Received: 20 APR 2026 | Accepted: 22 JUN 2026 | Published Online: OCT 2026
UCLM Journal of Computer Science, Engineering and Information Technology Vol. 1 Issue 1 (October 2026)

AUTOPOWCO: An Automated Poultry Waste Removal and Collector with Sprinkler and Scraper System

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Abstract - *Chicken poultry and husbandry are one of the largest meat production and agricultural markets in the world. Chicken is the world's most extensive domestic animal stock in terms of population. In the early twenty-first century, chicken meat accounted for the fastest-growing share of the world's meat production. Poultry waste is one of the major pollutants if not properly disposed of. As the demand and supply of chicken meat and products increase, the amount of waste collected and disposed of also increases. The researchers proposed a prototype to address the efficiency of collecting and the time required for cleaning poultry wastes, which is crucial in public health, as well as proper collection, disposal, and management of agricultural waste to minimize environmental pollution. The researchers tested and evaluated the efficiency and time required for cleaning the proposed prototype, and utilized a self-made questionnaire to measure respondents' satisfaction with its perceived ease of use and perceived usefulness. The machine is tested and evaluated at Valdueza's Dressing and Poultry Plant at Danglag, Consolacion, Cebu, with fifteen respondents, including the proprietor. To conclude, the proposed prototype introduces the "Automated Poultry Waste Removal and Collector with Sprinkler and Scraping System", capable of collecting and cleaning poultry wastes and manure, addressing the current circumstances for efficiency of cleaning, health, and convenience of the users in the chosen environment. The researchers focus on the detailed design of the efficiency of cleaning, time of cleaning, ease of use, and usefulness. This advancement offers opportunities to chicken poultry and dressing plant daily operations, promoting efficiency, productivity, health, and safety for the workers.*

Keywords – ***poultry, automated, cleaning, efficiency, collecting, convenience, ease of use, usefulness, prototype, system***

INTRODUCTION

In the early years of the twenty-first century, chicken meat accounted for the fastest-growing share of the world's meat production. Poultry waste is one of the major pollutants if not properly disposed of. Poultry litter and poultry manure are by far the largest waste products from the poultry industry and are commonly used as sources of nutrients for crop production (Hochmuth, G. and J. Jones, 2009). It is crucially important to properly dispose of and manage agricultural waste to minimize the contribution of pollution to the environment. (Oyedun, A. O., et al., 2025), Poultry manure can cause environmental problems such as water, air, and land pollution.

Generally, manure refers to feces and urine produced by animals; it contains organic matter and nutrients, which improve its fertilizer value. Litter is a poultry industry waste by-product of feces, bedding materials, wasted feed, and feathers. Ammonia, dimethylamine (DMA), and trimethylamine (TMA) are the common odorous compounds from poultry manure (Nowak et al., 2016). The waste collection of the chicken poultry in Consolacion, Cebu, is not automated, and the cleaning system and procedures are operated manually through manual labor, resulting in direct contact of humans with the poultry waste and manure. Long-term exposure and inhalation of odorous compounds from poultry manure can harm farm workers, surrounding residents, and animals. Campylobacteriosis, or Campylobacter, is a disease that can make people and animals sick with the disease. Many adverse reactions, including emotional stress, headaches, acedia, sleeplessness, vomiting, irritability, and sadness, can be brought on by odors. The public usually reacts to objectionable odorous episodes by registering complaints with the local authorities (Nicell J.A., 2022).

All things considered, the present study aimed to develop an Automated Poultry Waste Removal and Collector with a sprinkler and Scraper System. The proponents will innovate the manual labor of cleaning and collecting wastes and manure employed in the chicken poultry and dressing plant. Specifically, this study is guided by the following objectives: identify related studies on the methods of automated cleaning and collecting poultry wastes, integrate the findings into the design process of the feasibility of the proposed project, include additional functions, design and construct a prototype of the project, and test the prototype to evaluate its ergonomic design, repondents' perceived ease of use and perceived usefulness. The output of this project will provide poultry employees and proprietors with a more convenient and safer way of cleaning and collecting poultry wastes and manure operations. Overall, it will improve the daily cleaning and collecting poultry wastes and manure operations in terms of convenience, safety, health, and the conservation of the environment.

