

# Pantawid Pamilyang Pilipino Program (4Ps) Beneficiaries Management and Forecasting System

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**Abstract:** The Pantawid Pamilyang Pilipino Program (4Ps) is a program in the Philippines that helps poor families by giving them money support. However, managing and monitoring the large number of 4Ps beneficiaries is difficult and often relies on manual processes. This study aims to improve how 4Ps data is handled by developing a system that can manage and predict beneficiary needs effectively. The main goal of the study is to create a system that makes it easier to manage 4Ps information and to forecast future needs using technology. The research used a development design, and data was gathered through interviews, surveys, and review of existing reports from the DSWD (Department of Social Welfare and Development). The system was tested by selected users and experts to check its usability and accuracy. The system includes features like Profile Management Disbursement Monitoring, Conditional Monitoring, Data Reporting, and Predictive Analytics. Findings show that the system helps improve data accuracy, reporting, and decision-making. It also provides insights into who may graduate from the program or need more support. The study recommends the use of this system to help local government units and DSWD offices improve their services and planning. Future researchers may explore adding more features like mobile access and integration with national databases.

**Keywords:** 4Ps Beneficiary Management, Forecasting System, Social Welfare, Data Monitoring.

## 1. Introduction

The Pantawid Pamilyang Pilipino Program (4Ps) is a pivotal poverty alleviation initiative in the Philippines, established under Republic Act No. 11310. It provides conditional cash transfers to low-income families who fulfill specific requirements, such as ensuring their children attend school and undergo regular health checkups. Designed to support long-term socio-economic improvement, the program targets extremely poor households, benefiting over 10 million children aged 6–18 (Cruz et al., 2016). Families must comply with education and health conditions to receive aid, which has led to significant reductions in poverty and improved living standards (David & Maroma, 2025). Studies have shown that 71.9% of beneficiaries come from the lowest income deciles (Albert et al., 2024), and the program has contributed to increased educational attainment, enhanced family well-being, and greater community engagement. However, implementation challenges remain, including inaccuracies in targeting dynamic beneficiary data like employment status and the growing need for budgetary support as the program expanded to cover 79%

of poor households by 2016 (Ponce, 2022). While 4Ps has made substantial progress, some critiques argue that it does not fully address the root causes of poverty, underscoring the need for complementary programs to promote sustainable development.

The Pantawid Pamilyang Pilipino Program (4Ps) faces major challenges in data management, such as slow communication, reliance on manual paperwork, and inadequate tracking of beneficiaries. These issues hinder timely information sharing, increase the risk of data errors, and make it difficult to monitor compliance with program requirements, ultimately delaying critical decision-making processes (Bo, 2023). To overcome these obstacles, the proposed 4Ps Management and Forecasting System aims to digitize data collection, enhance beneficiary monitoring, and integrate advanced technologies like predictive analytics to improve operational efficiency. Key challenges include inefficient communication channels, which delay coordination among stakeholders; paper-based processes that slow down data processing and increase errors; and limited tools for tracking beneficiaries' compliance with program conditions ("Improving Behavioral Change Interventions: A Closer Look at 4Ps Family and Youth Development Sessions", 2023).

To address these, the system proposes enhanced data collection through digital tools, the use of predictive analytics for better forecasting and decision-making, and regular monitoring to assess beneficiary progress and program impact. However, successful implementation may face resistance from users accustomed to traditional methods, highlighting the need for comprehensive training and support to ensure smooth adoption of the new technology (Colonna & Helliwell, 2024).

The proposed system integrates several features designed to improve administrative efficiency and ensure compliance with 4Ps program regulations. Key functions include digital registration for walk-in applicants, real-time tracking of eligible beneficiaries, and monitoring of critical family obligations such as payroll submissions and school attendance. Online registration streamlines processing and minimizes errors commonly associated with manual entry, while real-time updates maintain accurate beneficiary records, promoting transparency and accessibility (Putri, 2024). The system also monitors compliance with program requirements, automatically sending reminders for meetings and documentation deadlines to

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encourage consistent participation (- *et al.*, 2024). To support staff decision-making, the system generates analytical reports that provide data-driven insights, enabling better resource allocation and continuous program improvement (Ganjiwale *et al.*, 2024). However, despite these benefits, digital transformation may also present challenges, such as concerns over data privacy and the need for adequate user training, which must be addressed to ensure the system's long-term effectiveness.

The integration of technology into social welfare systems is designed to enhance accessibility, efficiency, and effectiveness in combating poverty. The proposed system for local government units and 4Ps beneficiaries features user-friendly interfaces and forecasting tools that predict eligibility and program exit, using the Technology Acceptance Model (TAM) to evaluate usability and perceived benefits. These forecasting features are central to optimizing program planning, enabling proactive decision-making based on data-driven insights. This approach aims to strengthen the 4Ps program's impact on poverty alleviation and sustainable national development. For instance, TAM was successfully applied in systems like SIKS-NG in Gunung Seteleng, where ease of use scored 68.33%, reflecting positive user reception (Wati *et al.*, 2022).

A web-based eligibility system can further bridge the gap between citizens and government services, improving accessibility and application processes ("Creation of Web based Eligibility System for Government Programs", 2023). Forecasting tools and decision support systems (DSS), such as those using Simple Additive Weighting (SAW), play a crucial role in identifying potential beneficiaries and estimating program exits, ensuring more accurate and effective resource allocation (Israel & Encarnacion, 2024; Rifasya *et al.*, 2025).

Moreover, technology solutions like web applications and data mining enhance program management and connect impoverished individuals with essential resources, as demonstrated by initiatives focusing on job creation, NGO collaboration, and skill education ("Empowering the Impoverished", 2023; Israel & Encarnacion, 2024). Despite these advantages, challenges such as digital literacy gaps and limited infrastructure must be addressed. Effective implementation also requires collaboration among government agencies, NGOs, and private sector partners to fully leverage technology in the fight against poverty.

### A. Project Context

The Pantawid Pamilyang Pilipino Program (4Ps) served as the Philippines government's efforts to alleviate poverty. The core principle of conditional cash transfers aimed at improving the health, nutrition, and education of children in poor households. However, despite its success in reaching millions of Filipino families, the current management processes underlying the 4Ps implementation remain outdated, scattered, and rely on manual operations.

The Philippine government's efforts to lessen poverty have been placed by the Pantawid Pamilyang Pilipino Program(4Ps), which gives conditional cash transfers to the poorest of the poor members of society. The management procedures that currently

support the 4Ps implementation, are outdated, scattered, and largely dependent on manual labor. (DSWD, 2020; Reyes *et al.*, 2019)

In addition, the lack of integrated data analytics made decision-making active rather than proactive. Ineffective resource allocation and delayed assistance delivery resulted from program administrators' inability to anticipate possible contract terminations or find slots for new beneficiaries.

This study aimed to create a 4Ps Beneficiaries Management and Forecasting System, a centralized, automated platform designed to meet the program's challenging operational requirements, in order to address these continuing problems. The following are the main goals of this system design: to cut-down on duplication and boost data accuracy, digitize beneficiary records, allow walk in and online applications, and centralize information storage. Use integrated modules and real-time updates to monitor participation in Family Development Sessions, health records, and school attendance. By using automated alerts, and announcements, DSWD officers, LGU's and beneficiaries can coordinate more easily. The program administrators access dynamic dashboard and analytics so they can evaluate resource usage, performance, and compliance. Using predictive analytics to anticipate contract terminations and open up slots for new qualified beneficiaries.

By addressing the inefficiencies of the current manual system, the proposed platform will improve the productivity in operation, reduce human error, and foster transparency in the administration of the 4Ps program by resolving the weaknesses of the current system. By giving them access to accurate, timely, and actionable data, it will also empower all stakeholders, decision makers and doers to national officials.

### B. Research Objectives

#### 1) General Objective

This study aims to develop the Pantawid Pamilyang Pilipino Program (4Ps) Management and Forecasting System that enhances the efficiency of data management, beneficiary tracking and predictive analytics for improved decision-making of the programs.

#### 2) Specific Objectives

1. To develop 4Ps Management and Forecasting System with a centralized platform and organize beneficiary data management, reporting, and communication channels with the following capabilities:
  - a) register and submit members form of 4Ps walk in applicants.
  - b) generate and display a table that shows the list of qualified 4Ps members for schedule of verification.
  - c) efficiently tracks 4Ps beneficiaries' information.
  - d) monitor the beneficiaries progress report if they are enrolled or not, their attendance in class, attendance to family development seminars, and health services they have taken for their payroll compliance monitoring.
  - e) notify the 4Ps parent beneficiaries about the scheduled meetings and the requirements they

- need to submit.
- f) create reports such as the list of qualified 4Ps beneficiaries, list of members to be paid, and details of the members' individual account.
2. To develop user interface for the member information, Municipal Link, DSWD SWA, LGU Link and Roving Bookkeeper.
  3. To integrate data analytics to forecast contract terminations by analyzing reasons for program graduation and beneficiary delinquencies, and to identify new available slots for incoming 4Ps parent beneficiaries
  4. To evaluate the acceptability of 4P's Beneficiaries Management and Forecasting System with the use of TAM.
  5. Determine the significant differences between the DSWD officer and 4Ps Beneficiaries in terms of Perceived Usefulness (PU), Perceived Ease of Use (PEU), Attitude Toward Use (ATU) and Behavioral Intention to Use (BIU).

C. Research Hypothesis

There are no significant differences between the DSWD officer and 4Ps Beneficiaries in terms of Perceived Usefulness (PU), Perceived Ease of Use (PEU), Attitude Toward Use (ATU) and Behavioral Intention to Use (BIU).

D. Conceptual Framework

The Pantawid Pamilyang Pilipino Program (4Ps) system enhances efficiency and transparency by integrating components such as secure access, data management, and role-based monitoring. Through the registration and authentication, authorized users like LGUs, SWAs, Roving Bookkeepers, and DSWD officials the system allows them to handle and monitor data smoothly, without interruptions or complications. The features include compliance monitoring, beneficiary tracking, payroll supervision, and administrative decision-making. Each user role has specific responsibilities, such as validating local

data (LGUs), overseeing compliance (SWAs), managing payments (Roving Bookkeepers), and monitoring program performance (DSWD). This system streamlines operations, ensures transparency, and empowers stakeholders to make informed decisions for the program's success.

The system improves beneficiary management and decision-making by using centralized data processing, predictive analytics, and user-friendly interfaces. It efficiently collects, organizes, and analyzes data, allowing for the generation of qualified lists, trend forecasting, and actionable insights for stakeholders. Additionally, all inputs and outputs within the system are recorded in a centralized database, ensuring data integrity, security, and traceability. By addressing challenges such as forecasting accuracy, data security, and stakeholder adoption, the system strengthens social welfare data governance, ensuring transparency and operational efficiency.

As shown in Figure 1, the proposed development of the Pantawid Pamilyang Pilipino Program (4Ps) Beneficiaries Management and Forecasting System, the system prioritizes managing and overseeing how data is handled. This system is designed to address inefficiencies in data processing, improve stakeholder collaboration, and enhance informed decision-making within the program.

E. Project Purpose

The purpose of this study is to create a system that efficiently executes all the tasks of the DSWD's Pantawid Pamilyang Pilipino Program (4Ps). The objective of this project is to build a system that streamline the management of 4Ps office involved in the program, ensuring the timely and accurate delivery of services. The output shall identify and indicate possible methods for effective management and delivery of financial aid to the lowest-income families and poor communities.

