PERSONAL FINANCIAL ADVISORY
"<ชื่อโครงงาน [ไทย] คลิกเพื่อแก้ไข>"

BY

MR. AEKKALUK	**PUNYACHAROENSRI**	**6288031**
MR. CHARAN	**SIRIJATURONTCHAI**	**6288043**
MISS NATTAPRAPA	**PINJARERN**	**6288108**

ADVISOR
ASST. PROF. DR. SRISUPA PALAKVANGSA NA AYUDHYA

A Senior Project Submitted in Partial Fulfillment of the Requirements for

THE DEGREE OF BACHELOR OF SCIENCE (INFORMATION AND COMMUNICATION TECHNOLOGY)

Faculty of Information and Communication Technology
Mahidol University

2021

CONTENTS

Page

CONTENTS (Cont.)

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER 1
INTRODUCTION

Chapter 1 consists of six subtopics which cover motivation, problem statement, objectives, scope, and expected benefits of the project, and the organization of the document. These topics are describing the inspiration and importance of this project to solve current problems.

(Example of Reference[1, 2])

1.1 Motivation

For a nation to become affluent, its infrastructure must be stable. People are the basis of any nation. The key is individuals who eat and sleep properly and whose lives are surrounded by basic factors for survival. We cannot dispute that Finance, Economics, and Money are the focuses of modern human existence.

Numerous nations have had severe economic crises in the past and faced bankruptcy as a result. Whether there is a subprime mortgage problem in the United States. 9 million people, or 6% of the total population, are unemployed because of high family debt. The economic crisis in Sri Lanka has forced the government to run out of money, preventing it from paying down the country's debt. In consequence, the economy was nearly bankrupt. We are all familiar with the "Tom Yum Kung" situation, which has occurred in Thailand. It resulted in the floating Baht Thai currency rate, which led to Thailand defaulting on a significant amount of its debt around the region, which became known as the "Asian Financial Crisis of 1997." All of these catastrophes occurred without our knowledge. It may be caused, among other things, by how each nation spends its money. Whether a state makes a decision or implements a policy, the results affect the nation, the economy, and even ourselves.

One of the greatest problems is a lack of knowledge. Lack of comprehension among the population may lead to financial difficulties. For instance, a poll done by the Bank of Thailand found a significant increase in the Thai population's propensity to save money. From around 3,500 million baht in 2014 to nearly 5,500 million baht in 2017, its value has grown. However, the proportion of investment is in disagreement. In 2014,

the proportion of investment is expected to be 2,600 million baht, however in 2017, the proportion of investment is still anticipated to be between 2,500 and 2,600 million baht. This indicates that Thais are more cautious. But a lack of investment expertise keeps the rate of investment low, which means that savings alone cannot improve the economy's liquidity in the present day. The majority of these problems stem from individuals' hesitation to take financial risks due to a lack of investing information and comprehension.

1.2 Problem Statement

According to statistic publish by Bank of Thailand (BOT) mentioned above. Thai people has a low financial skill, knowledge, behavior, and attitude especially first jobber between age 22-27. In which the problem comes from bad saving practice and poor money management prior to lack of experience. For instance, when a first jobber receives their first salary, they tend to use it to solve their facing problem first or bought the unnecessity without long-term plan. Causes by expenses that are higher than income, first jobber needs to seek for another way to make an active income.

The aforementioned problem inspires the researcher to create the financial advisory for the first jobber before they enter the world of capitalism with regret. Since the first jobber didn't has any obligation and has more ambition to work than other age, it is a good starting point for them to aware the importance of financial. Knowing the importance of financial can be a basic foundation which later can be use to create financial knowledge.

1.3 Objectives of the Project

Due to the aforementioned problems, the following objectives were proposed:

- To encourage behaviors that strengthen the discipline of saving and know how to adjust their plans for savings to suit their own financial situation.
- To promote saving attitudes and long-term financial planning to be able to manage money properly.

- To promote user's financial behavior, knowledge, and literacy and be able to practice till it shows beneficial result.
- To understand one's personal financial situation and how to avoid risks in order to avoid financial harm.
- To encourage financial immunity to deal with the risks or volatility in life.
- To promote financial discipline, which leads to financial planning and action to achieve goals.
- To build awareness and prepare the life plan for retirement.
- To build awareness and prepare the life plan for retirement.

1.4 Scope of the Project

According to the current problems with the determination to assist first jobber, Personal Financial Advisory System will be developed with the following scope.

- Developing a fundamental conceptual system of financial literacy for first jobber to see the importance of finance. Achieve fruitful growth through investment.
- Developing a system that promotes financial awareness by providing features to set savings goals and manage money for savings or spending according to the purpose.
- Developing a system for preparing and long-term financial planning to achieve financial stability.
- Developing a tracking progress system for emergency savings and saving money according to the goal.

1.5 Expected Benefits

- Help users gain the right financial knowledge.
- Help users realize the importance of saving money for their own financial situations.
- Help users in maintaining good financial health in order to accumulate wealth and achieve financial freedom in the future.

- Help users manage financial risks in life by providing protection against unexpected situations.

1.6 Organization of the Document

This document consists of 3 chapters including:

1. Introduction – the inspiration of the project and ideas, including motivation, problem statement, objectives, expected benefits, and project scope.
2. Background – the knowledge and information needed to develop the system, including the theory and the technologies that could be used.
3. Analysis and Design – the overview of this project, the database design, and the software design process that are used in this project include the system architecture, structure chart, data dictionary, and relational schema.

CHAPTER 2
BACKGROUND

This chapter discusses the preliminary knowledge of the first jobber's financial literacy in detail, covering the theory, technologies used, and some important terminologies important in understanding the project.

2.1 Overview of the Organization for Economic Cooperation and Development (OECD)

It is an organization that will be surveyed to assist in providing information on the financial literacy or abilities of each nation to analyze, grow upon, and make appropriate conclusions.

The OECD operates in Thailand and gathers data concurrently. Alternatively, Bank of Thailand. The survey will be broken down into financial literacy, which consists of four differences.

- Financial literacy
- Financial Knowledge.
- Financial behavior
- Financial attitudes

For measure, the financial literacy of each country needs to be calculated in 3 steps. First, the average score is considered by computing the proportion of total scores using the arithmetic mean (sometimes known as the mean). to evaluate the components and levels of financial competence.

Next, estimate the value of regression analysis by examining the degree of association between various factors and the level of financial talent by utilizing regression equations to assess elements that are often related to the level of financial competence.

The last one, the minimum targeted score was determined using the expected financial skill score. to confirm that individuals who properly answered met the score standards. to comprehend the distribution of the samples' financial skill level scores in each area. What is the preferred ratio? The evaluation standards are shown in the table below.

