



Influence of Purchase Decision for An Advanced Production Digital Platform Adoption Process in The Coal Industry: The Investigation Using PLS-Sem Analysis

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ABSTRACT: In 2022, the coal-producing sector faced unusual difficulties, which were paralleled by a significant rise in global pricing. The business is too complex for the the most advanced technologies, especially when it comes to figuring out the best blend scenarios. This calls for a comprehensive approach that combines modern technology with careful consideration to support companies in surviving in a competitive and unpredictable commercial environment. Over the past few years, industries have been seeking technological advancement in an effort to improve operating procedures and efficiency, but these innovations still face challenges in being broadly accepted and adopted. In order to determine the primary characteristics that most significantly promote technology adoption, this study combines the Unified Theory of Acceptance and Use of Technology (UTAUT) with purchasing decision theory. The main tool used to collect data is structured questionnaires, which are given to respondents who fulfill predetermined requirements. The replies are gathered, and the SmartPLS 4.0.9.9 software is used to handle them. According to the study, behavioral intention and behavior manner use are not significantly mediated by unanticipated situational events or other people's attitudes that align with purchase decision theory. Additionally, users' use of behavior to adopt digital production platforms in the coal mine business is positively impacted by behavioral intention. Policymakers could consider encouraging all staff members on a regular basis to help them develop a positive mindset, which will enhance their usage behavior.

KEYWORDS: Platform Digital, Purchase Decision, PLS-SEM, Technology adoption, UTAUT.

INTRODUCTION

The current technology used to compute ideal blend conditions is unable to handle the complex operations of the coal business. Traditional methods often do not have the necessary processing power and agility to handle the wide range of parameters needed to determine the ideal blend composition. This could make it challenging for companies to optimize both the value of their coal resources and the efficiency of their operations. Additionally, profit margins could be impacted by the objective of maximizing revenue. Finding the right balance between these two objectives becomes crucial for preserving a sustainable business model where revenue generation is in line with maintaining good profit margins. The coal sector experienced difficulties achieving output goals in 2022 as a result of a significant rise in worldwide prices. Operations failed to reach goals despite the higher trend in prices, raising concerns about supplying demand and taking advantage of the advantageous market circumstances. But things got much more problematic when the company faced unexpected outcomes. Rather than maximizing earnings from the price index jump, there was a notable increase in demurrage and penalty costs. This unexpected increase in overhead expenses was a significant setback that impacted overall profitability and made it more challenging for the business to capitalize fully on the increasing price trend. The business needed to carefully balance achieving production targets with keeping associated costs under control in order to maximize revenue and reduce potential losses.

The ideal blend scenarios could not be determined by the current technologies due to the complicated challenges specific to the coal sector. The different criteria required in determining the optimal blend composition were too complicated for current techniques to handle since they lacked the necessary flexibility and processing power. These technological shortcomings were a major obstacle preventing the industry from efficiently adjusting to the complexity brought about by the changing nature of the market. Due to a lack of internal knowledge about the complexities of the backend application, the IT staff struggled to provide adequate support. As a result, user expectations were not adequately met during the development phase, which hindered the technology's potential for successful application. The development team faced difficulties due to the extensive dependencies and several licenses necessary to



operate the interfaces. The complex structure of this situation prevented a smooth integration and raised the challenges associated with the adoption process.

While the majority of the articles (Cobelli et al., 2023; Huang, 2023; van der Waal, 2022; Balakrishnan, 2022; Alkhowaiter, 2022; Singh, 2023; Azman Ong, 2023) primarily concentrate on incorporating established theories such as the Theory of Planned Behaviour (TPB), Health Belief Model (HBM), or their expansions, this study presents a novel perspective by combining the Purchase Decision framework and UTAUT. Market orientation is positively associated with performance and effort anticipation, but it has a negative effect on enabling conditions. According to Cobelli's study on pharmacists' views regarding telemedicine (Cobelli, 2023), this discovery eventually affects the likelihood of people adopting telemedicine and has important consequences for telemedicine service providers. Huang's research on the behavioral intention of virtual reality (VR) found that perceptions of VR tourism enhanced the relationships between UTAUT (Unified Theory of Acceptance and Use of Technology) components, emphasizing the impact of perceived benefits on behavior (Huang, 2023). Alkhowaiter's study on the implementation of mobile payments in Gulf Cooperation Council (GCC) countries found that trust and Islamic religiosity are important factors that influence the outcome (Alkhowaiter, 2022). Bellet's study on automated vehicle adoption demonstrated the UTAUT4-AV model's effectiveness in predicting intention for different types of automated vehicles. Similarly, Gao's research on smart education continuance intention emphasized the significant impact of the flow state in enhancing intention (Gao, 2023; Bellet, 2023).