DSWD. The Department of Social Welfare and Development (DSWD) is in charge of running the Pantawid Pamilyang Pilipino Program (4Ps), which gives financial help to the poorest families in the country. By using a centralized digital system, DSWD can make the program faster, more organized,

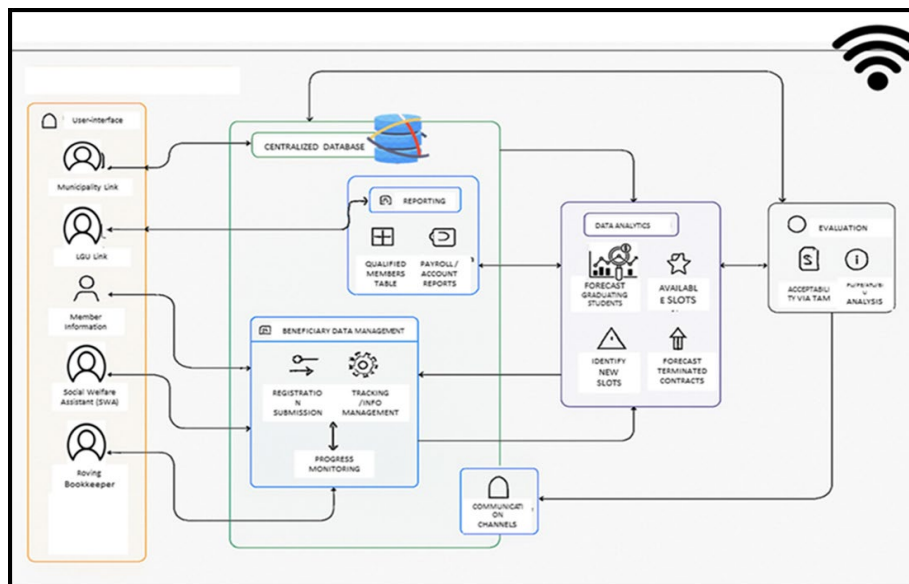


Fig. 1. Conceptual framework of Pantawid Pamilyang Pilipino Program 4Ps beneficiaries and forecasting system

and more helpful to the people who need it most. The system will help DSWD send out financial aid more quickly by checking who qualifies automatically and keeping track of beneficiaries in real time. It will also include a better complaint system so that problems can be reported and fixed faster. With regular training, DSWD staff like Municipal Links and Social Welfare Assistants can use the system more effectively. This will lead to more accurate information, fairer selection of beneficiaries, and fewer mistakes. The system will also help DSWD identify families who leave the program and find new families to help. Overall, the digital system will make DSWD's work easier, faster, and more responsive, making sure that the 4Ps program truly helps those who need it most.

*SWA Officers.* Social Welfare Assistant (SWA) officers have an important job in helping run the 4Ps program. They are the ones who collect and update information about families, check if the families are following the program rules—like sending their children to school, attending health checkups, and joining family development sessions—and help connect families with the DSWD. By using a centralized digital system, their work will become easier and faster. The system will reduce the need for too much paperwork because the data can be entered and updated online. It will also help SWA officers quickly see if a family is meeting the requirements or needs support. With automatic checks, they won't need to review everything manually, which saves time and avoids mistakes. The system will also improve communication between SWA officers and other DSWD staff by sharing important updates through the platform. With proper training, SWA officers will be able to use the system confidently. Overall, the system will help SWA officers do their jobs more easily, stay organized, and give better support to families who need help the most.

*LGUs.* Local Government Units (LGUs) play an important role in helping the 4Ps program work well in their communities. Using a central digital system with real-time data tracking makes it easier for LGUs to manage and give out financial aid quickly and correctly. They are the ones who generate the list of qualified 4Ps members to be added to the system and monitor if members are meeting their program requirements. This system helps make sure the money goes to the right families on time and that everything is clear and fair. When LGU staff are trained to use the system, they can better keep track of how families are doing and follow the program's rules. The system also uses data to help LGUs understand where help is needed most so they can plan and spend their resources wisely. This way, LGUs can make sure their support is effective and that families get the help they need. Overall, the system helps LGUs do their job better and serve their communities more smoothly.

*Roving Bookkeepers.* Roving bookkeepers have an important job in handling and keeping track of the money used in the 4Ps program right in the communities. With a central digital system that updates information in real time and automatically checks if families are following the rules, their work becomes easier and more accurate. This system helps roving bookkeepers quickly record money transactions and see when funds are given out. It also makes it clear where the money goes, which helps prevent mistakes or misuse. The system also checks if

families are meeting their requirements, like submitting needed documents or attending activities. Overall, this system helps roving bookkeepers do their job faster, keep good financial records, and make sure the financial help reaches the right families on time.

*Community and Barangay Officers.* Community and Barangay Officers play a key role in supporting the 4Ps program at the local level. With the help of a centralized digital system, they can communicate and coordinate more easily with higher authorities like the DSWD and LGUs. The system allows them to quickly share updates, report issues, and track the progress of beneficiaries in their area. This makes it easier for them to provide timely help and support to families, such as reminding them about meetings or assisting with requirements. The system also simplifies reporting by automatically generating necessary reports, saving time and reducing errors. Overall, the digital system helps Community and Barangay Officers work more efficiently, stay connected with other program staff, and better serve the families in their communities.

*4Ps Beneficiaries.* The 4Ps beneficiaries are the families who get help from the Pantawid Pamilyang Pilipino Program. The new system will make it easier for them to know what's going on with the program. They will get messages and reminders about important things like meetings and what papers they need to submit. The system will also help them keep track of their progress, such as if their children are going to school, joining family classes, or getting health checkups. With these reminders and updates, families can follow the program rules better and continue to get financial support without problems. Overall, the system helps 4Ps families stay informed, connected, and get the help they need to improve their lives.

#### *F. Scope and Limitation of the Study*

This study focuses on developing a 4Ps Management and Forecasting System designed to improve how beneficiary data is managed, tracked, and analyzed for better decision-making. The system allows registration of walk-in applicants, generate lists of qualified beneficiaries, track progress such as school attendance and health services, send notifications for meetings and requirements, and create various reports. It will also include user interfaces for different users like members, Municipal Links, DSWD Social Welfare Assistants (SWA), LGU Links, and Roving Bookkeepers. Data analytics will be integrated to forecast contract terminations and identify available slots for new beneficiaries.

This system however is limited to the municipality of Pangil, Laguna as a pilot area. The system focuses on data management and forecasting but does not handle payroll or the actual distribution of financial aid. The effectiveness and acceptance of the system tested through the Technology Acceptance Model (TAM), but the evaluation will be limited to a single program cycle and may not reflect long-term performance or adaptability to future changes.

## **2. Review of Related Literature**

This section discusses the features, capabilities, limitations,

and theoretical frameworks of existing research, IT concepts, and software applications relevant to the proposed 4Ps management system. It tries to present the review thematically by putting some key areas of interest.

## A. Studies and Literature

### 1) Financial Aid

Financial aid is an important way to help more people go to school and reduce poverty, especially in poor and underprivileged communities (Organisation for Economic Co-operation and Development [OECD], 2020). Many studies show that giving financial help to students can greatly increase the number of children and young people who go to school and stay in school, especially those from low-income families (Dynarski & Scott-Clayton, 2013). For example, research shows that financial aid helps more students attend and finish college, with the biggest benefits seen among students who have less money (Deming & Dynarski, 2009). These results are true in many countries, proving that financial help plays a big role in helping people escape poverty and improve their lives (World Bank, 2022; Evans & Yuan, 2019).

In the Philippines, the Pantawid Pamilyang Pilipino Program (4Ps) is a major program created by the government to fight poverty by giving cash to poor families if they follow certain rules (Department of Social Welfare and Development [DSWD], 2021). Families receive monthly money, but in return, they must make sure their children go to school regularly and attend health check-ups or family training sessions. The goal of 4Ps is to improve families' current living conditions and give them a better future by helping with health and education (Fernandez & Olfindo, 2011). One key rule is that children must attend school at least 85% of the time each month, making sure the money is really used to support learning (DSWD, 2021).

Many studies prove that 4Ps has helped families, especially when it comes to school. There have been increases in the number of students who enroll in school, finish their grade level, and stay in school. At the same time, fewer children are dropping out (Orbeta, 2014; Asian Development Bank [ADB], 2020). Even though the program has been rated as very good in improving health and education, there are still problems—such as the cash amounts not being enough and delays in giving out the money (World Bank, 2022). Still, most families report better nutrition, health, and access to education because of the 4Ps (DSWD, 2021; Reyes et al., 2015).

Looking at how the 4Ps works, it's clear that giving money alone is not enough. What makes it work well is the way it connects financial help with responsibilities, like sending children to school and going to health check-ups. This ensures the money is used for the right reasons and helps improve lives (Fiszbein & Schady, 2009). However, there are still challenges. Some families say the cash is too small to cover all needs, and payment delays can cause stress (Acosta et al., 2019). Also, while more students go to school because of 4Ps, it hasn't had a big effect on how well they do in school. This shows that we also need programs that improve learning, not just attendance (Manasan, 2020).

To sum up, financial aid programs like 4Ps are very helpful

in reducing poverty. But for them to work well, they must be carefully planned, managed properly, and improved regularly. Connecting money support to school and health responsibilities helps families now and builds a better future by improving their knowledge and skills (United Nations Development Programme [UNDP], 2022). In the future, the program should consider giving bigger cash grants, fixing payment systems, and adding more support for improving learning. Financial aid works best when it is part of a full plan that helps people and communities grow and succeed (World Bank, 2022; Evans & Yuan, 2019).

### 2) 4Ps Program

The Pantawid Pamilyang Pilipino Program (4Ps) is the main program of the Philippine government to help poor families. It aims to stop the cycle of poverty by supporting the health and education of children in low-income households. The program started in 2008, led by the Department of Social Welfare and Development (DSWD). It gives cash aid to poor families, but they must meet some conditions—like making sure their children go to school regularly, and mothers attend check-ups before and after giving birth. By focusing on these important areas, the 4Ps hopes to help poor families have better lives in the long run.

Many studies show that the 4Ps has helped improve children's school attendance and access to health services. For example, more children aged 12 to 17 are going to school because of the program. Families in the program also say they are getting better health care, such as regular check-ups for pregnant women, help during childbirth, and better food for young children. A major review by the Philippine Institute for Development Studies (PIDS) also found other good results—like fewer people going hungry and more families knowing about family planning methods. These results show that the 4Ps is working well to help both short-term and long-term needs of poor families.

But even with these good results, the 4Ps still faces some problems. Some families have trouble getting their cash aid on time. Others don't know how to manage their money well, and there have been cases where families who should not qualify were included in the program. Also, while the 4Ps has made it easier for people to go to school and get health care, it hasn't made a big impact on other areas—like how much money a family spends or whether children get vaccinated. This means the program is doing well in its main goals, but still needs to improve to help more families in more ways.

Looking closely at how 4Ps works, we can see that giving cash with rules is a strong way to help families improve their lives. The rules make sure families use the money for good reasons, like sending kids to school or going to health centers. This helps turn financial help into real change. But problems like delays in giving money and lack of training on money matters make the program less effective. Also, even though school attendance is better, the program has not made a big difference in how well students perform in school or how much money families earn. So, other programs are needed to support learning and income.

In summary, the 4Ps Program is a big part of the country's

efforts to fight poverty. It has clear benefits for health, education, and overall family well-being. The program combines cash aid with rules and support to help families grow stronger and prepare for a better future. Going forward, the government should work on solving the program's problems, teach families more about managing money, and make sure that the program leads to real improvements in school success and income. The 4Ps is a good example of how well-planned social programs can truly help people if they are managed properly and improved over time.

### 3) *Challenges Encounter*

The Pantawid Pamilyang Pilipino Program (4Ps) is known as the main program of the Philippine government to help poor families. It aims to stop the cycle of poverty by giving cash aid to the poorest families, as long as they meet certain rules—like sending their children to school and going to health check-ups (DSWD, 2021). Although the program has helped improve education and health, it still faces many problems that affect how well it works. These problems happen in the way the program is managed, in the services it provides, and in the daily lives of the people it serves. Knowing about these issues is important to make the 4Ps better (ADB, 2020).

One of the biggest problems is delayed cash assistance and too much dependence on the program. A study by Balacuit Jr. (2018) found that some parents become too dependent on the aid and lose interest in finding work. Sometimes, when the cash is delayed, families are forced to pawn their cash cards, which makes their money problems worse. There are also problems in how the program is run—such as outdated information, not enough staff, and poor communication with other government offices (DSWD, 2021). These make it hard for the program to serve everyone who needs it (Manasan, 2020).

Other issues involve checking if families follow the rules. In some places like Tabuk City, Kalinga, not all children are properly checked for school attendance or performance. Some families who are not really poor still get help from the program (Balacuit Jr., 2018). If these things are not fixed, it can waste resources and reduce the program's impact. Also, some families have trouble following the rules—because schools and health centers are far, there are not enough services, or the children are older than the usual grade level. These make it harder for them to meet the program's conditions (Fernandez & Olfindo, 2011; Reyes et al., 2015).

From these problems, we can see that the 4Ps struggles with both system-related issues and challenges from the people's situations. On the government's side, late cash transfers, poor monitoring, and lack of teamwork among offices make the program slow and inefficient (Manasan, 2020). On the family's side, depending too much on aid and not being able to follow the rules show deeper problems—like lack of access to basic services and limited knowledge on money matters (Fiszbein & Schady, 2009). These combined problems show that while the 4Ps has good goals, its current setup is not enough to handle the complex problems of poverty in the country. The program needs better monitoring, improved data systems, and stronger teamwork with local governments (UNDP, 2022).

