

Determinants of Perception and Acceptance Behavior of Employees on New Technology Equipment in a Semiconductor Company

Matt Joseph S. Enriquez

mattjosephenriquez24@gmail.com

San Antonio, Santo Tomas City, Batangas, 4234

Abstract

Numerous studies have delved into understanding perception and acceptance behavior, yet research in manufacturing or production industries remains somewhat constrained. This study zeroes in on the factors influencing employees' embrace of new technology and their perceptions and acceptance of innovation within this context. Specifically, it seeks to gauge how internal (such as organizational support, incentives, perceived usefulness, innovativeness, experience, and self-image) and external factors (like engagement) impact semiconductor employees' perception of using new equipment and subsequently their acceptance behavior. Employing regression analysis, the study explores the interplay between these factors and employees' perceptions of new technology, shedding light on how these perceptions shape their acceptance behavior. The findings underscore the significance of emphasizing organizational support, incentives, and particularly, fostering a sense of engagement to cultivate a positive perception of new technologies, thereby facilitating their seamless integration, and ensuring success.

Keywords: innovation; acceptance behavior; new technology equipment

1. Introduction

1.1. Background of the Study

In modern times, innovation and technology are integral parts of our everyday lives, impacting how we live and work. These tools are not only useful, but also crucial for boosting production, refining services, and improving goods. Technology is an ever-present part of our life, always affecting us in all aspects (Kammerzelt, 2021). In the workplace, the integration of technology is no longer a choice but a fundamental requirement. Technology has brought in a new era for performing things faster and better. It makes work easier and allows workers to make data-driven decisions (Twohig, 2023). The demand for technology highlights the close relationship between its growth and the continual evolution of our workplaces. This link is critical as organizations strive to preserve efficiency, competitiveness, and relevance in today's fast changing global market. Factors such as organizational patronage, incentives, perceived usefulness, innovativeness, experience, self-image, and engagement also play a significant role in the perception of use that leads to the acceptance behavior of an individual.

Being adaptable to technological changes is seen as a basic need in various industries. Businesses seeking to expand, especially the manufacturing sector, must accept and adapt to continuing technological advances. Around the globe, 52% of companies have noticed a boost in employee productivity, 49% have seen improved performance, and 46% have observed enhanced customer experience following technology renovation (Danielkievich, 2022). This flexibility to technological changes is acknowledged as a fundamental requirement across industries, showing a shared recognition that the deployment of contemporary technology is critical for long-term success and competitiveness. According to Tick, Reka, & Judit (2022), as these forces converge, businesses are forced to adapt and reposition themselves within this developing technology environment. This instance represents an important turning point in the global manufacturing industry's growth trend. The manufacturing industry, regardless of size or geographic footprint, is on the edge of an enormous shift in this revolutionary setting. This growth requires a shift in viewpoint, shifting the focus away from established global patterns and to the research of new procedures that surpass traditional boundaries. Employees, as the main workforce of the organizations, should be instilled with this change.

Employees play a crucial role in how a company operates, forming the core of departmental functionality. When it comes to dealing with technological advances, employees play a critical role, either enabling or hindering the seamless integration of new advancements. It is crucial that the employees embrace adaptation. The journey of technological adaptation and acceptance is diverse, resembling a tapestry constructed from human points of view, organizational structures, and external factors (Ghobakhloo & Ching, 2019).

The company's constant challenge is the integration of new technology into its process. One company that places significant importance on technology is Semiconductor Company. According to Ghobakhloo and Ching (2019), the successful implementation of new technologies in manufacturing is dependent on important factors influencing technological acceptance and acceptability. Personal attitudes toward technology, shaped by individual ideas and experiences, have a significant impact on one's readiness to embrace new advances in technology. One key variable to investigate is the extent to which employees have the desire to accept the new equipment and technological innovations. The researcher decided to conduct this research with high hopes of developing a system for the employees to easily adapt on the new technology equipment and ensure return on investment in acquiring the new technology.

This study determines the predictors of perception of use of the new equipment and the effect of perception of use on acceptance behavior. Specifically, the study aims to identify which variables are significant to the perception of use. The research then examines how this perception of use impacts people's willingness to accept and adopt the new equipment. By understanding these factors, the study can provide valuable insights for ensuring successful implementation of new technologies.

1.2. Literature Review

The factors influencing the perception of use encompass a comprehensive set of predictors, including organizational patronage, incentives, perceived usefulness, innovativeness, experience, self-image, and engagement. Each of these elements contributes to shaping how individuals perceive and embrace innovative practices within an organizational context.

Organizational patronage is considered as an external factor. Leaders and managers play a vital role in supporting and empowering their teams to embrace more innovative approaches. This factor contributes to

eliminating organizational barriers, which is crucial for perception of use of new technological equipment. The characteristics of managers have been recognized as factors influencing the perception of innovation (Okrah & Irene, 2023). According to Firk et.al. (2022), top management plays a crucial role in establishing the groundwork for innovation by fulfilling responsibilities such as identifying the strategic potential of innovation, articulating its strategic significance, and allocating resources accordingly. The support of top management plays a significant role in shaping a company's strategies and decisions related to service innovation (Hs, Liu, Tsou, & Chen, 2019). The significance of top managers and their teams is increasing, as their capacity to cultivate a conducive innovation environment within the company is viewed as a powerful predictor of employee creativity. This, in turn, fosters an appropriate climate for innovation and facilitates the mobilization of necessary resources for employees to participate in creative endeavors (Prokop & Hajek, 2023). Incentives are frequently viewed as a great motivator influencing employee behavior in the perception of innovations (Talukder, 2018). This highlights the value of incentives, not just as motivators for acceptance but also as drivers for creative processes that support innovation in a business environment. Rewards and incentives have an impact on employee creativity which helps in enhancing perception on innovation (Chaubey & Sahoo, 2019).