While the overall objective of identifying technology adoption remains same across all these research, this particular study takes an alternative viewpoint in examining the complex relationships affecting employee attitudes and adoption behaviors inside a corporate setting. Moreover, the identification and description of the specific factors that affect behavior use in the coal mining industry are challenging due to the distinctive technology development and application exclusive to coal mine companies. These technologies are utilized internally and accessed only by personnel directly involved in the operations and usage of the applications. The research topic for this study was as follows:

How do unanticipated situational factors and the attitudes of others, which influence purchase decisions, enable the deployment of a digital production planning platform in the coal mining industry?

This study uses a quantitative research methodology to fully investigate the factors that impact the adoption of a technological production platform with current developments. This methodology enables the analysis of the variables being considered in an organized and methodical manner. As far as we know, this approach has not been employed in prior research on the adoption of digital production platforms in the coal mining sector. By doing this, we contribute to the existing body of research by emphasizing the connections between the variables and identifying the motivational patterns associated with the use of digital platforms for production in the coal mining industry. Consequently, it provides a valuable alternative for research that rely on acceptance variables derived from previous literature.

LITERATURE REVIEW

1. Business Model Innovation as Strategic Choice

The dynamics of business model innovation are often explored in the literature through various terms that describe the process of change, such as evolution, renewal, replication, learning, erosion, and lifetime. Modifications to business models are a necessary adjustment to the commercial landscape (Holtström, 2022). Understanding the relationship between different elements of a business model is crucial when evaluating how strategic changes impact business model innovation, as highlighted by Demil and Lecocq (2010). Understanding the challenges of change is essential, so let's analyze the development of business models across the strategic transformation constructs. The five stages of the technology adoption lifecycle are commonly represented as a bell curve, where consumers are grouped based on their psychological tendencies. These customers are known for their willingness to take risks and their affinity for innovative concepts. They tend to be younger, have higher disposable incomes, and have expertise in the world of entrepreneurship and innovation. Early adopters, comprising slightly over 10 percent of the population, are the next group in line to acquire new technology products. Furthermore, late adopters are typically older, less financially flexible, and less educated in comparison. Similar to a venture capitalist, the early majority looks to early adopters and influencers for guidance and takes a more cautious approach when making financial investment decisions. With limited financial flexibility and a healthy dose of skepticism towards new products or services, the late majority tends to embrace innovations long after the average customer. The final category



in the stages of technology adoption consists of the laggards. Some individuals are hesitant to embrace change and don't want to follow the guidance of influential figures (Everett M. Rogers, 2003).

2. Purchase Decision

The purchase intention and final decision of consumers can still be impacted by two overarching factors, despite the brand evaluations they may develop. The attitudes of others are the determining factor. Two factors determine the extent to which an individual's attitude decreases a preference for an alternative: (1) the level of negative perception the other individual has of the alternative selected by the consumer, and (2) the consumer's flexibility in accommodating the desires of the other person. Whether the other person's aversion is significant and personal influences the consumer to a greater extent that it will affect the buying intention. This holds true in reverse as well. Infomediaries, through the dissemination of their assessments, serve a function associated with alternative viewpoints. A significant factor influencing a consumer's decision to make changes, postpone, or disregard a purchase is the perception of risk. Consumers implement risk mitigation strategies such as refraining from making decisions, seeking advice from peers, and favoring nationally recognized brands and warranties (Kotler, 2018).