In conclusion, the challenges faced by the 4Ps program are

many and connected. To solve them, we need a complete approach. Fixing how the program is managed, making sure the right families get help, and monitoring more closely are important steps to make the program more effective (ADB, 2020). Also, working closely with local government, partner agencies, and the families themselves can help make sure that the 4Ps not only gives temporary help, but also supports families to stand on their own in the future. In the end, the success of the 4Ps depends on how well it can adjust to challenges and continue improving how it works (World Bank, 2022).

### 4) *Document Management*

Document management is an important but often overlooked part of big social programs like the Pantawid Pamilyang Pilipino Program (4Ps). This program gives cash aid to millions of poor Filipino families and creates a lot of paperwork—like registration forms, reports, ID records, and payment details. Managing all these documents well is needed to keep the program honest, organized, and running smoothly (DSWD, 2020). Without good systems, mistakes, delays, and even fraud can happen more easily (ADB, 2019).

Good document management is especially important to keep correct and updated information about the families receiving help. A study by Reyes et al. (2018) says that keeping good records is key to making sure families follow the rules, like sending kids to school and going to health check-ups. Because the program helps over 4 million families, doing this by hand is too hard and often leads to mistakes (World Bank, 2017). To fix this, digital systems have been introduced to speed up the work, but problems like poor internet in rural areas and the lack of computer skills for staff and families still cause difficulties (DSWD, 2020).

Research shows both good and bad points about how the 4Ps handles documents now. The Asian Development Bank (2019) says using computers has made data more accurate and faster to process, helping staff respond to families quicker. But switching from paper to computers hasn't been easy. Problems like keeping data private, different computer systems not working well together, and the need for constant training for staff still exist (Reyes et al., 2018). Also, because each region manages documents differently, there are inconsistencies in how things are stored and handled (World Bank, 2017).

Looking at the 4Ps as a whole, managing documents well is very important for the program's success but is limited by some problems. While technology helps make things faster, it is held back by poor infrastructure and the different skills of local workers. Using both paper and digital records causes extra work and more chances for errors. Also, not having a single system used by all parts of the program makes teamwork harder and slows decisions (ADB, 2019). Fixing these issues means upgrading technology, training staff better, and giving clear rules on how to manage documents (DSWD, 2020).

In summary, document management is a key but complex part of the 4Ps. Digital tools have helped a lot, but problems with internet access, training, and different rules need to be solved to get the full benefits. Improving how documents are managed will make the program work better and increase trust

in it. A good document management plan is very important for the 4Ps to keep helping poor Filipino families and reduce poverty.

##### 5) *Central Data Management System*

The Pantawid Pamilyang Pilipino Program (4Ps) is a big social program that depends a lot on strong central data systems to correctly identify who needs help, deliver services smoothly, and keep track of progress clearly. As the program grew quickly—from a few hundred thousand to more than four million families—it became very important to have a reliable and expandable data system (DSWD, 2020; Reyes et al., 2018). These central data systems help keep beneficiary records correct, check if families follow the program rules, and make it easier for different government offices to work together across the country (ADB, 2019).

The core of 4Ps' central data system includes digital tools like the Beneficiary Data Management System (BDMS) and the Compliance Verification System (CVS) (DSWD, 2020). These tools let staff update family information in real-time, monitor health and school attendance, and create reports to help make decisions. But because the program grew so fast, the original system—built for 300,000 families—had to handle over 4.4 million families. This caused slowdowns, system crashes, and duplicate records (Reyes et al., 2018; World Bank, 2017). These problems show why it's important to have data systems that can grow and stay strong as the program expands.

To fix these problems, 4Ps works with other government groups and technology projects. For example, the Community-Based Monitoring System (CBMS) from the Philippine Statistics Authority helps collect and update family data more accurately and quickly (PSA, 2022). Local projects like the e4PsMap app, created by the Department of Science and Technology and the University of Mindanao, help local governments watch over the program better (Rural Development Institute, 2021). These partnerships help keep the data system useful for both program workers and the families it serves.

Looking closely at the 4Ps data system shows both good points and ongoing problems. Digital tools have made data more accurate, helped operations run smoother, and made it easier to check program results (ADB, 2019). But the system's fast growth has caused technical problems, data mistakes, and delays (Reyes et al., 2018; World Bank, 2017). Using many different systems and needing constant data checking also makes things complicated and means staff need regular training. Fixing these issues will require better technology, stronger teamwork among agencies, and clearer rules for how data should be handled (DSWD, 2020).

In summary, having a strong central data system is very important for the success and future of big social programs like 4Ps. The program shows why it's important to have systems that can grow, keep data correct, and keep improving digital processes. Going forward, investing more in technology, training staff, and working closely with other agencies will be key to making sure 4Ps reaches all families and helps reduce poverty in the Philippines (World Bank, 2017; ADB, 2019).

##### 6) *Forecasting*

Forecasting is very important for planning and running big social programs like the Pantawid Pamilyang Pilipino Program (4Ps). Being able to guess future needs, how many families will join, and what resources are needed helps the program leaders prepare well and use resources wisely. According to the 4Ps Operations Manual, setting goals and making forecasts are key steps in planning the program. This helps make sure the program meets the changing needs of people and the economy (DSWD, 2018). Good forecasting helps the program make the most of the cash aid it gives and reach its goals, like improving health and education (World Bank, 2016).

The 4Ps forecasting uses a mix of data from the program, tools to find poor families, and results from studies that check how well the program is working. The program uses the Proxy Means Test (PMT) to find eligible families based on factors like family size, education, income, and housing (DSWD, 2018; Reyes et al., 2015). This way, the program can estimate how many families need help and change its plans as new information comes in. Studies done by groups like the Philippine Institute for Development Studies (PIDS), with help from the World Bank and Asian Development Bank, give useful information about how the program is doing and help improve future forecasts (Orbeta & Paqueo, 2016; ADB, 2019).

Research shows that forecasting should work together with ongoing checks and impact studies. For example, the Third Wave Impact Evaluation shows that forecasting isn't just done once but is a continuing process that changes as poverty levels, family situations, and outside events change (DSWD, 2016). For example, in 2014, the program was expanded to include children older than 14 because evaluation results showed this group was missing out. This helped the program adjust its goals to better serve families (Reyes et al., 2015). This ongoing process keeps forecasting useful and makes sure the program meets the most important needs.

Looking at the 4Ps forecasting system shows both its good points and challenges. Using data tools like PMT and regular studies has made planning more accurate and flexible. But forecasting still faces problems like poor data quality, difficulty predicting sudden economic or natural problems, and the complex lives of families (World Bank, 2016). The program also depends on old data and records, which can sometimes cause mistakes, especially when things change quickly. To improve, the 4Ps could use more advanced data tools, collect data in real-time, and plan for different possible future situations to be more ready and flexible (ADB, 2019).

In summary, forecasting is a key part of the 4Ps program's success because it helps leaders plan ahead and make smart decisions based on facts. Using strong methods to find families in need, checking the program's effects, and watching progress closely all help the program respond to poor Filipino families. In the future, improving forecasting with better data tools and planning will be very important to keep the program working well and helping families break out of poverty for good (Orbeta & Paqueo, 2016; Reyes et al., 2015).

##### 7) *Beneficiary Tracking*

Beneficiary tracking is a key part of the Pantawid Pamilyang

Pilipino Program (4Ps). It helps make sure that help reaches the families who really need it and that the program's resources are used well. The Department of Social Welfare and Development (DSWD) uses a strong system to keep track of each household. This is important to keep the program honest and to meet its goal of reducing poverty. The main tool for this is the National Household Targeting System for Poverty Reduction (NHTS-PR), also called Listahanan. This system finds and lists poor families who qualify for the 4Ps. It helps make sure only the right families get help, which lowers mistakes and stops benefits from going to the wrong people (DSWD, 2018; Reyes *et al.*, 2015).

Tracking beneficiaries in the 4Ps has many steps. Each family has a case manager who visits regularly to check if they are following the program's rules, like sending children to school and attending family sessions (DSWD, 2016). These case managers build trust with families, find problems, and offer help when needed. The program also works with local city and municipal workers who can provide advice and counseling if families have problems. This hands-on way helps make sure families don't just get the money but also do their part (Orbeta & Paqueo, 2016).

Technology also helps track beneficiaries by allowing real-time updates and checks. The program uses systems like the Beneficiary Update System (BUS) and the Compliance Verification System (CVS). These help keep family information up-to-date and check if families are following the rules (World Bank, 2016). The systems track changes like family size, children's school enrollment, and health records. There is also the Grievance Redress System (GRS), which lets people complain or report problems about who is included or left out of the program. This helps make the program fairer and more open (Asian Development Bank [ADB], 2019).

Looking at the 4Ps beneficiary tracking shows both its good points and challenges. Using both personal visits and digital systems creates a strong way to monitor families, making sure both people and technology work well together. But because the program helps millions of families across many places, it faces problems like keeping data accurate and updating it quickly (DSWD, 2016; Reyes *et al.*, 2015). Having local case managers and workers is good, but they need constant training and support to do their jobs well. Also, the program must be able to track and react to changes in family situations to keep help focused and useful.

In summary, beneficiary tracking is very important for the 4Ps to work well. It helps the program give help to the right families, check if they follow rules, and respond to their changing needs. The mix of strong targeting, personal case management, and digital tools creates a flexible and effective monitoring system. Going forward, the program needs to keep improving technology, train staff well, and involve the community to make beneficiary tracking stronger and keep the 4Ps an effective way to fight poverty and improve lives (Orbeta & Paqueo, 2016; World Bank, 2016).

#### 8) *Monitoring and Evaluation of Beneficiary*

Monitoring and evaluation (M&E) are very important to make sure the Pantawid Pamilyang Pilipino Program (4Ps)

works well and keeps getting better. This program is the main social help project of the Philippine government. The M&E system is set up to check that the cash help reaches the right families, that families follow the health and education rules, and that the program's effects are carefully measured. Through regular monitoring, the Department of Social Welfare and Development (DSWD) can keep track of how the families are doing, find problems in the program, and make improvements (DSWD, 2018; Reyes *et al.*, 2015).

The 4Ps uses a mix of hands-on visits and digital tools to monitor families. Field workers and case managers regularly visit homes to check if families are following program rules like sending kids to school and joining family sessions (Orbeta & Paqueo, 2016). At the same time, digital systems like the Social Welfare and Development Indicator Information System (SWDI-IS) help track beneficiary data in real time, making it easier to make decisions based on facts (DSWD, 2016). Combining personal visits with technology helps the program gather both numbers and real stories about how families are doing.

Studies show that strong M&E systems are key to keeping the program honest and achieving long-term success. The Philippine Institute for Development Studies (PIDS) and other groups suggest constant help and teamwork among government offices to improve monitoring and evaluation (Reyes *et al.*, 2015). For example, an M&E study in Tabuk City, Kalinga showed how well families followed the program rules and what problems happened during the project (Gaceta, 2020). These reports help improve how the program finds families to help, delivers services, and stays useful for beneficiaries.

Looking closely at the 4Ps M&E system, it has many good points but also some challenges. The mix of personal visits and digital tracking covers a lot and keeps people responsible. But problems like not enough staff, mistakes in data collection, and slow updates to family records still happen (DSWD, 2018; ADB, 2019). The fast growth of the program also put pressure on monitoring, causing some data problems and letting some families who should not be in the program get included (Orbeta & Paqueo, 2016). Fixing these issues means keeping staff trained, upgrading systems, and improving cooperation between agencies to keep good monitoring.

To sum up, monitoring and evaluation are very important for the 4Ps to keep helping families reduce poverty and build better futures. Using both visits and digital tools, along with regular checks on how well the program works, gives a strong base for making smart decisions and improving the program. In the future, building better skills, using new technology, and working well together will be key to making sure the 4Ps stays a helpful, clear, and trusted program for Filipino families (Reyes *et al.*, 2015; World Bank, 2016).

#### 9) *Algorithm*

Algorithms play a vital role in making the Pantawid Pamilyang Pilipino Program (4Ps) work effectively, especially in selecting and monitoring households that need help the most. At the core of the 4Ps targeting process is the National Household Targeting System for Poverty Reduction (NHTS-PR), also known as Listahanan. This system uses a set of clear

rules and calculations—called an algorithm—to evaluate who qualifies based on their living conditions and income. The use of these standardized, data-based rules helps ensure that the selection of beneficiaries is fair, consistent, and free from personal or political bias (DSWD, 2018; World Bank, 2016).

