Managing Digital Strategy (MIS 6302.0W1)

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Intelligent Document Processing

Business Idea

Introduction:

Established in 1976, Smile Bancorp has emerged as a frontrunner in the dynamic landscape of the commercial real estate market. The institution is dedicated to pioneering long-term solutions in commercial real estate financing. Whether navigating the complexities of the multi-family sector, hospitality, retail, industrial, or office spaces, Smile Bancorp stands as a partner, ready to address the challenges inherent in commercial property development, investment, and management. The bank plays a pivotal role in facilitating financing across various stages of the real estate lifecycle, encompassing acquisitions, construction, bridge loans, and term loans. With a commitment to excellence and a wealth of experience, Smile Bancorp continues to be the trusted choice for those seeking robust financial support in the ever-evolving landscape of commercial real estate.

Issue Description:

In the dynamic landscape of today's lending market, numerous challenges arise, particularly in maintaining current and accurate records of borrowers, assets, and collateral. The complexity intensifies when dealing with loans that undergo lengthy approval cycles, such as commercial real estate loans and specific Small Business Administration-backed loans. Although most banks and commercial lenders employ document management systems—often referred to as "Imaging Systems"—these tools are typically deployed post-funding. Consequently, commercial lenders consistently grapple with the task of effectively capturing, storing, and managing documents during the origination process.

The manual document management procedures involved in origination and underwriting prove time-consuming and cumbersome for both borrowers and lending institutions. Staff members invest valuable hours in tasks like assembling initial documents, transferring them to advance the application, ensuring timely receipt and action on documents, and locating any missing files. Unfortunately, this laborious process invariably slows down the underwriting process. Moreover, there exists a significant risk of approving loans based on outdated data, without a comprehensive understanding of the borrower's income or sufficient collateral.

Goals

- Improve Efficiency: The primary goal of Intelligent Document Processing is to automate manual, time-consuming processes, thereby increasing efficiency and productivity.
- Reduce Errors: By automating document processing, banks aim to minimize human errors that can occur in manual processes.
- Enhance Customer Experience: Faster and more accurate processing of documents can lead to improved customer satisfaction and loyalty.
- Cost Savings: By reducing the time and resources required for document processing, the bank can achieve significant cost savings.
- Regulatory Compliance: Intelligent Document Processing can help the bank ensure they comply with various regulatory requirements related to document processing.

• Time to Market: Automating the document processing will result in increased efficiency and reduction in cyclical work/errors that could be leveraged to reduce time to market for product offerings and services. Typically, a loan process that tool 45 days (about 1 and a half months) before funding can now be efficiently completed in around 15 days (about 2 weeks).

Objectives

- Automate Document Processing: Implement Intelligent Document Processing solutions to automate the processing of several types of documents such as loan applications, customer onboarding forms, and financial statements.
- Integrate with Existing Systems: Ensure that the Intelligent Document Processing solution can seamlessly integrate with the bank's existing IT infrastructure.
- Train Staff: Conduct training sessions to ensure that staff members understand how to use the IDA solution effectively.
- Monitor Performance: Regularly monitor the performance of the IDA solution to ensure that it is
 meeting its intended goals. This could involve tracking metrics such as the number of documents
 processed, the accuracy rate, and the time saved.
- Continuous Improvement: Continually refine and improve the IDA solution based on feedback and performance data.
- Ensure Security and Privacy: Implement robust security measures to protect sensitive customer data. Ensure that the IDA solution is compliant with data privacy regulations.

Background Information

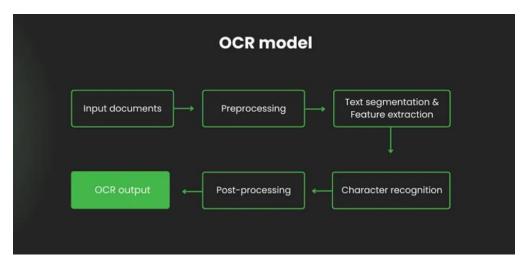
The commercial banking business is inundated with documents such as loan applications, account opening forms, and compliance reports. These documents are often unstructured, making them difficult to process with traditional methods. Intelligent Document Processing (IDP) leverages AI, machine learning, and natural language processing to automate the extraction and processing of information from these documents. This technology revolutionizes efficiency and accuracy in document handling, which is critical for banks to stay competitive and compliant.