Perceived usefulness is defined as the extent to which an individual believes that utilizing a system will contribute to achieving improvements in job performance (Chen & Aklikokou, 2019). Research has also demonstrated that perceived usefulness stands out as one of the most robust predictors, maintaining its significance consistently across all measurement points (Talukder, 2018). Results from several studies indicate that the perceived usefulness factor emerged as the most influential determinant in driving the perception regarding innovation of diverse technologies within an educational context (Granić & Marangunić, 2019). The formation of attitudes towards the use of innovation is influenced by the perception of usefulness, which refers to the extent to which an individual believes that technology can enhance their performance. (Sugandini, et al., 2018).

Innovativeness strengthens the manifestation of innovative behaviors, serving as a link for the development of new products, services, or processes. Every organization aims to shape the attitudes of its employees towards embracing innovation. However, there is variability in the readiness of individuals to adopt specific innovations (Talukder, 2018). A level of innovativeness is essential to foster perception towards innovation (Domi, Keco, Capelleras, & Mehmeti, 2019) According to the study of Tominc (2019), innovativeness encompasses a multidimensional process, examining technologies, product innovations, and competition from various perspectives. The inclusion of experience as a factor was introduced to understand how the influence of the original factors from TAM1 changed as users accumulated more experience to the said innovation (Nikolopoulos & Likothanassis, 2018).

Experience serves as a reference variable in establishing subjective norms, which, in turn, influence perception on innovation (Setiyani, Effendy, & Slamet, 2021). An individual might perceive that utilizing a system will enhance their professional image and job performance (Talukder, 2018). Research findings indicated that the concept of image was distinctly independent and could be assessed as a distinct factor to innovation (Yuen, Cai, Qi, & Wang, 2020). Enjoyment pertains to the degree to which an individual perceives the use of the system as enjoyable and satisfying. Also, enjoyment of an innovation plays a significant role in fostering a positive perception of what has been newly implemented (Talukder, 2018). Positive emotions and enjoyment can cultivate favorable attitudes and behaviors in the workplace, ultimately contributing to successful job performance. Highlighting the significance of enjoyment empowers employees to broaden their perspectives on enhancing service delivery performance through creativity and an enhanced perception of

innovation (Al-Hawari & Bani-Melhem, 2019). According to Talukder (2018), the tendency to respond positively or adversely to certain things or organization can be referred to as perception toward innovation. It includes a person's sentiments of favorability or unfavourability toward the execution of a particular activity. According to Granić & Marangunić (2019), the user's perception of innovation stands as a key factor in determining whether the user will choose to accept or reject in using the system.

Behavioral intention signifies an individual's motivation, indicating their deliberate plan or decision to exert effort in performing the accepted behavior (Connor, 2020). Also, TRA aims to understand an individual's perception of innovation by examining the fundamental motivation for a specific action. Moreover, the normative component plays a role in deciding whether the individual will genuinely engage in the anticipated behavior. According to the theory, the intention to perform a particular accepted behavior comes before the actual execution of said behavior (Awadallah & Elgharbawy, 2020). Acceptance behavior is categorized as the comprehensive system usage indicative of actual adoption. Based on multiple studies, the primary criterion for individual adoption is often identified as system usage, with self-reported measures commonly used to operationalize this aspect of adoption (Talukder, 2018).

1.3. Research Framework

This study is based on the research framework of Majharul Talukder referred to as the “Causal Paths to Acceptance of Technological Innovations by Individual Employees”. The relationship of the variables can be seen in Figure 1.

Talukder identified that the active role of management is crucial. Managers need to demonstrate commitment to innovation by providing technical training and administrative support to employees. When individuals also perceive strong managerial support, resource allocation, and personal benefits, they are more likely to embrace innovations positively. The study also highlights the role of engagement in establishing a positive perception of innovation. Organizations should not only focus on extrinsic benefits but also include fun elements in the system to motivate individuals.

It was also discovered that individuals' self-image plays a crucial role in their perception and usage behavior. Attaining expertise in a specific innovation not only fosters a positive self-image but also instills a sense of special pride in them. While personal innovativeness negatively influences adoption behavior. The study suggests that individuals tend to experience frustration when confronted with an excess of innovative features, particularly in situations where changes occur frequently.

In the semiconductor industry, the perception of innovation among is influenced by several key factors. Organizational patronage, through robust support and resources from top management, fosters an environment that helps creativity and experimentation. Incentives, both monetary and non-monetary, further motivate employees to engage in innovative activities by rewarding their efforts and outcomes. When employees perceive the usefulness of their innovative contributions, they feel more motivated and engaged, boosting their self-image as valuable team members. Their past experiences and natural creativity (innovativeness) also play a big role. All these factors together create a dynamic environment where innovation thrives, driving the semiconductor industry forward.