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II. STATEMENT OF THE PROBLEM

This study aimed to design an AIRAT-NA: Smart Tourist Guide and Fare Estimation System for tourists traveling within Cebu Province, addressing their concerns regarding fare transparency, mode of transportation, and access to reliable travel guidance. Specifically, the objectives of this study are as follows:

1. Identify the transportation-related challenges faced by tourists in Cebu Province, including issues with fare estimation and access to reliable travel information.
2. To design and develop a system that shows fare estimates, offers different modes of public transportation, and provides clear guidance to selected destinations.
3. Evaluate and test the developed system in terms of:
   3.1. Accuracy of fare estimation
   3.2. Accuracy of travel time estimation
   3.3. Processing Time
4. Conduct user acceptance testing to determine the satisfaction of the user:
   4.1. Perceived ease of use
   4.2. Perceived usefulness
   4.3. Behavioral intention to use

III. METHODOLOGY

A. Research Design

The study aimed to develop and innovate an automated waste collector for poultry farms and dressing plants to offer workers further convenience and a safer working environment. The research design used in this proposal was both descriptive and experimental. The descriptive method was used for the preliminary observations and development of the proposed prototype. The effectiveness and satisfaction of the proposed prototype with the workers and poultry owners were determined. The self-made survey questionnaires were directly distributed to the research participants. The experimental research design used and adopted in this proposal was used to test whether the independent variables used were appropriate with each other, and the effectiveness of the proposed prototype was evaluated. The poll determined whether their project could solve the present work environment problem. An experimental investigation would determine the project's efficacy.

B. Research Environment

The study will be conducted at the Valdueza's Dressing and Poultry Plant, Danglag, Consolacion, 6001 Cebu, Philippines

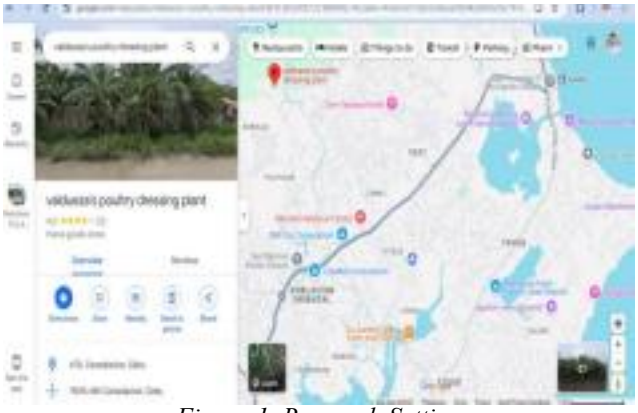

Figure 1. Research Setting

C. Research Respondents

The target respondents are fifteen (15). Fourteen of these are workers, and one owns a poultry farm for chickens. The target participants are those who worked and were assigned to different sectors in the poultry farm.

Table 1. Research Respondents

Respondents	Number of Respondents	Taken as Respondents	% of Distribution
Workers	14	14	93.33%
Proprietor	1	1	6.67%
TOTAL	**15**	**15**	**100%**

D. Research Instrument

The researchers utilized a researcher-made questionnaire to investigate the effectiveness and functionality of the Automated Poultry Waste Collector installed with a sprinkler system in maintaining, collecting, and properly disposing of chicken waste and manure. The researcher-made questionnaire was made based on the research study's topic. The survey questionnaire is a set of questions that are carefully prepared to be answered by poultry workers to collect facts and information. The questionnaire consists of two parts: the post-survey, in two categories:

- Perceived Ease of Use – these cover the factors of the proposed prototype's ease of manipulation, minimize work load, reducing work time, easy maintenance, convenience to use, and doesn't require deep knowledge to operate this prototype.
- Perceived of Usefulness – these cover the factors of the proposed prototype's on how useful it is in the agriculture industry, minimizing the contact with poultry wastes and manure, more efficient waste collection, automated functionality, and made with high-quality materials.

The researchers will use the Likert-Scale Method in the survey questionnaires to specify the satisfaction level of the

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respondents with the proposed output.

E. Gathering Data

The researchers will follow a step-by-step process for gathering data. First, the researcher will formally request the approval of the Dean of the College of Engineering at the University of Cebu, Lapu-Lapu, and Mandaue to conduct the study. After the letter is approved, the researcher will conduct a face-to-face survey questionnaire and prototype evaluation. Then, the participants were selected using random sampling, and the survey comprised appropriate questions. The researchers will collect the papers and analyze the results for reliability and consistency. Researchers need to follow these steps.