Stakeholders and Their Needs

- Bank Management: Needs reliable data for decision-making and operational oversight.
- Customers: Require quick and seamless banking services.
- Employees: Benefit from reduced mundane tasks, focusing on higher-value activities.
- Regulatory Bodies: Expect banks to adhere to compliance standards and regulations.
- IT Department: Looks for scalable solutions that integrate with existing systems.

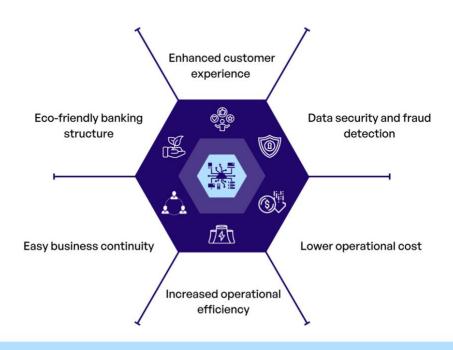
Application Design

- 1. User Interface (UI): Intuitive UI for employees to manage and oversee document processing.
- 2. Document Ingestion: Capability to handle various document types and sources.
- 3. Data Extraction and Classification: Al-powered engines to accurately extract and categorize data.
- 4. Validation and Verification: Automated cross-referencing of data against internal and external databases for accuracy.
- 5. Workflow Automation: Streamlined processes for approvals, escalations, and exceptions.
- 6. Reporting and Analytics: Real-time dashboards for monitoring and analysis of document processing.
- 7. Security and Compliance: Robust security measures to protect sensitive information and ensure compliance.





Benefits of Cloud Computing in Banking



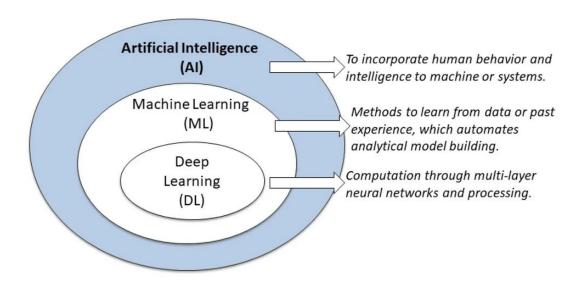
Technological Functionality Design

The current document processing of Smile Bancorp involves lots of manual work and hand-exchanges of documents. The work becomes even more complex when multiple departments must coordinate to process a single case. This in turn results in slower processing times and increased overload on the employees, resulting in employee burnouts and errors at work.

It is proposed to introduce an advanced software system in the process to handle repetitive and time-consuming work. A system that will co-pilot with the employees to reduce their workload and increase their efficiency. Smile Bancorp has already moved to cloud-based systems in 2016. However, the current system is developed to be a central storage of files and borrower directory. There is no automation whatsoever. Below is a technical overview for the proposed system that will be developed specifically for the requirements of Smile Bancorp to improve the case processing time and accuracy and improve the security of data. The goal is to use technology for each of the steps of loan processing.

Key Terminology and Definitions

SR.NO	TERMINOLOGY	DEFINITION
1	API	API stands for Application Programming Interface. It's basically a set of instructions that allows different programs to talk to each other.
2	AI / ML Engine	An AI/ML engine is a software that will run behind the scenes to perform complex actions that uses Artificial Intelligence and Machine Learning functionalities.
3	Optical Character Recognition (OCR)	OCR stands for Optical Character Recognition. It's a technology that turns images of text into editable text that computers can understand.
4	Natural Language Processing (NLP)	NLP stands for Natural Language Processing. It's a field of artificial intelligence (AI) that deals with computers understanding and manipulating human language.
5	Large Language Models (LLM)	LLM stands for Large Language Model. It's a type of artificial intelligence (AI) that's particularly good at understanding and generating human language.
6.	Customer Relationship Model (CRM)	CRM software, which stands for Customer Relationship Management software, is a specific type of program that businesses use to manage interactions with current and potential customers.