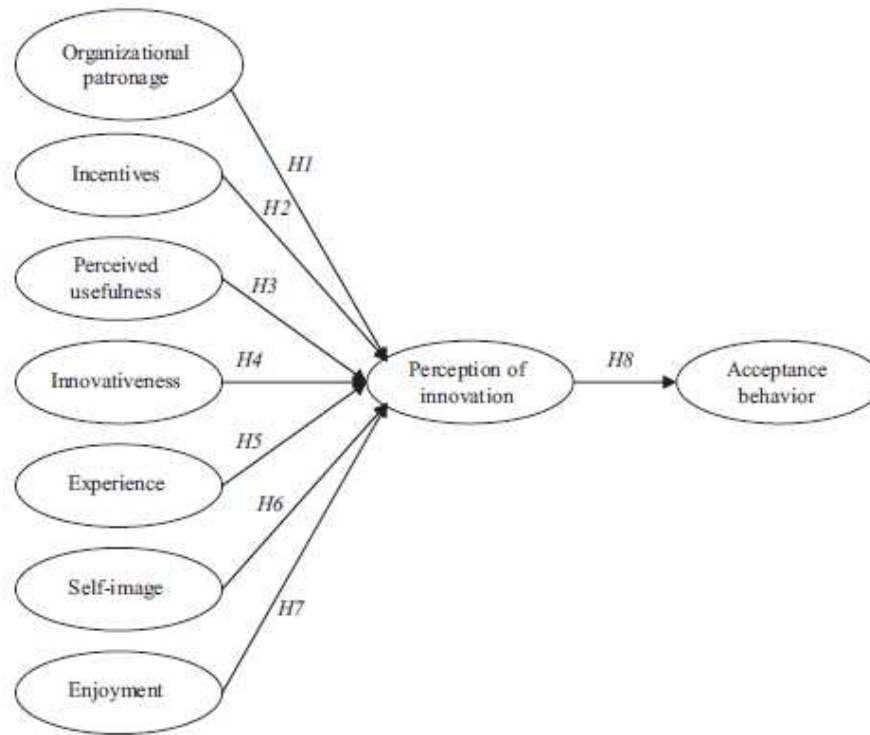


Figure. 1. Conceptual Framework

While the study of Talukder was conducted in an educational institution in Australia, this research was done in the Philippines in a manufacturing and semiconductor company setting. The same variables were used with focus on the new equipment. Enjoyment term was changed to “engagement” to reflect a broader focus on overall involvement and interaction with the new technology equipment. Engagement encompasses a wider range of emotions, including enjoyment, pleasure, fun, and interest. The relationship of the variables can be seen in Figure 2.

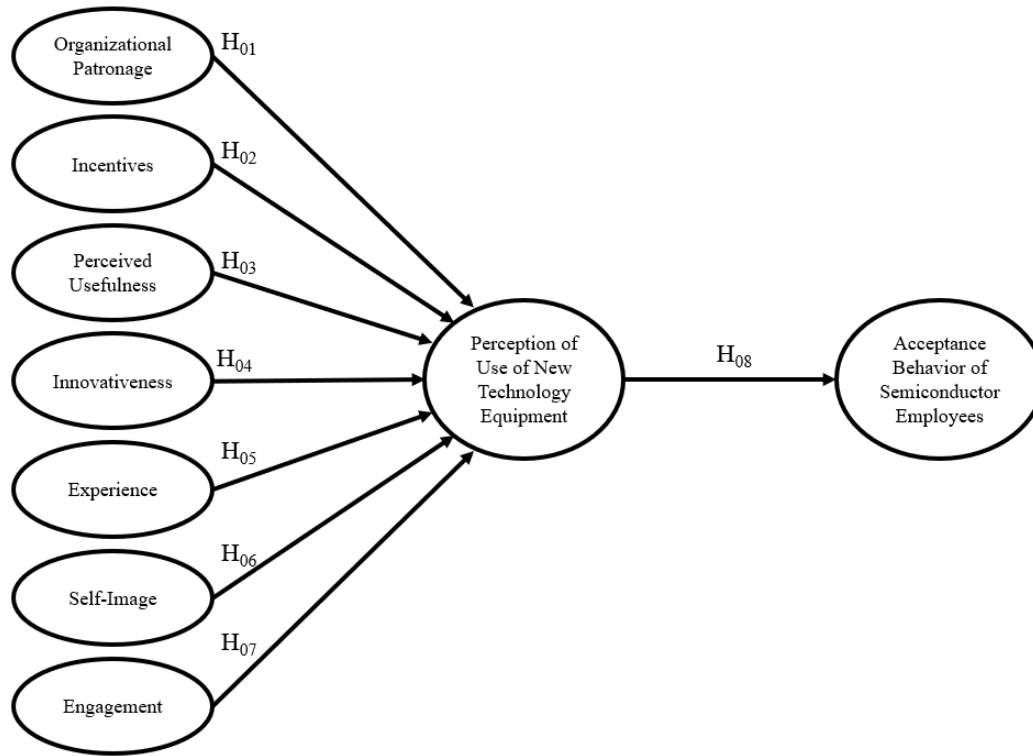


Figure. 2. Operational Framework

This study determines the predictors of perception of use of the new technology equipment. Identified predictors of perception of use includes organizational patronage (patronage involves evaluating the resources and support provided by top or senior management), incentives (advantages or disadvantages of accepting innovation), perceived usefulness (how much someone thinks using a specific system will make their job better), innovativeness (openness try out new things), experience (based on what someone already knows about innovation and how skilled they are in using new methods), self-image (how using innovation makes someone feel about their position in the company), and engagement measure of how much someone likes and finds using the system satisfying. Further, the effect of perception of use on acceptance behavior is determined.

1.4. Significance of the Study

Understanding the dynamics of this acceptance of new equipment is essential for companies seeking ways to maximize the return of their technological investments. This study is beneficial to the following groups:

For the employees at the semiconductor company, this research will identify the employees' level of familiarity with developing technology, as well as their inherent desire to welcome and adopt these innovations. Identifying gaps in employees' knowledge and enthusiasm for new technologies is critical in developing ways to effectively bridge these gaps.

For the semiconductor company administration, the research aims to assist in creating a cohesive and efficient system that fully utilizes the potential of new equipment. Through the seamless integration of technological solutions, this integrated strategy attempts to optimize organizational processes.

For the semiconductor industry, this study holds significant importance as it addresses the critical need for continuous innovation and technological advancement to maintain a competitive edge environment. Given that the manufacturing and semiconductor industries are seldom the focus of such research, this study fills a vital gap by exploring the unique challenges and opportunities faced by these sectors.

