bank acts proactively—and smarter on social networks and in every personal interaction, to improve reputation and trust

Vertical Applications

myhome, mycar, myhealth tailored around the customer's specific situation and based on ecosystem partners

Omni Channel

Seamless customer experience regardless of channel, in the branch, on social, on mobile, or through the contact center.

Digital/Electronic Payments

Growth of e-commerce, digital money and mobile payments is turning mPayments, ePayments, payment cards and even digital currencies, into a strategic battleground for banks relative to new Payments entrants.

Social and Digital Branch Channels



Customers authenticate their identify

once at the branch via one channel (e.g., via biometrics at the ATM), remain authenticated on their mobile app / card.

Figure 14: Digital Banking

digital signature

Digital signatures and tablet

licenses-or even retinas-to

cameras can scan drivers

confirm identification

Content Provider Ecosystem Connections

Bank brings together an extended ecosystem of provider partners offering goods and services in every area of home and consumption, health and protection, travel and leisure, communication and transportation for customers' life purchases.

Big Data Analytics

Know the customer, offer just in time relevant discount, pre sales, post sales support, cross sale. Value through patterns and predictions.

CRM integration

From "transactions to interactions". Link the CRM tool with Collaboration and Social tools for customer service via the right service representative, backstop and expert group.

Workforce Collaboration

As job roles become more complex, organizations are seeking to enhance their ability act with agility and speed by turning to workforce collaboration tools, such as instant messaging, teleconferencing and shared workspaces, to enhance enterprise productivity.

Rich Communication Options

Human touch is retained in the digital world, delivered in high value settings, providing expert advice at the customers' moment of truth



Figure 15: Digital Themes

2.2 Digital Pivot Points

Contextualizing these observations with industry's executives, we have identified the need to plan their strategies around digital, the "phygital" transformation of their branches and the interoperability between

them and external players as the primary areas for digital attention. As a second priority, they wish to improve their operational efficiency through digital capabilities. Figure 16 illustrates the emphasis on the different pivot points for the banking industry.

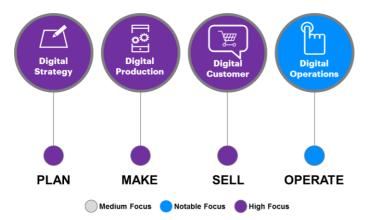


Figure 16: Banking Industry - Digital Pivot Points

2.3 Initiating the digital transformation

With global best practices as our reference point, we propose a set of initiatives that will accelerate the industry's digital rotation.

These incorporate:

- initiatives that refer to individual organizations within the industry under review
- initiatives that can be jointly undertaken by the organizations to enable the industry's rotation to digital

2.3.1 Initiatives that refer to individual organizations within the industry

With regards to the initiatives that refer to individual organizations, it is evident that not all of these may be applicable for the organizations within this industry; indeed, digital initiatives are recommended to be selected in accordance to the different strategy, business model, size, available budget and most importantly, each company's own digital aspirations and vision. The initiatives that follow, are broken down into tactical, which we call "tactical moves" and disruptive, which we call "cut new ground". In addition,

they are linked to the digital themes presented previously that influence the specific group of industries. The classification of the identified initiatives is depicted in Figure 17.

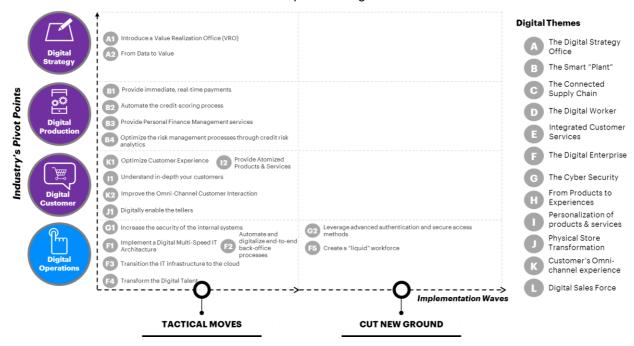


Figure 17: Classification of Suggested Initiatives Across Three Dimensions

These initiatives and their specific descriptions are subject to the strategic priorities and digital roadmap of each organization. Therefore, in the table below we only provide a high-level description of these.