ตารางที่ 2: แสดงเกณฑ์การพิจารณาคะแนนเฉลี่ยตามเกณฑ์คะแนนที่คาดหวัง (รายภูมิภาค)

เกณฑ์ (คะแนนเต็ม)	คะแนนที่คาดหวัง
ทักษะทางการเงิน (21 คะแนน)	> 14
ความรู้ทางการเงิน (7 คะแนน)	≥ 5
พฤติกรรมทางการเงิน (9 คะแนน)	≥ 6
ทัศนคติทางการเงิน (5 คะแนน)	> 3
ที่มา: การกำหนดเกณฑ์คะแนนของรายงาน OECD/INFE International Survey of Adult Financial Literacy Competencies, OECD, 2020	

Figure 2.1 Examples of OECD criteria for financial literacy evaluation in Thailand which is conducted by Bank of Thailand (BOT)

2.2 Overview of Non-Performing Loan (NPL) [14][15]

Non-performing loans, or NPLs, are loans that are more than 90 days delinquent or that are predicted to be "bad debt."

As a non-generating debt, non-performing loans are despised by financial institutions. According to the Bank of Thailand's guidelines, it also increases the cost of setting aside funds for problematic loans. It cannot transfer the reserve to any other account, so consumers may be certain that their money will not vanish.

Bad debts are incurred due to the borrowing of loans. The borrower lacks the assets essential to repay the loan firm. A property seizure case may be accelerated under three circumstances: 1. Fraud. Other creditors, including many banks to which the debtor owes money, have filed suit against the debtor. This necessitates the distribution of assets because the home serves as security, and the creditor cannot be reached.

2.3 Result from the interview

The goal of the interview determines the problem. The researcher conducts the interview into 2 rounds

For the first round, the researcher conducts an in-depth interview with 4 college students to determine the problem that they are facing and other 15 with questionnaire to determine their financial problem total of 19 participant.

Second round, using a questionnaire to compare the financial problem between different ages with 22 participants.

From the 2 previous rounds of interview, the problem from various participant were founded so we customer segmentation from the behavior of the participant.

Group 1 college student: receive income from their parents, none of financial obligation, which make them underprepared for their financial saving, planning and management. Even with financial obligation, it didn't have much impact on their liquidity.

Group 2 salaryman: This group of people start to have their own financial obligation and some of them have to take responsibility for other financial obligation. Financial management of each individual can have affect on their liquidity and debt.

Group 3: First-time jobbers: beginning to work, resulting in a lack of work experience and the need for others to advise them. This group didn't have many financial obligations and thought that money management was inapplicable.

The researcher discovered that being a first-time jobber is a stage of life in which one should be cautious about finances, so the researcher conducted an interview with first-time jobbers specifically. using in-depth interviews with 14 participants to discover the financial problems and concerns of the first jobber.

Persona of First Jobber:

- 0 - 4 years of work experience
- Must be undergraduate
- Age between 22-26
- Live in Thailand
- Have only 1 source of income and didn't receive support from other
- Not pay off someone debt
- Not be a pillar of the family
- Manage their own finances

The researcher identified four first-jobber problems based on the interview:

1. Problem 1 – Don’t know how to save and manage money
2. Problem 2 – Lack of long-term planning
3. Problem 3 – Not being able to manage debt
4. Problem 4 – One way income is not enough, having more than one source of income (active income) is necessary

2.4 Overview of Preventive Financial [13]

The originally method called “Preventive Medicine” is the practice of encouraging preventive health care in order to enhance the health of patients. The ultimate objective is to avoid illness, disability, and death.

Same as "Preventive financial" since the personal financial advisory system is designed with First jobbers as the target audience. The approach attempts to avoid persons in their first employment from experiencing financial difficulties, as they will have their first work experience at this age. As quickly as possible, first jobbers will be able to manage their finances and their lives.

In conclusion, "prevention" refers to the act of preventing something in the early stages of a problem in order to provide a remedy for the future. The method that might encourage users to be conscious of their financial condition and attempt to plan and control it for the future is known as "Preventive finance."

2.5 Overview of Mutual Fund for First Jobber [16]

A "mutual fund" is a group of investors that pool their resources to make a substantial investment. The asset management firm (AMC) that raises the assets will register the fund. Being a legal entity and investing the money in accordance with the prospectus's guidelines.

DCA (Dollar-Cost Averaging), often known as "Average investment," is an investment that is made in installments over time. over time with the same amount of capital, whether stocks, funds, or assets. To anticipate that the value of such assets will rise throughout the chosen time period. disregarding price swings along the way.

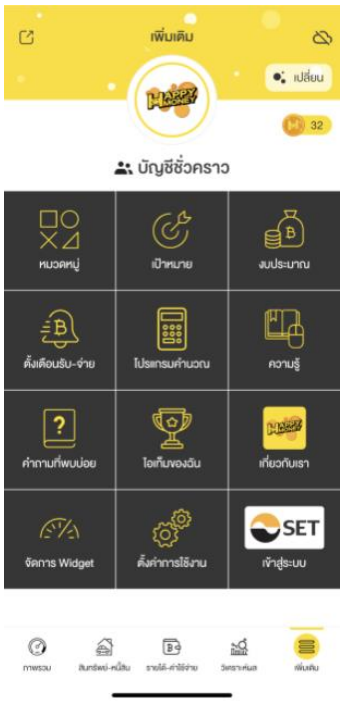
In conclusion, DCA investing is a different kind of investment that is excellent for first jobber investors. So just a rudimentary understanding is needed. The first employees may still invest even if they don't understand the market's rhythm very well. Additionally, it requires a bit of upfront expenditure.

2.6 Overview of Competitors

There are many existing web applications that aim to first jobbers. Four outstanding representatives are chosen to analyze their system, features, UI Design, teaching model, business model, and their successful stories.

