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Digital Transformation in University Extension Services: Evaluating UTAUT Constructs in the Adoption of a SMART Extension Management System

Abstract

The digital transformation of extension services in higher education institutions is pivotal in enhancing operational efficiency, optimizing resource allocation, and improving service delivery. This study examines the adoption and acceptability of the SMART Community Extension Management System (SMART-CEMS) at Cebu Technological University (CTU) using the Unified Theory of Acceptance and Use of Technology (UTAUT) framework. The research evaluates the impact of key UTAUT constructs—performance expectancy, effort expectancy, social influence, and facilitating conditions—on system adoption among faculty members, extension coordinators, and administrators. A descriptive-correlational research design was employed, utilizing a structured survey questionnaire and inferential statistical analyses to assess user perceptions, adoption drivers, and challenges. Findings indicate that performance expectancy and effort expectancy significantly influence adoption, as users perceive the system as a transformative tool that enhances efficiency and streamlines extension service operations. Social influence and facilitating conditions were also found to play crucial roles, with institutional support and access to training serving as key determinants of adoption success. Despite its benefits, challenges such as data migration complexities, system integration issues, and user training gaps were identified as barriers to full implementation. The study provides strategic recommendations to mitigate these challenges, including targeted training programs, policy integration, and continuous technical support. These findings contribute to the broader discourse on digital transformation in higher education, offering valuable insights for institu-

tions seeking to modernize extension services through technology-driven solutions. Future research should explore longitudinal adoption trends and the integration of advanced analytics and artificial intelligence to further optimize system capabilities.

Keywords: Community Extension Services, Digital Transformation, Higher Education, Institutional Efficiency, Technology Adoption

Introduction

As technology advanced rapidly, numerous industries were pressured to embrace more inventive, efficient solutions to satisfy rising demands and difficulties. Traditional extension management systems, which depended primarily on manual procedures and antiquated approaches, frequently needed help to meet these demands efficiently. This study sought to look into the creation of a Smart Community Extension Management System that used modern technology to improve decision-making, operational efficiency, and overall effect (Cascio & Montealegre, 2016).

Cebu Technological University faced considerable issues due to its manual extension management practices. Extension services, such as community outreach, training programs, and resource distribution, were delivered using labor-intensive and time-consuming techniques. These manual procedures were prone to mistakes, delays, and inefficiencies, frequently resulting in poor service delivery and limited effect. Data collection, processing, and reporting were all done manually, which caused consistency and made tracking progress and outcomes difficult. This issue highlighted the critical need for a more efficient, automated solution to simplify operations and improve the efficacy of the University's extension services (Atymtayeva et al., 2020).

The Smart Community Extension Management System was created to solve these issues by providing a complete and integrated system that automates mundane processes, improves data management, and allows real-time project tracking. This approach made reporting more accurate and timely, enabling extension agents to make sound judgments based on credible data. The system lowered staff workload, eliminated mistakes, and expedited workflows by centralizing project information and offering a user-friendly platform for managing extension operations (Attaran et al., 2020).

The Smart Community Extension Management System's ability to deliver personalized insights and suggestions based on unique project data and com-

munity requirements was a significant asset. Unlike traditional one-size-fits-all methods, the system could customize solutions to each stakeholder's needs, ensuring that extension services were more focused and successful. This individualized strategy increased participation and improved outcomes for the institution and the communities it serves (Malik & Sandhya, 2021).

The SMART-CEM also had a substantial influence on operational efficiency. Extension services frequently required repeated processes such as data input, scheduling, and communication, which were time-consuming and subject to human mistakes. Automating these chores gave extension agents more time to focus on strategic, high-value activities like community involvement and project creation. This simplified strategy increased productivity and guaranteed that resources were utilized more efficiently (Attaran et al., 2020).

Integrating sophisticated digital capabilities into the Smart Community Extension Management System is consistent with the broader digital transformation trend across several industries. As businesses embraced digital technology, creating this system marked a big step forward in modernizing extension services. It improved the competence and efficiency of these services, putting them in a better position to assist the digital growth of their areas. The Smart Community Extension Management System transformed how community extension services were managed, making them more responsive, impactful, and in line with the expectations of the digital era (Cascio & Montealegre, 2016).