First, create research survey questionnaires. A research instrument, together with the consent form, is required to gather data. Second, the researchers will communicate with the target respondents to conduct the face-to-face survey and prototype evaluation. Ensuring this will not affect their respective time and responsibilities during the survey. Then, the survey questionnaire is a modified checklist given to the research respondents as they test the prototype for evaluation. The survey questionnaire is self-made to ensure that unique questions developed by the researchers are aligned with the researchers' research study. Lastly, after the respondents have taken the survey and successfully evaluated the prototype, the researchers check, interpret, and analyze the respondents' papers. The researchers utilized Frequency and simple percentages to interpret and describe the data gathered. On the scale for measuring the respondents' satisfaction level towards the project's development, the 5-point Likert scale below was utilized.

F. Scoring Procedure

The respondents' choices were modified into five scales based on the given description, as shown in Table 2, to facilitate the researcher's data analysis. The following means, ranges, and interpretations were utilized. The researchers utilized a 5-point Likert scale to measure the respondents' satisfaction with the development project, and the data collected were from the face-to-face interviews and the surveys.

Table 2. Scoring Procedure of Pre-survey, Functionality, Efficiency of Cleaning, Time of Cleaning, Perceived Ease of Use, and Perceived Usefulness

Weight	Categorical	Parametric Scale	Verbal Interpretation
5	Strongly Agree / Highly Acceptable	4.2 – 5.0	The device's functionality, efficiency of cleaning, time of cleaning, perceived ease of use, and perceived usefulness are at 80 % and above.
4	Agree / Acceptable	3.4 – 4.19	The device's functionality, efficiency of cleaning, time of cleaning, perceived ease of use, and perceived usefulness are at 69%-79.99 %.
3	Neutral	2.6 – 3.39	The device's functionality, efficiency of cleaning, time of cleaning, perceived ease of use, and perceived usefulness are at 58%, 68.99%.
2	Disagree / Unacceptable	1.8 – 2.59	The device's functionality, efficiency of cleaning, time of cleaning, perceived ease of use, and perceived usefulness are at 47%, 57.99%.

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1	Strongly Disagree / Highly Unacceptable	1 – 1.79	The device's functionality, efficiency of cleaning, time of cleaning, perceived ease of use, and perceived usefulness are at 46.99% and below.

IV. RESULTS AND DISCUSSION

The proposed prototype will operate on its own with or without the presence of the users.

Table 3. Functionality Table 4. Manual Testing and Evaluation

Trial Number	Day	Time	Function	Verbal Interpretation
1	1	9:14 AM	Manual	Highly Acceptable
2	1	5:00 PM	Automated	Highly Acceptable
3	2	8:42 AM	Manual	Highly Acceptable
4	2	5:00 PM	Automated	Highly Acceptable
5	3	9:10 AM	Manual	Highly Acceptable
6	3	5:00 PM	Automated	Highly Acceptable
7	4	9:21 AM	Manual	Highly Acceptable
8	4	5:00 PM	Automated	Highly Acceptable
9	5	8:50 AM	Manual	Highly Acceptable
10	5	5:00 AM	Automated	Highly Acceptable
11	6	8:35 AM	Manual	Highly Acceptable
12	6	5:00 AM	Automated	Highly Acceptable
13	7	9:07 AM	Manual	Highly Acceptable
14	7	5:00 PM	Automated	Highly Acceptable
Aggregate Mean				**Highly Acceptable**

Table 3 shows the utilization of the functionality of the Automated Poultry Waste Removal and Collector with Sprinkler and Scraper System. The researcher conducted a total of 14 trials for 1 week, 2 trials each day. The testing and evaluation were held at Valueza's Dressing and Poultry Plant. The verbal interpretation of each trial indicates that the users are highly satisfied with both manual and automated functions. The aggregate mean of verbal interpretation of the functionality of the proposed prototype indicates highly satisfied users. To utilize the manual and automated functions, manual operation testing was conducted during the morning cleaning and collecting operations. In manual operation, the users are the main command whether he/she is satisfied with the cleaning and collecting operation of the proposed prototype. For automated operations, the Sino Timer is programmed with the desired date, time, and duration to operate. During a 1- week testing and evaluation, the Sino Timer is programmed to operate exactly at 5 PM in the afternoon with a duration to operate of 2 minutes for the entire week.