This study addresses the United Nations Sustainable Development Goal 9 (SDG 9). SDG 9 emphasizes the crucial role of fostering innovation, building resilient infrastructure, and promoting sustainable industrialization (United Nations, 2023). The research aims to not only increase technological development, but also to ensure that these advancements are accessible and beneficial to all, therefore aligning with the primary objectives of SDG 9 and fostering a more sustainable and equitable future. Also, this study aims to investigate the various factors that affect innovation and the effect of innovation on acceptance.

1.5. Objectives of the Study

The research project aims to maximize the use of new equipment and assure a favorable return on investment in the integration of this innovative technology. Specifically, this intends to:

- know the level of organizational patronage, incentives, perceived usefulness, innovativeness, experience, self-image, and engagement of the semiconductor employees;
- describe the perception of use of the new equipment and the acceptance behavior;
- determine the effect of organizational patronage, incentives, perceived usefulness, innovativeness, experience, self-image, and engagement on the perception of use of the new equipment;
- determine the effect of perception of use of new technological equipment on acceptance behavior; and
- develop a system for the employees to easily adapt to the new equipment and ensure return on investment in acquiring the new technology.

1.6. Hypotheses

The following hypotheses were tested in this study:

H01. Organizational patronage has no significant effect on an individual's perception of the use of new technology.

H02. Incentives have no significant effect on an individual's perception of the use of new technology.

H03. Perceived usefulness has no significant effect on an individual's perception of the use of new technology.

H04. Innovativeness has no significant effect on an individual's perception of the use of new technology.

H05. Experience has no significant effect on an individual's perception of the use of new technology.

H06. Self-image has no significant effect on an individual's perception of the use of new technology.

H07. Engagement has no significant effect on an individual's perception of the use of new technology.

H08. Perception of the use of new technology has no significant effect on a semiconductor employee's acceptance behavior.

2. Methods

2.1. Research Design

This study utilized Descriptive Research Design that aims to depict and comprehend various characteristics of a phenomenon, providing an in-depth understanding of its nature. The researcher also used qualitative and causal research design. Quantitative Research Design was used in emphasizing the objective measurements and the numerical analysis of data collected with the use of questionnaires. In the study, numerical data of organizational patronage, incentives, perceived usefulness, innovativeness, experience, self-image, and engagement was gathered and used to explain the possible effect of these variables to perception of use towards acceptance behavior. On the other hand, causal research is a form of conclusive research that attempts to establish a cause-and-effect connection between multiple variables (Voxco, 2023).

2.2. Locale of the Study

The study was conducted at a semiconductor company located in Calamba, Laguna. Recently, the company made a significant investment in various new technological equipment, which may offer insights into the factors influencing perception and acceptance behavior within the industry. Understanding these factors can help in formulating strategies to enhance technology adoption.

2.3. Respondents of the Study

A total of 84 respondents participated in the survey. A total of 84 respondents participated in the survey, with 36 from the Failure Analysis Department, 16 from the Reliability Department, 12 from the Equipment Department, 11 from the Process Engineering Department, and 9 from the Maintenance Department. According to Memon, et al (2020), it is suggested that a sample size greater than 30 and less than 500 is suitable for most behavioral studies. The central limit theorem also states that the distribution of the mean will always follow to a normal distribution if the sample size is sufficiently large, which is met when sample size (n) is equal to or exceeds 30 (Turney, 2022).

2.4. Sampling Design

The researcher employed the total enumeration sampling design. Total population sampling is an intended and focused method of sampling in which the complete population with specific characteristics is thoroughly evaluated and included in the study (Canonizado, 2021). This strategy aims to include every individual who meets the given criteria, resulting in a full understanding of the target group.

2.5. Research Tools and Instruments

This study adapted the questionnaire of Talukder (2018), "Causal Paths to Acceptance of Technological Innovations by Individual Employees" with 40 items. The questionnaire is composed of a five-point Likert Scale to specify the level of agreement of the respondents to the statements. The table below shows the number of items per variable.

Table 1. Questionnaire Specification

Part	Variable	Item No.
I.	Organizational Patronage	1 to 4
II.	Incentives	5 to 7
III.	Perceived Usefulness	8 to 13
IV.	Innovativeness	14 to 17
V.	Experience	18 to 21
VI.	Self-image	22 to 35
VII.	Engagement	26 to 29
VIII.	Perception Toward Use	30 to 35
IX.	Acceptance Behavior	36 to 40

The survey questionnaire consists of a set of statements corresponding to each variable under study. Organizational patronage will be assessed through a four-statement section. Incentives were examined using four statements, while perceived usefulness will be explored through six statements. The study included four statements each for innovativeness, self-image, engagement, and for experience. For perception of use, there are six statements which were rated using a Likert scale, with 1 = Strongly Disagree and 5 = Strongly Agree.

For acceptance behavior, five indicators were used for this study to measure individual adoptions. The first is the time spent on using the new technology using a five-point scale ranging from (1) almost never to (5) two hours or more. The second is the frequency of usage using a five-point scale ranging from (1) once a month or less to (5) several times a day. The third one is the level of usage using a five-point scale ranging from (1) not used at all to (5) used extensively. The fourth one is the different applications of the new technology using a five-point scale ranging from (1) none to (5) four features or more. And lastly, the sophistication level using a five-point scale ranging from (1) least sophisticated to (5) highly sophisticated.

The adapted questions from Talukder (2018) were modified by replacing "Calendar" with "New Technology Equipment." This adjustment is important because it customizes the questions to suit the semiconductor industry and aligns it with the focus of the study.

The instrument was pre-tested among the 30 employees working in the semiconductor company. Table 2 shows the result of the reliability test with Cronbach's Alpha findings.