Listahanan's algorithm collects many types of information—such as family size, education level, type of housing, employment, and access to basic services. All of these factors are then combined using a Proxy Means Test (PMT), which calculates a score to estimate how poor a household is. This score helps rank families and decide who gets help through the 4Ps. Because this process is mostly automatic, it cuts down on human error and bias, and makes it easier to manage millions of applications across the country (Reyes *et al.*, 2015; Orbeta & Paqueo, 2016).

Studies show that strong and fair algorithms are essential for social programs like the 4Ps. According to the World Bank (2016), using clear and data-driven rules to choose beneficiaries is one of the most important parts of successful cash transfer programs around the world. Likewise, the DSWD Operations Manual and the 4Ps Implementing Rules and Regulations (IRR) highlight the need to regularly update the selection algorithm. This ensures the program stays up to date with current social and economic conditions and continues to target those who need help most (DSWD, 2018).

Looking at how the 4Ps uses algorithms shows both benefits and challenges. On the positive side, the use of clear, data-based rules has helped reduce mistakes and build public trust in the program. It also allows the government to use its resources wisely and expand the program when needed. However, the accuracy of these algorithms depends on having complete and up-to-date information. If the data is wrong or outdated—especially in remote areas with limited internet and technology—the system can make mistakes in choosing who qualifies. Also, staff members need training to properly use and maintain the system (Asian Development Bank, 2019).

In summary, algorithms are powerful tools that help make the 4Ps fairer, more efficient, and easier to manage. They allow the program to reach the right people and adapt to changing needs. For the 4Ps to continue making a difference in reducing poverty, it's important to keep improving the algorithm, update the data regularly, train staff, and involve the community in the process. These steps will help ensure the program remains strong, accurate, and effective for years to come (World Bank, 2016; Reyes *et al.*, 2015).

#### *10) Announcement and Notification*

Clear announcements and timely notifications are very important for the smooth running of the Pantawid Pamilyang Pilipino Program (4Ps). These updates help families understand when they will receive their cash assistance, what they need to do to stay in the program, and any changes to the rules. The Department of Social Welfare and Development (DSWD) uses different ways to share information—such as community meetings, barangay officials, text messages, and official websites—to reach millions of households across the country (DSWD, 2018; World Bank, 2016). Good communication helps reduce confusion and encourages families to meet the program's

requirements.

When new families are added to the program or when there are updates to the rules, the process usually starts with community meetings. During these gatherings, local government unit (LGU) staff help explain who is qualified and what they need to do next. Once a family is confirmed as a beneficiary, they receive information about when they will get their cash grants, when their compliance will be checked, and what other tasks they need to complete—such as attending family development sessions or going to health checkups. To make sure families don't forget, reminders are also sent through text messages or phone calls (Reyes *et al.*, 2015).

Research shows that strong communication systems are key to making conditional cash transfer programs like the 4Ps work well. The World Bank (2016) points out that clear and timely communication helps families follow the program rules, like sending their children to school or going to health centers. The 4Ps Operations Manual also recommends using a mix of communication tools to reach families in faraway or remote places, especially where internet and phone signals are weak (DSWD, 2018).

When we look closely at how the 4Ps share information with beneficiaries, we can see both good points and challenges. The use of many types of communication—like face-to-face meetings, text messages, and barangay announcements—helps make sure that families in different areas all get the information they need. However, there are still problems, such as late messages, language barriers, and limited access to mobile phones or the internet, especially in remote communities. Also, as the program continues to grow, it becomes harder for staff to keep up with sending updates to everyone on time (Asian Development Bank, 2019).

In summary, sharing accurate and timely information is essential for the success of the 4Ps. By using both traditional and digital ways to communicate, the program makes sure that even families in the most distant areas stay informed and involved. To make communication even better, it's important to invest in better technology, train local staff, and work closely with communities. These improvements will help the 4Ps stay inclusive, efficient, and responsive to the needs of poor Filipino families (Reyes *et al.*, 2015; World Bank, 2016).

#### *B. Related System*

This study examines current 4Ps data management methods and assesses advanced feature systems that are important to enhancing the Pantawid Pamilyang Pilipino Program (4Ps) Management and Forecasting System in order to support the attainment of the research objectives.

The 4Ps Management and Forecasting System is currently an important tool for gathering beneficiary data, encouraging stakeholder interaction, and generating required reports in order to maintain efficient program management. It facilitates the registration of walk-in applicants, the compilation of lists of qualified beneficiaries, the tracking of beneficiary compliance (such as attendance at classes and medical exams), and the generation of payroll monitoring reports. However, the system has problems with security protocols, reporting accuracy, data

integration, and anticipating newly available slots due to program terminations.

The Integrated Social Protection System (ISPS), which has stronger data security measures like multifactor authentication, structured incident response protocols, frequent user training, and the use of AES-256 encryption (Advanced Encryption Standard, or "256"), is cited in this study as an example of security and operational practices that fill these weaknesses (Torres et al., 2022; Dela Cruz & Ramos, 2023).

To clearly highlight these differences, Table 1 presents a direct comparison between the 4Ps Management and Forecasting System and ISPS in terms of their key features:

Table 1 shows that the ISPS system improves the current 4Ps system in terms of security measures. While the 4Ps system lacks complete encryption, leaving it vulnerable to possible threats, ISPS uses sophisticated encryption techniques to ensure data confidentiality and integrity. Additionally, ISPS regularly provides cybersecurity training for its users and enforces stringent access controls and a clear incident response framework, aspects that the 4Ps system should strive to enhance.

It is very important to compare the 4Ps Management and Forecasting System to current models that represent best practices in system operations and security in order to fully evaluate its current limits. The Integrated Social Protection System (ISPS) is one such system that is well-known for its effective management procedures and strong data protection measures. Table 1 provides a thorough side-by-side comparison of the two systems in all important areas, such as user training programs, incident response systems, data encryption, and access control mechanisms. The comparison finds particular mistakes and shortcomings in the 4Ps system by looking at these components. Additionally, it offers practical advice on how to implement ISPS's improved tactics to enhance the system, which will ultimately improve stakeholder engagement, operational effectiveness, and data security. The comparison finds significant problems and shortcomings in the 4Ps system by looking at these components. Additionally, it offers practical advice on how to implement the more advanced practices that ISPS has shown to improve the system, which will ultimately increase stakeholder trust, operational effectiveness, and data security.

*C. Synthesis*

To meet the changing needs of the Pantawid Pamilyang Pilipino Program (4Ps), the 4Ps Management and Forecasting System was carefully created. Its main goal is to improve beneficiary monitoring, reporting, and communication efficiency while increasing data monitoring.

The system's primary focus is on managing and registering 4Ps participants. It provides correct documentation, facilitates

correct beneficiary tracking, and improves the enrollment process for walk-in applicants. The automatic creation of summarized lists for eligibility verification is an important aspect that greatly lowers validation mistakes and duplicate data.

The system keeps track of information about beneficiaries' attendance at classes, enrollment status, involvement in Family Development Seminars (FDS), and use of health services. Program administrators can accurately execute payroll, keep an eye on compliance, and reduce cash disbursement delays by combining these data. In order to accomplish the objectives of the 4Ps program, this strategy encourages increased accountability and openness in the administration of financial payments.

By quickly alerting beneficiaries about important updates, mandatory submissions, and scheduled meetings, a comprehensive notification system improves communication. In addition to preventing missed deadlines, this direct interaction increases beneficiary involvement.

The system can also produce detailed reports, including summaries of individual accounts, lists of eligible beneficiaries, and evaluations of payment eligibility. These reporting features improve financial governance transparency and encourage data-driven decision-making. Forecasting for contract completions and the discovery of new beneficiary candidates are also made possible by the integration of data analytics, which promotes better decision-making and timely enrollment planning.

The system, which has a user-centered interface, serves a variety of stakeholders, such as DSWD Social Welfare Assistants (SWAs), Roving Bookkeepers, Municipal Links, and 4Ps recipients. At every stage of program implementation, operational transparency and accountability are strengthened by clearly defined access roles for every group.

Following established best practices in software development, the system underwent rigorous testing to ensure functionality, accuracy, performance, and security. These empirical validations affirm the platform's reliability and operational readiness for beneficiary data management.

The Technology Approval Model (TAM) was used to analyze the system's usability and perceived ease of use among managers, employees, and beneficiaries in order to determine user approval. The system is kept responsive to stakeholder needs by using the insights gathered from TAM assessments to direct ongoing improvements

For enhancing the 4Ps program's registration, monitoring, reporting, and communication procedures, the 4Ps Management and Forecasting System provides an all-inclusive, tried-and-true, and future-ready solution. Through the integration of strong data management features, predictive analytics, and user-centered design, the system improves

Table 1

Comparison of 4Ps management and forecasting system and ISPS

Aspect	4PS Management and Forecasting System	Integrated Social Protection System (ISPS)
Data Encryption	Needs secure encryption protocols	Employs AES-256 encryption
Access Controls	Role-based permissions advisable	Uses multi-factor authentication
Incident Response Plan	Development required for breach incidents	Established protocols for timely responses
User Training	Training on security best practices lacking	Regular sessions conducted for staff

service delivery, builds stakeholder trust, and advances the 4Ps initiative's main goals.

The integration of modern predictive analytics techniques may be the main focus of future system improvements. The program could take steps to solve possible issues before they affect service delivery and strengthen the strategic planning skills of program implementers by using predictive modeling to identify beneficiaries at risk of non-compliance, estimate future budgetary needs, and know participation advancements.

### 3. Methodology

This section discusses the method to be used in the development of the 4Ps Beneficiaries Management and Forecasting System. The chapter includes the design, population, sampling, data collection method, system development approach and the evaluation process of the data collected in the study.

#### A. Research Design

The study used the descriptive and developmental research design to guide the development of the 4 Pantawid Pamilyang Pilipino Program (4Ps) Management and Forecasting System, a program of the Department of Social Welfare and Development (DSWD).

The descriptive research design was used to analyze the current management practices, challenges and needs in handling 4Ps beneficiaries data. Through initial survey and document analysis (Singh, 2023), it gathered information on the existing process of the DSWD in the 4Ps programs. The study also used the developmental research design to focus on the creation, testing and refinement of the system that fit to managing and forecasting (Singh, 2023) trends among 4ps beneficiaries. Using the Agile development approach, the system was developed in short, repeated cycles called sprints. Each sprint involved refining requirements based on user feedback, collaborating on system design, building parts of the system step-by-step, testing frequently, and releasing updates regularly. This method allowed continuous improvement and quick adjustments to meet the actual needs of DSWD workers, LGU staff, and 4Ps beneficiaries.

To achieve the objectives of the study, both qualitative and quantitative data were used in the design and development of the system. Qualitative data were gathered through open-ended surveys and informal interviews with DSWD workers, LGU staff, and 4Ps beneficiaries to understand their challenges, needs, and feedback about existing systems. This input informed key design decisions during each sprint of the Agile development process. Meanwhile, quantitative data were obtained from existing DSWD 4Ps records and structured surveys. These were used to evaluate the acceptability and usability of the system across different user groups.

#### B. Population of the Study

The population for this study are the stakeholders involved in the Pangil, Laguna Pantawid Pamilyang Pilipino Program (4Ps). Table 2 shows the respondents include members - beneficiaries of 4Ps and the DSWD personnel -such as

Municipal Link, DSWD SWA, LGU Link and Roving Bookkeeper who are responsible for coordinating and overseeing the planning, monitoring, and execution of the program. A total of 699 active members of the 4Ps program and four (4) DSWD personnel were able to use the program. Table 2 shows the population of the study.

Table 2  
Population of the study

Respondents	Total Population
4Ps Active Member	699
DSWD Personnel incharge in the 4Ps	4
<b>Total</b>	<b>703</b>

The 4Ps members (beneficiaries) are the low-income households and communities that system gives an enhanced communication and service delivery through geolocation features and SMS notifications; the system will benefit those in remote areas. In addition, the DSWD personnel will greatly benefit from a centralized system designed to improve data management, streamline operations, and support informed decision-making processes. SWAs have a direct interaction with beneficiaries through household assessments, compliance monitoring, and cash transfers. Reduced paperwork and better tracking and communication with beneficiaries are needed for the efficiency of the workload. Their basic level of coordination and beneficiary support tools are enhanced through improved reporting and collaboration with the community and barangay officers. With data analytics, local Government Units will employ their municipal officials to distribute resources judiciously for more timely release of funds and to effectively enforce policies. Roving bookkeepers responsible for maintaining financial transparency and tracking compliance will be able to benefit from real-time disbursement updates and automated tracking systems to enhance efficiency.