Loan Process Workflow

All the loan cases at Smile Bancorp go through following stages -

- 1. Deal initiation
- 2. Deal mandate
- 3. Credit worthiness
- 4. Pre-closing
- 5. Booking
- 6. Funding
- 7. Service

Currently, all the steps involve a lot of manual work. The goal of the system is to introduce automation in each of the loan steps.

Proposed System

Below is a higher-level explanation of the current process and the proposed technological changes in each of the steps of loan processing.

Deal Initiation:

This is where the borrower identifies a need for financing and approaches a lender (bank, credit union, etc.) or a broker to discuss their options.

Deal Mandate:

Current Process	The borrower reaches out to one of the agents over telephone or in person with their requirements.
Drawbacks	 Complete human dependency. Any enquiry must go through a person. This makes it impossible for a potential borrower to enquire during off-hours and holidays. The potential borrower must wait to see if all the agents are engaged.
Solution	Implement Chatbot and Voice Bot
Advantages of Solution	 Chatbots and voicebots will be available 24x7 They can understand and respond to all the general queries and automatically add the enquiries to the CRM will appropriate comments. The agents will be available to handle the most promising queries. The chatbots can handle any number of queries at a time.
Technology Used	LLM to train chatbots
Vendors	winder.ai, cohere

If the lender is interested, they will issue a deal mandate which formally outlines the terms under which they are willing to consider the loan. This may include interest rates, loan amount, and repayment terms.

Current Process	 Based on the requirements and bank policies and standards the agent defines a higher-level proposal for the borrower. The entire process is done manually.
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Drawbacks	 Time-consuming process as the vendor must do the calculations and draft the documents manually. The delay may be much more if the agent is handling multiple cases simultaneously. Manual work is prone to human errors.
Solution	An AI based system, which will automatically create a deal mandate based on the borrower requirements, documents, and bank policies.
Advantages of Solution	 Most repetitive and time-consuming tasks will be done by the AI engine. The agent will act as a verifier of the deal mandate instead of the creator of it. The agent will have more time to act on other crucial tasks.
Technology Used	AI/ML EngineOCR / Computer Vision
Vendors	Amazon Web Services (AWS), Google Cloud

Credit Worthiness:

The lender will then assess the borrower's creditworthiness. This involves analyzing their financial health, including their income, assets, liabilities, and past borrowing history.

Current Process	 Once a deal mandate is created, it is then sent to the verification team. The verification team confirms the credit score of the borrower. Apart from that they also check their financial income, expenses, and if there are any ongoing or completed loans. If the loan is secured against collateral, then it is to be appraised for its value.
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Drawbacks	 The verification team must check multiple information sources to gather the required information. Then they must confirm the loan can be granted. The entire process is very complex due to data coming from multiple sources and advanced calculations.
Solution	 The AI engine will read the financial statements submitted by the borrower and make accurate calculations about their income and expenses. It will also make an API call to the central financial institutions to acquire the credit score, and other loan details of the borrower. In case of collateral, the AI engine can evaluate the asset if the engine is sufficiently trained. At the end, the AI engine will generate a comprehensive report for the verification team to act upon.
Advantages of Solution	 The system itself will fetch all the required information and process it. This will in turn increase the processing time of the cases. There is less chance of the information being outdated or out of sync as it is fetched directly from the central financial institutions.
Technology Used	API, AI/ML Engine, OCR/Computer Vision
Vendors	Amazon Web Services (AWS), Google Cloud, CloudSoft Software Solutions

Pre-Closing:

Once the lender is satisfied with the borrower's creditworthiness, they will move into the pre-closing phase. This involves gathering all the necessary documentation, such as appraisals, tax returns, and business plans.