Research Questions

This study assesses the adoption and acceptability of the SMART Community Extension Management System at Cebu Technological University (CTU) through the Unified Theory of Acceptance and Use of Technology (UTAUT) framework. Specifically, it seeks to address the following research questions:

1. To what extent does the SMART Community Extension Management System align with the key UTAUT constructs in terms of:
   1.1. Performance expectancy (perceived usefulness of the system)
   1.2. Effort expectancy (ease of use and usability)
   1.3. Social influence (impact of peers and institutional support on adoption)
   1.4. Facilitating conditions (availability of infrastructure, training, and resources).

Research Methodology

Research Background

This study employed a descriptive-correlational research design to collect quantifiable data relevant to the study's objectives. The research was conducted at Cebu Technological University (CTU) and its satellite campuses, focusing on the Community Extension Services Department. As digital transformation continues to reshape institutional operations, the implementation of a SMART Community Extension Management System aims to improve efficiency in managing community extension programs. However, the success of such a system relies heavily on user adoption, making it essential to assess how faculty members, extension coordinators, and administrators accept and utilize the technology. The findings of this research will be valuable in refining technology adoption strategies, improving institutional digital infrastructure, and fostering a culture of innovation within extension services.

Sample

The respondents of this study included 122 individuals, composed of 20 Extension Directors, 100 Extension Coordinators, 1 Vice-President for Production Extension and Resource Generation (VP-PERG), and 1 University Director. Since the population of potential respondents was relatively small, the study employed total population sampling, a method that involves gathering data from all individuals within a defined group to ensure comprehensive representation (Rahi, 2017). This approach provided a more accurate assessment of user perceptions, challenges, and factors influencing the adoption of the SMART Community Extension Management System.

Instruments and Procedures

To collect the necessary data, the researchers developed a structured survey questionnaire based on the Unified Theory of Acceptance and Use of Technology (UTAUT) framework, initially developed by Venkatesh, Morris, Davis, and Davis (2003). UTAUT has been widely used in technology adoption research due to its ability to assess user intention and behavior across various digital systems (Venkatesh et al., 2012). The questionnaire consisted of three main

sections: demographic profile, UTAUT constructs assessment, and adoption challenges. The first section gathered information about respondents' roles, experiences, and technological familiarity. The second section assessed key UTAUT constructs, namely performance expectancy, effort expectancy, social influence, and facilitating conditions, which have been identified as significant predictors of user adoption in prior studies (Williams, Rana, & Dwivedi, 2015). The final section identified potential barriers to adoption, such as technical difficulties, system integration issues, and institutional readiness.

To ensure instrument validity and reliability, the questionnaire was reviewed by internal and external experts, including technology adoption specialists and research statisticians. Content validity was established through an expert panel review, following the guidelines of Lynn (1986), which emphasize the importance of domain relevance and clarity in questionnaire validation. A pilot test was conducted to measure reliability using Cronbach's Alpha, yielding scores of 0.94 for performance expectancy, 0.92 for effort expectancy, 0.91 for social influence, and 0.93 for facilitating conditions, all of which indicate excellent reliability (George & Mallery, 2019). These results confirm that the questionnaire is highly reliable in measuring the acceptability and adoption of the SMART Community Extension Management System.

The research process began with the identification of the total population of extension service personnel across CTU and its satellite campuses. The researchers first sought approval from the University Extension Office to conduct the study. Following approval, the official list of extension directors, coordinators, and faculty members involved in extension projects was obtained from the CTU administrative office. Once the target respondents were identified, the survey questionnaire was disseminated through Google Forms and in-person consultations to accommodate all participants.

To ensure a high response rate, the researchers conducted daily monitoring of online responses and scheduled follow-up consultations with respondents from nearby campuses. Additionally, semi-structured interviews were conducted with selected respondents to gain deeper insights into technology adoption challenges and experiences. After confirming that all responses had been gathered, the researchers finalized the data collection process for statistical analysis.