#### C. Sampling Design

The study used stratified random sampling for 4Ps beneficiaries and the total enumeration for the DSWD personnel to ensure a representative and comprehensive data collection process.

The 4Ps beneficiaries have a total number of 699 members that are selected in the different barangay in the Municipality of Pangil, Laguna. The stratified sampling is the most appropriate technique because this method ensures that each barangay is proportionally represented in the study, preventing bias and improving the accuracy of findings (Ahmed, 2024). By randomly selecting the respondents in the respondent for each barangay, the study captures the variation across different communities' acceptance, making the results more reliable. The 249 from barangay are computed depending on their percentage in the population were selected using the stratified sampling method to ensure the contribution of the number of respondents maintain fairness from a large population compared to a smaller population.

Meanwhile, the total enumeration was applied to the DSWD personnel since the population consisted of only 4 personnel. Since the personnel are responsible for implementing and

Table 3  
Sampling distribution

Respondents	Total Population	Sampling Technique	Sample Size
4Ps Active Member	699	Stratified Sampling	Balian- 49
			Dambo- 21
			Galalan- 16
			Isla (Pob.)- 39
			Mabato-Azufre- 18
			Natividad (Pob.)- 26
			San Jose (Pob.)- 8
			Sulib- 72
DSWD Personnel incharge in the 4Ps	4	Total enumeration	4
<b>Total</b>	<b>703</b>		<b>249</b>

managing the 4Ps program. Since the number is limited to include all four individuals ensures that their insights and expertise are fully considered. This approach also eliminates sampling error and ensures that all relevant administrative perspectives are included in the study.

Table 3 displays the computed sample size consisting of two hundred forty-nine (249) respondents. A stratified sampling technique was employed to select participants from among the 4Ps members, ensuring proportional representation based on their distribution within the population. In contrast, the four (4) DSWD personnel directly involved in the implementation of the 4Ps program were included through total enumeration, given their limited number and direct relevance to the study.

**D. Data Collection Instrument**

The study used a survey questionnaire, semi-structured interview, and historical data collection. The primary data collection instrument was the acceptability evaluation of the Pantawid Pamilyang Pilipino Program (4Ps) Management and Forecasting System. To obtain accurate information and data for this research, a combination of qualitative and quantitative tools was used to meet the specific research objectives (Creswell & Creswell, 2018).

*Survey Questionnaires.* To collect information from the people involved in the 4Ps program, the researchers used survey questionnaires with fixed questions. These surveys were given to DSWD staff, Social Welfare Assistants (SWAs), barangay officials, Local Government Units (LGUs), and 4Ps beneficiaries. The questions were based on the Technology Acceptance Model (TAM), which helps measure how people feel about using a new system.

The survey had four main parts: Perceived Usefulness (PU), which asks if the system helps them do their work better; Perceived Ease of Use (PEU), which checks if the system is easy to learn and use; Attitude Toward Use (ATU), which looks at whether people feel good or bad about using the system; and Behavioral Intention to Use (BIU), which finds out if they are likely to use the system in the future.

Each question used a 5-point Likert scale to show how much the person agrees or disagrees. The choices were: 1 – Strongly Disagree, 2 – Disagree, 3 – Neutral, 4 – Agree, and 5 – Strongly Agree. This helped the researchers measure people’s opinions in a clear and consistent way.

By using this scale, the answers could be counted and studied using basic statistics like the average score and how many people chose each option. This helped the researchers understand what people think about the system’s usefulness,

ease of use, and how likely they are to use it.

Overall, the survey was very helpful in gathering feedback and understanding how the system could be improved and how likely it is to be used by the people involved in the 4Ps program.

*Interviews.* Semi-structured interviews will be conducted with the key informants of program administrators and field implementers in order to get qualitative, deeper data on the existing challenges pertaining to implementing the program and the extent to which the system will affect the operation. It provides an in-depth perspective that helps refine the Pantawid Pamilyang Pilipino Program (4Ps) Management and Forecasting System features and ensure the alignment of stakeholders' needs.

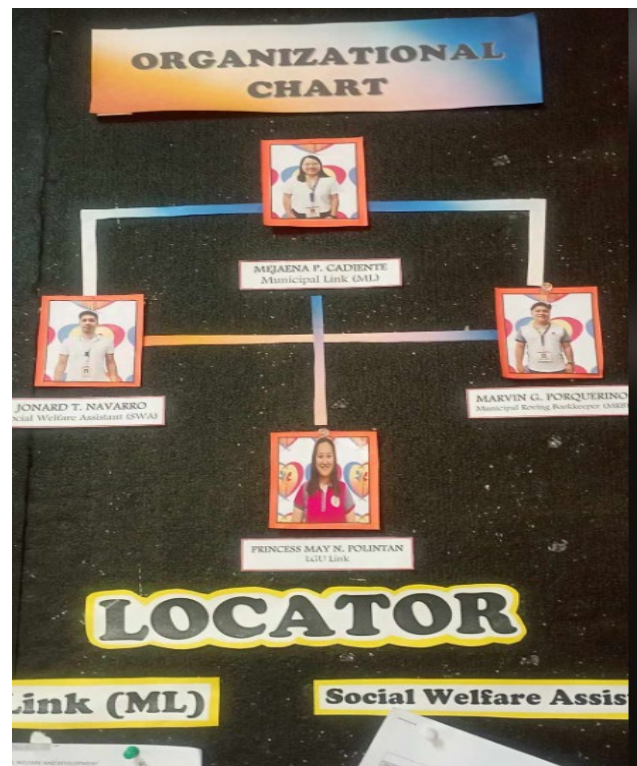


Fig. 2. DSWD interview for proposed system assessment

Figure 2 shows two important parts: first, a photo of an interview with someone working in the 4Ps program, and second, an organizational chart showing the structure of the people involved in the program. These help explain how the information gather from those who actually manage and implement the program. The goal is to understand the challenges they face and use their input to improve the 4Ps

Management and Forecasting System. The chart also helps make sure the system fits well with how the program is organized and how people do their jobs.

*Historical Data.* The use of historical data from the current 4Ps program is important for this study because it helps set a baseline to compare the old and the new systems. This includes information such as profile management, disbursement records, and compliance reports. By reviewing this data, the researchers can clearly see if the new system works better in terms of accuracy, speed, and efficiency. It also helps identify the problems and limitations in the existing system, which can guide the design of the improved one. In addition, the historical data is useful for forecasting trends, like future disbursement needs or possible compliance issues. Using real data from the current system also makes the study more reliable and relevant to actual conditions in the 4Ps program.

*E. Statistical Treatment*

To ensure a comprehensive evaluation of the Pantawid Pamilyang Pilipino Program (4Ps) Management and Forecasting System, various statistical methods were employed to analyze the collected data accurately and meaningfully.

To determine the sample size, Slovin’s formula was utilized, which allowed for appropriate sampling from the target population while minimizing sampling error.

The study applied descriptive statistical techniques to summarize and interpret the gathered data. These included frequency and percentage distributions to describe respondent characteristics and overall trends. The mean was used to determine the central tendency of responses in the Technology Acceptance Model (TAM) evaluation, particularly in measuring constructs such as Perceived Usefulness (PU).

To assess how useful the developed system was perceived by its users, a user-based evaluation was conducted. Respondents rated the system based on five key statements aligned with the PU construct using a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The responses were analyzed to evaluate the system’s effectiveness, efficiency, and overall impact on user performance.

In addition, to determine whether there were significant differences in perceptions between different groups of respondents (e.g., based on age, role, or experience), the Mann-Whitney U test was applied. This non-parametric test was chosen due to its suitability for ordinal data and small sample sizes. It was particularly useful in comparing two independent groups to assess whether their perceptions of the system’s usefulness differed significantly.

Table 4  
Likert scale used in measuring attitude

Likert Scale Interpretation	Likert Scale	Likert Scale Interval
Strongly Agree	5	4.21 - 5.00
Agree	4	3.41 - 4.20
Neutral	3	2.61 - 3.40
Disagree	2	1.81 - 2.60
Strongly Disagree	1	1.00 - 1.80

*F. Project Design*

The 4Ps Management and Forecasting System, used the

Agile Model (see Figure 3). This method allows the system to be developed step-by-step, with changes and improvements made based on the feedback from users like DSWD workers, LGU staff, and 4Ps beneficiaries. The Agile Model includes five important stages: Planning, Data Gathering and Requirement Analysis, Designing, Testing and Debugging, and Evaluation. Agile makes it easier to fix problems, improve the system, and adapt to user needs as development continues. As stated by Edeki (2015), Agile breaks down big tasks into smaller ones, which helps teams plan and work more efficiently.



Fig. 3. Agile methodology model

*1) Analysis*

The first step in developing the system was to gather and organize both the functional and non-functional requirements. This involved understanding how 4Ps members apply for the program, how their personal and family information is stored, and how their compliance with program conditions—such as attending school, going to health checkups, and joining family development sessions—is monitored. To better understand how the program works on the ground, the developer also conducted interviews with municipal links, Social Welfare Assistants (SWAs), LGU staff, and roving bookkeepers.

From these interviews, it was found that many staff members experience difficulties in managing records manually, such as delays in updating data, inconsistent file formats, and a lack of automatic reporting tools. They also mentioned that it takes time and effort to track the status of beneficiaries and forecast who might graduate from the program. Most of them expressed the need for a system that is easier to use, can store information in one place, and can provide quick access to reports and reminders. These findings helped guide the development of key features for the system, such as tracking beneficiaries, forecasting graduates, and sending automatic reminders to members. The information gathered from the interviews ensured that the system was designed based on real needs and would help make the work of 4Ps staff faster, easier, and more efficient.

## 2) Planning

Next, studying books, articles, and reports related to the 4Ps program and data systems. The developer also talked to DSWD and LGU staff in Pangil, Laguna to understand the problems they face, especially in tracking members and their compliance. These discussions helped shape the idea and features of the system.

## 3) Design

The system was carefully planned to make sure it is easy to use and meets the needs of the people who work with the 4Ps program. The first step in the design process was creating flowcharts to show how the system works—from the registration of 4Ps members to checking if they are attending school, going to health checkups, and joining family development sessions. These flowcharts helped the developer understand how different parts of the system should connect and work together.

After that, the developer made wireframes, or simple screen designs, to show what each part of the system would look like. These include the layout of the buttons, forms, menus, and other parts the users will see and use. To make these designs, the developer used tools like Adobe XD to create the screen layouts and Photoshop to design the visual parts such as icons and colors.

The design was improved by listening to feedback from DSWD workers and other staff who would use the system. Their suggestions helped make sure the system is clear, simple to use, and fits the tasks they do every day. Important parts of the system, like adding new members, tracking their progress, sending reminders, and generating reports, were made easy to access. By using good design tools and real user feedback, the system was built to be useful, organized, and easy to use for everyone involved.

## 4) Development

The system was built using simple and reliable tools like HTML, Tailwind CSS, PHP, JavaScript, and MySQL. These were chosen because they work well together and are good for making a website that is easy to use. HTML was used to create the basic layout of each page. Tailwind CSS helped in designing the pages so they look clean, neat, and work well on both phones and computers. PHP was used to connect the pages to the database and make the system work whenever a user fills out a form or asks for a report. JavaScript made the system more interactive, helping users get quick responses and making sure their input is correct before saving. MySQL was used to store all the data, like member details, attendance, and payment records, in a safe and organized way. A forecasting tool was also added to help the DSWD staff predict which members are about to graduate from the program. This can help them plan ahead and see how many new members can be accepted. For now, the system is only being tested in Pangil, Laguna, as a pilot version before it is shared in other areas.

## 5) Testing

After building the system, it was tested to make sure everything works the way it should. Actual users, like DSWD staff and local government workers, tried out all the important parts of the system. They tested tasks such as adding new

members, updating their information, tracking if members go to school or health checkups, and checking reports. They also tested the forecasting tool to see if it correctly predicts when members might finish the program. The testing was done step by step to find any mistakes or problems. Users shared their thoughts about how easy the system was to use and if it helped them do their work faster. This feedback was used to fix problems and make the system better. The study also used a tool called the Technology Acceptance Model (TAM) to see if users found the system useful, easy to use, and if they would want to keep using it in the future.

## 6) Maintenance

After the system was test and implemented a maintenance check done to ensure that the system maintain it usefulness to the beneficiaries. The develop project were maintained by the development team so that it will adjust to the exact needs of the beneficiaries.