Current Process	The loan officer prepares all the loan documents, including the loan agreement, promissory note, security agreements, and UCC filings (for claiming collateral in case of default).
Drawbacks	All the documents and agreements are drafted manually.
Solution	Once the loan is approved, the AI engine can do all the paperwork by itself based on the type of loan and loan conditions set by the loan officer.
Advantages of Solution	 Completely automated solution. All the documents are drafted on the letterheads and are ready to be sent to the legal team and the borrower.
Technology Used	Al Engine, OCR / Computer Vision
Vendors	Amazon Web Services (AWS), Google Cloud

Booking:

Once all the paperwork is complete and approved, the loan is booked by the lender. This means it is officially recorded in their books and the funds are set aside for the borrower.

Current Process	 All the pre-closing documents are sent to the loan committee for their review by email. The committee assesses the risk and ensures that the loan adheres to the bank policies. Upon approval, the committee sends confirmation to the accounts team, which then checks the internal funds and locks them.
Drawbacks	 The entire assessment and risk analysis is done manually. The accounts team must check the accounts by checking the ledgers and make multiple functions to lock the funds.

	This is a multi-step process and may be delayed even if one party did not complete the work on time.
Solution	 The AI engine will perform an initial analysis of the documents and provide a summary to the loan committee. This way they do not need to go through all the documents but only the crucial information. On approval, the system can also check the bank ledgers and book the funds then removing the dependency of the accounts team all together.
Advantages of Solution	 Time is saved for the loan committee. Reducing the number of steps required for the booking stage.
Technology Used	AI/ML Engine, OCR / Computer Vision, API integration
Vendors	Amazon Web Services (AWS), Google Cloud, Cloud Soft Software Solutions

Funding:

This is when the loan funds are disbursed to the borrower. This may happen in a lump sum or in tranches depending on the loan agreement.

Current Process	 All the concerned parties (borrower, bank officials, and lawyers) meet for the closing. The document prints are signed. These documents are then scanned and forwarded to the accounts department. The accounts department confirms the authenticity of the document and then the loan amount is disbursed as per the agreement.
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Drawbacks	 Documents are signed by pen. This method, though traditionally preferred, has its flaws. There are many documents to be signed by all members of the party. These documents are then verified against the original signatures from the government database. The signing process must be redone if there are errors or mismatches during the signing phase. Also, if any party members cannot make it to the physical location to sign, the entire process might be put on hold.
Solution	Document signing can be done electronically or biometric.
Advantages of Solution	 E-signs can be completed very fast and with a negligible margin for error. It can be done remotely. Once signed, the documents can be automatically forwarded to the account's teams. There is no need to re verify the signatures as they are e-signed. The entire process becomes hassle-free and fast.
Technology Used	Blockchain, API, OCR/Computer Vision
Vendors	Amazon Web Services (AWS), Google Cloud, Cloud Soft Software Solutions, Amazon Managed Blockchain

Servicing:

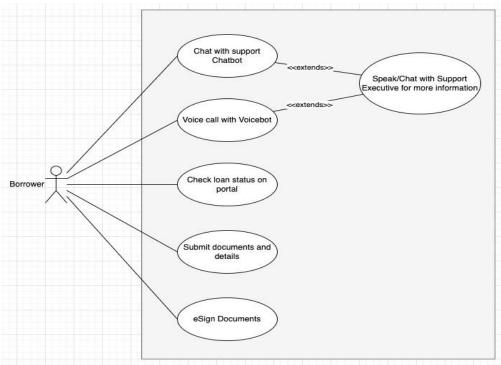
After the loan is funded, the servicing phase begins. This is where the borrower makes their regular loan payments to the lender. The lender will also handle any customer service issues related to the loan during this time.

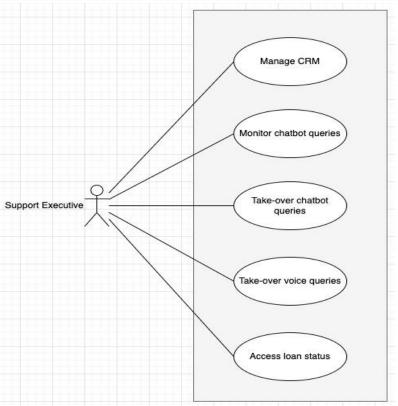
	The borrower reaches out to the bank either via telephone, email, or in
Current Process	the office for any queries.