Table 2. Cronbach Alpha Findings

Part	Variables	Variables	Interpretations	Variables
I.	Organizational Patronage	0.870	Good	Retain
II.	Incentives	0.858	Good	Retain
III.	Perceived Usefulness	0.904	Excellent	Retain
IV.	Innovativeness	0.889	Good	Retain
V.	Experience	0.934	Excellent	Retain
VI.	Self-image	0.817	Good	Retain
VII.	Engagement	0.930	Excellent	Retain
VIII.	Perception Toward Use	0.794	Acceptable	Retain
IX.	Acceptance Behavior	0.745	Acceptable	Retain

Overall, the instrument passed resulting to significant loadings in Cronbach's alpha. Cronbach's alpha, ranging from 0 to 1, indicates the internal consistency of scale items, with higher values suggesting greater reliability. According to George and Malory (2003, cited by Daniel B.K., 2018), a coefficient above 0.90 is excellent, 0.80-0.89 is good, 0.70-0.79 is acceptable, 0.60-0.69 is questionable, 0.50-0.59 is poor, and below 0.50 is unacceptable. These benchmarks aid in assessing the reliability of research scales. Also, according to Taber, K.S., (2018), Cronbach alpha values of 0.7 or higher indicate acceptable internal consistency.

2.6. Data Analysis and Interpretation

To ensure that the interpretation of data is valid and reliable, the researcher used the following statistical procedures:

Mean and Standard Deviation. This was used to describe the external factors which include organizational patronage and incentives, and internal factors which are perceived as usefulness, innovativeness, experience, self-image, and engagement. In the range of 1.00 to 1.49, the interpretation is "Very Low", while in the range of 1.50 to 2.49, it signifies a result of "Low". For values falling between 2.50 to 3.49, the interpretation is "Moderate". Results falling within the range of 3.50 to 4.49 indicate "High", and finally, for values ranging from 4.50 to 5.00, the interpretation is "Very High."

Multiple Regression. This was used to determine the effect of the internal and external factors towards perception of use. A p-value of <0.05 will indicate a significant effect. Standardized beta coefficient helps identify which among the internal and external factors has the greatest contribution to the perception of use.

Simple Regression. This was used to determine the effect of the perception of use on acceptance behavior. A p-value of <0.05 will indicate a significant effect.

2.7. Ethical Considerations

Upon performing the study, the researcher made certain that ethical issues were followed. The researchers went through a series of discussions to ensure that the study topic is original and that no identical topics exist. To minimize plagiarism, the study also contained a bibliography and relevant citations.

The researcher obtained and used informed consent from the department head and the study participants when conducting the survey. A letter of approval was sent to the mentioned department head to request permission to conduct the survey. When the request was accepted, the researcher issued a consent letter to the employees who would be taking part in the survey. Furthermore, the purpose of the study, as well as the rules for the questionnaire employed, were thoroughly described to the participants. Moreover, to assure the confidentiality of the results and information gathered, the researcher informed the participants that the results of the survey will be kept and used solely for the purpose of the study.

3. Results and Discussion

3.1. Respondents Information

In this section, the outcomes of the data that were statistically analyzed are presented. This contains the analyses performed with the data using the appropriate statistical tools and achieved the following outcomes.

Table 3. Respondents per Department

Department	Engineer		Technician		Inspector	
	N	%	N	%	N	%
Failure Analysis	24	28.57%	6	7.14%	6	7.14%
Reliability	6	7.14%	8	9.52%	2	2.38%
Equipment	8	9.52%	4	4.76%	0	0.00%
Process Engineering	11	13.10%	0	0.00%	0	0.00%
Maintenance	3	3.57%	6	7.14%	0	0.00%
Total	52	61.90%	24	28.57%	8	9.52%

The table above illustrates the number of respondents from each department who participated in the study. All participants are using the new technology equipment as part of their work. Most of the respondents are Engineers with 61.90%, followed by Technicians at 28.57%, and lastly, the Inspectors with 9.52%. Since total enumeration sampling was used, all 84 employees were included. Also, the discussions will delve into their varied perceptions of the new technology equipment.

3.2. Descriptive Statistics

Table 4 illustrates descriptive statistics regarding respondents' perceptions of organizational patronage, incentives, perceived usefulness, innovativeness, experience, self-image, engagement, perception towards use, and acceptance behavior. Overall, the respondents consistently displayed positive perceptions across various aspects evaluated in the study. An analysis of organizational patronage reveals a high mean score (4.29) coupled with a standard deviation of 0.723. This signifies strong support from the organization, although

some degree of variation exists the mean score for incentives is 4.50, with a standard deviation of 0.611. This suggests that the respondents are highly motivated by incentives when it comes to adopting new technology and incentives are a strong motivator for the respondents. The data indicates a positive perception of usefulness (mean: 4.12). However, the standard deviation (0.721) highlights a variation in perceived value among participants. A high mean (4.44) and a comparatively low standard deviation (0.62) paint a clear picture of perceived high innovativeness. This implies a strong consensus on this aspect. The average experience level is high (mean: 3.66) with a high standard deviation (0.949). This translates to some individuals having significantly more experience than others. Self-image, with a mean of 4.05 and a standard deviation of 0.751, could be related to how people feel about themselves in this context. The high mean suggests a generally positive self-image, but the standard deviation indicates some variation in this perception. Engagement shows a high mean score (4.35) and a relatively low standard deviation (0.64). There's a consistent level of engagement. A positive perception towards use is evident from the high mean (4.4) and a low standard deviation (0.59). The mean score of 3.9, considered high according to the VI, suggests a generally positive acceptance behavior. However, the standard deviation of 0.7 indicates some variation in individual acceptance levels.