## 4. Results and Discussion

This section presents the results of the system development and evaluation based on the research objectives. The findings are thoroughly examined in alignment with the study, the proponents objectives, specifically focusing on data management functionalities, user interface and experience design, predictive analytics capabilities, system performance through testing, and user acceptability assessed through the Technology Acceptance Model (TAM). The presentation of the results is guided by the specific objective of the study.

*To develop 4Ps Management and Forecasting System with a centralized platform and organize beneficiary data management, reporting, and communication channels.*

The proponent developed a centralized and efficient 4Ps Management and Forecasting system that can consolidate and secures beneficiary data in one platform, streamlines the management of records and compliance monitoring, provides accurate and timely reports for decision-making, and enhances communication among DSWD staff, field workers, and stakeholders. The system also supports data-driven forecasting to anticipate beneficiary needs and optimize resource allocation. Furthermore, it ensures data integrity and privacy through secure access controls and audit trails.

### 1) 4Ps Management and Forecasting System with a centralized platform

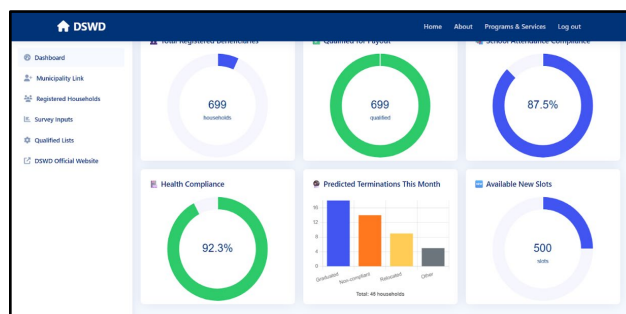


Fig. 4. Centralized platform

Figure 4 shows a centralized platform created to make the

Pantawid Pamilyang Pilipino Program (4Ps) more efficient and transparent. It features an easy-to-use dashboard that helps administrators keep track of household registrations, check compliance with program requirements, and predict future trends. The system monitors family participation in health and education activities, tracks potential removals from the program, and helps make better decisions about where to allocate resources. It also ensures that available slots are fairly given to new qualified beneficiaries. By using accurate and updated data, the system improves accountability, speeds up work processes, and ensures that financial aid goes to those who truly need it. In general, the system strengthens how the 4Ps program is managed and helps plan for its future, making it more sustainable and effective. It minimizes manual errors and duplication of records, promoting a more reliable and streamlined database. Additionally, it fosters greater collaboration between local government units and DSWD offices by providing real-time access to relevant data.

*4Ps Management and Forecasting System with organize beneficiary data management*

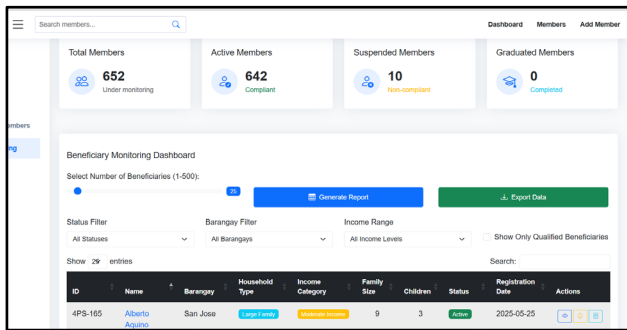


Fig. 5. Organize beneficiary management

Figure 5 shows a centralized tool that helps organize and manage information about beneficiaries of the Pantawid Pamilyang Pilipino Program (4Ps). It allows administrators to efficiently track and monitor active members, suspended households, and those who have completed the program. This system ensures that household data is accurate and transparent.

It includes useful features such as filtering by barangay, income level, and beneficiary status, making it easier to find and review specific information. The system also generates reports, which help with planning, resource distribution, and improving the program when needed.

By keeping records up to date and simplifying how data is managed, the system increases efficiency, supports transparency, and helps make sure that financial assistance goes to the families who truly need it. In the end, it strengthens the integrity of the program and improves support for low-income households.

*4Ps Management and Forecasting System with reporting:*

Figure 6 shows the designed to help leaders make better decisions by providing clear and detailed reports about beneficiaries and how the program is performing. It allows administrators to create reports on active, suspended, and graduated members, helping ensure transparency and accountability in managing the Pantawid Pamilyang Pilipino

Program (4Ps).

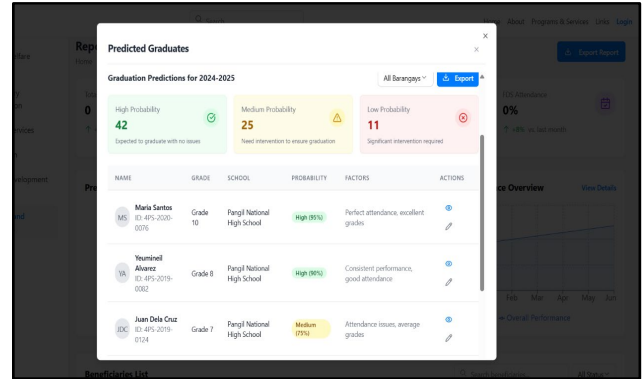


Fig. 6. Reporting

Users can filter data by barangay, income level, and beneficiary status, making it easier to understand trends and plan for future needs. The system also allows reports to be exported for easier record-keeping and tracking of compliance.

In the long run, this reporting feature helps make the program more efficient, improves how resources are used, and ensures that financial support reaches the people who need it most.

*4Ps Management and Forecasting System with communication channels*

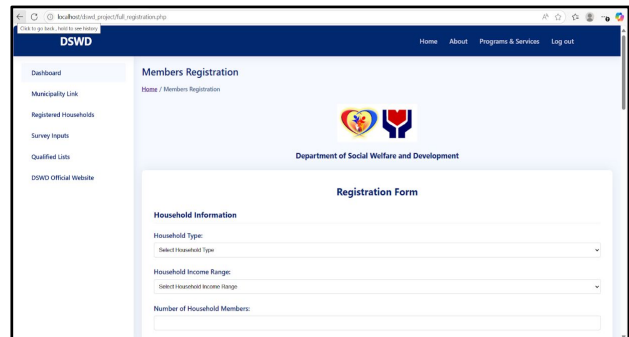


Fig. 7. Communication channels

Figure 7 shows the 4Ps Management and Forecasting System with communication channels is designed to make it easier to register beneficiaries and share important information in the Pantawid Pamilyang Pilipino Program (4Ps). It includes a Member Registration feature where families can sign up by providing basic details such as household type, income level, and family size.

The system also has built-in communication tools that allow the Department of Social Welfare and Development (DSWD) to send updates, announcements, and reminders directly to beneficiaries. This helps keep everyone informed and improves access to information.

By making registration simple, keeping household data accurate, and improving communication between the DSWD and beneficiaries, the system helps the program run more smoothly. In the end, it ensures that financial support and services go to the families who need them most. This strengthens the overall efficiency and accountability of the 4Ps implementation. Moreover, it builds trust among beneficiaries,

fostering greater cooperation and participation in the program.  
 2) *Generate and display a table that shows the list of qualified 4Ps members for schedule of verification*

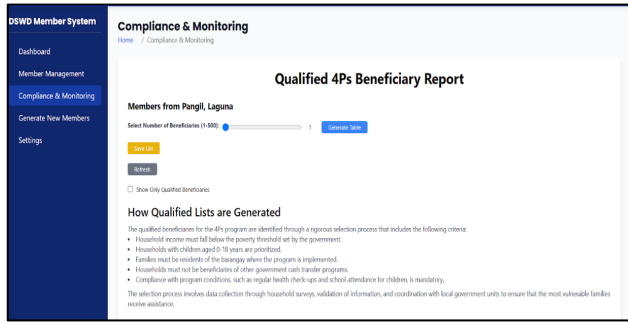


Fig. 8. Generate and display a table that shows the list of qualified 4Ps members for schedule of verification

Figure 8 shows the proposed ICT-based system helps create and show a simple list of qualified 4Ps members who are scheduled for verification. After walk-in applicants are registered, the system checks their information to see if they meet the requirements, like family size, income, and documents. If they are qualified, the system gives them a schedule for verification and adds their names to the list. DSWD staff can easily view, update, or print the list using the system. This makes the process faster, more organized, and easier to understand. It also helps make sure that only those who truly need support are included in the program.

3) *Efficiently tracks 4Ps beneficiaries information*

Figure 9 shows the proposed ICT-based system helps keep track of 4Ps beneficiaries' information in a clear and simple way. When a person applies, their details like name, family members, income, education, and health are saved in the computer system. Each beneficiary gets a unique ID, making it easy to find or update their information anytime. DSWD staff can quickly check their status, make changes if needed, and keep their records correct and updated. This avoids missing or repeated data and helps staff give the right support on time. The system makes tracking faster, more organized, and easier to manage, helping achieve the goal of monitoring 4Ps beneficiaries properly.

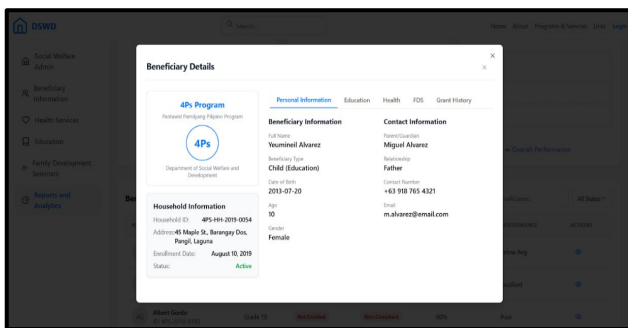


Fig. 9. Tracks beneficiary information

4) *Monitor the beneficiaries progress report if they are enrolled or not, their attendance in class, attendance to family development seminars, and health services they have taken for their payroll compliance monitoring*

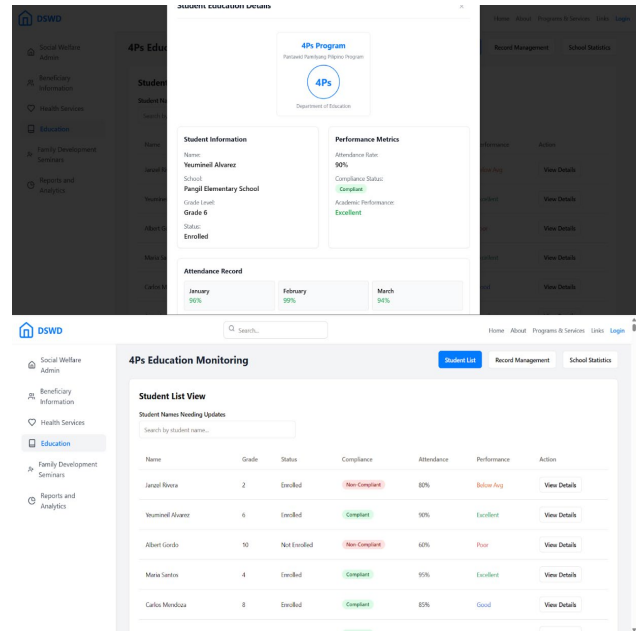


Fig. 10. Monitoring of the beneficiaries progress report (enrolled or not, class attendance, attendance to family development seminars, and health services)

Figure 10 shows the proposed system helps track the progress of 4Ps members by recording if they follow the program's rules. It checks if the children are enrolled in school and attending classes. It also monitors if the parents go to Family Development Seminars and if they receive health services like checkups or vaccines. Teachers, health workers, and seminar leaders can input this information into the system. All the data is saved under each member's profile, so DSWD staff can easily see if they are meeting the program's requirements. The system also helps create reports to show who should receive their cash assistance. This makes the process faster, more organized, and ensures only qualified members get paid.

5) *Notify the 4Ps members about the scheduled meeting and for the requirements that they need to pass*

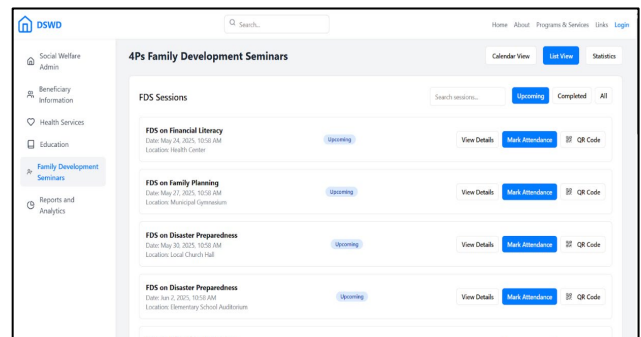


Fig. 11. Notification about meetings and requirement to be submitted by 4Ps members

Figures 11 shows the proposed system helps remind 4Ps members about their meeting schedule and the requirements they need to bring. When a meeting is planned, the system sends a message to the members using text or email. The message tells them the date, time, and place of the meeting, and lists the documents they need to pass. This helps members remember their schedule and come prepared. The system also shows if the message was delivered. This makes communication easier, helps members attend on time, and keeps the program running smoothly.