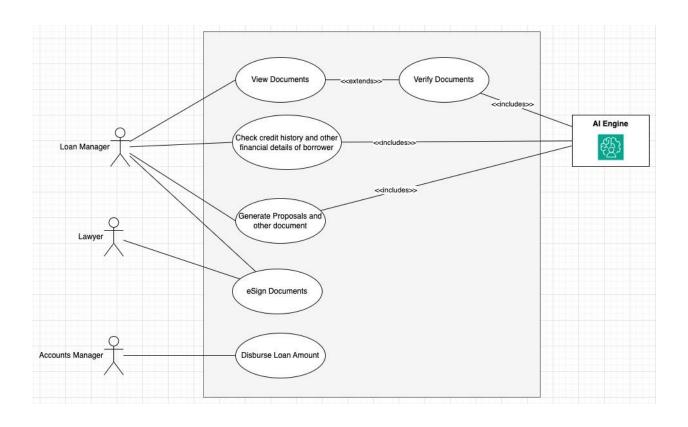
Drawbacks	 The drawbacks are the same as during the initiation. Complete human dependency as all enquiries must go through a person. This makes it difficult to get support during holidays and off hours. The agent may take time to access the requested information resulting in an increase in service time. The borrower must wait if all agents are engaged.
Solution	Implement Chatbot and Voice Bot
Advantages of Solution	 Chatbots and voice bots will be available 24x7 They can understand and respond to all the general queries and. There is no limit on number of queries that can be handled at a time
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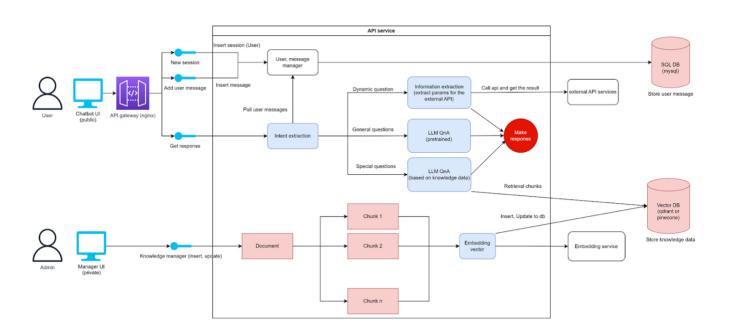
In addition to the huge improvement in performance, processing time, and ease of use there is one more advantage that is available in all the steps - **multi-language support**. Since the documents are machine generated, they can be created in any language of the choice. Also, the voice and chat bots can handle queries in multiple languages.

User Interaction with System:

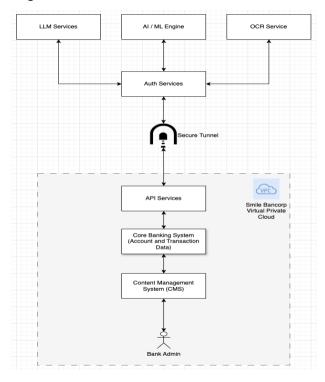








Higher-Level Architecture Diagram



Business Plan

The business plan for Smile Bancorp introduces an Intelligent Document Processing (IDP) system designed specifically for the loan origination sector. This system targets the inefficiencies in document management, especially in complex cases like commercial real estate and Small Business Administration-backed loans. By integrating cutting-edge technologies such as machine learning and natural language processing, the IDP system aims to drastically reduce processing times, improve data accuracy, and enhance the overall customer experience.