Table 4. Manual Testing and Evaluation

Day	**Time**	**Efficiency of Cleaning (%)**	**Time of Cleaning (sec.)**	**Verbal Interpretation**
1	9:14 AM	95%	102 sec.	Highly Acceptable
2	8:42 AM	96.72%	84 sec.	Highly Acceptable

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3	9:10 AM	96.25%	86 sec.	Highly Acceptable
4	9:21 AM	96.67%	106 sec.	Highly Acceptable
5	8:50 AM	96.10%	92 sec.	Highly Acceptable
6	8:35 AM	98.64%	94 sec.	Highly Acceptable
7	9:07 AM	97.27%	88 sec.	Highly Acceptable
Average		**96.66%**	**93.14 sec.**	**Highly Acceptable**

Table 4 showcases the Manual Testing and Evaluation of Automated Poultry Waste Removal and Collector with Sprinkler and Scraper System. During this testing and evaluation phase, the user is the main command who utilizes the proposed prototype. When the user is satisfied with the cleaning and collecting operation of the machine, the user can disable the proposed prototype. During the testing and evaluation, the proposed prototype showed a remarkable performance, varying from the time of cleaning, with the efficiency of cleaning ranging from 95% above. The average efficiency of cleaning of 96.66%, with the average time of cleaning being 94.14 seconds, and with the overall verbal interpretation of being highly satisfied with the manual functionality of the Automated Poultry Waste Removal and Collector with Sprinkler and Scraper System. Indicating that the factors of remaining waste residues, operation time, and the quality of wastes, either in solid or liquid form, affect the efficiency of cleaning. The longer the operating time, the less remaining waste residues, the better quality or more solid form of poultry wastes and manure, the higher the efficiency of cleaning.

Table 5. Automated Testing and Evaluation

Day	Time	Efficiency of Cleaning (%)	Time of Cleaning (sec.)	Verbal Interpretation
1	5:00 PM	98.21%	120 sec.	Highly Acceptable
2	5:00 PM	94.26%	120 sec.	Highly Acceptable
3	5:00 PM	98.15%	120 sec.	Highly Acceptable
4	5:00 PM	98.91%	120 sec.	Highly Acceptable
5	5:00 PM	98.57%	120 sec.	Highly Acceptable
6	5:00 PM	99.25%	120 sec.	Highly Acceptable
7	5:00 PM	98.46%	120 sec.	Highly Acceptable
Average		**97.26%**	**120 sec.**	**Highly Acceptable**

Table 5 showcases the Automated Testing and Evaluation of Automated Poultry Waste Removal and Collector with Sprinkler and Scraper System. During this testing and evaluation phase, the Sino Timer is utilized as the main component and command in this automated operation. The Sino Timer is programmed to operate at exactly 5:00 PM from Sunday to Saturday for an entire week, and with an operation time of 2 minutes. During the testing and evaluation of the automated operation, the proposed prototype showed a remarkable performance in the efficiency of cleaning, greater than that of manual operation of collecting and cleaning poultry wastes and manure. The value of the efficiency of cleaning consists mostly on 98% above, indicating that each trial has a verbal interpretation from the users as highly acceptable. The average efficiency of cleaning of the automated functionality of the proposed prototype is 97.26%, with the average time of cleaning being 120 seconds, and the average verbal interpretation is highly acceptable. The data from automated operation of the Automated Testing and Evaluation of Automated Poultry Waste Removal and Collector with Sprinkler and Scraper System indicated that the longer operating time, the lesser remaining waste residues, and the better waste quality, the higher efficiency of cleaning can be achieved by the proposed prototype.

Post-Survey

Table 6. Perceived Ease of Use

Statement Questions	Weighted Mean	Verbal Interpretation

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1. The Automated Poultry Waste Collector minimizes the workload during cleaning operations.	4.8	Strongly Agree
2. The machine enhances the efficiency of the poultry operations.	4.8	Strongly Agree
3. The operating procedure of the machine is clear and easy to follow.	4.73	Strongly Agree
4. The machine does not require extensive training to be used properly.	4.8	Strongly Agree
5. Setting and programming the timer of the machine is easy.	4.4	Strongly Agree
6. The machine can be used daily without difficulty or inconvenience.	4.8	Strongly Agree
7. I am comfortable using the machine even without assistance from others.	4.67	Strongly Agree
Aggregate Mean	**4.71**	**Strongly Agree**