Data Analysis

The collected data was analyzed using descriptive and inferential statistical tools. Frequency and percentage were used to determine the distribution of respondents based on demographic factors such as age, gender, and profes-

sional role. To evaluate respondents' perceptions of the UTAUT constructs, the weighted mean was employed (Likert, 1932). Additionally, Pearson r correlation analysis was used to examine the relationships between performance expectancy, effort expectancy, social influence, and facilitating conditions and the level of system adoption (Cohen, 1988). To further determine which factors significantly influence adoption, a regression analysis was conducted to predict the impact of each UTAUT construct on technology acceptance in extension services (Field, 2018). These statistical tools ensured a comprehensive assessment of the factors affecting the acceptability and implementation of the SMART Community Extension Management System.

Results and Discussion

Performance Expectancy

Performance expectancy evaluates users' perceptions of how the system will improve their job performance.

Table 1 displays the evaluation of the degree of acceptability of the Smart Community Extension Management based on performance expectancy. The assessment yielded a composite mean score of 4.73 and a standard deviation 0.437, indicating a highly favorable evaluation. The respondents demonstrate a significant level of acceptance for the potential improvement in their job performance, increased efficiency in task completion, and enhanced ability to manage and monitor data using SMART-CEM. Performance expectancy, as defined by the Unified Theory of Acceptance and Use of Technology (UTAUT), refers to the degree to which individuals believe that using a system will help them attain gains in job performance.

The high composite mean score of 4.73 in Table 1 suggests a strong belief in the potential of SMART-CEMS to enhance work productivity and efficiency. According to Venkatesh et al. (2003), performance expectancy is one of the strongest predictors of technology adoption, with users more likely to embrace a system when they perceive it will improve task efficiency and data management. This is consistent with the findings of Davis (1989), who proposed that perceived usefulness—closely aligned with performance expectancy—plays a crucial role in users' decisions to accept and use new technologies. The results from Table 19 indicate that respondents recognize the advantages of SMART-CEMS in improving job performance, streamlining task completion, and enhancing their ability to manage and monitor data effectively.

Table 1. The Level of Acceptability of the Smart Community Extension Management in terms of Performance Expectancy

Indicators	Weighted Mean	SD	Verbal Interpretation
1. Using the SMART-CEMS would improve my job performance.	4.63	0.486	Very Highly Acceptable
2. Using the SMART-CEMS would enhance my efficiency in completing my tasks.	4.82	0.386	Very Highly Acceptable
3. Using the SMART-CEMS would make it easier to track and monitor the data.	4.68	0.467	Very Highly Acceptable
4. Using the SMART-CEMS would allow me to immediately acquire and retrieve the data needed in the community extension services.	4.76	0.427	Very Highly Acceptable
5. SMART-CEMS would be useful for evaluation.	4.78	0.419	Very Highly Acceptable
Average Weighted Mean	4.73	0.437	Very Highly Acceptable

Legend: 4.21-5.00: Very Highly Acceptable; 3.41-4.20: Highly Acceptable; 2.61-3.40; Acceptable; 1.81-2.60: Moderately Acceptable; 1.00-1.80: Not Acceptable

Effort Expectancy

The effort expectancy evaluates how easy the system is to use, focusing on the perceived ease of learning and operating the system. It assesses whether users find the system intuitive and straightforward, requiring minimal effort to effectively engage with its features and functionalities.

Table 2 presents the assessment of the level of acceptability of innovative community extension management as determined by effort expectancy. The examination yielded a composite mean score of 4.78 and a standard deviation of 0.415, indicating a positive review. The respondents exhibit a notable degree of receptiveness towards the ease of learning to operate the SMART-CEMS, their ability to effortlessly locate desired information using the SMART-CEMS, and the clarity and intuitiveness of the SMART-CEM's user interface.

Table 2. The Level of Acceptability of the SMART Community Extension Management in terms of Effort Expectancy

Indicators	Weighted Mean	SD	Verbal Interpretation
1. Learning to operate the SMART-CEMS is easy for me.	4.74	0.440	Very Highly Acceptable

Indicators	Weighted Mean	SD	Verbal Interpretation
2. I could easily find the information I am looking for using the SMART-CEMS	4.75	0.434	Very Highly Acceptable
3. The user interface of the SMART-CEMS is clear and intuitive.	4.82	0.386	Very Highly Acceptable
4. I find the SMART-CEMS flexible to interact with.	4.82	0.386	Very Highly Acceptable
5. I find the SMART-CEMS easy to use (user-friendly).	4.76	0.427	Very Highly Acceptable
Average Weighted Mean	4.78	0.415	Very Highly Acceptable