The current situation of Smile Bancorp faces challenges in managing the vast amount of documentation. Documentation management in the current situation can lead to a few challenges including:

- Manual processing delays- Lenders spend significant time collecting, organizing, and verifying
 documents from borrowers. These activities are not only time consuming but also prone to
 human error, leading to data entry mistakes and document misplacement. Staff might input
 incorrect information into the system or misplace important documents leading to issues such
 as increased operational costs and extended loan approval times, impacting both client relations
 and business efficiency.
- Data obsolescence delays- In the rapidly changing financial landscape, data can become quickly outdated. For Smile Bancorp, delays in updating documents can result in decisions being made based on old or irrelevant information. This situation can affect loan conditions dramatically as

- market conditions can shift dramatically. The consequences of data obsolescence include financial losses and increased risk of loan defaults.
- Customer frustration- Customers expect quick and seamless service influenced by other digital
 experiences in their lives. The traditional loan application process has many delays and the need
 for frequent submission of additional documents, leading to frustration of customers. At Smile
 Bancorp, the loan application process is slow and cumbersome which can cause significant
 customer dissatisfaction. Because of this slow process, potential borrowers choose and favor
 competitors that are faster and more responsive. In addition, customer dissatisfaction can result
 in negative reviews, making it harder to attract new clients.

In response to these challenges, Smile Bancorp needs to consider adopting a management solution to incorporate the needs identified by our target customer base, including bank management, customers, employees, and regulatory bodies.

The Intelligent Document Processing System (IDP) leverages advanced technologies to revolutionize document management. There are many tools the IDP system can use including Optical Character Recognition (OCR), machine learning, and natural language processing. These tools allow documents to be automated, meaning that less manual work is needed to enter data which reduces mistakes and speeds up the process. IDP systems are also connected to the cloud, allowing different departments to access and share updated information and data easily. This ensures that all stakeholders are working with the most current information. Robust compliance tools are also offered by IDP systems where automation of checking regulatory adherence is performed to reduce legal risks.

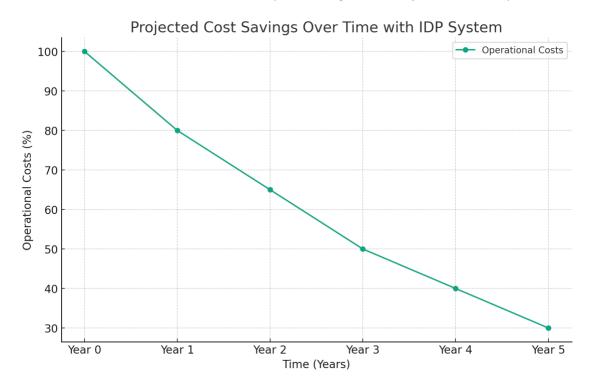
Our solution addresses each area of concern below.

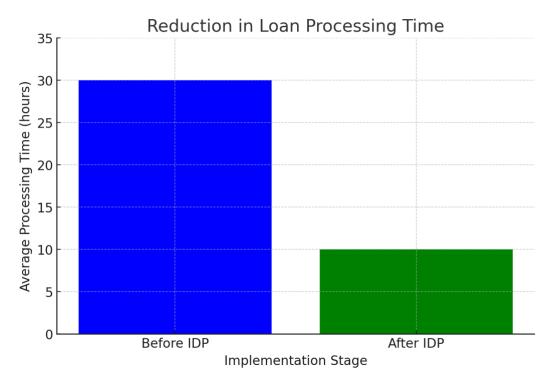
- Streamlined Processing- This change allows for rapid document processing to accelerate
 activities and response time to customer inquiries and loan applications. In addition, turnaround
 times are decreased to allow quicker loan approvals and other banking activities, leading to a
 more competitive and dynamic business operation.
- Reliable Data- The incorporation of the IDP system produces accurate and up-to-date
 documentation in real time and eliminates issues related to data obsolescence and ensures that
 all decisions are made based on the most current information. Reliability is crucial for
 maintaining trust and confidence of customers who rely on the bank's data integrity.
- Enhanced Customer Interaction- With faster and efficient processes, this results in higher customer satisfaction as delays are decreased during the loan application process. The streamlined process reduces the need for repetitive document submissions and speeds up service delivery, directly enhancing customer satisfaction and loyalty.