The data in Table 6, showcased above, are the factors influencing the perceived ease of use among respondents to the Automated Poultry Waste Removal and Collector with Sprinkler and Scraper System. The respondents strongly agreed with the factors of the proposed prototype's functionality of ease of use. With the weighted mean of 4.8. The Automated Poultry Waste Removal and Collector with Sprinkler and Scraper System minimizes the workload during cleaning operations and has the same weighted mean as the factor. The respondents strongly agree that the machine enhances the efficiency of the poultry operations. The other factor with the highest weighted mean of 4.8, the machine can be used daily without difficulty or inconvenience. However, there is a factor that has the lowest weighted mean of 4.4; the proposed prototype's setting and programming the timer of the machine is easy. During the 1-week monitoring trial and evaluation, some of the respondents experienced difficulty, especially with automated functionality, because the Sino timer requires programming to set the desired operation time of the machine. More training on programming the Sino timer to efficiently operate the automated functionality of the Automated Poultry Waste Removal and Collector with Sprinkler and Scraper System.

Table 7. Perceived Usefulness

Statement Questions	**Weighted Mean**	**Verbal Interpretation**
1. The machine efficiently collects poultry waste.	4.8	Strongly Agree
2. The machine reduces direct human contact with poultry wastes and manure.	4.67	Strongly Agree
3. The machine helps maintain cleanliness in the poultry area.	4.67	Strongly Agree
4. The machine saves the time and physical effort of poultry workers.	4.6	Strongly Agree
5. The machine contributes to a safer working environment in the poultry farm.	4.8	Strongly Agree
6. The waste management condition of the poultry area improves due to the use of the machine.	4.73	Strongly Agree

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7. The machine is useful and important in the daily operations of the poultry farm.	4.8	Strongly Agree
Aggregate Mean	**4.72**	**Strongly Agree**

The data in Table 7 showcases the data of all the factors of the perceived usefulness of the Automated Poultry Waste Removal and Collector with Sprinkler and Scraper Systems towards the respondents. The respondents strongly agreed with the factors of the proposed prototype's functionality and usefulness. The factors of the proposed prototype's usefulness have the highest mean of 4.8; the machine efficiently collects poultry waste, the machine contributes to a safer working environment in the poultry farm, and the machine is useful and important in the daily operations of the poultry farm. The data gathered from the trial and survey are essential to determine whether the machine satisfied the respondents' expectations towards the proposed prototype. The factor with the weighted mean of 4.6 that needed improvements the machine saves the time and physical effort of poultry workers. The disposal of poultry wastes needs further improvements to minimize the physical effort and save time, as the main focus of the proposed prototype is collecting poultry wastes.

Findings

Chicken Poultry Husbandry and Dressing Plant is one of the largest agricultural sectors in the world and one of the fastest-growing meat production sectors in the market. As the demand and supply constantly increase, waste management is crucial in maintaining public health and conserving the environment. The researchers noticed the daily problems encountered in the operation of the chicken poultry husbandry and dressing plant, the waste collection, and disposal. The researchers innovate a automated poultry waste collector that minimizes the physical contact with poultry wastes, and saves labor costs as the current cleaning and collecting operations require a lot of workload. The idea of the Automated Poultry Waste Removal and Collector with Sprinkler and Scraper System came to be to address current problems faced by the chicken poultry husbandry and dressing plant in their waste management and disposal operations.

The researchers innovated an automated poultry waste removal and collector installed with a sprinkler and scraper System. This proposed prototype is inspired by the conveyor machines and the mechanism of waste collection using a conveyor, utilized by manual labor for cleaning and collection. The peculiarity of this proposed prototype is driven by a Synchronous Motor, powered by a control panel or an automated, real-time Sino Timer switch. The purpose of this proposed prototype is to provide convenience, safety, and efficiency in poultry operations. For manual operation, the user has the command to the machine to clean and collect poultry wastes and manure until the user is satisfied with the efficiency of cleaning by the proposed prototype. For the automated operation, the Sino Timer switch is programmed to a desired time, date, and duration to operate. The machine will operate on its own after setting the Sino Timer switch with or without the presence of the user.