#	Digital Initiative	Description	Value Chain Area
A1	Introduce a Value Realization Office (VRO)	Introduce a Value Realization Office that will monitor and steer the business value delivery of the ongoing digital transformation	Digital Strategy
A2	From Data to Value	Organizations shall innovate, build differentiated data insight solutions and transform into Data Powered Enterprises by designing their data strategies and operating models, introduce structured data governance models, design new or optimize the existing data engineering tools and mechanisms and build data management platforms	Digital Strategy
B1	Provide immediate, real-time payments	Provide immediate, real-time payments that will enable collecting and analyzing financial transaction data in real-time, deriving financial insights immediately, and drastically reducing the effort involved in reconciliation payments to retail and corporate clients	Digital Production
B2	Automate the credit- scoring process	Automate the credit-scoring process to combine traditional credit-scoring and customer behavioral data insight	Digital Production
В3	Provide Personal Finance Management services	Provide customer services and more specifically advisory and educational services targeted to the various customer segments and their needs	Digital Production
B4	Optimize the risk management processes through credit risk analytics	Leverage Big Data and Analytics to optimize the underwriting and risk scoring processes	Digital Production
F1	Digital Multi-Speed IT Architecture	Implement a new multi-speed IT Architecture to increase the speed of technology evolution to address digital customers' liquid expectations while remaining reliable and cost effective	Digital Operations

#	Digital Initiative	Description	Value Chain Area
F2	Automate and digitalize end-to-end back-office processes	Digitalize and automate end-to-end internal processes powered by artificial intelligence (robotics) and big data analytics to increase their operating resilience	Digital Operations
F3	Transition the IT infrastructure to the cloud	Move the IT infrastructure to the cloud to improve efficiencies, enable the seamless integration of business processes and provide immediate, ondemand access to the latest solutions and approaches	Digital Operations
F4	Transform the Digital Talent	Define the new digital roles, capabilities and skillset, assess the active workforce and design digital training sessions to digitally upskill and reskill the organizations' personnel	Digital Operations
F5	Create a "liquid" workforce	Draw on diverse external sources, on-demand workers, such as freelancers, contractors and consultants, participative public pools, such as crowdsourcing and application development companies, and more constant service providers, such as traditional outsourcers to create real workforce fluidity	Digital Operations
G1	Increase the security of the internal systems	Strengthen internal systems and incorporate increased security measures such as multilayered authentication and internal control processes to strengthen security and comply with increased regulations	Digital Operations
G2	Leverage advanced authentication and secure access methods	Leverage advanced authentication and secure access methods including the increased adoption of biometrics and tokenization to protect banks from cybercrime and fraud	Digital Operations
I1	Understand in-depth your customers	Combine social data with internal and use big data analysis to obtain an in-depth understanding of your customers, anticipate their needs by leveraging individual customer profiles based on their history, loyalty, preferences and behavior and prepare focused offers	Digital Customer
12	Provide atomized Products & Services	Contextualize interactions and provide digital products/services tailored to customer needs via real-time analytics	Digital Customer
J1	Digitally enable the tellers	Enable the tellers with rich customer reference information and "next-best-action" guidance, to transform them into retail sales representatives	Digital Customer
K1	Optimize Customer Experience	Introduce and rollout customer journeys to improve the customer experience across channels in the context of the personalized treatment and strengthen the B2C and B2B interfaces	Digital Customer
K2	Improve the Omni- Channel Customer Interaction	Provide a seamless customer experience across all customer interfaces (branch, mobile, call center)	Digital Customer

2.3.2 Initiatives that can be jointly undertaken by the organizations to enable the industry's rotation to digital

In addition to the suggested set of initiatives that each individual organization can undertake in order to accelerate their digital rotation, another set of digital initiatives has emerged. These initiatives carry the potential to be undertaken jointly by organizations belonging to this group. Such initiatives can cover a wider breadth of digitalization, enabling faster and more pervasive digital rotation.

These initiatives are described briefly in the table below.

#	Cross-Banking Digital Initiative	Description
1	Introduce cross-bank crowdfunding schemes	Investigate the potential introduction of a cross-bank crowdfunding scheme as a common initiative that could be undertaken by the financial institutions and could further boost the Greek entrepreneurship.
2	Set up a digital finance think tank	Setup a digital finance think tank, in which key players shall participate. These shall be leading organizations from the banking industry, federations (i.e. SEV) as well as key players from other Greek industries (i.e. key companies from the Consumer Goods & Retail industries). Scope of the think tank would be to investigate emerging digital themes and discuss on a set of innovative cross-organizational/ cross – industry initiatives that will further enhance customer – centricity.
3	Introduce a cross- baking KYC initiative	Introduce a common, cross-banking Know-your-customer initiative that will be enabled by customer data opening and sharing amongst financial institutions. This could be achieved through a data platform, where customers could provide their personal data just once to their bank, and retrieve their personal details for all subsequent transactions. This could increase efficiencies by eliminating costly, laborious, and hugely duplicative KYC processes by each financial institution. As a next step, blockchain technology shall be also explored to identify how this can further enhance this initiative.
4	Promote the established cross-bank payment platform and create a common User Experience	With regards to the established cross-bank payment platform, financial institutions shall focus their effort into the two following domains: • Further promote the use and benefits of the cross-bank payment platform to the Greek market to increase its adoption rate and enable e-payments without the use of payment intermediaries (i.e. visa, mastercard etc.) • Create a common and unique User Experience for the payment platform to increase customer satisfaction and enable platform's seamless use.
5	Introduce an e-ID card based on online banking authentication	Leverage and provide online banking authentication services for the introduction of an electronic ID. The eID shall be used by citizens/customers for digital identification as well as signing transactions and documents. The customer's identification shall be guaranteed by the bank issuing the eID. Authorities, companies and other organizations must check the validity of the customer's identity and signature.
6	Collaborate to provide financial services to socially disadvantaged groups	Financial institutions shall join forces to explore how they can jointly support disadvantaged groups of the Greek society with regards to the provision of both online and offline financial services (i.e. provision of

#	Cross-Banking Digital Initiative	Description
		easypay points, joint installation and operation of ATMs in remote locations etc.)

