

Supporting REsearch Report

Mojo Banking Solutions, Inc.



October 5, 2020

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BSA425

The intension of this document is providing an overview of the online banking industry. This will include a basic background of the industry in and of itself. Technology trends currently present within the industry itself, and what approach will be taken with said project. Chosen vendors will also be covered regarding the project. As well as alternative approaches regarding the project. What will also be discussed is the impact analysis regarding the project, as well as a cost-benefit analysis, financial analysis, and risk assessment. This will all be summarized in an executive summary as well.

The project in and of itself is that of an online based bank which provides various services to its customers such as accounts setup, deposits, credit debit and travel cards. It will provide loans, insurance, investments, and tax services. This service will provide the scalability, availability, security, and manageability one would expect from an online based banking service both through its web-based interface as well as mobile application-based interface.

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| **Executive Summary** |

This document in and of itself offers continued research on the online based banking service as desired by Mojo Banking Solutions, Inc. it will seek to provide a basic background of the online banking industry. It will highlight current technology trends within the industry such as the Apple and Goldman Sachs endeavor. It will highlight the approach taken for the project over all and the methodology in play in its construction and ultimate execution. An assessment of the selected vendors and a what technologies they offer that are beneficial towards the project will be discussed. Possible alterative routs to the project will be discussed as well and what options will need to be explored for these possibilities. An impact analysis as it pertains to the industry will be discussed. A cost-benefit analysis will be provided based on the industry in question. A financial analysis pertaining to the industry itself will be discussed, this will include highlights of current industry leaders. And finally, a risk analysis will be discussed, this will also provide risks applicable to the venture of this project but also means of mitigating said risks.

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| **Industry Background** |

Online banking is services that allow a customer to generate electronic transactions through a financial institution by means of a financial institution’s internet-enabled website or application. The first steps into modern online based banking stating in New York City in 1981, where Citibank, Chase Manhattan, Chemical Bank, and Manufactures Hanover began to advertise remote services for their customers (Sarreal, 2019). The next innovation came in 1995 as President Bank became the first financial institution to offer internet banking to its customers with the inclusion of full access to their accounts online (Woods, 2014). In 2009, Ally Bank is rebranded from General Motors Acceptance Corporation (GMAC) Bank establishing itself as one of the first banks available as online only without a brick and mortar presence for its customers (Woods, 2014).

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| **Technology Trends** |

Current trends in the online banking world being data utilization, collaboration, platform economy, and financial health. Data utilization allows banks to better understand the needs and preferences of their customer. This would be the access of psychographic and lifestyle data, purchase data, geo-location data, and insights on channel preferences as well as social medium use. Collaboration is the partnerships businesses form to have seamless integration with the already existing products and systems without the need for renegotiation within their relationships. The main concept behind platform economy is plug and play, this allows for multiple consumers and producers to connect, interact, and exchange value; this in turn allows for the services and products from different companies to satisfy the needs of a wide range of customers. Financial health being the price, convenience, and location of the business entity and its ability to make well informed decisions in their main goal of improving their overall financial health (Hamilton, 2020).

Other trends being large companies such as Apple branching into the banking and financial institutions, Apples Card which is partnered with Goldman Sachs being an example. In 2019, Hunting Bank rolled out their Heads Up artificial intelligence-based software that give customers advice on savings, spending, and achieving financial goals. HSBC partnered with fintech Amount to launch a digital lending platform in late 2019, there is speculation of other such partnerships forming in 2020 (American Banker, 2020).

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| **Project Approach** |

Regarding the construction and execution of this online banking service as to be offered by Mojo Banking Solutions, Inc. it has been devised that the project will take an agile approach in its construction. The Agile methodology was chosen as it allows for more flexibility over the waterfall methodology and was a better fit given the circumstances surrounding the project at hand. The execution of the Agile methodology allows for more input form the stakeholders (primarily the leadership of Mojo Banking Solutions, Inc.) at each iteration of the project (Agile Alliance, 2020).

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| **Selected Vendors** |

Selection of vendors has different factors to consider. First of which being who offers what service(s) that are beneficial for the success of this online banking project, second being the stability of said vendor, a third issue is overall cost of the service(s) the vendor offers that are being used towards the project, and finally, fourth issue being the stability of the service being offered. That all being considered, the three top companies that offer services beneficial to the project being Amazon Web Services (AWS), Google, and Microsoft’s Azure architecture.