As conceptualized in the Unified Theory of Acceptance and Use of Technology (UTAUT), effort expectancy refers to the ease of using a system. A high composite mean score of 4.78 in Table 20 suggests that respondents find the SMART-CEM user-friendly and intuitive, with minimal effort required to operate and locate information. According to Venkatesh et al. (2003), effort expectancy is a critical determinant of user acceptance, especially in the early stages of technology adoption. Systems with clear, intuitive interfaces and simple learning curves tend to see higher user acceptance and satisfaction (Al-Gahtani, 2016).

Moreover, Davis (1989) reinforces that perceived ease of use significantly impacts users' intentions to adopt a technology, as systems that are easier to use lower barriers to entry and improve overall user experience. The results from Table 19 indicate that SMART-CEMS meets these criteria, promoting ease of use and accessibility.

Social Influence

This section assesses the extent to which users perceive that important people, such as colleagues or supervisors, believe they should use the system. It evaluates the role of social factors in encouraging or discouraging the use of the system within the organization.

Table 3 presents the acceptability of innovative community extension management based on social influence. The data yielded a composite mean score of 4.79 and a standard deviation 0.417, suggesting a highly favorable evaluation. The respondents express a high level of agreement regarding their co-worker's belief in the necessity of using SMART-CEMS, their coworkers' perception of the privacy protection provided by SMART-CEMS, and their confidence in the reliability of SMART-CEMS based on their coworkers' opinions.

Table 3. The Level of Acceptability of the SMART Community Extension Management in terms of Social Influence

Indicators	Weighted Mean	SD	Verbal Interpretation
1. My co-workers think that I should use SMART-CEMS.	4.77	0.419	Very Highly Acceptable
2. My co-workers think that the SMART-CEMS protects the privacy of its users.	4.81	0.395	Very Highly Acceptable
3. I feel confident that the SMART-CEMS is reliable based on my co-worker's opinion.	4.79	0.412	Very Highly Acceptable
4. I believe that using SMART-CEMS will be supported by the institution's leadership.	4.79	0.412	Very Highly Acceptable
5. I feel confident that using SMART-CEMS will enhance my image or status among my peers.	4.81	0.395	Very Highly Acceptable
Average Weighted Mean	4.79	0.417	Very Highly Acceptable

As defined in the Unified Theory of Acceptance and Use of Technology (UTAUT), social influence refers to how individuals perceive that essential others believe they should use a particular system. The high composite mean score of 4.79 in Table 20 indicates that social influence significantly impacts the acceptability of SMART-CEMS among respondents. Venkatesh et al. (2003) highlight that social influence is critical in technology adoption, particularly in environments where peer perceptions and recommendations strongly affect individual behaviors. This aligns with research by Sykes et al. (2009), which found that co-worker endorsement and perceptions of privacy and reliability play pivotal roles in shaping individuals' attitudes toward new technologies. The results from Table 20 suggest that the positive perceptions of co-workers regarding the necessity, privacy, and reliability of SMART-CEMS have bolstered users' confidence and acceptance of the system.

Facilitating Conditions

The presence of facilitating factors determines the level of acceptance for innovative community extension management, as shown in Table 4.

Table 4. The Level of Acceptability of the SMART Community Extension Management in terms of facilitating Conditions

Indicators	Weighted Mean	SD	Verbal Interpretation
1. The necessary resources will be available when I use the SMART-CEMS.	4.77	0.419	Very Highly Acceptable

Indicators	Weighted Mean	SD	Verbal Interpretation
2. I have confidence that I will receive adequate support when I use SMART-CEMS.	4.79	0.412	Very Highly Acceptable
3. I believe it is necessary to have sufficient training for the effective use of SMART-CEM.	4.79	0.412	Very Highly Acceptable
4. I am positive that the current processes used in the extension services will be compatible with SMART-CEMS.	4.77	0.419	Very Highly Acceptable
5. Technical assistance will be available when experiencing difficulties when using SMART-CEMS.	4.78	0.415	Very Highly Acceptable
Average Weighted Mean	4.78	0.415	Very Highly Acceptable

The data produced a composite mean score of 4.78 and a standard deviation 0.415, indicating a very positive evaluation. The respondents express a high level of agreement regarding the availability of necessary resources when using SMART-CEM, their confidence in receiving adequate support when using SMART-CEMS, and their belief in the importance of sufficient training for the effective use of SMART-CEMSS.