3. UTAUT – Unified Theory Acceptance and Use of Technology

Venkatesh et al. (2003) introduced UTAUT, which suggests four major dimensions as direct predictors of usage intention and behavior: performance expectancy, effort expectancy, social influence, and facilitating factors. The definition of performance expectancy in UTAUT is "the degree to which an individual believes that using the system will help him or her to attain gains in job performance." It should be noted that this definition is the same as TAM's perceived usefulness (Kim et al., 2010). The theoretical model of UTAUT suggests that the actual use of technology is determined by behavioural intention. The perceived likelihood of adopting the technology is dependent on the direct effect of four key constructs, namely performance expectancy, effort expectancy, social influence, and facilitating conditions. The effect of predictors is moderated by age, gender, experience and voluntariness of use (Venkatesh et al., 2003). Evaluation of alternative, which is based on the characteristics of the task and the technology, is described as the degree to which the features and supports of the technology meet the requirements of the task (Goodhue and Thompson, 1995). As previously noted, technological characteristics like dependability and performance serve as the foundation for the development of reliability. When contemplating a purchase, our preferences can be swayed by the opinions of others. Two key factors influence this: the strength of their negative attitude towards our preferred choice and how much we feel obligated to please them. The more intense and close they are to us, the more likely we are to adjust our purchase intentions.

H1. Attitudes of others positively influence on use of behavior to adoption digital production platform.

A user's decision to modify, postpone, or avoid a purchase decision is heavily influenced by perceived risk. The degree of perceived risk varies with the amount of money at stake, the amount of attribute uncertainty, and the amount of user self-confidence. It has been demonstrated by recent empirical research conducted outside of the context of IT (e.g., Kirchmeyer 2002; Twenge 1997) that gender roles have a solid psychological foundation and are largely stable, though they are subject to change over time (Venkatesh et al., 2003) Similarly gender, age is believed to have a moderating effect. Studies on attitudes connected to the workplace (e.g., Hall and Mansfield 1975; Porter 1963) indicate that younger employees could value external advantages more.

H2 : Attitudes of others has mediating influence on use of behavior to adoption digital production platform.

H3 : Unanticipated Situational Factor has mediating influence on use of behavior to adoption digital production platform.

RESEARCH METHODE

The author has interpreted the concept graphic of the Likert scale as follows in accordance with the research measurement: Rating scale: 1 (Strongly Disagree), 2 (Disagree), 3 (Neutral), 4 (Agree), and 5 (Strongly Agree). To systematically gather data, the author developed a questionnaire in accordance with a comprehensive examination of pertinent literature. When generating the inquiries, which drew inspiration from an assortment of scholarly journals, the subject matter of the research was methodically examined. Using variables (22 items) of the UTAUT model, user technology acceptability was assessed (Singh et al., 2023; Cai et al., 2023; Azman Ong et al., 2023; Cobelli et al., 2023; Rouidi et al., 2022). The assessment of alternatives (5 items) and attitudes towards others (4 items) were obtained from the studies by Cai et al. (2023) and Huang (2023), respectively, unanticipated situational factors (8 items).