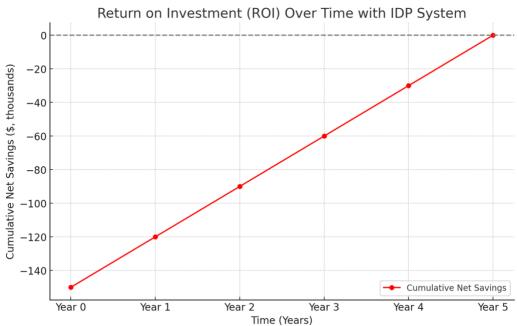
The implementation strategy will consist of five phases:

 Planning and Assessment- This initial phase involves a thorough assessment of the current processes and technologies in place at the financial institution. Key activities in this phase include performing a needs analysis to identify challenges and requirements in the existing loan origination process. In addition, the current IT infrastructure must

- be evaluated to determine compatibility with the new system. Stakeholder engagement is key to gathering insights and fostering buy-in. Choosing the right technology partner and solutions is vital; therefore, vendor selection should be based on capabilities, experience, and support offerings.
- 2. Development and Customization- Once the planning is complete, the next step is to develop and customize the IDP solution to meet the specific needs identified. This will tailoring the IDP solution to integrate with existing systems. Incorporating essential features that streamline the loan origination process is key, therefore the system should integrate key features like automated data capture, compliance checks, and real-time processing.
- 3. Testing and Training- Before full-scale deployment, it is important to test the system thoroughly and train staff in its use. Pilot implementation is suggested to identify issues and ensure the system operates as intended. With this, the feedback provided from the pilot testing allows for necessary adjustments and improvements.
- 4. Full-Scale Deployment- After testing and training is completed, the next step is to roll out the system across the organization. As the system is implemented, performance of the system should be monitored closely and provide ongoing support and troubleshoot any issues that arise.
- Continuous Improvement and Scaling- When deployment is completed, the IDP system will
 be optimized and expanded. Regular review of the system's performance will be
 evaluated to ensure it has met operational goals and adjust as necessary.







Financial Plan

The financial plan for our proposed Intelligent Document Processing (IDP) system includes a breakdown of the anticipated costs associated with system development, implementation, and maintenance. It also discusses an optimistic projection of potential savings and revenue generation from an anticipated

increase in efficiency and customer satisfaction. Below, we will break down the financial plan into its overarching components.

1. Development Costs:

Initial development costs will cover software development, customization, and integration with existing systems.

- This may include employing software developers, obtaining licenses, and acquiring hardware infrastructure as needed. Costs will vary according to the complexity and extent of the IDP system for each of these.
- Quotes will be sought out from potential technology partners or providers to accurately
 evaluate all costs and select partners/providers that provide the most benefit for the most
 affordable cost

2. Implementation Costs

Implementation costs include expenses for establishing the IDP system across the organization.

- This involves educating employees, conducting pilot tests, and providing any further assistance needed during the deployment phase of our system.
- Staff training sessions will be necessary to ensure understanding of how to successfully use the IDP system and will be included in the budget.

3. Ongoing Maintenance and Support Costs:

Includes expenses for software upgrades, system maintenance, and technical support.

- Due to the evolving landscape of technology, we may need to set aside resources for regular upgrades and troubleshooting to keep the system running smoothly.
- Depending on the arrangement with the technology partner or vendor, it is likely for there to be ongoing expenses for software licensing, support services, and hosting infrastructure.

4. Cost Savings:

Our company estimates plenty of cost savings from enhanced efficiency and productivity using the IDP system since it will cut down on execution times

- This may include savings from reduced manual labor hours, faster loan processing times, and fewer errors.
- To quantify these cost savings, we will analyze existing operational costs and forecast possible savings after installing the IDP system. For example, reduced processing times can result in lower labor and operational costs too.

5. Revenue Generation:

Smile Bancorp can generate more revenue by improving client happiness and loyalty through faster and more efficient loan processing. Our company expects to attract more borrowers and keep existing

clients by expediting the loan origination process and improving the overall customer experience, and therefore resulting in increased profitability.

6. Return on Investment (ROI):

The ROI of an IDP system is calculated by comparing the entire costs (development, implementation, and maintenance) to the expected benefits (cost savings and income production) over a specific time period.

- We will define key performance indicators (KPIs) to assess the success of the IDP system, such as shorter processing times, more data accuracy, and higher customer satisfaction.
- Regular ROI evaluations will allow us to assess the efficacy of the IDP system and make improvements as needed to maximize profits.