Table 4. Descriptive Statistics

Variable	Mean	Std. dev	VI
Organizational Patronage	4.29	0.723	High
Incentives	4.50	0.611	Very High
Perceived Usefulness	4.12	0.721	High
Innovativeness	4.44	0.620	High
Experience	3.66	0.949	High
Self-image	4.05	0.750	High
Engagement	4.35	0.640	High
Perception Toward Use	4.40	0.590	High
Acceptance Behavior	3.90	0.700	High

Legend: 4.50-5.00 = Very High; 3.50-4.49 = High; 2.50-3.49 = Moderate; 1.50-2.49 = Low; 1.00-1.49 = Very Low

In summary, results show the perceived level on all variables are high. This suggests that the respondents generally have a positive perception of these factors influencing technology adoption. Moreover, these favorable perceptions indicate a promising outlook for the potential uptake and integration of new technologies within the studied context.

3.3. Regression Matrix

Table 5 shows the effect of organizational patronage, incentives, perceived usefulness, innovativeness, experience, self-image, and engagement to the perception of use of the new equipment.

Table 5. Effect of Organizational Patronage, Incentives, Perceived Usefulness, Innovativeness, Experience, Self-Image, and Engagement on the Perception of Use of the New Equipment

Construct	Unstandardized Coefficients		Standardized Coefficients	t-value	Sig
	β	Std. Error	β		
(Constant)	0.042	0.354		0.120	0.905
Organizational Patronage	0.128	0.061	0.157	2.103	0.039*
Incentives	0.311	0.104	0.322	2.979	0.004*
Perceived Usefulness	0.120	0.109	0.126	1.105	0.273
Innovativeness	0.116	0.064	0.142	1.812	0.074
Experience	-0.013	0.046	-0.022	-0.289	0.773
Self-image	0.003	0.085	0.004	0.032	0.974
Engagement	0.330	0.076	0.359	4.357	0.000*
<i>Dependent Variable: Perception Towards Use</i>					
<i>R</i> ² =0.702		<i>F</i> =25.525		<i>p</i> value=0.000	
<i>*Significant</i>					

The results revealed that organizational patronage ($B=.128$, $p\text{-value} <.05$), incentives ($B=.311$, $p\text{-value} <.05$) and engagement ($B=.330$, $p\text{-value} <.01$) have a statistically significant effect on the perception of use of new technology equipment in a semiconductor company. A one-unit increase in organizational patronage, incentives and engagement, the use of new technology equipment will increase by .128, .311 and by .330 respectively.

However, perceived usefulness ($B=0.120$, $p\text{-value} >.05$), innovativeness ($B=0.116$, $p\text{-value} >.05$), and self-image ($B=0.003$, $p\text{-value} >.05$) have no significant effect on the perception of use of new technology equipment. There is a direct relationship between perceived usefulness, innovativeness, self-image, and use of new technology equipment. A one unit increase in perceived usefulness innovativeness and self-image, the use of new technology equipment will increase by 0.120, 0.116 and 0.003 respectively and the effect is not statistically significant at $p\text{-value} >.05$. It indicates that the perceived usefulness of new technology equipment may be hindered by its complexity, making it challenging for individuals to recognize its true benefits. Also, according to the study of Sagnier, et.al (2020), perceived usefulness is likely to be particularly crucial for utilitarian technologies, as they are primarily designed to serve functional purposes. Users often prioritize the effectiveness of these technologies in fulfilling specific tasks or addressing practical needs, making it a key factor in their adoption.

Furthermore, individuals with high levels of innovativeness and experts may have a deeper understanding of technology and innovation, leading them to have more discerning criteria for evaluating innovations.

Notably, the self-image variable is particularly insignificant (p-value of 0.974), highlighting that personal perception or ego does not play a meaningful role in shaping how innovation is viewed within the organization. This suggests that employees may prioritize tangible organizational benefits over personal prestige when evaluating new technologies, focusing more on practical contributions to the organization's success. Also, according to the study of Montani, et al.(2021), certain employees who take a more altruistic approach tend to engage in behaviors that foster innovation. Their concern for others motivates them to generate solutions that benefit their colleagues, supervisors, or customers.

Likewise, there is an inverse relationship between experience ($B=-0.013$, p-value $>.05$) and perception of use of new technology equipment. A one unit increase in experience, use of new technology equipment will decrease by .013 but such effect is not statistically significant at p-value $>.05$. This may indicate that individuals with more experience might rely on traditional methods or tools they are familiar with, feeling less inclined to adopt new technologies. Additionally, highly experienced individuals might perceive new technology as unnecessary or less beneficial compared to their established methods. According to the study of Woods et.al (2018), it was identified that employees with high levels of experience tended to exhibit lower levels of innovation as they spent more time in their role. Employees who have been with the company for an extended period tend to have a deeper understanding of the company's specific practices, which could make them less interested in seeking innovation or knowledge from external sources (Bogers, Foss, & Lyngsie, 2018).

3.3.1. Organizational Patronage

Table 5 shows the influence of organizational patronage on perception of use of the new technology equipment. This means that the greater the respondent's perceived managerial support, the higher the use of the new technology equipment will be. According to the study of Singha et.al., 2019, innovation-championing leaders foster a culture of employee empowerment, enabling them to contribute to open innovation. Top management involvement is essential as it increases employees' attentiveness, which is a critical factor (Schoemaker, Heaton, & Teece, 2018). It also indicates that both the organizational setting and the national context interact significantly to influence how interpersonal goals impact employees' views on the benefits and costs of innovation (Montani, et al., 2021).

3.3.2. Incentives

Moreover, when the respondents perceived that there will be more time saved and more meaning into their work, they are more likely to increase the use of the new equipment. Mao & Weathers (2019) states that incentives underscore the positive impact of treating employees well on fostering innovation. It suggests that prioritizing favorable employee treatment can significantly enhance innovation outcomes within organizations. Incentives drive and motivate individuals to act, while also providing them with the flexibility necessary to foster innovation. By offering incentives, organizations can effectively encourage both motivation and innovation among their employees (Delmas & Pekovic, 2018).