Note: As per Alpha Bank's suggestion, initiatives 3 & 5 could potentially be merged under the following initiative:

Initiative: Establish a national Digital ID infrastructure and introduce a cross-bank KYC initiative

Description: In collaboration with the state authorities, create a national DigitalID infrastructure (potentially leveraging taxisnet, as well as the Banks' infrastructure). The national DigitalID would be the primary means for the digital identification of citizens and could be also used for the digital signing of documents and transactions.

In the creation of the DigitalID, the collaborating parties should evaluate potential means for remote identification (e.g., video calls) and examine as well the potential incorporation of biometrics, such as for example, fingerprint, retina and face recognition.

Based on the above mentioned national DigitalID infrastructure, the Banks will introduce a joint cross-banking KYC initiative. The creation of a common KYC platform would be enabled by customer data sharing amongst financial institutions, aiming at asking customers once only for their personal data. This would increase efficiencies by eliminating costly, labour intensive and largely duplicative KYC processes by each financial institution.

As a next step, blockchain technology will be also explored to identify how it could potentially further enhance the above initiative.

It should be noted that there has been some progress in the discussions between the Hellenic Bank Association and the state authorities, with regards to the access of the Banks to the taxisnet database (expected in October 2017).

2.4 Global Leading Practices

Case Study – Blik mobile payment scheme

BLIK is a mobile payment scheme developed by Poland's six largest bank – PKO Bank Polski. The scheme has been initially offered to own clients within the IKO mobile app. Shortly after the launch, five other major banks as well as the incumbent ACH-KIR joined the project. In order to make the project universal and accessible to every interested party, an independent company and system operator –PSP was created and a new name –BLIK was announced in 2015. With the new service, customers of the banks involved, can use their smartphones to make payments in stores and online, withdraw cash from ATMs and send P2P payments to customers of any of the six banks. As of 2016, the payment platform had about 2 million users and had handled close to 3 million transactions amounting to 710 million PLN.

Source: http://www.bankingtech.com/675381/modern-payments-and-banking-apis/

Case Study – N26 Mobile Bank

Number 26 (N26), a mobile banking startup backed by PayPal founder Peter Thiel, recently took a major step forward in its vision The Berlin based startup, was awarded a full German banking license by the Federal Financial Supervisory Authority and the European Central Bank on July 18, 2016. This license gives the company regulatory approval to conduct banking operations across Europe and expand its current platform, which includes real-time banking, cash withdrawals, and money transfers.

N26 has targeted younger customers who have grown up surfing the web and do not have decades-long ties with traditional banks. The startup uses tools such as providing push notifications on smartphones when banking transactions are completed, guaranteeing free cash withdrawals anywhere in the world and teaming with retailers in Germany to let customers withdraw and deposit cash. The company soon will introduce this service to some of its new expansion markets. In order to comply with Europe's tough banking rules, the start-up has also teamed with a traditional financial service provider, Wirecard Bank, so that customers' deposits are protected, up to a limit. "We see ourselves as a Europe-wide company," said Mr. Stalf, who plans to roll out more sophisticated banking services, like overdraft facilities and savings products, next year. "For 18 to 35-year-olds, it's normal to do everything on their mobiles".

Source: https://bits.blogs.nytimes.com/2015/12/03/number26-german-banking-start-up-expands-across-europe/?_r=0

2.5 Maximizing the Banking industry's economic output (GVA)

Our econometric analysis suggests that by 2021 the initiation of the digital rotation for the banking industry is expected to result to a moderate increase in the economic output by 2,32 percentage points equals to approximately €156,3 million⁴. The projected GVA uplift is a product of macroeconomic analysis assuming a 10% increase on the industry's digital maturity (Figure 18).

This projected uplift refers only to the direct effect that the implementation of the digital initiatives, that were presented in section 2.3.1, can potentially have on the industry's economic output.

The implementation of the cross-organizational digital initiatives, mentioned in section 2.3.2, are expected to have a significantly larger effect on Greece's overall GDP uplift.



Source: Oxford Economics, Accenture analysis

Figure 18: Banking GVA Uplift as % of the 2021 GVA baseline, (Million Euros, %)

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⁴ 2021 Gross Value Added is calculated from Eurostat data using Oxford Economics projected growth rates. The spill-over effect to the economic performance of other industries is not included in this figure.

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