6) Create reports such as the list of qualified 4Ps beneficiaries, list of member to be paid, and details of the members individual account

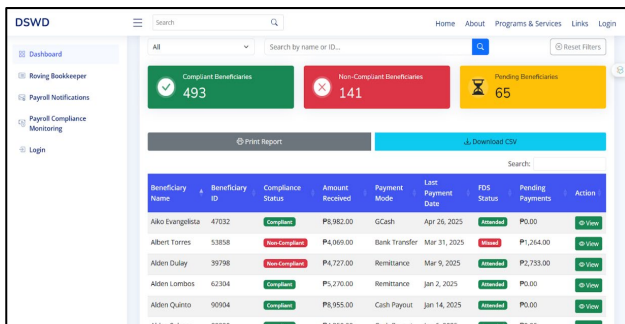


Fig. 12. Report (list of qualified 4Ps beneficiaries, list of members to be paid, and details of the members individual account)

Figure 12 show the proposed system helps make reports like the list of qualified 4Ps members, the list of members who will receive payment, and the details of each member’s account. When members are registered, their information is saved in the system, including their personal details, attendance, and payment records. The system checks who follows the program rules and adds them to the list of qualified members. It also creates a list of members to be paid and shows their payment history and current status. This helps DSWD staff work faster, avoid mistakes, and make sure only those who qualify get the support. The system makes reporting easier, clearer, and more organized.

To develop user interface for the member information Municipality Link, DSWD, SWA, LGU Link and Roving Bookkeeper

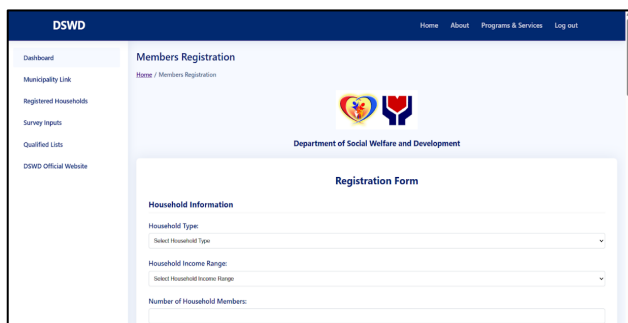


Fig. 13. User interface for DSWD

Figure 13 shows the system has a simple and easy-to-use interface for different users like the Municipality Link, DSWD staff, SWA, LGU Link, and the Roving Bookkeeper. Each user

will have their own login and see only the tools and information they need. For example, the Municipality Link and LGU Link can check and update member details, set meeting schedules, and track attendance. DSWD staff can manage reports and approve who gets paid. SWAs can check and confirm family information. The Roving Bookkeeper can review payment details. This helps each user do their work faster and more correctly. The system keeps information safe, clear, and easy to use, helping the 4Ps program run better. ser roles and permissions are clearly defined to avoid unauthorized access and ensure accountability. Notifications and alerts are built into the system to remind users of important tasks or deadlines. Each action taken within the system is logged for transparency and audit purposes. Overall, this role-based interface ensures efficient coordination and smoother operations among all involved personnel.

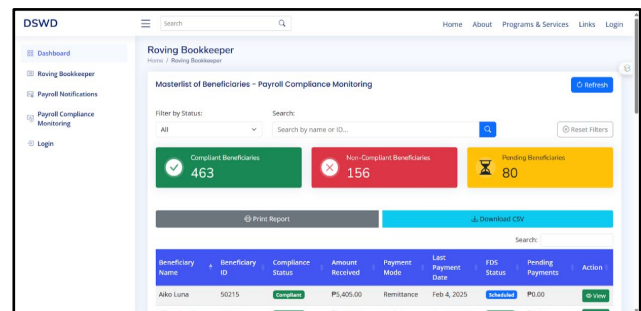


Fig. 14. User interface for roving bookkeeper

Figure 14 show the designed to make remote bookkeeping simple and efficient. It allows users to record financial transactions, manage accounts, and create reports in an organized way, helping ensure accuracy and ease of use.

The system includes helpful features like real-time data entry, automatic calculations, and customizable reports, which reduce mistakes and save time. Since it can be used remotely, it is ideal for professionals who need a flexible and reliable tool for managing finances from anywhere.

Overall, this interface improves accuracy, saves time, and allows bookkeepers to manage accounts effectively without needing to be on-site.

To integrate data analysis to forecast the terminated contract and identify the new slots for beneficiaries of 4Ps

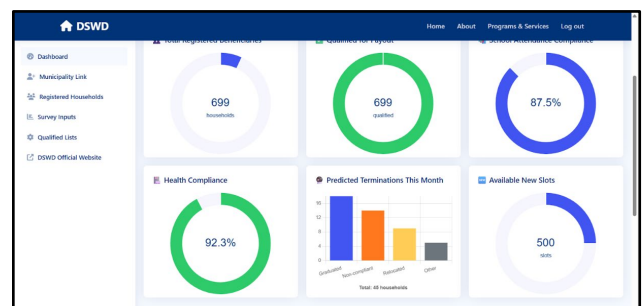


Fig. 15. Data Analytics for forecasting the terminated contract and identify slots for new beneficiaries of 4Ps

Figure 15 show the proposed system uses simple data

checking to help find out which 4Ps members might be removed from the program and how many new members can be added. It looks at important records like school attendance, health checkups, and seminar attendance. If a member often misses these, the system will mark them as possible for termination. It also keeps track of members who have already left the program. With this information, the system shows how many slots are now open for new qualified members. This helps DSWD make faster and better decisions. The system makes the process easier, clearer, and helps keep the 4Ps program fair and updated. It minimizes the need for manual validation and reduces the risk of overlooking inactive or non-compliant members. The automated checks also help ensure that only those meeting the program's conditions continue to receive support. Additionally, it gives staff a clear view of program compliance trends across different areas. This improves transparency and allows for better planning of outreach and support efforts.

*To evaluate the acceptability of 4P's Beneficiaries Management and Forecasting System with the use of TAM.*

A total of 256 respondents were participated in the study. Four (4) DSWD Officers and two hundred fifty-two (252) 4Ps Beneficiaries respondents answers the questionnaire disseminated.

Table 5 presents the perceived usefulness of the 4Ps Management and Forecasting System based on various indicators. The overall mean score is 4.29, with a verbal interpretation of "Strongly Agree," indicating a high level of user agreement regarding the system's usefulness. Among the indicators, PU1—which states that using the system would improve transaction processes—received the highest mean score of 4.36, ranking first. This suggests that users believe the system significantly enhances operational efficiency. PU3, which highlights the system's ability to improve the accuracy of forecasting beneficiary needs, follows with a mean of 4.32, ranking second. This shows that the system is seen as valuable in supporting accurate data-driven decision-making. The high scores for both indicators reflect the users' confidence in the system's ability to optimize workflow and enhance the overall quality of program planning and delivery.

Indicators PU2 and PU5 are tied at a mean of 4.28 and are both ranked at 3.5. PU2 reflects the system's role in supporting informed decisions about program implementation, while PU5 emphasizes the benefit of providing real-time and updated information. These indicators highlight how the system contributes not only to strategic planning but also to timely and accurate service delivery. Lastly, PU4, which discusses the reduction of paper-based processes and manual errors, received a mean of 4.21 and is ranked fourth. This suggests that users recognize the value of digitization in minimizing human error

and administrative burden. All indicators were verbally interpreted as "Strongly Agree," reinforcing the perception that the 4Ps Management and Forecasting System offers meaningful improvements to program operations, decision-making, data accuracy, and efficiency. The consistent high ratings suggest that users find the system reliable, user-friendly, and responsive to the demands of their roles.

Furthermore, the system's accessibility and ease of use may have contributed to its favorable evaluation, especially among beneficiaries with limited technological experience. Its straightforward interface and guided navigation allowed users to complete tasks with minimal technical support. This ease of interaction encouraged more consistent and confident use of the platform. The integration of user-specific dashboards and role-based access added another layer of efficiency, allowing each stakeholder to focus on relevant tasks. Beneficiaries noted that their concerns and status updates were addressed more promptly through the platform. These outcomes suggest that the system has the potential to be scaled for broader use in other municipalities or related welfare programs. Continued feedback and system refinement based on user experience will be vital for maintaining and improving its effectiveness over time.

The Technology Acceptance Model (TAM), developed by Davis (1989), serves as a foundational framework for understanding Perceived Ease of Use (PEU) in system adoption. TAM posits that ease of use significantly influences user acceptance, as systems requiring minimal effort encourage engagement and utilization (Davis, 1989). Studies on government digital platforms emphasize the importance of user-friendly interfaces in ensuring accessibility for diverse users (Ndou, 2004; Bertot, Jaeger, & Grimes, 2010). Research suggests that systems designed with intuitive navigation and clear information presentation enhance user satisfaction and adoption rates (Venkatesh & Davis, 2000). In the context of the Pantawid Pamilyang Pilipino Program (4Ps), literature highlights that digital tools supporting forecasting and management improve decision-making and operational efficiency (Acosta & Velarde, 2015). A study reviewing the implementation of 4Ps found that beneficiaries benefit from streamlined processes, reducing manual errors and improving accessibility (Orbeta et al., 2014).

The Technology Acceptance Model (TAM), introduced by Davis (1989), is widely recognized in research on system adoption, emphasizing that Perceived Ease of Use (PEU) directly influences user acceptance because systems requiring minimal effort encourage engagement and utilization. Studies consistently show that users are more likely to adopt technology when they find it intuitive and accessible (Venkatesh & Davis, 2000; King & He, 2006).

Research on government digital platforms highlights the

Table 5  
Perceive usefulness

Indicators	Mean	SD	Verbal Interpretation	Ranking
PU1 In using the 4Ps Management and Forecasting System platform it would improve transaction of the program.	4.36	0.689	Acceptable	1
PU2 The 4Ps Management and Forecasting System help in making informed decisions about program implementation.	4.28	0.680	Acceptable	3.5
PU3 The 4Ps Management and Forecasting System improve the accuracy of forecasting beneficiary needs.	4.32	0.712	Acceptable	2
PU4 Using 4Ps Management and Forecasting System will reduce paper and manual errors.	4.21	0.823	Acceptable	4
PU5 Using the 4Ps Management and Forecasting System it provide real time and updated information.	4.28	0.712	Acceptable	3.5
<b>Total</b>	<b>4.27</b>			

Table 6  
Perceived ease of use

Indicators	Mean	SD	Verbal Interpretation	Ranking
PEU1 The 4Ps Management and Forecasting System is easy to navigate.	4.20	0.759	Strongly Agree	5
PEU2 The interface of 4Ps Management and Forecasting System is user friendly and well organized.	4.26	0.706	Strongly Agree	1
PEU3 I find the information presented on the 4Ps Management and Forecasting System easy to understand.	4.25	0.707	Strongly Agree	2
PEU4 I can easily access the features I need in the 4Ps Management and Forecasting System	4.22	0.801	Strongly Agree	3
PEU5 Using the 4Ps Management and Forecasting System it requires minimal effort and does not require training	4.31	0.782	Strongly Agree	4
<b>Total</b>	<b>4.27</b>			

Table 7  
Attitude towards usage

Indicators	Mean	SD	Verbal Interpretation	Ranking
ATU1 I have positive attitude towards using 4Ps Management and Forecasting System.	4.25	0.725	Strongly Agree	3
ATU2 I feel that the 4Ps Management and Forecasting System provides a good idea in managing 4Ps program.	4.24	0.747	Strongly Agree	4
ATU3 I enjoy and confident using the 4Ps Management and Forecasting System in managing 4Ps program.	4.22	0.766	Strongly Agree	5
ATU4 I would recommend the 4Ps Management and Forecasting System that would benefit all stakeholder involves in the 4Ps program.	4.29	0.711	Strongly Agree	2
ATU5 The 4Ps Management and Forecasting System will enhance the quality of 4Ps program management.	4.34	0.678	Strongly Agree	1
<b>Total</b>	<b>4.27</b>			

importance of user-friendly interfaces in ensuring accessibility for diverse users, with systems designed for clear navigation and well-organized layouts enhancing user satisfaction and adoption rates (Ndou, 2004; Bertot, Jaeger, & Grimes, 2010). Additionally, frameworks such as the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) and Innovation Diffusion Theory (IDT) (Rogers, 2003) further support the role of ease of use in technology adoption.