Starting with Microsoft’s Azure, Azure Batch is an Azure service which allows multiple workers to run Virtual Machines in parallel this allows for faster processing of data files (Microsoft, 2019). There is also Azure’s ExpressRoute and VPN Gateway which lets one extend their on-premises networks into Microsoft’s cloud over a private connection facilitated by the connectivity provider; connection can be from and any-to-any (IP VPN), a point-to-point Ethernet network, or virtual cross-connection (Microsoft, 2020). ExpressRoute also has built in redundancy and allows for connection to other Azure cloud services. Another Microsoft based service being Azure SQL Database. This in and of itself offers scalability, high speed architecture with minimal downtime. The presence of SQL servers already within the cloud structure itself means the architecture needed is already present. The addition of the SQL Server Management Studio is a SQL developer friendly environment in and of itself. There is also an array of built in SQL Database management and migration tools such as SQL Data Sync (Scherocman, 2016). Finally, Azure is an ideal platform to innovate a new banking ecosystem and deliver a highly personalized experience. It allows for the transformation of customer experience, the simplicity of regulatory compliance, and an optimization of risk management (Web Synergies (S) Pte Ltd, 2019).

Microsoft itself has been in operation since 1975, its Azure platform has been in operation since 2008, this fulfils the stability criteria as laid out prior. With the utilization of Azures services calculator, the estimated monthly cost for an Azure comprised architecture would run to approximately six-thousand dollars a month for a complete solution including web support, mobile support, security, remote connection, and database support (Microsoft, 2020).

With AWS there is the presence of the Relational Database which offers ease of use through its automatic software patching and recommendation engine. It features high-performance Solid-State Device backed architecture that supports instance stability. There is also emphasis placed on encryption and security (Saras, 2020). There is also the AWS cloud structure itself that offers 175 fully featured services from a surplus of datacenters around the world.

The addition of AWS’s CloudFormation allows for the integration of third-party resources and management of them throughout their life cycles. CloudFormation in and of itself allows for the automation of DevOps and GitOps which in and of themselves can be utilized for web-based applications as well as mobile based applications (Android and IOS for example) (AWS, 2020). One can build an infrastructure using AWS’s Elastic Computer Cloud (EC2) which allows one to establish a virtual architecture with its web-scaled computing power. It is also known for its ability to allow one to quickly scale their capacity as more instances of virtual servers can be instantiated within minutes to deal with increased traffic to services (G2, 2020). AWS pricing is based on a per-use structure, given AWS’s pricing estimator in order to build an AWS structure using various services the estimated cost would be roughly six to seven-thousand dollars a month with the addition of AWS tools mentioned prior, this estimate could go up and down on the basis of site traffic and over all use (AWS, 2020). AWS itself has been in operation since 2006 and its growth has surpassed that of Microsoft and Google respectively (Miller, 2016). While AWS’s parent company Amazon itself has been in business since 1994.

Google itself being the youngest of the three starting in 1998, with its flagship Cloud product being launched in 2008. Its offering of its Compute Engine offers kernel-based virtual machines which offer certain configurations, these being standard, high-memory, high CPU, and shared core processing (Carklin, 2020). Its cloud system supports Open Banking API’s, high performance computing. Contact Center AI, there is also Cloud SQL and Cloud Bigtable services for database management. Google services themselves are branched out by use similar to Amazon, generally cost it cheaper so its possible it may be the proposed six-thousand dollars per month or less depending on usage and need (Aboukhalil, 2018),

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| **Alternative Approach** |

Alternative approaches to the utilization of cloud-based services for the establishment of an online bank vary. One can invest in building the cloud infrastructure themselves however factors such as a physical location for any needed hardware come into play. With the cost of hardware comes the cost of maintenance in particular the servers and physical components. End of life usage would have to be established on devices such as Hard-Disk Drives (HDD’s) as these can wear out over time leaving themselves inoperable. Special considerations must be taken into server housing as well, such as ambient temperature and a means of maintaining the severs and equipment at a safe temperature are also necessary. There also comes the issue of natural phenomenon, incidents such as earthquakes, flooding, and fire are highly likely within a California based datacenter and must be planned for accordingly. Tools such as backup battery supplies to keep the center running will also have to be considered at a cost as well; also the possibility of fallback locations in the event of failure, but these would also have to be appropriately vetted to serve company needs.

Another such option is dividing the infrastructure into different services and the possibility of into integrating them into a working system. It is entirely possible to purchase a virtual infrastructure from a vendor, attach other services from other vendors to it such as cloud services, database structures, security emplacements (Firewalls for example) and so on. Two issues come up with the approach, the possibility of incompatibility or simply having to customize something to fit a need, and the agreement with the vendors themselves. Service Level Agreements (SLA’s) would have to be made with each vendor utilized in the construction of the architecture. In the event of a failure said vendor would have to be held responsible for the downtime as made in the SLA.

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| **Impact Analysis** |

Internet based banking itself has helped to revolutionize the banking industry with its inception. It in and of itself has been the focus of major traditional banking industries, an example being Bank of America. Benefits of internet banking are it allows for faster validation for incoming payment form buyers or clients, the ability of one to send or transfer money from a web application instead of the reliance of a brick and mortar outfit, it gives one access to the records making them easy to retrieve, it provides a Realtime view of said customers account(s), it allows access to current products, rates, as well as services, and it allows one to update their personal information easily. Internet banking offers twenty-four-hour helpdesk support and secure online transactions (Popoola, 2019).