Facilitating conditions, as described in the Unified Theory of Acceptance and Use of Technology (UTAUT), refers to the degree to which individuals believe that organizational and technical infrastructure exists to support the use of a system. The high composite mean score of 4.78 in Table 21 reflects the respondents' belief in the availability of resources, adequate support, and necessary training to use SMART-CEMS effectively. Venkatesh et al. (2003) emphasize that facilitating conditions, such as access to resources and support, are critical to the successful adoption and sustained use of technology. Similarly, research by Teo (2011) found that adequate training and technical support significantly impact users' confidence and capability in utilizing technology systems. The results suggest that these facilitating factors strongly support the acceptance of SMART-CEMS among respondents, enhancing their ability to use the system effectively.

Table 5. Summary of the Level of Acceptability of the SMART Community Extension Management

	N	Mean	SD	Verbal Interpretation
Performance Expectancy	89	4.73	0.437	Very Highly Acceptable
Effort Expectancy	89	4.77	0.414	Very Highly Acceptable
Social Influence	89	4.79	0.407	Very Highly Acceptable

	N	Mean	SD	Verbal Interpretation
Facilitating Conditions	89	4.78	0.415	Very Highly Acceptable
Overall	89	4.77	0.418	Very Highly Acceptable

Table 22 summarizes the assessment of the level of acceptability of the SMART Community Extension Management System, highlighting the high ratings across all categories: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. Each category yielded a mean score of 4.77 and a standard deviation of 0.418, suggesting consistent positive evaluations among respondents.

According to Venkatesh et al. (2003), these four dimensions from the Unified Theory of Acceptance and Use of Technology (UTAUT) are essential determinants of user acceptance. The high-performance expectancy score suggests that respondents believe SMART-CEMS improves job performance and task efficiency. Similarly, effort expectancy reflects the system's ease of use, with Davis (1989) stating that systems perceived to be easier to use are more likely to be accepted. The high score in social influence suggests that the opinions and behaviors of colleagues significantly influenced users' attitudes toward adopting SMART-CEM, consistent with Sykes et al. (2009). Lastly, the high score in facilitating conditions indicates that users believe they have access to the resources, support, and training necessary to effectively use the system, aligning with Teo (2011), who emphasized the importance of these factors in technology adoption.

Overall, the table indicates that SMART-CEMS is widely accepted among its users due to its perceived benefits, ease of use, social influence, and supportive environment.

Conclusions

This study examined the adoption and acceptability of the SMART Community Extension Management System at Cebu Technological University (CTU) using the Unified Theory of Acceptance and Use of Technology (UTAUT) framework. Findings revealed that key UTAUT constructs—performance expectancy, effort expectancy, social influence, and facilitating conditions—significantly influenced the system's adoption among extension directors, coordinators, faculty, and administrative staff.

Performance expectancy played a crucial role, as respondents perceived the system as a valuable tool for improving efficiency, automating processes,

and enhancing data management in extension services. Effort expectancy also emerged as a critical factor, with users expressing that system usability, interface design, and ease of learning impacted their willingness to adopt the technology. Additionally, social influence was found to affect adoption, as institutional support, peer encouragement, and leadership advocacy played significant roles in user acceptance. Lastly, facilitating conditions, including access to technical support, infrastructure readiness, and training opportunities, were essential in ensuring successful implementation.

Despite the positive reception, barriers such as system adaptation challenges, data migration issues, and user training needs were identified, highlighting areas for improvement. Addressing these concerns through comprehensive user training, continuous technical support, and policy integration can further enhance adoption rates and long-term sustainability.

Overall, this study underscores the importance of UTAUT constructs in assessing technology adoption and provides empirical evidence supporting the digital transformation of extension services. Future research may explore additional technology acceptance models and investigate longitudinal adoption trends to strengthen the implementation of smart systems in higher education extension programs.

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