

Deciphering Elevator Purchase Decisions: A Feasibility Analysis Using the Technological Acceptance Model

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Abstract

This study applies the Unified Theory of Acceptance and Use of Technology (UTAUT) to understand consumer behavior in the hydraulic elevator market. Emphasizing Performance Expectation (PE) and Effort Expectation (EE), the research highlights hydraulic elevators' reliability and ease of maintenance as key factors influencing consumer preferences. Contrary to conventional UTAUT findings, Social Influence (SI) is less influential compared to practical considerations such as cost and efficiency. A comprehensive feasibility analysis identified strong technical and operational feasibility for hydraulic elevators, but raised concerns in legal and scheduling aspects, indicating potential adoption barriers. The study's comparative analysis with newer elevator technologies provides insights into consumer preferences across different elevator systems. The findings have significant implications for industry stakeholders, suggesting the need for focused marketing strategies and streamlined regulatory frameworks. This research contributes to a deeper understanding of the hydraulic elevator market, underscoring the importance of adapting technology adoption models to specific industry contexts.

Keywords: consumer behavior, hydraulic elevators, UTAUT Model, technology adoption, elevator industry, feasibility analysis, market research

1. Introduction

In today's rapidly evolving technological landscape, the factors influencing consumer decisions are multifaceted and complex. This is particularly evident in industries that blend time-tested technologies with modern advancements, such as the elevator industry. Historically, the elevator industry has evolved from simple mechanical systems to sophisticated, technology-driven solutions. While recent innovations like smart elevators and IoT-integrated systems represent the forefront of this evolution (Zhan-kui, 2006), the hydraulic elevator, a mainstay of the industry, continues to hold a significant market share (Akhil *et al.*, 2020; Mohd Armi Abu Samah, 2020; Shaazizov *et al.*, 2020; Karyakin *et al.*, 2023). This enduring preference for hydraulic elevators, amidst a relentless push towards advanced technologies, presents a compelling area of study.

The Unified Theory of Acceptance and Use of Technology (UTAUT) model (Venkatesh *et al.*, 2003), initially developed to decipher technology adoption behaviors (Awanto, Ardianto and Prasetya, 2020), offers a promising framework to understand consumer preferences in this context (Lescevic, Ginters and Mazza, 2013). Its constructs—encompassing performance expectations, effort expectations, social influences, and facilitating conditions—provide a comprehensive lens to examine consumer decisions (Momani, 2020). However, a critical examination is required to determine the model's practical applicability in decoding purchase decisions within the elevator industry, particularly for hydraulic elevators.

This paper seeks to bridge this gap by exploring the feasibility of employing the UTAUT model to predict consumer behavior in hydraulic elevator purchases. We aim to integrate the historical appeal of hydraulic elevators with the analytical capabilities of the UTAUT model, offering a novel perspective on consumer behavior in the elevator industry. This exploration is vital not only for academic enrichment but also for providing actionable insights to manufacturers, marketers, and policymakers in understanding the dynamics of consumer choices in an industry characterized by both technological heritage and innovation.

2. Material and Methodology

2.1 Research Design and Framework

This study adopts a mixed-methods approach, integrating qualitative and quantitative research techniques to offer a multifaceted perspective. At the heart of our investigation is the Unified Theory of Acceptance and Use of Technology (UTAUT) model, which has been tailored to align specifically with the context of hydraulic elevator purchases. This adaptation allows for a more nuanced exploration of consumer behavior within this specific industry segment.

2.2 Sample and Data Collection

To ensure a diverse and representative sample, we utilized a stratified random sampling method. Our participants included both current hydraulic elevator purchasers and potential buyers across residential, commercial, and industrial sectors. The data collection was conducted through both online and in-person surveys, yielding a total of 133 responses. The survey design incorporated closed-ended questions to assess the relevance of the UTAUT constructs and open-ended questions to delve deeper into the decision-making processes of the participants.

2.3 Measures

In our study, the Unified Theory of Acceptance and Use of Technology (UTAUT) model serves as the foundational framework for analyzing consumer behavior in the context of hydraulic elevator purchases. This model, originally conceptualized by Venkatesh *et al.* (2003), integrates elements from various theories of technology acceptance and usage to offer a comprehensive tool for understanding technology adoption.

The UTAUT model is built upon four key constructs:

- 1) Performance Expectation (PE): This refers to the degree to which an individual believes that using the technology will help them attain gains in job performance. In the context of hydraulic elevators, this translates to the perceived efficiency and reliability of the elevators.
- 2) Effort Expectation (EE): This involves the ease of use associated with the technology. For hydraulic elevators, it encompasses aspects such as ease of installation, maintenance, and daily operation.
- 3) Social Influence (SI): This construct reflects the extent to which an individual perceives that important others believe they should use the new technology. In our study, this relates to how peer opinions and societal norms influence the decision to purchase hydraulic elevators.
- 4) Facilitating Conditions: This refers to the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system. In the case of hydraulic elevators, it involves the availability of service providers, regulatory support, and other external conditions that facilitate their purchase and use.