7. Budget Allocations:

We plan to designate adequate funds for each of the IDP system's development, deployment, and maintenance phases to ensure enough funding is planned and available to promote success at all stages.

- Prioritize investments according to vital needs and expected returns.
- Budget flexibility is critical for accommodating unforeseen charges and alterations during the IDP system's installation and optimization phases.

For example, we can highlight one of the more important facets within our budget allocation — AWS software. The externally sourced tooling needed to ensure success for the project is estimated at \$99,663.12 USD annually. This includes the following AWS services:

- Amazon EC2
- Amazon Lex
- Amazon SageMaker
- Amazon Rekognition



Contact your AWS representative: Contact Sales 🔀

Export date: 22/04/2024 Language: English

Estimate URL: https://calculator.aws/#/estimate?refid=9cd376cd-1c18-46f2-9f75-0e1cdbca94c5&id=2ca5bbdfcf927b997512ad7bba77a26cd060a160

Estimate summary		
Upfront cost	Monthly cost	Total 12 months cost
0.00 USD	8,305.26 USD	99,663.12 USD
		Includes upfront cost

Detailed Estimate

Name	Group	Region	Upfront cost	Monthly cost
Amazon EC2	No group applied	US East (Ohio)	0.00 USD	48.76 USD

Status: -

Description:

Config summary: Tenancy (Shared Instances), Operating system (Linux), Workload (Consistent, Number of instances: 2), Advance EC2 instance (t4g.large), Pricing strategy (Compute Savings Plans 3yr No Upfront), Enable monitoring (disabled), DT Inbound: Not selected (0 TB per month), DT Outbound: Not selected (0 TB per month), DT Intra-Region: (0 TB per month)

22/04/2024, 17:13 My Estimate - AWS Pricing Calculator

Amazon Lex No group applied US East (N. Virginia) 0.00 USD 950.00 USD

Status: -

Description:

Config summary: Number of speech requests (Request and Response Interaction) (200000), Number of text requests (Request and Response Interaction) (200000)

Amazon SageMaker No group applied US East (Ohio) 0.00 USD 4,000.00 USD

Status: -

Description:

Config summary: Requests units (millions), Requests units (millions), Number of request per month (500), Duration of each request (ms) (400)

Amazon Rekognition No group applied US East (Ohio) 0.00 USD 3,306.50 USD

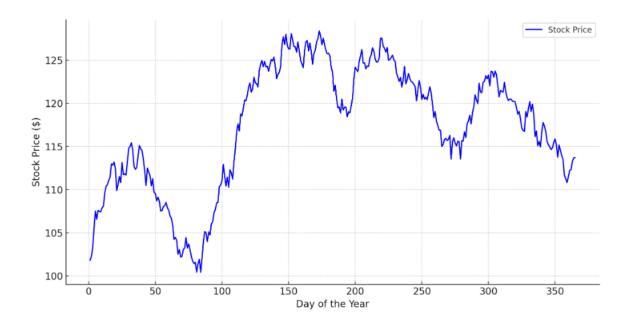
Status: -

Description:

Config summary: Number of images processed with labels API calls per month (1000000 per month), Number of images processed with content moderation API calls per month (1000000 per month), Number of images processed with detect text API calls per month (1000000 per month) Estimate based on (Number of inference hours per month), Number of model training hours (one-time) (2.5), Number of inference hours per day (8), Number of inference units (1), Inference processed for number of days per month (22)

Acknowledgement

AWS Pricing Calculator provides only an estimate of your AWS fees and doesn't include any taxes that might apply. Your actual fees depend on a variety of factors, including your actual usage of AWS services. Learn more



Concluding Insight:

Smile Bancorp will handle the issues associated with manual document management through careful planning and budgeting for the implementation of our IDP system. We hope to further solidify this company as a market leader in the commercial real estate market and continue improving other adjacent processes once implemented. Furthermore, the financial strategy will be evaluated and revised regularly to account for changes in business requirements, technological improvements, and market conditions.

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