Dr Boom Clinic Opportunity

# Executive Summary

Dr. Boom Clinic is currently facing inefficiencies due to **repetitive data entry** **across two systems**: **ProMed (the clinic’s database) and Amed (NSTDA’s medical reimbursement platform).** This duplication not only increases workload but also leads to errors and consumes valuable time for medical personnel.

To mitigate these challenges, **this project proposes a semi-automated solution** leveraging AI-driven text extraction and automation tools. By implementing this approach, **the clinic aims to reduce repetitive tasks by 1-2 hours per day**,minimize data entry errors, and enhance operational efficiency, ultimately enabling medical personnel to dedicate more time to patient care.

# Business Problem

* -Medical personnel **manually enter the same patient data twice** into two different systems (ProMed and NSTDA).
* -This process is time-consuming, **adding an extra 1-2 hours of administrative work per day**.
* -The manual approach increases the risk of human errors, such as incorrect medical records.

# Analysis

Currently, Dr. Boom Clinic operates only on weekends, serving 50-70 patients per week. After clinic hours, an additional 1-2 hours is required to manually enter patient medical records into NSTDA’s medical reimbursement platform. To manage this, the clinic hires Health Science students for data entry at a rate of 160 THB per day.

Looking ahead, the clinic plans to expand its operations to both weekdays and weekends, increasing the number of working days to at least 20 day per month. If no automation is implemented, the expected monthly cost for data entry alone will rise to at least 3,200 THB.

# Solution Options

Note: The clinic owner and the lead developer are relatives. Therefore, **the cost calculations in this business case will not include developer wages**, as the development work is provided free of charge. Additionally, the project will prioritize the use of open-source and free tools to minimize implementation costs.

The cost calculation is based on a 5-year period, which aligns with the expected minimum service life of the necessary hardware and tools.

1. **Do Nothing**

If no action is taken, the clinic will continue hiring personnel for manual data entry. The estimated cost for hiring is 38,400 THB per year.

Estimated Cost:

* Annual cost: 38,400 THB
* Total cost over 5 years: 192,000 THB

**Pros:**

* **No Initial Investment Required** – The clinic does not need to spend money on developing or implementing a new system.
* **No System Changes or Learning Curve** – Staff can continue working as usual without needing training on a new process.
* **Guaranteed Continuity** – Since the current process is already in place, there is no risk of technical failures or system migration issues.
* **Simple and Easy to Manage** – Hiring students for data entry is a straightforward process that does not require additional IT infrastructure.

**Cons:**

* **High Long-Term Cost** – The clinic will continue spending 38,400 THB per year (or 192,000 THB over 5 years) on hiring personnel, making it an expensive long-term solution.
* **Inefficiency and Wasted Time** – Manually entering data takes 1-2 hours per day, reducing productivity and increasing operational overhead.
* **Higher Risk of Human Error** – Manual data entry is prone to mistakes, which could lead to incorrect reimbursement claims and potential administrative issues.
* **Limited Scalability** – As the clinic expands to weekdays and weekends, the workload will increase, requiring more time or additional hiring, further raising costs.
* **Opportunity Cost** – The time spent on manual entry could be better utilized for patient care or other critical tasks.

1. **Direct NSTDA API Integration**

One possible solution is to request access from NSTDA to determine whether a REST API is available for developers. This API would allow the clinic’s system to directly send medical record data to the NSTDA medical reimbursement platform in real-time as doctors enter data into their own clinic database.

**Pros:**

* **Eliminates Manual Data Entry** – Automating the data transfer between systems removes the need for manual input, saving time and effort.
* **Reduces Errors** – Direct integration ensures data consistency across platforms, minimizing human input mistakes.
* **Long-Term Cost Savings** – Once implemented, this solution eliminates the ongoing labor cost of hiring staff for data entry.

**Cons:**

* **Requires API Availability** – This solution depends on NSTDA providing API access, which may not be available or come with restrictions.
* **Technical Complexity** – Developing and maintaining an API integration requires technical expertise and ongoing support.

1. **Manual Data Entry with Macros**

Instead of manually entering data from scratch, this approach involves pre-setting frequently used data into macros. The macro system will allow users to quickly input recurring information, reducing both time and errors in the data entry process.

However, since data still needs to be entered into both databases manually (ProMed and NSTDA’s reimbursement platform), this method will only partially improve efficiency. it is expected to decrease the required data entry time from 2 hours to less than 1 hour per day.

Estimated Cost:

* FastKeys(Macro software ) : 4,000 THB /life-time
* Previous hiring cost (2 hours/day): 38,400 THB per year
* New hiring cost (~1 hour/day): ~19,200 THB per year
* Estimated 5-year cost: 100,000 THB

**Pros:**

* **Reduces Data Entry Time** – Automating repetitive inputs with macros helps speed up data entry, cutting daily work time from 2 hours to less than 1 hour.
* **Minimizes Human Error** – Pre-set templates ensure consistency and accuracy in frequently used data fields, reducing mistakes.
* **Low Implementation Cost** – This solution requires minimal investment and does not need major system modifications.

**Cons:**

* **Still Requires Manual Entry** – Even with macros, staff must manually enter data into both databases, limiting efficiency gains.
* **Limited Long-Term Impact** – While it improves efficiency, it does not provide full automation, meaning some manual workload remains.

1. **Semi or Full Automation**

This approach focuses on **entering patient data only once into the one database, while the system automatically transfers the necessary information to the other database.**

The proposed method by the development team involves capturing a screenshot of the completed data, then using AI-powered text extraction tools to convert the image into text. The extracted text is then automatically entered into the second database using Microsoft Power Automate or similar automation tools.