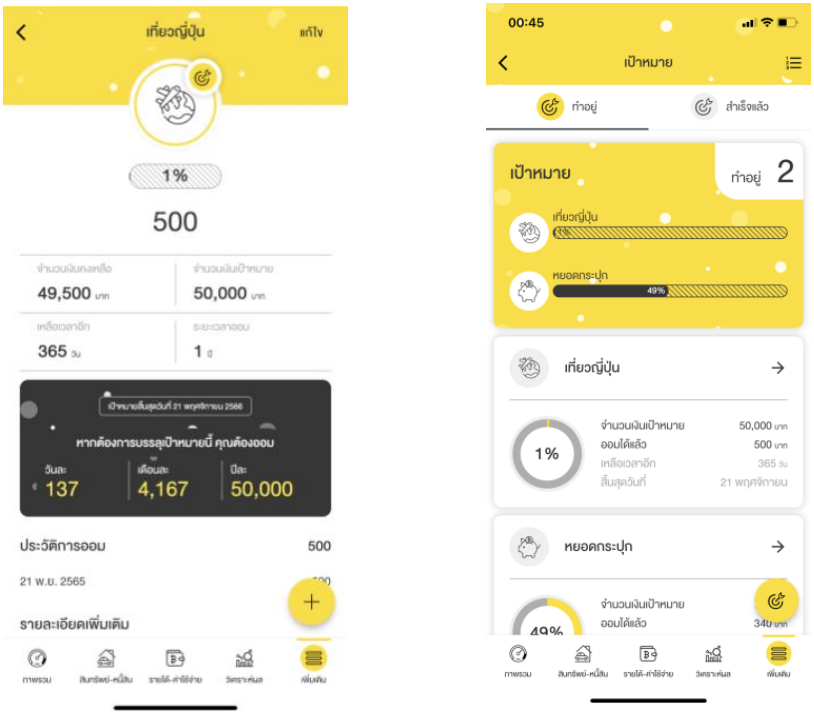
2.6.1 Happy Money App – SET

Happy Money App is an application developed by "The Stock Exchange of Thailand" as an aid in money management to create savings for all life goals, get to know the user spending habits by recording income-expenses by categories that match the user lifestyle, record assets and liabilities to monitor changes in past and present financial positions including analyzing financial health in various aspects to find financial strengths and weaknesses as shown in Figure?



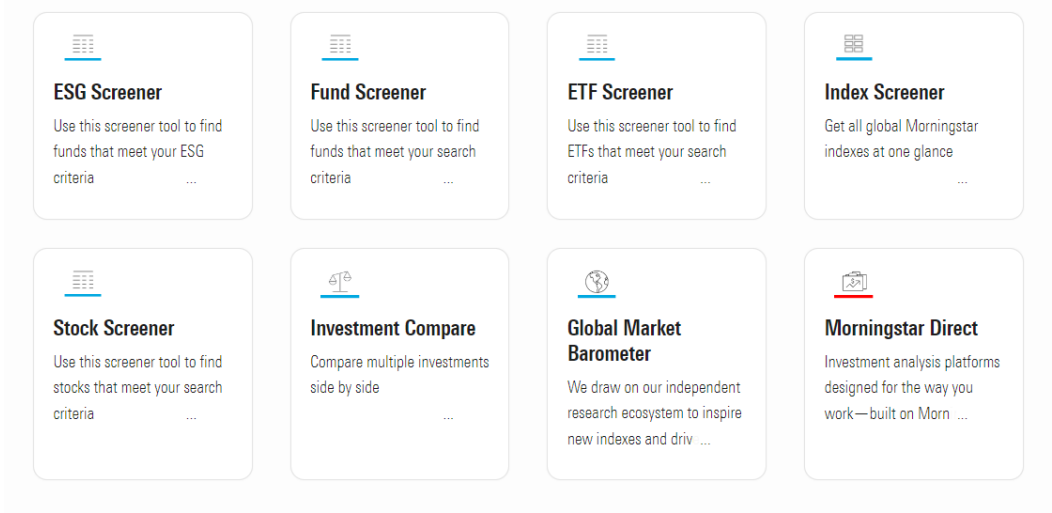
Moreover, there is also an optional function with setting savings goals. It helps in tracking the progress of the goal with advice to reach goals faster and set the budget

before using to plan expenses in advance, help control expenses, don't accidentally use to spend money extravagantly as shown in Figure?

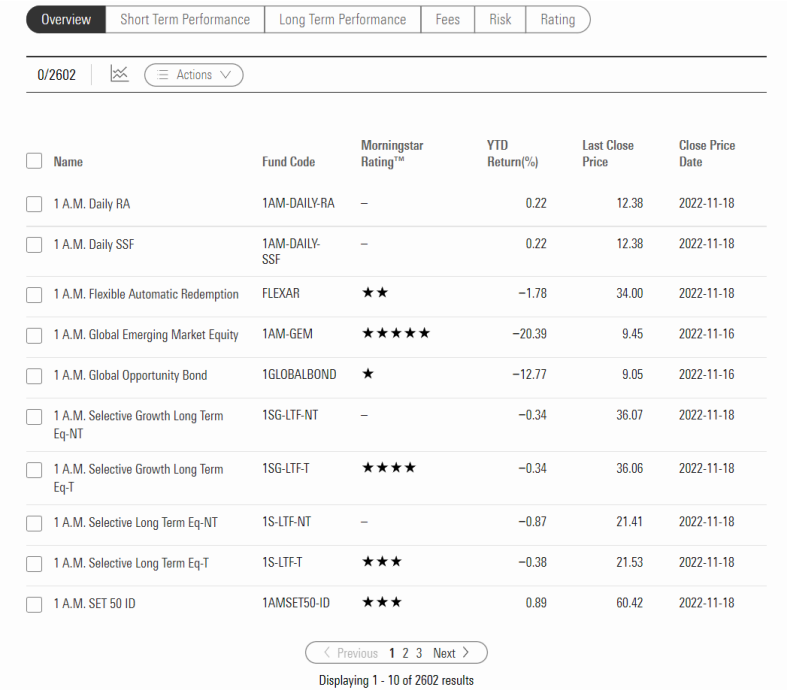


2.6.2 Morningstar

In 1984. Morningstar, Inc. is an American financial services company. It is headquartered in the city of Chicago, Illinois and was founded by Joe Mansueto. It offers a wide range of investment research and investment management services. Helping people plan, save, and invest to achieve their financial goals as shown Figure?



However, there will be a ranking of mutual funds on how they perform. The calculation is mainly based on Morningstar Risk Adjusted Return (MRAR), which is a measure that Morningstar invented itself by chasing from 5 stars, which is the best to 1 star, as shown Figure?



2.6.3 Smart-to-invest

Smart-to-invest is the website by the SEC (The Securities and Exchange Commission, Thailand) to offer financial knowledge, investment news, financial

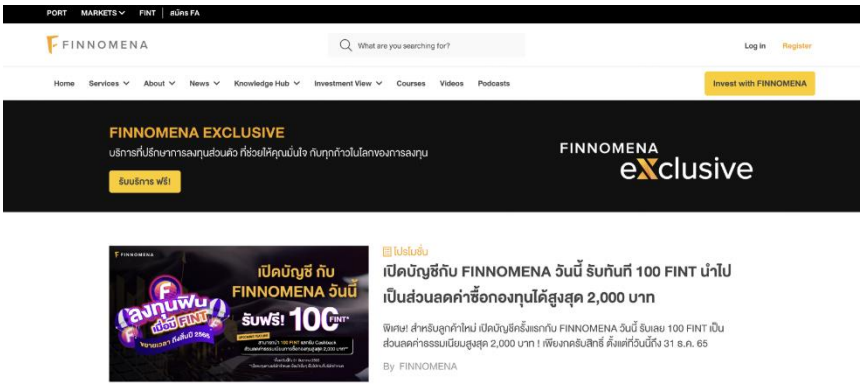
calculator tools (retirement fund, risk assessment, investment planning, and more), and new investment products of mutual fund, stocks, and debentures.