The system performance and evaluation focuses on the factors of Functionality, Efficiency of Cleaning and Time of Cleaning. The functionality of the Automated Poultry Waste Removal and Collector with Sprinkler and Scraper System was utilized on both manual and automated functions. Each trial's verbal interpretation shows that users are quite pleased with both the automated and manual features. A highly satisfied user base is shown by the aggregate mean of vocal interpretations of the proposed prototype's functioning. The Manual Testing and Evaluation of Automated Poultry Waste Removal and Collector with Sprinkler and Scraper System, the manual functionality was deemed highly satisfactory, with an average cleaning effectiveness of 96.66% and an average cleaning time of 94.14 seconds. Indicating that the longer the operating time, the less remaining waste residues, the
better quality or more solid form of poultry wastes and manure, the higher the efficiency of cleaning. In testing and evaluation of the Automated Poultry Waste Removal and Collector with Sprinkler and Scraper System, the cleaning efficiency rating is primarily 98% above, meaning that each trial is verbally interpreted by the users as being very acceptable. With an average cleaning time of 120 seconds and an average verbal interpretation that is quite satisfactory, the automated functionality of the suggested prototype has an average cleaning efficiency of 97.26%. The data gathered indicated that the longer operating time, the lesser remaining waste residues, and the better waste quality, the higher efficiency of cleaning can be achieved by the proposed prototype.

The conducted user acceptance testing was based on the factors of perceived ease of use, perceived usefulness, and the overall acceptance of the two factors. Perceived ease of use has an aggregate mean of 4.71, indicating that the users strongly agree that the proposed prototype is easy to utilize. The highest weighted mean of 4.8 are factors; the machine minimizes the workload during cleaning operations and has the same weighted mean as the factor. The respondents strongly agree that the machine enhances the efficiency of the poultry operations, and the machine can be used daily without difficulty or inconvenience. There is a factor needed for innovations and developments with the weighted mean of 4.4; the proposed prototype's setting and programming the timer of the machine is easy. Indicating that there are difficulties encountered in programming the Sino Timer switch. More training in programming the Sino Timer is necessary to adapt to the advancements of technology. Perceived usefulness has an aggregate mean of 4.72, indicating that the respondents strongly agree that the proposed prototype is useful in daily poultry operations. The factors with the highest mean of 4.8 are that the machine efficiently collects poultry waste, the machine contributes to a safer working environment in the poultry farm, and the machine is useful and important in the daily operations

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of the poultry farm. The least weighted mean among all the factors is 4.6, needed improvements. The machine saves the time and physical effort of poultry workers. The disposal of poultry wastes needs further improvements to minimize the physical effort and save time, as the main focus of the proposed prototype is collecting poultry wastes. With the overall acceptance and satisfaction of the Automated Poultry Waste Removal and Collector with Sprinkler and Scraper System, the respondents strongly agree and strongly accept the elements offered by both perceived ease of use and perceived usefulness, as demonstrated by the aggregate mean of 4.715 for perceived ease of use and perceived usefulness. The Automated Poultry Waste Removal and Collector with Sprinkler and Scraper System, according to the respondents, reduces workload during cleaning operations and improves the efficiency of cleaning and collecting.

V. CONCLUSION

Animal agricultural farms, especially poultry farms, have become one of the most significant contributors to the food, agricultural, and economic industries. Poultry is the world's most extensive domestic animal stock in terms of population. In the early years of the twenty-first century, poultry meat accounted for the fastest-growing share of worldwide meat output. Due to increasing demand in the market and farm expansions, the increasing problem of waste products, or live animal manure, if not collected and disposed of appropriately, poultry waste is one of the primary sources of pollution. With the factors of odor source, poultry operations draw mice, flies, and other pests that spread illness, causing disturbances to the nearby neighborhood, negatively affecting the environment, and affecting personal health when exposed constantly to the waste products. To address this problem, the proposed prototype, Automated Poultry Waste Collector, implies a solution for poultry farm employees to minimize contact with poultry waste products and offers a more convenient and safer workplace.

Based on the gathered data, the findings from the responses, and the valuable insights of the participants or respondents to the design and fabrication of the Automated Poultry Waste Collector in agricultural poultry farms. It showcases the results of the respondent's satisfaction with the presented factors of perceived ease of use and perceived usefulness of the Automated Poultry Waste Collector, addressing the challenges and risks faced by the poultry farmers or workers in their daily operations. During the testing, evaluation, and utilization of the proposed prototype, the respondents agreed that it is reliable and safe, performs better than manual cleaning, collecting, and disposing, and are satisfied with its serviceability in their daily operations on the farm. The positive outcomes and results of the proposed prototype signify continuous innovations or improvements to the fabrication and design processes.

AUTHOR CONTRIBUTIONS

Author 1: Conceptualization, Methodology; Author 2: Data curation, Writing-Original draft preparation, Writing-Reviewing; Author 3: Investigation, Validation, Visualization, Writing- Reviewing; Author 4: Data curation, Writing-Original draft preparation

FUNDING

This research received no external funding.