Business aspects of online baking are an overall less of a need for staffing, operations can be run with very few personnel as there is no brick and mortar presence to finance, less employees means less individuals dipping into the banks profit margin. Lack of brick and mortar foundations simply means less money to be invested in property for the housing of physical bank locations. One noted drawback is operational costs increase as an online bank is opened however it decreases over time as the system stabilizes and any issues are worked out. A gap of between two to three years was noted in the paper intitled “Measuring the Impacts of Internet Banking to Bank Performance: Evidence from Vietnam” by Van Dinh, Uyen Le, and Phoung Le. This gap essentially is how long it took the notion of an online bank to out preform the revenue traditional brick and mortar bank (Dinh, Le, Le, 2015).

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| **Cost-Benefit Analysis** |

In a the “Proposing a model for cost-benefit analysis and lunching electronic (online) banking services in Iran) case study done by Bakhtiar Salehi and Zahra Reza Samiz it was discusses that there is a significant connection between communication infrastructure with decision-making for electronic banking. Among the paper was a survey taken by a group of bank officials (this being thirty individuals), it was noted in the study there is a high increased legal risk associated with digital banking, there is also a high operational risk and complexities associated with digital channel service offering, but there was a drastic increase of competition with the advent of digital banking, and an overall increase of the banks reputation with the addition of digital banking services (Salehi, Samizadeh, 2014).

Strengths of online banking include the possibility of online and mobile based banking; this gives customers access to their accounts from any internet capable device (in theory). Online banking can present customers with lower fees, better rates, and no minimums. Online banks typically boast better and more up to date technology over their physical counterparts. Customer service can take place within the digital realm in its entirety through chat applications. Weaknesses of online banking include the possibility of a narrower set of non-essential banking services, service interruptions, cybersecurity concerns, limitations on deposits, a lack of a banker relationship, and issues with mobile security regarding banking overall. (Maldonado, 2020).

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| **Financial Analysis** |

In terms of financial stability whether online banking will generate profit is still a subject of debate. Online based banking provider Security First Network Banks as of January 2020 hold three-million dollars in assets according to the President of the Bank, Eric Harz; it also holds an extremely high customer satisfaction rating. Another example being Citigroup Inc. which has held onto roughly one-hundred million customers since its inception in 1997 (IDG Communications, Inc., 2000). As of 2019, Citibank currently services one-hundred and ten million clients in nineteen different markets and had a profit of just over seven billion dollars (Citigroup, Inc., 2020).

In 2014 Chime Bank was launched, and as specified in Kate Rooney’s article “Online bank Chime now valued at $1.5 billion after new funding round”. It currently bolsters over three-million customers. It is also noted by Kate Rooney that chimes digital-first approach with a promise of zero fees has helped Chime attract two-hundred thousand users per month (Rooney, 2019). From this one could extrapolate an online based bank could generate high earning potential if it adheres to what its customers desire.

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| **Risk Analysis** |

Common issues with online banking being the speed of technological change, changing customers’ expectations, increased visibility of publicity accessible networks, less face-to-face-interaction with financial institution customers, the dependence on third party technical expertise, and proliferation of threats and vulnerability’s in publicly accessible networks (FFIEC, 2020).

Issues one can run into in the realm of online banking include Distributed Denial of Service (DDOS) attacks in which one’s servers are bombarded with junk traffic causing the network infrastructure to overload and fail. Other issues include security flaws within banking apps that may be reversed engineered by foreign agents. The provider of this online banking service (Mojo Banking Solutions, Inc.) can protect customers with a password and username based credentials as well as authentication measures to ensure the individual is the appropriate individual accessing the account in question but one weakness that can still be exploited is the customer themselves as well as Mojo employees. Phishing and whaling attacks can be carried out through legitimate looking e-mails that are spoofed by foreign agents. Spam and e-mail filtering measures can be put in place to mitigate this risk however the best means of mitigation is to make both employees and customers aware of such things through communication and training. Features such as e-mail and text alerts can also help customers in the event of account breach or unauthorized access. Another such security feature to instill is the purchasing of similar domains to that of Mojo Banking Solutions, Inc. (https://www.mojobank.com) for the explicit reason to prevent the spoofing of Mojo’s website in the event a customer enters the wrong domain address in their search field, tools can be set up to reroute the customer in this instance to the correct website (Credit Loan, LLC., 2019).

According to Jeff Goldman’s article “The Price of a Breach: Cyber Attacks on Online Banking Services Cost $1.75 Million to Resolve” the average cost of a cyber breach among online banks is roughly $1.75 million per accordance, more than double the cost of malware incidents. Attacks such as DDOS among others can be quite pricey to resolve in both the immediate financial impact but the impact on the businesses reputation which in turn could potentially take years to repair and regain customer loyalty. (Goldman, 2017).

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