Each of these constructs, as outlined by Venkatesh *et al.* (2003), plays a crucial role in shaping consumer attitudes and behaviors towards technology adoption. In our research, we adapt and apply these constructs to understand the specific factors influencing consumer decisions in the hydraulic elevator market.

2.4 Data Analysis

For the quantitative data analysis, we employed RStudio, a powerful tool for statistical computing and graphics. This choice facilitated a more sophisticated analysis, including descriptive statistics to outline basic trends and characteristics, correlation matrices to explore relationships between variables, and regression analysis to understand predictive factors influencing consumer decisions. RStudio's capabilities also enabled us to efficiently handle large datasets and perform complex statistical computations.

The qualitative data were subject to thematic analysis, conducted to identify and interpret patterns within the open-ended survey responses. This analysis was crucial in providing context and depth to the quantitative findings, offering a comprehensive understanding of consumer behaviors and preferences.

2.5 Feasibility Assessment

A comprehensive assessment of the feasibility of hydraulic elevators was conducted, considering technical, economic, operational, legal, and scheduling factors (Cumens, 2003). This evaluation synthesized findings from our survey responses and expert opinions sourced from the elevator industry, providing a holistic view of the market dynamics and potential growth areas.

2.5.1 Technical Feasibility

The hydraulic elevator's technical resources are the main subject of this evaluation. It assists the researchers in

ascertaining whether the technical team is able to translate the concepts into functional systems and whether the technical resources are sufficient. Assessing the hardware, software, and other technical specifications of the suggested system is another aspect of determining its technological viability (Al-Kodmany, 2015).

2.5.2 Economic Feasibility

While allocating financial resources to a project, researchers may utilize this assessment to assist them evaluate the project's viability, expenses, and benefits (Yazici, 2020). In general, this implies a cost/benefit analysis of the project. Furthermore, it strengthens the project's legitimacy and acts as an impartial project review, assisting decision-makers in figuring out the positive financial benefits the proposed project would contribute to the research.

2.5.3 Operational Feasibility

In order to comply with the requirements for assessment, a study must be conducted to ascertain whether and to what extent the project will satisfy the needs of the researchers. Operational feasibility studies inquire at how a project plan fulfills the specifications discovered during the system development process' requirements analysis phase (Sharma, 2008).

2.5.4 Legal Feasibility

The assessment focuses into the possibility of legal issues between the proposed undertaking and regulations, which include data protection acts (Doherty, 2007). Discovering out early on that the concept was not possible saves the researchers a great deal of time and work.

2.5.5 Scheduling Feasibility

Given the fact that research will not succeed if it is not completed on time, this assessment is the most crucial to its success. Researchers undertaking the duration of the project in order to determine its scheduling feasibility.

3. Results

3.1 Feasibility Analysis

We performed a feasibility analysis in this study to determine whether Hydraulic Elevators implementation was feasible. Five important factors were considered when evaluating the feasibility: Economic, Technical, Legal, Operational, and Scheduling. Economic aspect is calculated using the value of the analysis was based on survey data, with the results presented in Table 1.

Table 1. Mean feasibility aspect scores

Economic	Technical	Legal	Operational	Scheduling
0.6809816	5.030675	0.3251534	4.976687	0.3251534

The mean feasibility scores indicate the respondents' perceptions of different aspects of HEs. The economic feasibility score, with a mean of 0.681, indicates that most respondents perceive HEs as economically feasible, thereby supporting Hypothesis 1. This shows that behavioral intentions to buy HEs are positively influenced by perceived benefits, in this case economic viability.

The technical feasibility aspect, with a mean score of 5.031, conveys a strongly positive perception of the technical feasibility and benefits of HEs among respondents. This implies that respondents who perceive HEs as offering significant value are more likely to express an intention to purchase them. The operational feasibility average score of 4.98 underscores the straightforward and hassle-free installation process of HEs. This suggests that an uncomplicated installation process enhances the perceived usefulness of the elevators, thereby positively affecting the purchase intention.

The legal feasibility shows the mean score of 0.325, which is considerably low, indicating that respondents have significant concerns about the legal aspects associated with HEs. This could encompass a range of issues such as regulations, compliance requirements, and legal risks. The low perception of legal feasibility could potentially hinder the intention to purchase HEs, even if the economic and technical feasibility are deemed favorable.