3.3.3. Engagement

Similarly, the higher the engagement the respondents experience, the more that they will use the new technology equipment. According to the study of Xu & Wang (2019), when employees engage in enjoyable interactions, they are more inclined to innovation. Positive interactions foster a conducive environment for creativity and innovation among employees.

Table 6 shows the effect of perception towards use of the new equipment to the acceptance behavior of semiconductor employees.

Table 5. Effect of Perception Towards Use of New Technology Equipment on Acceptance Behavior of Semiconductor Employees

Construct	Unstandardized Coefficients		Standardized Coefficients	<i>t</i> -value	Sig
	β	Std. Error	β		
(Constant)	2.204	0.551		4.004	0
Perception Towards Use	0.387	0.124	0.326	3.125	0.002*
<i>Dependent Variable: Acceptance Behavior</i>					
<i>R</i> ² =0.106		<i>F</i> =9.768		<i>p value</i> =0.002	
<i>*Significant</i>					

The results revealed that perception towards use of new technology equipment ($B=0.387$, $p\text{-value} < .05$) have a statistically significant effect on the acceptance behavior of semiconductor employees in a semiconductor company. A one-unit increase in use of new technology equipment, the use of new technology equipment will increase by 0.387. The result states that using the new technology equipment is important, helpful, practical, relevant, and liked by the employees. This suggests a positive perception of the new equipment, which can lead to a higher likelihood of acceptance and use. Talukder's (2018) study highlights the significant influence of an individual's perception of innovation on both university staff's perception of innovation and their subsequent adoption. It underscores the importance of understanding how individual attitudes towards innovation shape organizational adoption behaviors.

4. Conclusion

The analysis of the descriptive statistics reveals positive perceptions among the semiconductor employees relevant to organizational patronage, incentives, perceived usefulness, innovativeness, experience, self-image, engagement, perception towards use, and acceptance behavior. Despite some variation, the overall results indicate a predominantly favorable outlook among respondents, highlighting a highly conducive environment for technology adoption within the organization, with incentives playing a the most influential variable. In summary, the findings indicate that respondents hold a high level of perception across all variables, implying a generally positive outlook on the factors influencing technology adoption.

The results in the study also present the relationship of organizational patronage, incentives, perceived usefulness, innovativeness, experience, self-image, and engagement on the perception of use of the new equipment. This study found that organizational support, incentives, and engagement all play a significant role in shaping employee perceptions towards using new technology equipment. Management enthusiasm, clear access, and the belief that technology leads to more meaningful work, saves time, and even enhances job security all contribute to a positive perception. Furthermore, if employees find the process of using the new equipment enjoyable, they are more likely to embrace its adoption.

This study also highlights user engagement as the most critical factor influencing employee perceptions towards new technology equipment. Organizations should prioritize making the transition to new technology a positive experience. This can be achieved by focusing on user-friendly interfaces, providing training that emphasizes the fun aspects of the equipment, and encouraging opportunities for exploration and discovery.

This study examined how factors like perceived usefulness, innovativeness, self-image, and experience influence the perception of using new technology equipment. While the findings suggested a positive association between these factors and technology use, none of these relationships were statistically significant. It's possible that the new technology itself is too complex, hindering users from recognizing its true value. Additionally, individuals with high levels of innovativeness have a deeper understanding of technology and innovation, leading them to have more discerning criteria for evaluating innovations. Furthermore, company culture plays a role, with individuals prioritizing older technologies that align with prestige within the company over those that might benefit them personally. Finally, experienced users might be comfortable with what they already know, making them less likely to adopt new equipment if it seems less intuitive or effective. Therefore, the study failed to reject Ho3, Ho4, Ho5, and Ho6.

The results in the study present the relationship of the perception of use of the new equipment to acceptance behavior. The study shows a strong link between how semiconductor employees view new technology equipment and their willingness to use it. It's clear that when employees have positive views about this equipment, they're more likely to accept and use it. In other words, if the management wants people to use the new technology, it is important to make sure they see it as valuable, helpful, and easy to use in their jobs. This highlights the importance for semiconductor companies to focus on improving employees' perceptions of technology. Doing so can encourage innovation and ultimately benefit the organization. Therefore, the study rejects Ho1, Ho2, Ho7, and Ho8.

5. Recommendation

To encourage employees to use new technology equipment and further accept innovation, implementation should focus more on organizational patronage, incentives, and mostly, on engagement. Emphasizing engagement is crucial as it stands out as the most impactful aspect. This study emphasizes that user engagement significantly influences how employees feel about adopting new technology. By focusing on these factors, organizations can encourage a more positive perception of new technologies and ultimately drive successful integration.

Implementing these initiatives can aid in promoting and enhancing organizational support, incentives, and engagement of new technology equipment, thereby fostering acceptance of innovation among semiconductor employees.

While current studies provide valuable groundwork, a larger sample size strengthens the generalizability of findings. Ideally, future research should aim for at least 100-150 participants from various companies to ensure results can be confidently applied to the broader semiconductor industry workforce. Furthermore, given the rapid pace of technological advancement in this field, focusing on even newer technological equipment is recommended. Employee reactions may differ significantly when presented with cutting-edge advancements compared to the technology explored in previous studies.