Furthermore, their financial tools can help the users to calculate their retirement fund and create the retirement plan from the user information. Also, providing information about the possibility of retirement plan, graph visualization of money in each period, and give tips.

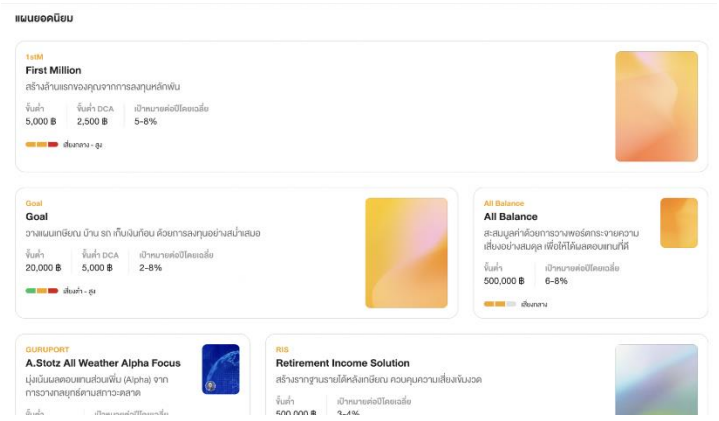
2.6.4 Finnomena

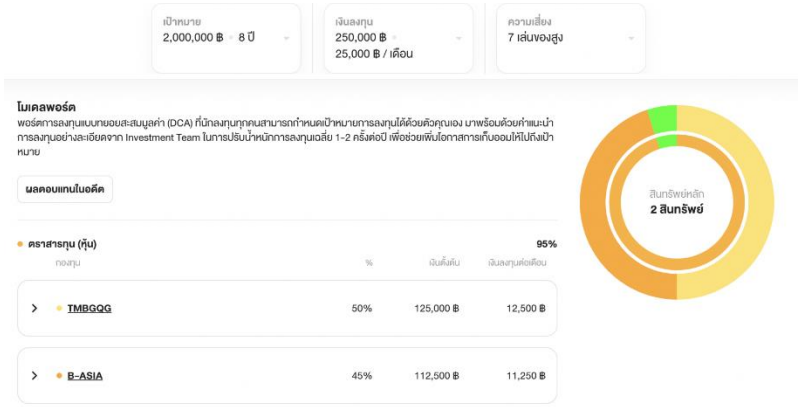
Finnomena is a mutual fund trading investment platform that helps investors manage long-term financial goals by recommending an investment portfolio based on

risk-return and investment goals. Also, taking care of investors' portfolios by investment advisors and using AI technology to provide in-depth analysis of best funds.



In addition, Finnomena offers multiple investment plans in which investors can select the appropriate investment plan to achieve their goals. The investment plan provided by the Finnomena team can generate the portfolio model and offer the option for investors to choose the risk and return.





2.7 Competitors Analysis

As discussed earlier, the four mentioned systems are compared with Personal Financial Advisory as shown in Table ?.

Table ? Competitor Analysis of Personal Financial Advisory System and Its competitors

Topics\ Systems	Personal Financial Advisory System	Happy Money (SET)	Morningstar	Smart-to-invest	Finnomena
Planning Settings					
Emergency Planning	√	X	X	X	√
Saving Planning (*No investment)	√	√	X	X	X
Retirement Planning	√	√	X	√	√
Passive Investment Planning	√	√	X	√	√
Goal Setting Comparisons					
Can add Emergency goal	√	√	X	√	√

		(Need to add new category of goal)			
Can add Saving goal	√	√ (Need to add new category of goal)	X	X	X
Can add Retirement goal	√	√ (Need to add new category of goal)	X	X	√
Can add Investment goal	√	√ (Need to add new category of goal)	X	X	√
Can Calculate Retirement Fund	√	√ (Need to add new category of goal)	X	√	X
Can have many goals at a time	√	√	X	X	√ (Waiting 1 day for account approval)
Investment Portfolio Comparisons					
Source of Investment Portfolio	Real Data	Unavailable feature	Real Data	Mockup Investment Portfolio (Just example)	Real Data
Type of Assets in Portfolio	- Cash - Government Savings Bank's Lottery - Fixed Income - Mutual Fund - Equity	Unavailable feature	- Mutual Fund - Equity - ETFs	- Fixed Income - Mutual Fund - Equity	Only Mutual Fund

Condition to Add Investment Portfolio	None	Unavailable feature	Required to register for Morningstar member	Unavailable feature	Required to register for Finnomena account
Process to create portfolio	Auto Generating	Unavailable feature	Manually	Unavailable feature	Auto Generating
Can have multiple portfolios at a time	√	Unavailable feature	√	Unavailable feature	√
Minimum of money to invest	X	X	X	X	√ (Depend on an investment plan)
Investors' Risk Assessment	√ (Suitability Test from Bank)	√ (TSI Risk Profile Questionnaire)	X	√ (Suitability Test from Bank)	√ (Risk & Yield from personal evaluation)
Wealth Management					
Portfolio Management	Manually	Unavailable feature	Manually	Unavailable feature	Manually & Fund Manager Service
Service Fee					
Planning Management					
Progression & Tracking of Saving Plan	√	√	X	X	X
Progression & Tracking of Emergency Plan	√	√	X	X	√
Can have many options in Emergency plan	√	X	X	X	X
Can have many options in Saving plan	√	X	X	X	X
Rewarding Comparisons					
The system has reward by	√	X	X	X	X

provided the badge to user					
Provided Platform					
Android	X	√	X	X	√
iOS	X	√	X	X	√
Website	√	X	√	√	√

2.8 Overview of tool and technologies used

2.8.1 Overview of Responsive Web Design [1]

Responsive Web Design is the modern web that the website can render on all devices while adapting automatically to all screen sizes. By using the Cascading Style Sheets (CSS) with various properties. For example, resolution, screen size, color capability, and more characteristics.

2.8.2 Overview of Web Application [2]

A web Application is a client-side and server-side software application that the clients can request in a web browser to the web server on the internet and delivers the requested information to the client by appearing on the screen. For example, mobile devices, and desktops.

2.8.3 Overview of Microsoft Azure [3, 4, 5]

Microsoft Azure is the cloud computing platform provided by Microsoft which applications and services can be built, tested, managed, and deployed. The solution of Azure includes Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (Saas) for example, analytics, virtual computing, and storage.