**Key Concern:** PDPA Compliance

One major concern for this method is compliance with PDPA (Personal Data Protection Act). **If you use external AI services like OpenAI for text extraction, patient data may be processed outside the clinic’s secure environment**, potentially violating PDPA regulations.

To avoid PDPA issues, an alternative approach is to use a local AI model such as Llama 3 and run the process on your own machine to ensure patient data remains private and secure.

**Pros:**

* **Eliminates Duplicate Data Entry** – Medical staff only need to input data once, and the system will handle the rest automatically.
* **Improves Efficiency** – Reduces manual workload, saving at least 1-2 hours per day for the clinic.
* **Minimizes Human Errors** – Automation ensures accurate data transfer between systems, reducing the risk of incorrect medical records.
* **Scalable Solution** – Once implemented, this method can easily support increased patient volume as the clinic expands.

**Cons:**

* **PDPA Compliance Risk** – Using external AI services for text extraction may pose a legal risk under data protection laws.
* **Technical Complexity** – Requires AI model implementation, automation setup, and maintenance, which may demand additional development time.
* **Computational Resources Needed** – If using a local AI model (e.g., Llama 3), the clinic must have sufficient hardware to process text extraction efficiently.

To implement a local AI model such as Llama 3 (13B) for text extraction and automation, the clinic will need a dedicated machine to run the model efficiently.

* Estimated Machine Cost for 5 Years: 150,000 THB
* Annual Cost: 30,000 THB per year
* **Monthly Cost: 2,500 THB per month**

This cost accounts for **hardware investment to ensure data privacy and PDPA compliance**, avoiding the risk of sending patient data to external AI services.

# Cost Benefits Analysis

In this project, ROI, payback period, and NPV are calculated based on a **cost reduction approach**. The primary cost considered in this analysis is the monthly wage of personnel responsible for data entry, which amounts to 38,400 THB per year.

1. **Do Nothing**

This option serves as the baseline case for comparison. Since no investment is made and no cost savings are generated, the total expense remains 192,000 THB over 5 years.

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| --- | --- |
| Total 5-Year Cost | 192,000 THB |
| Payback Period | Not applicable |
| ROI | Not applicable |
| NPV | Not applicable |

1. **Direct NSTDA API Integration**

If NSTDA provides an API, this option incurs no additional costs since developer wages are not included in the calculation. The system will automate data entry, **eliminating the need for manual work and reducing the monthly labor cost of 3,200 THB.**

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| --- | --- |
| Total 5-Year Cost | 0 THB |
| Payback Period | Immediate |
| ROI | Infinite |
| NPV | 192,000 THB |

1. **Manual Data Entry with Macros**

The estimated cost of this approach is 19,200 THB per year, covering the reduced labor cost for data entry. Additionally, the total investment cost, including software implementation, is 100,000 THB.

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| --- | --- |
| Total 5-Year Cost | 100,000 THB |
| Payback Period | Not applicable |
| ROI | Not applicable |
| NPV | Not applicable |

Option 3 is quite similar to Option 1. **Although it reduces costs by half, the clinic still incurs expenses for hiring personnel to perform data entry.**

1. **Semi or Full Automation**

Even though the estimated cost is 2,500 THB per month over 5 years, **the clinic must pay the full 150,000 THB upfront in the first year** (assuming a 0% installment plan).

|  |  |
| --- | --- |
| Total 5-Year Cost | 150,000 THB |
| Payback Period | 3.9 year |
| ROI | 128 % |
| NPV | 6,806 THB |

\*\*r in NPV calculation = 8 %\*\*

# Recommendation

After reviewing all options**, Option 2 (Direct NSTDA API Integration) is the best choice**, provided that the API is available. **However, there is a possibility that NSTDA may not provide an API or that access may be restricted, making this solution infeasible.** Additionally, even if the API is available, implementing this solution may take a significant amount of time to develop and integrate.

During this transition period, Option 3 (Manual Data Entry with Macros) can be used as an interim solution to reduce the time and cost associated with hiring personnel for data entry.

However, **if Option 2 (API Integration) is not available, the recommended approach is to implement Option 4 (Semi or Full Automation) in the long term** while using Option 3 (Manual Data Entry with Macros) during the transition phase to minimize immediate costs and inefficiencies.

**Key Advantages of Option 4 (Semi or Full Automation)**

* **Future AI Project Cost Reduction** – Once the clinic has acquired the necessary machine, future AI-based projects can be implemented at a significantly lower cost.
* **Eliminates Manual Data Entry** – The system automates data transfer, removing the need for personnel to input data manually.
* **Improves Accuracy and Consistency** – Reduces human errors and ensures that data is correctly recorded in both databases.
* **Long-Term Cost Savings** – Although the initial investment is high, it eliminates ongoing labor costs, making it financially beneficial in the long run.
* **Scalability** – The solution can support increased patient volume as the clinic expands without requiring additional staff.
* **Compliance and Data Security** – Running AI models locally ensures patient data remains secure and compliant with PDPA regulations.

Since **Option 4 demonstrates a strong cost-benefit ratio (ROI: 128%, Payback Period: 3.9 years, and a positive NPV)**, the choice is clear. **If Option 2 (API Integration) is not available, the clinic should proceed with Option 4 and initiate the implementation process immediately.**

**During the transition phase, Option 3 (Manual Data Entry with Macros) should be used as an interim solution** to reduce data entry time and hiring costs until the full automation system is fully implemented.

# Appendix

## Cost benefit analysis Calculation

**Option 4:** **Semi or Full Automation.**

In this project calculate with **cost reduction approach**.

Investment cost : 150,000 THB

Cost Reduction : 192,000 THB over 5 year (38,400/year)

Discount rate in NPV calculation : 8 %

**Payback Period** = = = 3.9 year

**R.O.I. in 5 year period** = = = 128 %

**NPV in 5 year period** =

=

= 6806.36 THB