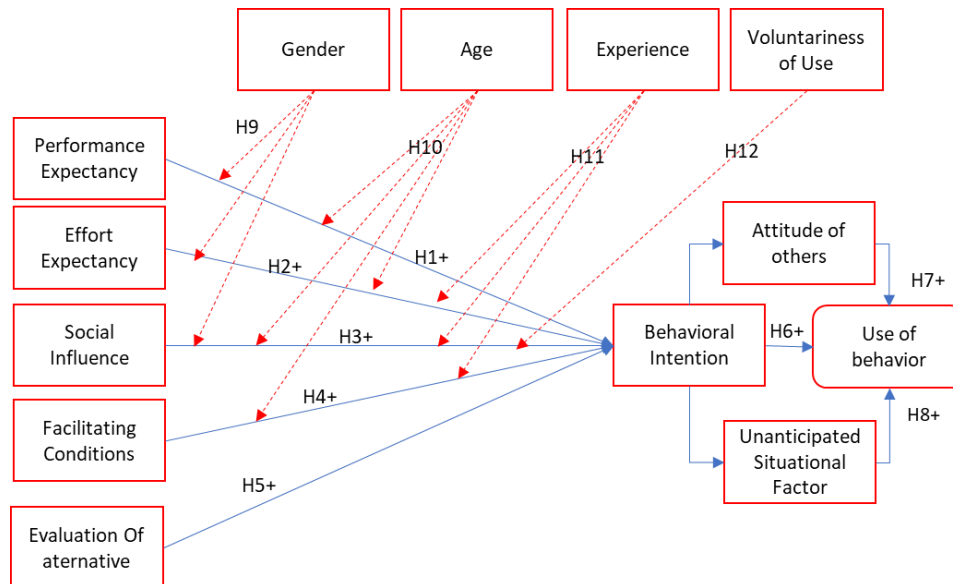


Fig 1. Conceptual model applied in this research,

The questionnaire was subsequently distributed to the 77 prospective members of the PT. CKPE production team, which is a critical component of the coal plan production flow process. The respondents were selected in accordance with the Standard Operating Procedure (SOP), which also served as a guide for assigning personnel responsible for ensuring the success of the adoption of production platforms at PT. CKPE. Notably, the process of selecting the respondents was complicated by the possibility that moving from the specifications would generate unwanted feedback. The subsequent analysis, conducted utilizing Smart PLS 4.0.9.9, shows a commitment to implementing sophisticated tools that ensure dependable data processing and interpretation. This further enhances the overall validity of the study design. To ascertain the validity, dependability, and structural relationships of the model, the evaluation procedure incorporates the assessment of formative and reflective measuring models, each serving a distinct purpose.

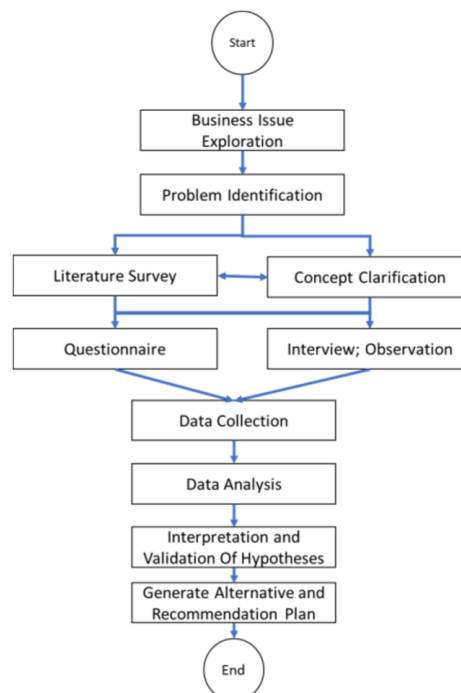


Fig 2. Research Framework applied on this study

RESULT AND DISCUSSION

The survey respondents exhibited a variety of characteristics, such as age, gender, level of proficiency, and formal education in information technology. In terms of gender composition, the sample comprised 83% males and 18% female respondents. The age distribution of the respondents exhibited significant variation: 28% fell within the age range of 26 to 35 years, 48% were aged 36 to 45 years, and 23% were aged 46 to 55 years. When assessing levels of IT proficiency, the distribution exhibited a variety of abilities. 13% of the respondents identified as advanced and possessed advanced IT skills, whereas 40% identified as novices who utilized only fundamental programs to support their work. The majority, 45%, were of the opposite opinion and were actively engaged in their studies of the subject, whereas a minority, 3%, regarded themselves as authorities on IT issues and were willing to offer assistance. As a result, 75% of the participants did not pursue formal IT education, while 25% of the participants confirmed that they had concluded formal IT education.

Partial Least Squares Structural Equation Modeling was used to process all of the collected data (PLS-SEM). In this model, the UTAUT components were had mediating variables, attitude of others and unexpected situational factors.