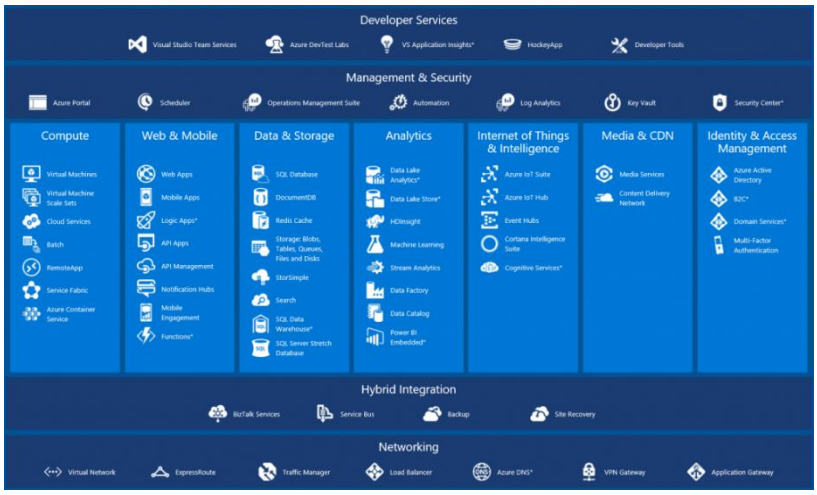


Figure 2.1 Type of Microsoft Azure Cloud Services

2.9 Personal Financial Theory

2.9.1 Personal Cash Flow Management [6, 7, 8]

Personal Cash Flow represents the financial status of individuals to show the liquidity and wealth of personal finances. To measure the personal cash flow can be indicated by writing an income statement and balance sheet. [6]

An income Statement is a financial statement showing the income and expenditures which can measure the liquidity of personal finance by calculating the total balance from income minus saving and minus expense. [6] [7]

Balance Sheet is a financial statement that shows the details of personal assets or liabilities at a specific point in time to measure the wealth of personal finance by calculate the net worth from total assets minus total liabilities. [6] [8]

2.9.2 Money Freedom Model from the Money Coach [6]

The Money Freedom Model is the concept of Personal Financial Freedom and consists of an emergency plan to protect financial status from income shock, retire rich plan to invest in long-term assets for expense upon retirement, and retire young to generate cashflow from income assets or passive income to get the financial freedom earlier.

- **Plan C – Emergency Plan**

Emergency Basket is the first goal for saving money to protect liquidity from an unpredictable future. For example, job loss, accident, or sickness which required to use

the money immediately. The appropriate emergency basket is around 6 – 12 months for individuals.

- **Plan B – Retire Rich**

A Retirement Plan is the second goal for cumulative saving and long-term investment focuses on paper assets with the power of compounding to reach the goal for spending the expenses when retirement at 60 years old.

- **Plan A – Retire Young (Financial Freedom)**

A Retire Young Plan is the third goal. The main concept of this plan is to have the money cash flow from passive income more than the total expense per month for financial freedom.

2.10 Terminologies

2.10.1 Compound Interest [9]

Compound Interest is interest calculated by adding the accumulated interest to the principal balance and compounding the return to grow the saving balance.

Compound Interest Formula: [10]

$$A = P(1 + [r / n]) \wedge nt$$

- A = the amount of money accumulated after n years, including interest
- P = the principal amount (your initial deposit or your initial credit card balance)
- r = the annual rate of interest (as a decimal)
- n = the number of times the interest is compounded per year
- t = the number of years (time) the amount is deposited for

2.10.2 TVM – Time Value Money

Time Value Money is the fundamental concept of financial literacy by stating the current value of money worth or higher than the future value of money. [11]

One of TVM Formula to calculate the “Future Value of Periodic Payments”: [12]

$$\textit{Future value of periodic payments}$$
$$(1)\ \textit{payment due at end of periods}$$
$$FV = PV(1+\frac{r}{k})^{nk} + PMT\frac{(1+\frac{r}{k})^{nk}-1}{r/k}$$
$$(2)\ \textit{payment due at biginning of periods}$$
$$FV = PV(1+\frac{r}{k})^{nk} + PMT\frac{(1+\frac{r}{k})^{nk}-1}{r/k}(1+\frac{r}{k})$$
$$(3)\ if\ r = 0$$
$$FV = PV + PMT \times nk$$

PV = present value
FV = future value
PMT = payment amount
r = interest rate
k = payment frequency
n = number of years

2.10.3 Preventive Financial

Preventive Financial is the concept to prevent people from bad financial management to create bad debt and bring them to make the non-performing loan by guiding the right direction and knowledge to manage their personal financial to achieve the financial freedom goal.

CHAPTER 3
ANALYSIS AND DESIGN

This chapter is mainly focused on the solution design which includes the overview of personal financial advisory system, saving money for goals planning and management, saving money for "Retire Rich" planning and management, investment planning (Retire Young) and portfolio management and future of work.

3.1 Solution Design

The researcher identified four first-jobber problems based on the interview:

1. Problem 1 – Don't know how to save and manage money
2. Problem 2 – Lack of long-term planning
3. Problem 3 – Not being able to manage debt
4. Problem 4 – One way income is not enough, having more than one source of income (active income) is necessary

From the above problem, the developer found during the interview session leading up to idea creation to solve problems of money management and long-term planning for the first jobber. So, that is the reason why we introduced the following features and solutions.

3.1.1 Overview of Personal Financial Advisory System

The Personal Financial Advisory System for First Jobber has four main parts: a plan for emergencies, a plan for saving, a plan for retirement, and a plan for investments. And the system

The system will show "Menu Selection and Feature Suggestion," which lets the user learn about the features and choose which ones to use. The system also has a dashboard for keeping track of activities and a profile setting that lets users change their own information.

After a feature is chosen, the system will start each main feature to meet the customer's goal as follows.

- Saving for Emergency: Let users figure out how much they need to save for an emergency and keep track of how much they have saved.
- Saving Goals: Let users figure out how much they need to save for saving goal and keep track of how much they have saved.
- Saving for Retirement: Let users figure out how much they need to save the fund for retirement and how much they need to invest.
- Investment Plan and Management: Let users figure out how much to invest and what kinds of assets are worth investing in.

Each feature and its operations will be detailed in detail below.