References

- Al-Hawari, M., & Bani-Melhem, S. (2019). Determinants of frontline employee service innovation behavior The moderating role of co-worker socializing and service climate. *Management Research Review*, 1076-1094.
- Awadallah, E., & Elgharabawy, A. (2020). Utilizing the theory of reasoned action in understanding students' choice in selecting accounting as major. *Accounting Education*, 1-21.
- Bogers, M., Foss, N. J., & Lyngsje, J. (2018). The "human side" of open innovation: The role of employee diversity in firm-level openness. *Research Policy*, 218-231.
- Chaubey, A., & Sahoo, C. K. (2019). Role of HR interventions in enhancing employee creativity and organizational innovation: an empirical study. *Industrial and Commercial Training*, Vol. 51, 195-206.
- Chen, L., & Aklikokou, A. K. (2019). Determinants of E-government Adoption: Testing the Mediating Effects of Perceived Usefulness and Perceived Ease of Use. *International Journal of Public Administration*.
- Connor, M. (2020). Theory of Planned Behavior. *Handbook of Sport Psychology*, 1-18.
- Daniel, B. K. (2018). Empirical verification of the "TACT" framework for teaching rigour in qualitative research methodology. *Emerald Insight*, 262-275.
- Delmas, M. A., & Pekovic, S. (2018). Corporate Sustainable Innovation and Employee Behavior. *Journal of Business Ethics*, 1071-1088.
- Firk, S., Gehrke, Y., Hanelt, A., & Wolff, M. (2022). Top management team characteristics and digital innovation: Exploring digital knowledge and TMT interfaces. *Long Range Planning*.
- Granić, A., & Marangunić, N. (2019). Technology acceptance model in educational context: A systematic literature review. *British Journal of Educational Technology*, 1-22.
- Hs, H.-Y., Liu, F.-H., Tsou, H.-T., & Chen, L.-J. (2019). Openness of technology adoption, top management support and service innovation: a social innovation perspective. *Journal of Business & Industrial Marketing*.
- Kammerzelt, A. (2021, June 7). *What is technology? And why is it so important for us in everyday life?* Retrieved from Voestalpine: <https://www.voestalpine.com/blog/en/innovation-en/what-is-technology-and-why-is-it-so-important-for-us-in-everyday-life/>
- Mao, C. X., & Weathers, J. (2019). Employee treatment and firm innovation. *Journal of Business Finance & Accounting*.
- Montani, F., Torres, C., Ferreira, M. C., Mendonça, H., Silva, A. J., Courcy, F., & V., D.-D. (2021). Self-image goals, compassionate goals and innovative work behavior: The role of organizational support for innovation across countries. *Journal of Business Research*, 588-600.
- Nikolopoulos, F., & Likothanassis, S. (2018). A Complete Evaluation of the TAM3 Model for Cloud Computing Technology Acceptance. *On the Move to Meaningful Internet System*, 289-296.
- Okrah, J., & Irene, B. (2023). The effect of top managers' years of experience on innovation. *International Journal of Innovation Studies*, 208-217.
- Prokop, V., & Hajek, P. (2023). The role of top management meetings in enhancing product innovation and performance. *R&D Management*, 745-763.
- Sagnier, C., Loup-Escande, E., Lourdeaux, D., Thouvenin, I., & Valléry, G. (2020). User Acceptance of Virtual Reality: An Extended Technology Acceptance Model. *International Journal of Human-Computer Interaction*, 1-15.
- Schoemaker, P. J., Heaton, S., & Teece, D. (2018). Innovation, Dynamic Capabilities, and Leadership. *California Management Review*, 1-28.
- Setiyani, L., Effendy, F., & Slamet, A. A. (2021). Using Technology Acceptance Model 3 (TAM 3) at Selected Private Technical High School: Google Drive Storage in E-Learning. *Journal of Ultimate Research and Trends in Education*, 80-89.
- Singha, S. K., Gupta, S., Busso, D., & Kamboj, S. (2019). Top management knowledge value, knowledge sharing practices, open. *Journal of Business Research*.
- Sugandini, D., Purwoko, Pambudi, A., Resmi, S., Reniati, Muafi, & Kusumawati, R. A. (2018). THE ROLE OF UNCERTAINTY, PERCEIVED EASE OF USE, AND PERCEIVED USEFULNESS TOWARDS THE TECHNOLOGY ADOPTION. *International Journal of Civil Engineering and Technology*, 660-669.
- Talukder, M. (2018). Causal paths to acceptance of technological innovations by individual. *Business Process Management Journal*.
- Tominc, P. (2019). Perceived Innovativeness and Competitiveness of Early-Stage Entrepreneurs. *Croatian Economic Survey*, 87-108.

- Turney, S. (2022, July 6). *Central Limit Theorem | Formula, Definition & Examples*. Retrieved from Scribbr: <https://www.scribbr.com/statistics/central-limit-theorem/#:~:text=The%20central%20limit%20theorem%20states%20that%20the%20sampling%20distribution%20of,size%20is%20n%20%E2%89%A5%2030.>
- United Nations. (2023). *Goal 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation*. Retrieved from United Nations: <https://www.un.org/sustainabledevelopment/infrastructure-industrialization/>
- Voxco. (2023). *Beyond the Basics: Exploring Research Approaches*. Retrieved from Voxco: <https://www.voxco.com/blog/exploratory-descriptive-and-causal-research/>
- Woods, S. A., Mustafa, M. J., Anderson, N., & Sayer, B. (2018). Innovative work behavior and personality traits. . *Journal of Managerial Psychology*, 29–42.
- Xu, F. Z., & Wang, Y. (2019). Enhancing Employee Innovation Through Customer Engagement: The Role of Customer Interactivity, Employee Affect, and Motivations. *Journal of Hospitality & Tourism Research*.
- Yuen, K. F., Cai, L., Qi, G., & Wang, X. (2020). Factors influencing autonomous vehicle adoption: an application of the technology acceptance model and innovation diffusion theory. *Technology Analysis & Strategic Management*, 1-15.