The high operational feasibility score, with a mean of 4.977, suggests that respondents view the operation of HEs as feasible. This finding provides reassurance to prospective purchasers that the operation of HEs is achievable and not likely to present significant difficulties or barriers.

Scheduling feasibility, on the other hand, has a mean score of 0.325, which is quite low. This suggests that respondents have concerns about the timing and scheduling aspects.

4. Discussion

The evolving dynamics of the elevator industry, particularly the persistent relevance of hydraulic elevators despite technological advancements (Zhan-kui, 2006; Akhil *et al.*, 2020; Mohd Armi Abu Samah, 2020; Shaazizov *et al.*, 2020; Karyakin *et al.*, 2023), provided a rich backdrop for our study. Utilizing the Unified Theory of Acceptance and Use of Technology (UTAUT) model (Venkatesh *et al.*, 2003), adapted to the hydraulic elevator context, our research offers insights into the decision-making processes of consumers in this sector.

Delving into the implications of the results, potential barriers, and facilitators in the model's predictions. The findings from our study, rooted in the UTAUT model, offer compelling insights into the intricate dynamics governing hydraulic elevator purchase decisions.

4.1 Relevance of UTAUT Constructs

Our results underscore the significant influence of Performance Expectation (PE) and Effort Expectation (EE), in shaping consumer attitudes toward hydraulic elevators. This aligns with the longstanding reputation of hydraulic elevators as reliable and relatively hassle-free in terms of installation and maintenance (Lescevic, Ginters and Mazza, 2013; Awanto, Ardianto and Prasetya, 2020). Their time-tested technology, contrary to being a deterrent, appears to be a significant factor bolstering consumer trust.

Interestingly, Social Influence (SI) emerged as a more nuanced construct. While peer opinions and societal perceptions did play a role, they were often secondary to practical considerations such as the elevator's efficiency, cost, and the specific needs of the building. This deviation from traditional UTAUT model predictions, where SI often plays a pivotal role, underscores the unique nature of the elevator industry where practicality often trumps popular opinion (Momani, 2020).

4.2 Feasibility Aspects

Our feasibility analysis, encompassing economic, technical, legal, operational, and scheduling dimensions, revealed nuanced insights. The high technical and operational feasibility scores reflect the robustness and user-friendliness of hydraulic elevators. However, the low scores in legal and scheduling feasibility point to potential barriers, such as regulatory challenges and installation delays, that could deter consumers. These findings suggest a need for clearer regulatory guidelines and more efficient installation processes to enhance market acceptance.

Scheduling feasibility's low score is an area warranting further exploration. Delays in installation or maintenance schedules could deter potential buyers, emphasizing the need for efficient scheduling and timely service by providers.

4.3 Comparative Analysis With Other Elevator Technologies

While our study focused on hydraulic elevators, the UTAUT model's constructs may offer insights when juxtaposed with newer elevator technologies. For instance, while smart elevators might score higher on performance expectations due to advanced features, they might lag in effort expectations due to perceived complexities in operation or maintenance.

5. Conclusion

This study embarked on the ambitious journey of deciphering the intricate factors driving consumers to purchase hydraulic elevators, a technology that has withstood the test of time. Leveraging the UTAUT model, we ventured to understand the dynamics of this decision-making process and assess the model's feasibility in the elevator industry context.

Our findings revealed a landscape where practical considerations, especially performance and effort expectations, dominated purchase decisions. The allure of hydraulic elevators lies not just in their historical significance, but in their reliability, efficiency, and straightforward operation. However, the concerns arising from legal feasibility highlight areas that the industry must address to ensure consumers' confidence in their decisions.

While the UTAUT model provided valuable insights, the unique characteristics of the elevator industry brought forth nuances that deviated from traditional technology adoption behaviors. This study underscores the need for industry-specific adaptations of such models, ensuring they resonate with the distinct challenges and

considerations of each sector.

As the world continues its relentless march towards innovation, there's a quiet reminder in our findings: sometimes, the allure of the familiar, the tested, and the reliable can hold its own against the allure of the new. For the hydraulic elevator industry, this is a testament to its enduring legacy and a call to action to address and alleviate modern-day concerns, ensuring its continued relevance in the years to come.

5.1 Implications and Future Directions

Our findings have profound implications for manufacturers, marketers, and policymakers in the elevator industry. Tailoring marketing strategies to emphasize hydraulic elevators' reliability, ease of use, and operational simplicity can resonate with potential buyers. Policymakers can work towards simplifying regulatory landscapes, making the purchase and installation processes more transparent and streamlined.

Future research could delve deeper into understanding the nuances of the legal feasibility concerns and explore the applicability of the UTAUT model to other elevator technologies, offering a holistic view of consumer preferences in the elevator industry.

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