3.1.2 Saving for Emergency

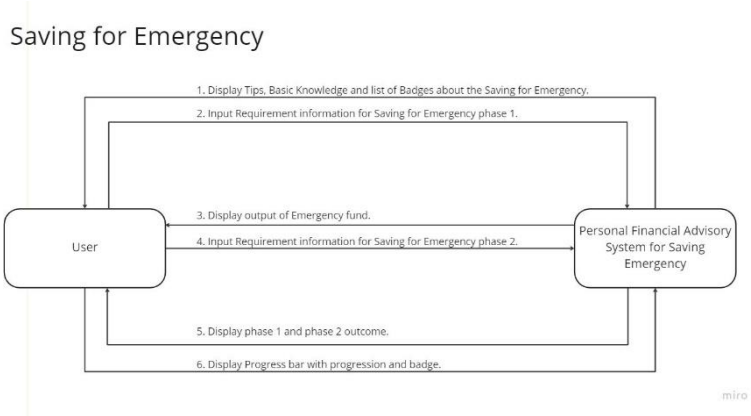


Figure 3.1 Saving money for emergencies planning and management workflow between system and user.

This part is about saving for emergency. The feature helps the user plan, organize, and keep track of activities related to saving money for an emergency, which is what its model does. The design of the feature is split into two parts: The educate basic knowledge part and the calculation of the emergency fund part.

For the education part, the system aims to give the user basic knowledge of "What is saving emergency really mean?", "Why it's matter?" and "Why it's important". The system also gives the user the list of required information to use the feature and the list of badges for user's achievement in the future.

For the calculation part the system separated into two phases as

- The calculation of emergency fund
- The calculation of the number of months until success

For phase 1, the calculation of the emergency fund, which is made up of two user inputs, is made up of:

- Monthly Expense
- Total month for saving

The way to figure out an emergency fund is to multiply "Monthly Expense" by "Total Months to Save." The result is the emergency fund, which is also the user's goal.

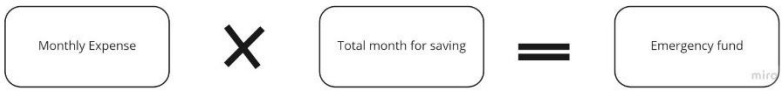


Figure 3.2 The phase 1 formula for Saving for Emergency

For the phase 2, the calculation of the number of months until success, which is also made up of two inputs, but it brings the output of phase one into the formula as

- Emergency fund
- Cash that the user wants to deposit

The way to figure out the number of months until the goal is successful is the "Emergency fund" which brings from the phase 1 output divided by "Cash that the user wants to deposit" The result is the number of months until the goal is successful.

Figure 3.3 The phase 2 formula for Saving for Emergency

Lastly, the feature will show the output with a progress bar so the user can see how his or her actions match up with the output.

3.1.3 Saving Goals

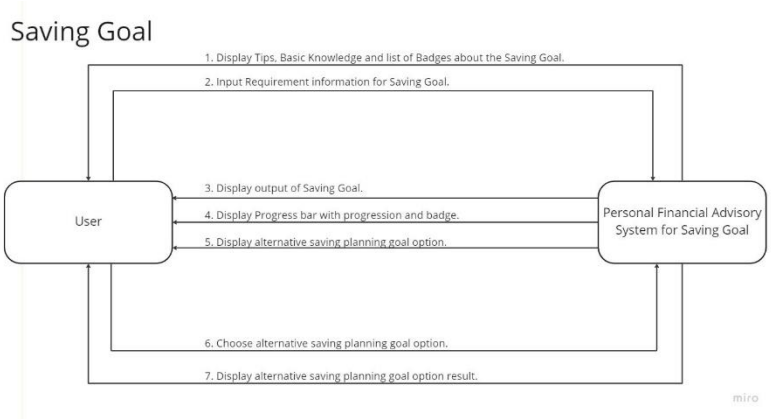


Figure 3.4 Saving goals for planning and management workflow.

This part is about saving goals. The feature helps the user plan, organize, and keep track of activities related to saving money for goals, which is what its model does. The design of the feature is split into three parts: The educate basic knowledge part, the calculation of the saving goals part and the alternative option for planning.

For the education part, the system aims to give the user basic knowledge of "What is saving goals really mean?", "Why it's matter?" and "Why it's important". The system also gives the user the list of required information to use the feature and the list of badges for user's achievement in the future.

For the calculation part of the saving goal planning system, it needs inputs from user which are made of

- Goal Name
- Total amount of cash that the user wants to deposit
- Saving period (Month)
- Current savings balance
- Cash input or Cash that the user wants to deposit

This feature is mostly made up of four calculations and outputs:

- The calculation of "Total saving balance"
- The calculation of "Total amount of money needed to reach the goal"
- The calculation of "Remaining saving time"
- The calculation of "Amount of money to save per day"

1. The calculation of "Total saving balance", which is made up of two user inputs, is made up of:
    - Current savings balance

- Cash input or Cash that the user wants to deposit

And it is calculated by "Current savings balance" plus by "Cash input" which is figure 3.5 described below:

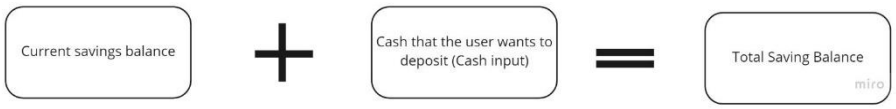


Figure 3.5 Total saving balance formula for saving goals planning and management.

Then, the system will display the "Total Saving Balance" as the output.

2. The calculation of "Total amount of money needed to reach the goal", which is made up of two user inputs, is made up of:
   - Total amount of cash the user wants to deposit
   - Total saving balance (Output from the formula in Figure 3.5)

And it is found by subtracting "Total amount of cash the user wants to deposit" by "Total saving balance," which comes from the "Total saving balance formula," as shown in figure 3.6 below:

Figure 3.6 Total amount of money needed to reach the goal formula for saving goals planning and management.

Then, the system will display "Total amount of money required in order to achieve the goal" as the output

3. The calculation of "Remaining saving time", which is made up of two user inputs, is made up of:
   - Saving period (Month)
   - Current day of saving

And it is found by subtracting "Saving period (Month)", which change it format to "Day" instead of month, by "Current day of saving", as shown in figure 3.7 below:

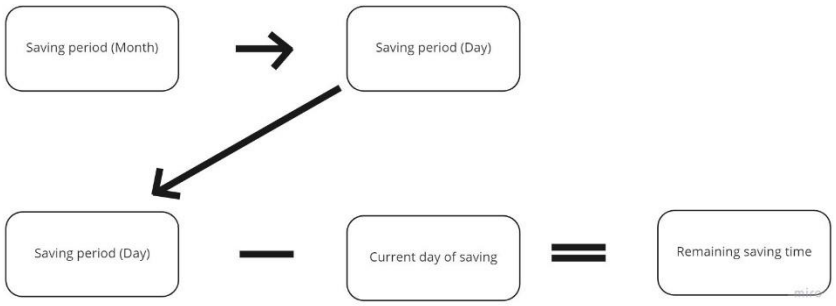


Figure 3.7 Remaining saving time formula for saving goals planning and management.

Then, the system will display "Remaining saving time" as the output.