The results from Table 6 align with this existing literature, reinforcing that ease of use is a critical factor in system adoption. The high mean scores indicate that users find the system intuitive and accessible, consistent with findings from TAM and studies on government digital platforms.

This ease of interaction not only encourages frequent use but also reduces resistance to adopting new technology. Consequently, systems designed with user-centered principles are more likely to achieve sustained engagement and successful implementation (Venkatesh & Bala, 2008).

Based on the results presented in Table 7, the overall attitude of the respondents toward the 4Ps Management and Forecasting System is highly favorable, with a computed average mean of 4.27, verbally interpreted as "Strongly Agree." This suggests that the respondents possess a strong and positive disposition toward the system's usage in managing the 4Ps program.

Among the five indicators, the highest mean score was recorded under ATU5 ("The 4Ps Management and Forecasting System will enhance the quality of 4Ps program management") with a mean of 4.34, indicating that respondents strongly believe in the system's ability to improve the overall quality of program implementation. This was followed by ATU4 ("I would recommend the system to benefit all stakeholders") with a mean of 4.29, demonstrating a high level of advocacy and willingness to promote the system to other users involved in the program. These results suggest that the system is not only viewed as functionally effective but also trusted enough to be endorsed by its users. The respondents' strong support reflects a sense of ownership and belief in the system's potential to make a meaningful impact. This level of endorsement is essential in fostering widespread adoption and sustaining digital transformation within the 4Ps program.

ATU1, which refers to respondents having a positive attitude

toward using the system, received a mean of 4.25, while ATU2, which relates to the usefulness of the system in managing the program, closely followed with a 4.24 mean. These results emphasize the respondents' trust in the functionality and efficiency of the system. The high scores indicate that users not only acknowledge the system's practical benefits but also show a strong willingness to integrate it into their daily operations. Such a positive reception is crucial for sustained usage and long-term impact. It also suggests that the system aligns well with the users' needs and expectations in managing the 4Ps program.

The lowest mean was recorded under ATU3 ("I enjoy and am confident using the system") with a score of 4.22, which, although still interpreted as "Strongly Agree," suggests a slight reservation in terms of user enjoyment and confidence. This may indicate the need for further system familiarization or training to improve user comfort and ease. It is possible that while the system is seen as functional and effective, some users may still face minor difficulties in navigating or fully utilizing its features. Addressing these concerns through continuous user support and feedback mechanisms could significantly enhance the overall user experience. Ensuring that users feel both confident and satisfied is essential for maximizing system effectiveness.

The data reflect a highly positive attitude toward the 4Ps Management and Forecasting System. Respondents believe it enhances program quality, aids in efficient management, and merits strong endorsement to other stakeholders. This strong attitude toward adoption is a promising sign for the system's sustainability and broader implementation. Furthermore, the generally high agreement across all indicators suggests readiness among users to embrace digital solutions in social service delivery. Minor areas such as user confidence may benefit from additional support to further optimize system adoption, ensuring that both technical performance and user satisfaction are maintained.

Based on the findings presented in Table 8, respondents demonstrated a strong behavioral intention to use the 4Ps Management and Forecasting System, with an overall mean of 4.24, verbally interpreted as "Strongly Agree." This suggests a high level of willingness among respondents to adopt and consistently use the system in the implementation of the 4Ps

Table 8  
Behavioral intention to use

Indicators	Mean	SD	Verbal Interpretation	Ranking
BIU1 I am likely to use the 4Ps Management and Forecasting System regularly once it implemented.	4.20	0.768	Strongly Agree	3
BIU2 I would recommend the 4Ps Management and Forecasting System to other involve in the program.	4.21	0.803	Strongly Agree	4
BIU3 I would explore the 4Ps Management and Forecasting System for further learning about the system.	4.25	0.721	Strongly Agree	5
BIU4 I would recommend the 4Ps Management and Forecasting System to implement in my municipality.	4.26	0.734	Strongly Agree	2
BIU5 I would continue use the 4Ps Management and Forecasting System for the improvement of the 4Ps program.	4.30	0.714	Strongly Agree	1
<b>Total</b>	<b>4.24</b>			

program.

The highest-rated statement was BIU5 ("I would continue to use the 4Ps Management and Forecasting System for the improvement of the 4Ps program") with a mean score of 4.30, indicating that respondents perceive the system as a valuable tool for enhancing the program and are committed to its continuous use. Following this is BIU4, with a mean of 4.26, where respondents expressed their intent to recommend the system for implementation in their respective municipalities—highlighting strong advocacy for broader adoption. BIU1 and BIU2, which relate to regularly using the system once implemented (mean = 4.20) and recommending it to others involved in the program (mean = 4.21), also received high ratings. This indicates confidence not only in using the system personally but also in promoting its benefits to colleagues and stakeholders. The lowest, though still strongly positive, mean was BIU3 ("I would explore the 4Ps Management and Forecasting System for further learning about the system") at 4.25, suggesting that while the respondents are eager to use the system, fewer may feel the need to delve deeply into its technical aspects.

The results clearly reflect a robust behavioral intention to use the 4Ps Management and Forecasting System. Respondents strongly agree on its continued use, promotion, and implementation across municipalities. These findings imply a strong readiness for adoption, which is crucial for the success and sustainability of the system.

Table 9  
Summary of indicators

Indicators	Mean	Verbal Interpretation
Perceived Usefulness	4.29	Strongly Agree
Perceived Ease of Use	4.23	Strongly Agree
Attitude Towards Usage	4.27	Strongly Agree
Behavioral Intention to Use	4.24	Strongly Agree
<b>Overall Total</b>	<b>4.26</b>	<b>Strongly Agree</b>

Based on the results presented in Table 9, the overall evaluation of the 4Ps Management and Forecasting System reveals a high level of acceptance and satisfaction among respondents, as reflected by an overall mean score of 4.26 with a verbal interpretation of "Strongly Agree." Among the four key indicators, Perceived Usefulness garnered the highest mean of 4.29, suggesting that users strongly believe the system significantly enhances program implementation, facilitates informed decision-making, and contributes to the efficient delivery of services. This highlights the system's perceived value and practical benefits in the context of managing the 4Ps program.

Attitude Towards Usage followed with a mean score of 4.27, indicating that users possess a favorable and supportive attitude toward adopting and using the system. Such positive attitudes

are essential for ensuring the system's continuous utilization and integration into routine operations. Behavioral Intention to Use, with a mean of 4.24, further confirms the respondents' willingness and intent to regularly use the system, reflecting a strong commitment to its application in the management of the program.

Meanwhile, Perceived Ease of Use received a slightly lower mean score of 4.23, though it still falls within the "Strongly Agree" range. This implies that users generally find the system easy to navigate and operate, with minimal effort required to perform necessary tasks. Overall, the consistently high scores across all indicators affirm that the 4Ps Management and Forecasting System is both effective and user-centered, demonstrating its potential as a valuable tool in enhancing the quality and efficiency of the 4Ps program.

*Determine the relationship between the DSWD officer and 4Ps Beneficiaries in terms of Perceived Usefulness (PU), Perceived Ease of Use (PEU), Attitude Toward Use (ATU) and Behavioral Intention to Use (BIU).*

The analysis revealed no statistically significant differences between the two groups across all four indicators. Specifically, the p-values for Perceived Usefulness (p = 0.599), Perceived Ease of Use (p = 0.355), Attitude Towards Usage (p = 0.832), and Behavioral Intention to Use (p = 0.975) all exceed the standard significance level of 0.05. As a result, the null hypothesis for each construct was accepted, indicating that the perceptions of DSWD Officers and 4Ps Beneficiaries regarding the system are statistically similar.

These results suggest that both user groups share a common view on the usefulness and ease of use of the system, their attitude towards its adoption, and their intention to use it in the future. According to the study by Waren et al. (2022) and Alshare et. al, (2019) discuss transparency and trust in intelligence system acceptance, emphasizing how user trust influences adoption. The absence of significant differences implies that the system is equally acceptable to both administrative personnel and program beneficiaries, supporting its broader applicability and acceptability across different stakeholder groups.

This supports the system's potential for widespread adoption and reinforces the importance of user-centered design and inclusive implementation strategies in government digital initiatives, as highlighted by Indama (2023). The findings affirm the system's acceptability and indicate a unified orientation toward its use, which is essential for sustained implementation success.

### 5. Summary, Conclusions and Recommendations

In this section, the overall outcome of the review is assessed, along with a summary of the results of its objectives, overall

purposes, and suggested solutions.

### A. Summary

The completed study successfully developed and evaluated the Pantawid Pamilyang Pilipino Program (4Ps) Management and Forecasting System, designed to enhance efficiency in data management, beneficiary tracking, communication, and decision-making processes within the Department of Social Welfare and Development (DSWD). The system offered functionalities such as centralized registration for walk-in applicants, generation of schedules for verification, real-time tracking of compliance data (education, health, seminars), automated notifications for beneficiaries, and reporting tools. It also featured tailored user interfaces for DSWD SWAs, Municipal Links, LGU staff, and Roving Bookkeepers to support their unique roles.

A predictive analytics module was integrated to identify terminated contracts and recommend new slots for future 4Ps enrollees. To assess system acceptability, the study applied the Technology Acceptance Model (TAM), focusing on four key constructs: Perceived Usefulness (PU), Perceived Ease of Use (PEU), Attitude Toward Use (ATU), and Behavioral Intention to Use (BIU). The Mann-Whitney U Test was employed to analyze the responses of two distinct user groups—DSWD Officers and 4Ps Beneficiaries.

Findings showed that across all TAM indicators, there were no statistically significant differences between the two groups, with all p-values exceeding 0.05. This indicated that both implementers and beneficiaries found the system equally useful, easy to use, and acceptable for adoption in their respective roles. These results validated the system's design, accessibility, and relevance to real-world administrative and social welfare workflows.

### B. Conclusions

The study concluded that the 4Ps Management and Forecasting System was effective in addressing the administrative, monitoring, and forecasting needs of the DSWD's 4Ps implementation. The platform successfully provided a centralized, reliable, and user-friendly solution for tracking member compliance, generating real-time reports, and forecasting beneficiary turnover.

The results of the TAM-based evaluation further confirmed that the system was widely accepted by both DSWD Officers and 4Ps Beneficiaries, reflecting high levels of satisfaction, confidence, and willingness to use the system across user categories. The lack of significant difference in perception between the two groups demonstrated the inclusiveness and usability of the system regardless of the users' roles or backgrounds.

The integration of predictive analytics into the 4Ps system signifies a forward-thinking approach to social welfare program management, enabling data-driven decisions that ensure equitable and timely delivery of assistance. This system stands as a model for how technology can enhance transparency, responsiveness, and accountability in government-run poverty alleviation programs.

### C. Recommendation

Based on the results and conclusions of this study, several recommendations are made to improve the implementation, usability, and long-term sustainability of the 4Ps Management and Forecasting System. These suggestions aim to help the Department of Social Welfare and Development (DSWD) make full use of the system, improve the delivery of services, and ensure transparency and accountability in managing the Pantawid Pamilyang Pilipino Program.

To begin with, it is recommended that the system be officially implemented in all DSWD regional and municipal offices. This will help standardize data collection, streamline reporting processes, and improve service delivery to beneficiaries. In addition, regular training sessions should be conducted for both DSWD staff and 4Ps beneficiaries. These sessions should focus on system navigation, data entry, technical procedures, and best practices to build user confidence and ensure accurate data handling.

Another important recommendation is the integration of a built-in feedback feature within the system. This will allow users to report issues, make suggestions, and share their experiences, which will help developers improve the system over time and make it more responsive to user needs. Furthermore, the forecasting component of the system should be enhanced using advanced analytics or machine learning. This upgrade would allow for more accurate predictions about which beneficiaries might leave the program and identify potential new ones, making planning and service delivery more efficient.

Since the system handles sensitive personal data, it is critical to follow the Data Privacy Act of 2012. Security measures such as encryption, user authentication, access control, and regular audits should be in place to protect information and prevent data breaches. Regular evaluations should also be scheduled to assess the system's performance, user satisfaction, and overall impact. These assessments will provide valuable insights for ongoing improvements.

Lastly, to ensure the system remains functional and widely used, DSWD should issue formal policy directives supporting its use and allocate dedicated funding for its maintenance, updates, and technical support. Strong institutional support is essential for the system's long-term success and continued relevance to the 4Ps program.

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