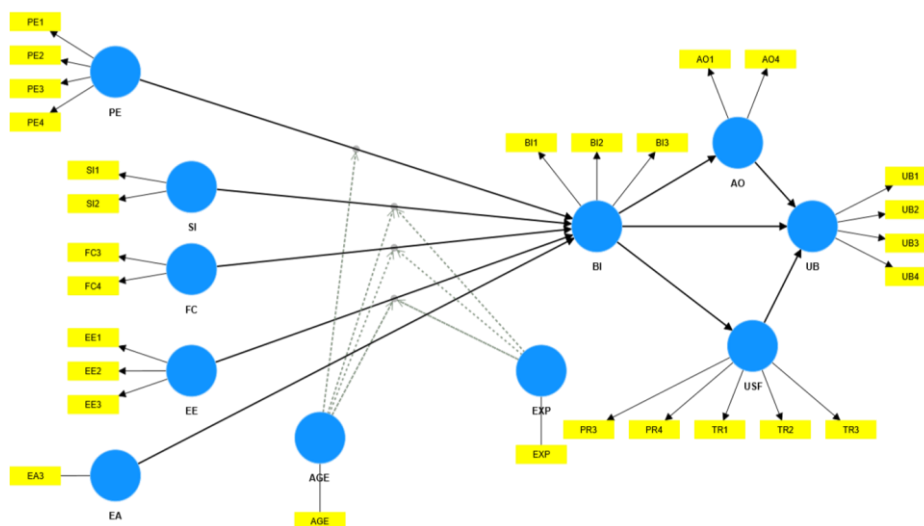


Fig 3. Adjusted Measurement Model between Manifest variable (MV) and Latent variable (LV) applied in this study

Table 1. Data processing using PLS-SEM Algorithm

Construct	Outer loadings	Outer loadings	α	CR	(AVE)
Attitude of Others	AO1 <- AO	0.90	0.55	0.81	0.68
	AO4 <- AO	0.75			
Behavioral Intention	BI1 <- BI	0.94	0.91	0.94	0.85
	BI2 <- BI	0.95			
	BI3 <- BI	0.88			
Use Of Behaviour	UB1 <- UB	0.93	0.88	0.92	0.74
	UB2 <- UB	0.86			
	UB3 <- UB	0.93			
	UB4 <- UB	0.71			

Attitude of Others (AO) exhibits strong outer loadings (0.749 to 0.898) across its indicators (AO1, AO4). Although the Cronbach's alpha of 0.551 but composite reliability still high, 0.811 considering moderate internal consistency. Meanwhile, AVE of 0.683 indicate good convergent validity, the lower Cronbach's alpha compared to other constructs suggests potential for improvement.



Behavioral Intention (BI) demonstrates strong outer loadings (ranging from 0.877 to 0.949) across its indicators (BI1, BI2, BI3). The construct exhibits a high internal consistency with a Cronbach's alpha of 0.912 and a composite reliability (ρ_c) of 0.945, while the AVE of 0.851 suggests substantial variance captured. Use of Behaviour (UB) displays robust outer loadings (ranging from 0.712 to 0.929) across its indicators (UB1, UB2, UB3, UB4). UB demonstrates good internal consistency with a composite reliability (ρ_c) of 0.920. The AVE of 0.743 indicates good convergent validity.

1. Structural Model Hypothesis Testing

Heterotrait-monotrait ratios (HTMT) are employed to assess discriminant validity in greater detail. These ratios compare the correlations within each construct (monotrait) to those between constructs (heterotrait). Positive discriminant validity is indicated by values below 0.90, whereas negative discriminant validity is indicated by values above 0.90. Upon examining the highlighted values, possible concerns regarding BI (Behavioral Intention) and UB (Use of Behavior) become apparent. Their HTMT value of 0.964 indicates that they may be overly similar. The remaining values fall below the established threshold, indicating that the discriminant validity is satisfactory for the majority of alternative construct pairs. The highlighted areas, nevertheless, necessitate additional focus. Taking into account that a portion of the HTMT results exceed the 0.9 threshold, the author also examines the value of the Fornell-Larcker criterion for the variable construct in order to assess the condition on discriminant validity. As per the Fornell-Larcker criterion, the average variance extracted (AVE) of a construct should exceed the squared correlations it has with other constructs. This indicates that the construct in question accounts for a larger proportion of the variance in its indicators than it shares with other constructs. As the AVE values for the diagonal elements exceed the squared correlations with other constructs, they satisfy the criterion for all constructs. It is worth mentioning that the AVE for each construct exceeds the AVE for the corresponding off-diagonal elements, thus confirming the measurement model's discriminant validity.