4. The calculation of "Amount of money to save per day", which is made up of two user inputs, is made up of:
    - Total amount of cash that the user wants to deposit
    - Saving period (Month)

And it is found by dividing "Total amount of cash that the user wants to deposit" by "Saving period (Month)", which change it format to "Day" instead of month, as shown in figure 3.8 below:

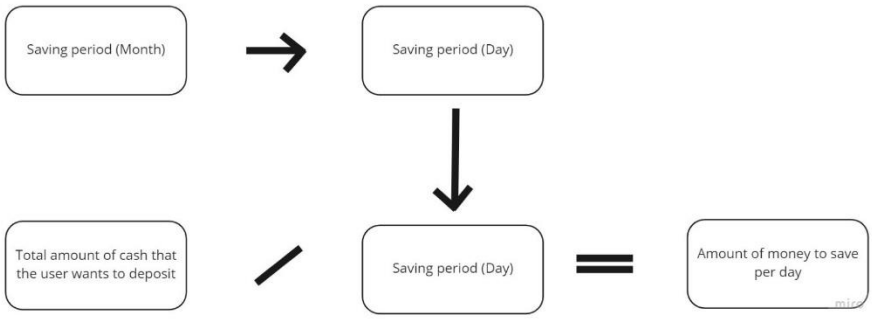


Figure 3.8 Amount of money to save per day formula for saving goals planning and management.

Then, the system will display "Amount of money to save per day" as the output.

For the optional alternative planning, the system will let the user choose the planning option and let the user change the possible plan in the future as he or she wants. This

system will help them plan or make decisions about their savings to achieve their goals more appropriately.

3.1.4 Saving for Retirement

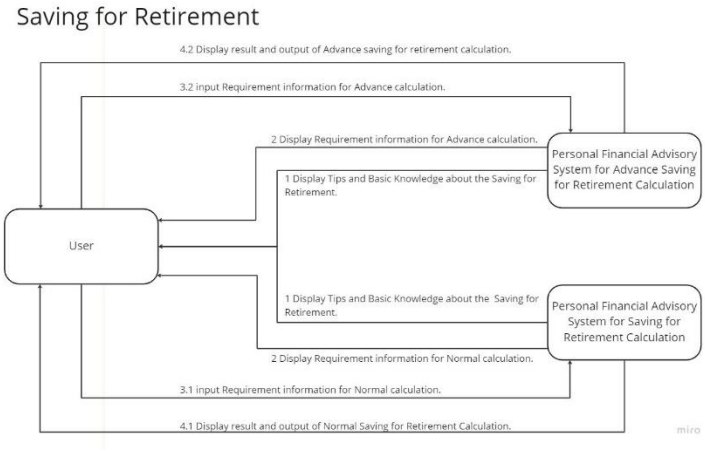


Figure 3.8 Saving for Retirement workflow.

This part is about Saving for Retirement. The feature helps the user plan and organize activities related to saving for retirement, which is what its model does. The design of the feature is split into two parts: The educate basic knowledge part, the calculation of the saving for retirement part.

For the education part, the system aims to give the user basic knowledge of "What is Retirement really means?", "Why it's the matter?" and "Why it's important". The system also gives the user the list of required information to use the feature.

For the calculation part of the retirement rich planning system, it needs inputs from user which are made of

- Date of Birth (General Thai format)
- Total Monthly Expense
- Age intended to retire (It depends on the company or the users.)
- Age people are expected to live after they retire (Year) (It depends on the users or the statistic one.)

The retirement fund calculation has two options: "Advanced Mode" and "Normal Mode." Users can choose which one to use. The difference between the two choices is that their results are different. The advance mode is more detailed and harder to

understand, and the output of each mode is also different as described in Figure 3.9 below.

The expected outputs of the advance mode are:

- Retirement fund for advance mode
- Amount of money for monthly investments
- Period until retirement (depends on “Age intended to retire”)
- Additional investment funds

The expected outputs of the normal mode are:

- Retirement fund for normal mode
- Amount of money for monthly investments
- Period until retirement (depends on “Age intended to retire”)

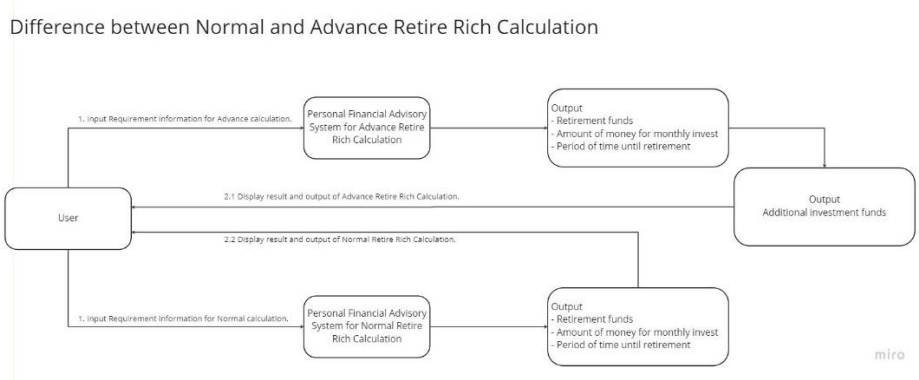


Figure 3.9 Difference between Normal and Advance Mode in Retirement calculation system

In Normal Mode, the system will take a few steps to figure out what to do. It is found by multiplying “Total Monthly Expense” by “Inflation rate,” which is based on “Date of Birth (General Thai format)” as the user's current age. And look at the table of inflation rates in Figure 3.10. And calculate the “Total Monthly Expense with Inflation rate” use the formula in the Figure 3.11 below.

CURRENT AGE(year)	Period before retirement(year)	Inflation Multiplier
50-59	0-10	1.20
40-49	11-20	1.50
30-39	21-30	1.80
20-29	31-40	2.20

Figure 3.10 Inflation rate table

Figure 3.11 Total Monthly Expense with Inflation rate formula

Next, the system will calculate "Retirement fund" And it is found by multiplying "Total Monthly Expense with Inflation rate" by "Age people are expected to live after they retire", which change it format to "Month" instead of year, as shown in figure 3.12 below:

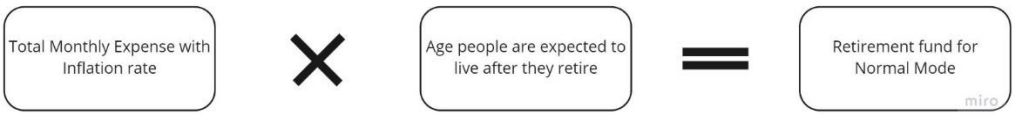


Figure 3.12 Retirement fund formula for Normal Mode Calculation

Then, the system will display "Retirement fund" for normal mode as the output.
Next, is the calculation of the "Amount of money for monthly investments" of Normal mode calculation which uses the Time Value Money (TVM) formula. The system will ask the user to input and additional input information as follows:

- Interest rate (Yearly)

And the steps in the process are shown in Figure 3.13:

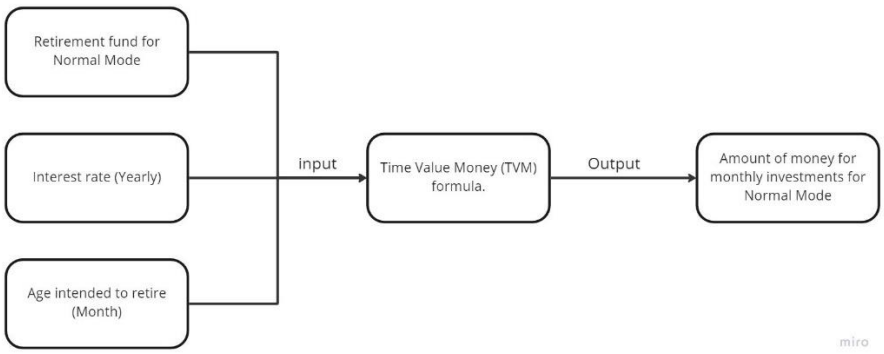


Figure 3.13 TVM calculation process for Normal Mode Calculation

As a result, the system will display "Amount of money for monthly investments"

In Advance Mode, the user will have to give the system more information, such as:

- Expected income after retirement

- Total assets that are currently available

And additional expect output of each step as followed:

- Gap of money in each month

Then, the system will take more steps than normal to figure out what to do. First, it does the same of Normal one with multiplying "Total Monthly Expense" by "Inflation rate," which is based on "Date of Birth (General Thai format)" as the user's current age. And look at the table of inflation rates in Figure 3.10. And calculate the "Total Monthly Expense with Inflation rate" use the formula in Figure 3.11 Above.

Next. The system will calculate the "Gap of money in each month" by subtracting "Total Monthly Expense with Inflation rate" with "Expected income after retirement" as Figure 3.14 below:

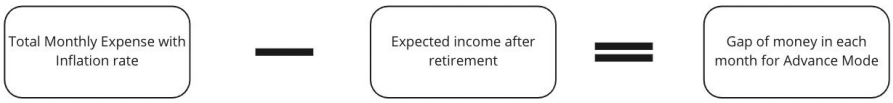


Figure 3.14 Gap of money in each month formula for Advance Mode Calculation

Next, the system will calculate the "Retirement fund" for Advance Mode which bring "Gap of money" into the formula, and it is found by multiplying "Gap of money in each month" by "Age people are expected to live after they retire", which change it format to "Day" instead of Year, as shown in figure 3.15 below:

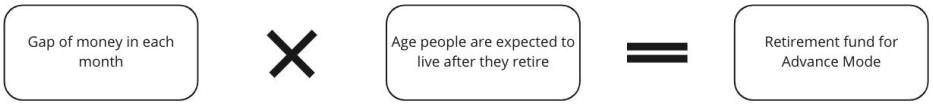


Figure 3.15 Retirement fund formula for Advance Mode Calculation

Finally, the system will calculate the "Additional investment funds" for Advance mode calculation. it is found by subtracting "Retirement fund for Advance Mode" by "Total current assets" as shown in figure 3.16 below:

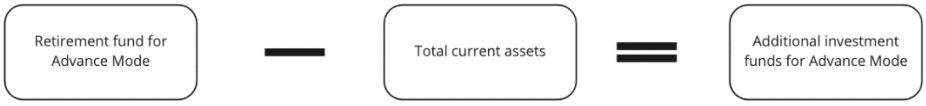


Figure 3.16 Additional investment funds formula for Advance Mode Calculation

Next, is the calculation of the "Amount of money for monthly investments" of Normal mode calculation which uses the Time Value Money (TVM) formula. The system will ask the user to input and additional input information as follows:

- Interest rate (Yearly)

And the steps in the process are shown in Figure 3.17:

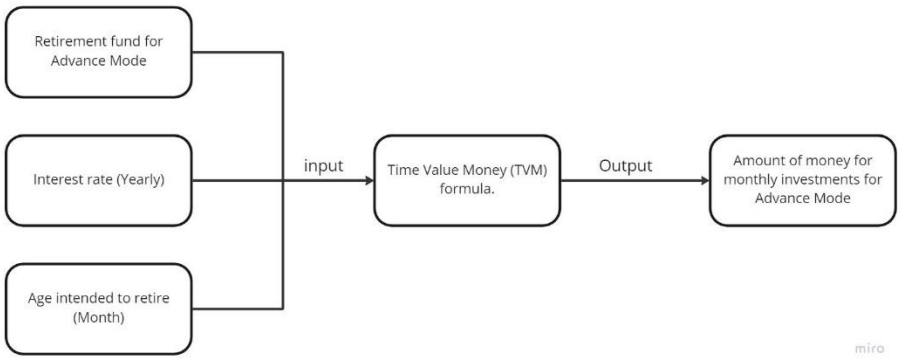


Figure 3.13 TVM calculation process for Advance Mode Calculation

3.1.5 Investment Planning and Management

Figure 3.16 Investment planning and management workflow.

This part is about Investment planning and management. The feature helps the user plan, organize, and keep track of activities related to Investment for goals, which is what its model does. The design of the feature is split into two parts: The risk assessment test, the investment portfolio management.

For the risk assessment test, the system will give the user a suitability test that they can use to figure out how risky they are before they invest. So, the level of risk can be 1 – 5 level for investors and each level can be suggested for the assets that are appropriate to the level of investors. For example, investors' risk levels in level 1 can be invested in money market funds and bank deposits.

After the investors take the suitability test, they must input the annualized return or yields to generate the appropriate investment portfolio model for an investor. The investment portfolio will allocate the ratio to at least the three assets which focus on the lowest risk first. Moreover, the investment portfolio model will not include the assets with a higher risk than the investor's investment risk level and pick the top ten and top

five annualized returns or yield from each asset. For example, the top five annualized returns in the category of mutual funds.

3.2 Future of Work

- Badge design
  - The level badge design.
- Progression dashboard
  - For tracking all the activities in one page.
- Profile setting
  - Users can set their account on the website including creating, editing and deleting.
- Debt Management
  - Users can learn how to start to reduce the debt step by step.
- Active Income Planning
  - Users can know how to increase the multiple income stream and planning how to start.

REFERENCES

1. Author. *Title*. Series Title [Type of Medium] Year Last Update Date [cited Access Year Access Date]; Edition:[Description]. Available from: URL
2. Author, B., *Title*. Editon ed. Series Title, ed. S. Editor. Vol. Volume. Year, City: Publisher. Number of Pagers.