GENERATIVE AI STATEMENT

The authors used ChatGPT solely as a language-support tool to improve the clarity, coherence, and grammatical accuracy of the manuscript. All AI-assisted outputs were critically reviewed, revised, and validated by the authors to ensure the accuracy, integrity, and originality of the content. The authors accept full responsibility for the final version of the manuscript and its published content.

ETHICAL CONSIDERATIONS

Prior to the data gathering, ethical approval was obtained from the University of Cebu Academic Research Ethics Committee (UCAREC). The approved protocol ensured adherence to the principles of respect for persons, beneficence, justice, voluntary participation, informed consent, confidentiality, and anonymity, and compliance with the Data Privacy Act throughout the research process.

DECLARATION OF INTEREST

The authors declare that they have no competing financial, professional, or personal interests that could have influenced the conduct, findings, or publication of this study.

DATA AVAILABILITY

Data will be made available by the corresponding author on request.

ACKNOWLEDGEMENT

This project proposal would not be possible without the help of these people. We, the mechanical engineering student researchers in the Engineering Department, would like to express our gratitude for the guidance and unwavering support we received throughout this process. The appreciation and gratitude go to the following persons:

Our **God Almighty**, and only savior, for the strength and guidance throughout this journey of proposing our project successfully.

To our adviser, **Engr. James Solano**, for his guidance and support in our proposal paper, and for correcting the present mistakes in our paper.

To our thesis adviser, **Ms. Catherine Rivera,** for her guidance every time we approached her for the clearance and progress of our paper.

To our beloved dean, **Engr. Fernandez** for the suggestions on making our proposal paper more accurate and precise to our desired project outcome. For approving and permitting us to proceed with our prototype.

To the panelist, **Engr. Delani**, and **Engr. Bacus,** we are grateful for the corrections and suggestions to our proposed

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project to make it better for society and the environment.

To the **respondents** who participated in the interview and evaluation of the proposed project, we would like to express our gratitude for your support, which made the proposal possible, allowing us to execute the prototype on your bicycles.

To the **co-researchers** who played their parts well, and whose contributions in this proposal paper are a big factor in finishing this, they are also deserving of the acknowledgment of each one of us.

Lastly, the researchers would also like to express their gratitude to their family, friends, and loved ones for their love, prayers, sacrifices, care, and support of the education journey of the researchers. This proposal would be impossible without the help of all the people who are always by our side.

REFERENCES

[1] Abubakar, I. R., et al. (2022). *Environmental Sustainability Impacts of Solid Waste Management Practices in the Global South*. Sustainable Waste Management to Mitigate Climate Change. Volume 19, Issue 9. (https://doi.org/10.3390/ijerph191912717).

[2] Assef, F. M., et al. (2022). *A Review of Clustering Techniques for Waste Management*. Volume 8, Issue 1. (https://doi.org/10.1016/j.heliyon.2022.e08784)

[3] Awino, F. B., and Apiz, S. E. (2022). *Solid Waste Management in the Context of Waste Hierarchy and Circular Economy Framework: An International Critical Review*. Integrated Environmental Assessment and Management. Volume 20, Issue 1, pp 9 – 35. (https://doi/pdf/10.1002/ieam.4774).

[4] Bhattacherjee, A. (2001). *Understanding Information Systems Continuance: An Expectation-Confirmation Model*. M.I.S Quarterly. Volume 25, Number 3, pp. 351 – 370. (https://doi.org/10.2307/3250921).

[5] Chandrappa, R. (2024). *Solid Waste Management: Principles and Practice*. Environmental Science and Engineering. Volume 2. (https://doi.org/10.1007/978-3-031-50442-6).

[6] Davis, F. D., et al. (1989). *User Acceptance of Computer Technology: A Comparison of Two Theoretical Models*. Management Science.
Volume 35, No. 8. (https://doi.org/10.1287/mnsc.35.8.982).

[7] Debrah, J. K., et al. (2021). *Raising Awareness on Solid Waste Management Through Formal Education and Sustainability: A Developing Countries Evidence Review*. UFP Energy, Environment and Health Research Unit.
Volume 6, Issue 1 .
(https://doi.org/10.3390/recycling6010006).

[8] Desa, A., et al., (2011). *A Study of Knowledge, Attitudes, Status, and Behavior Concerning Solid Waste Management*. Procedia – Social and Behavioral Sciences. Volume 18, pp. 643 – 548. (https://doi.org/10.1016/j.sbspro.2011.05.095).