Table 2. Heterotrait-monotrait ratio (HTMT) - Matrix

	AO	BI	UB	USF
UB	0.894	0.964		
USF	0.602	0.539	0.490	

Table 3. Fornell-Larcker criterion

	AO	BI	UB	USF
AO	0.827			
BI	0.630	0.923		
UB	0.658	0.885	0.862	
USF	-0.400	-0.475	-0.451	0.745

2. Formative Measurement Model Assessment

An analysis of the formative measurement model showed several notable aspects. Although multicollinearity can pose a problem for constructs with VIF (variance inflation factor) values exceeding 5, the majority of relationships in this model remain below that threshold. The majority of other combinations, including BI-to-AO, BI-to-USF, and USF-to-UB, have VIF values that are lower than 5. This suggests that the risk of multicollinearity in these relationships is diminished. It is critical to address instances of high VIF values due to the fact that multicollinearity can lead to incorrect estimations of regression coefficients and complicate the comprehension of the model.



Table 4. Result of Variance Inflation Factor (VIF) calculation, criteria for Colinearity between variable construct

	VIF
AO -> UB	1.695
BI -> AO	1.000
BI -> UB	1.840
BI -> USF	1.000

3. Evaluation of Structural Model

R² values of 0.75, 0.50, and 0.25 are considered substantial, moderate, and weak. However, R² values have to be interpreted in the context of the model and its complexity. Excessive R² values indicate that the model overfits the data (Hair, et.al. 2021). This implies that a considerable degree of variation among people's behavioral intentions is captured by the model that was chosen. The construct Attitude of Others (AO) has a modest level of explanatory power, as indicated by its R-square value of 39.7%. Almost 40% of the variation in people's attitudes toward the beliefs or actions of others can be explained by the path from Behavioral Intention (BI) to Attitude of Others (AO). For the construct Use of Behaviour (UB), the R-square value of 80.0% highlights a substantial amount of variability in individuals' actual usage of a particular behavior that can be explained by the specified predictors, primarily influenced by Behavioral Intention (BI). Regarding the construct Use of Behavior (UB), the R-square value of 80.0% indicates a significant degree of variation in people's real use of a certain behavior that can be accounted for by the listed predictors, with Behavioral Intention (BI) having the greatest influence. The Unexpected Situational Factor (USF) exhibits a low level of predictability, as indicated by the R-square value of 22.6%. The relationship between Unexpected Situational Factor (USF) and Behavioral Intention (BI) helps to explain a small amount of the variation in people's perceptions of unforeseen situational circumstances influencing their behavior.

4. Hypothesis Testing

To evaluate the significance and reliability of the anticipated routes, these statistics are critical. The significant T statistics of 5.760, 5.374, and 6.930, respectively, together with the corresponding P values of 0.000, indicate that there is substantial evidence supporting the relevance of the relationships between BI and Unanticipated Situational Factor (USF), BI and Attitude of Others (AO), and BI and Use of Behavior (UB). The results of this study suggest that BI exerts a substantial and reliable impact on AO, USF, and UB. As evidenced by the initial sample value of -0.018, the relationship between Unanticipated Situational Factor (USF) and Use of Behavior (UB) is weak, as calculated by non-significant T statistics (0.256) and a P value of 0.798. The initial sample value of 0.163, the T statistic of 1.524, and the P value of 0.128 indicate a weak correlation between Attitude of Others (AO) and Use of Behavior (UB). The given data provides a representation of the precise indirect effects occurring within the model. The initial scenario involves identifying the indirect correlation between Use of Behavior (UB) and Behavioral Intention (BI) via the Attitude of Others (AO). The second section investigates the indirect effect of BI on UB as mediated by the Unexpected Situational Factor (USF). In general, despite the observation of an indirect influence in both scenarios, the statistical analyses indicate that the prospective effects were not statistically significant for the present sample. Focusing on the relationship between certain moderators and predictors and behavioral intention (BI).

Table 5. Path Coefficients between variable construct.

Construct	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Result
BI -> AO	0.630	0.644	0.109	5.760	0.000	Accepted
BI -> USF	-0.475	-0.498	0.088	5.374	0.000	Accepted
BI -> UB	0.773	0.744	0.112	6.930	0.000	Accepted
USF -> UB	-0.018	-0.033	0.071	0.256	0.798	Rejected
AO -> UB	0.163	0.192	0.107	1.524	0.128	Rejected



Based on research findings that highlight the importance of behavioral intention, management can implement successful strategies to improve users' behavioral intention on digital platforms. The study's validity remains maintained despite the limitations on the respondents' range, as its primary objective is to investigate the factors that influence the adoption model. The research remains relevant to the current dynamics within by specifically targeting the current workforce. The results of implementing this focused approach will contribute to our comprehension of technology adoption models by providing substantial insights into patterns of adoption. It is essential to comprehend how to achieve an appropriate balance between the complexity of the investigation within specified limitations and the capacity of the findings to be applied to a broader context.

The research findings provide valuable insights into the factors that influence the installation of a digital production platform in the everyday operations of PT. CKPE. Performance expectancy is a significant factor that has the potential to influence the willingness of customers to use the digital production platform. This demonstrates that the willingness of consumers to embrace and incorporate the platform into their daily operations is influenced, to some extent, by their perception of its effectiveness. The users' tendency to adopt is enhanced by their perception of the platform's usability for everyday tasks. Given the study's confinement to a narrow set of conditions, the results indicate that neither age nor experience had a significant moderating effect.

Practical Implications of the Study

This study proposes two recommendations for enhancing user behavioral intention. First and foremost, policymakers should consider enhancing the platform's effectiveness by incorporating features such as a user-friendly dashboard, a wide range of planning and reporting choices, informative error notifications, concise summary pages, and robust reporting capabilities. To enhance user behavior intention and usage, incorporating features such as mobile access, real-time monitoring, and rapid result evaluation would significantly expand the program's capability. Additionally, management has the option to conduct trial operations or pilot testing in order to reduce users' perceived effort expectations and enhance their behavioral intention. Through this practical trial experience, users develop a genuine comprehension of effort expectancy, leading to the cultivation of good feelings when utilizing the platform. The reference is from Cai et al. (2023). Demonstrating senior management's unwavering commitment to fully supporting application development can have a favorable influence on behavioral intention and affect usage behavior. This encompasses the establishment of a specialized team for the purpose of development, provision of necessary hardware assistance, and formulation of a concise policy declaration (Alkhowaiter, 2022). To enhance usage behavior, managers can also foster a positive mindset by regularly disseminating encouraging messages to all staff members (Cobelli et al., 2023). Ensuring that all stakeholders participating in the process are in agreement also helps to improve utilization. In addition, consistent endeavors to address unforeseen circumstances by assuring a flawless and user-friendly application will further enhance positive utilization habits. Overall, these proposals offer management and stakeholders realistic solutions to optimize the productivity and user engagement of the digital production platform.

CONCLUSION

To summarize, the digital production platform can affect users' intention to use it, while ignoring the impact of others' views and unexpected situational factors. The study's outcomes indicate that the introduction of a digital production platform will have an influence on PT. CKPE's daily operations. The connection between behavioral intention and other UTAUT features seems to be influenced by the attitudes of others, which is an interesting finding. However, the impact of this influence on the adoption of the digital production platform employed in PT. CKPE's everyday operations is not regarded statistically significant. Unanticipated factors also have a moderating effect on the behavioral intention towards using the digital production platform, although they do not exhibit statistical significance in relation.

Within the context of this study, it is suggested that researchers continue with other research projects. Specifically, it is crucial to ensure an adequate number of participants to enhance the validity of the research findings. In order to have a comprehensive comprehension of how moderator factors impact the observed connections, it is crucial to provide a meticulous description of these variables. Additionally, it is recommended to clearly define the connections between pathways, moderating factors, and intervening variables in order to provide a thorough understanding of the study's design. The research aims to enhance inclusivity and depth by involving a diverse variety of people, which aligns with the restrictions specified in the path model design. In order to ensure the accuracy of the data collection process, it is advisable to commit a greater amount of time and incorporate talks with participants. Furthermore, it is recommended to include capable participants in order to gain insights from an external standpoint, which will provide a more comprehensive understanding of the factors that influence the adoption behaviors of digital production platforms.



Additionally, it is advisable to include interview sessions with important individuals in the study to enhance the likelihood of obtaining more accurate solutions to the issues of the implementation of digital production platforms in the particular organizational context.

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