[9] Estriegana, R., Medina-Merodio, J. A. y Barchino, R. (2019). *Student acceptance of virtual laboratory and practical work: An extension of the technology acceptance model*. Computers and Education. Volume 135, pp. 1 – 14. (https://doi.org/10.1016/j.compedu.2019.02.010).

[10] Hochmuth, G. and J. Jones. (2009). *Collecting a Poultry Litter Sample for Analysis*. Water Quality, Quantity, and Supply. Issue 2. (https://doi.org/10.32473/edis-ss506-2009).

[11] Kolominskas et al. (2002). *Strategies to Reduce Odor Emissions from Meat Chicken Farms*. In Proceedings 2002 Poultry Information Exchange, pp. 27–39. (https://doi.org/10.1017/S0043933917000083).

[12] Medeiros, F., et al. (2021). *Circular Economy and Solid Waste Management: Challenges and Opportunities in Brazil*. Circular Economy and Sustainability. Volume 1, pp. 261 – 282. (https://doi.org/10.1007/s43615-021-00031-2).

[13] Nanda, S., and Berruti, E. (2021). *Municipal Solid Waste Management and Landfilling Technologies: A Review*. Environmental Chemistry Letters. Volume 19, pp 1433 – 1456. (https://doi.org/10.1007/s10311-020-01100-y).

[14] Nowak, A. et al. (2017). *Odorous Compounds from Poultry Manure Induce DNA Damage, Nuclear Changes, and Decrease Cell Membrane Integrity in Chicken Liver Hepatocellular Carcinoma Cells*. International Journal of Environmental Research and Public Health. Volume 14, Issue 8. (https://doi.org/10.3390/ijerph14080933)

[15] Nowak, A. et al. (2016). *Cytotoxicity of Odorous Compounds from Poultry Manure*. International Journal of Environmental Research and Public Health. Volume 13, Issue 11. (https://doi.org/10.3390/ijerph13111046).

[16] Oyedun, A. O., et al. (2025). *A Review of Emerging Trends in Circular Manure Management and the Role of Digital Solutions*. Journal of Saudi Society of Agricultural Sciences. Volume 24, Article 21.
(https://doi.org/10.1007/s44447-025- 00029-4)

[17] Pongrácz E. (2002). *Re-defining the Concepts of Waste and Waste Management: Evolving the Theory of Waste Management*. Doctoral Dissertation Process and Environmental Engineering, Oulu, Finland.
(https://oulurepo.oulu.fi/handle/10024/37368).

[18] Raab, K. (2024). *A Literature Review on Solid Waste Management and Disposal Behavior at the Base of the Pyramid*. Management of Dynamics in the Knowledge Economy. Issue 1, pp 1 – 20. (https://www.ceeol.com/search/article detail?id=1230659).

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[19] Ritter, L., et al. (2011). *Sources, Pathways, and Relative Risks of Contaminants in Surface Water and Groundwater: A Perspective Prepared for the Walkerton Inquiry*. Journal of Toxicology and Environmental Health Part. Volume 65, Issue 1. (https://doi.org/10.1080/152873902753338572).

[20] Roeper, H., et al. (2005). *Low-tech Options for Chicken Manure Treatment and Application Possibilities in Agriculture*. Department of Waste Management, Hamburg University of Technology. (https://doi.org/10.1016/j.rser.2016.01.117)

[21] Singh, P., et al. (2018). *Poultry Waste Management*. International Journal of Current Microbiology and Applied Science. Volume 8, Number 8. (https://doi.org/10.20546/ijcmas.2018.708.077).

[22] Singh, P., et al. (2024). *Green Solutions for Heavy Metal Remediation*. Unveiling the Potential of Agricultural Waste through Techno-Economic Analysis and Life Cycle Assessment. (https://doi.org/10.1201/9781032685793-15).

[23] Ziraba, A. K., et al. (2016). *A Review Framework for Understanding the Potential Impact of Poor Solid Waste Management on Health in Developing Countries*. Archives of Public Health. Volume 74, Issue 55. (https://doi.org/10.1186/s13690-016- 0166-4).

[24] Zhao, Y., et al. (2011). *Environmental Impact Assessment of Solid Waste Management in Beijing, China*. Waste Management. Volume 31, Issue 4, pp 793 – 799. (https://doi.org/10.1016/j.wasman.2010.11.007).

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