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# Evaluation of Factors influencing the Shopee PayLater adoption in Indonesia

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**Abstract:** Current technological developments are one of the causes of the creation of financial technology (fintech) innovations. One of the fintech innovations that is developing in Indonesia is Shopee PayLater. This study aims to investigate the factors that determine the use of the Shopee PayLater function and its impact on consumption behavior among Indonesian students who use it. The primary data was collected from Indonesian e-commerce users. Later, the Grey Relational Analysis model was used for data analysis and evaluation of the factors. According to the findings, income, behavioral intention, and social influence all had a favorable and significant impact on the use of Shopee PayLater. Additionally, using Shopee PayLater has a good and significant impact on people's purchasing habits.

**Keywords:** Shopee PayLater; consumptive behavior behavior; e-commerce; grey relational analysis

## 1. Introduction

Currently, the use of the internet is becoming increasingly widespread. The internet is a new medium for information and communication facilities and a 'market' for buying and selling online. In Indonesia, e-commerce has been increasingly popular in recent years. Statista (2019) recorded the number of e-commerce users in Indonesia in 2017 reached 139 million users, then increased 10.8% to 154.1 million users last year. This year it is estimated that it will reach 168.3 million users and in 2023 it is estimated that it will reach 212.2 million (Jayani, 2019).

Seeing the public enthusiasm for e-commerce, it is a challenge for companies to continue to innovate to improve the quality of the best products or services that fully meet the needs and demands of consumers, one of which is Shopee. Shopee, which is one of the largest e-commerce companies in Indonesia, is an online shopping concept application under the auspices of the SEA Group, one of the largest internet group companies in Southeast Asia. According to the iprice.co.id E-commerce Map, Shopee has maintained its first place as the top e-commerce for ten consecutive quarters based on PlayStore rankings. Shopee also topped the AppStore ranking category in the second quarter of 2019. Meanwhile, the monthly average number of Shopee website visitors has reached 90.7 million (Jayani, 2019). After the various achievements that have been achieved, Shopee seems to never stop innovating in improving the quality of services to meet consumer needs. This is realized by providing various payment methods ranging from bank transfer payments, credit cards, Shopee Pay, to Shopee officially launching its newest feature, Shopee

PayLater. Shopee PayLater implements a peer-to-peer lending system which is a platform that brings together lenders and borrowers via the internet. Peer-to-peer lending provides credit and risk control tools. This platform assists lenders and borrowers in meeting their respective needs and generating cost-effective money management (Yuneline, 2022). The presence of Shopee PayLater in the Shopee app has piqued the interest of many consumers who want to test transacting online using this function.

The convenience of Shopee PayLater as a choice of payment method at Shopee has the potential to encourage consumptive behavior. Consumptive behavior is the act of consumers buying or using goods or services in excess just to fulfill desires without thinking about the benefits or needs of these goods or services. This can be caused by consumers who do not think twice about buying something that is not really needed.

Indonesia is one of the primary markets of Shopee, and considering the surge in e-commerce in the country (see, Figure 1), it provides a useful case study for e-commerce businesses. In the current study, different factors influencing the Shopee PayLater adoption in Indonesia will be identified from the literature and later using the Grey Relational Analysis (GRA) they will be evaluated. The remainder of this paper is structured as follows: First, an extensive literature review is presented which discusses Shopee PayLater, and consumptive behavior, followed by an introduction to the GRA model. Then the research methodology was discussed, followed by a presentation and discussion of the results. Finally, this research ends with conclusions and recommendations.

## 2. Literature review

### 2.1 FinTech (Financial Technology)

According to Bank Indonesia regulation number 19/12/PBI/2017, financial technology is the use of a financial system to create new products, services, technology, and/or business models that can affect monetary policy, financial system efficiency, security, and security, as well as payment mechanisms Payment systems, market support, investment management and risk management, loans, financing and capital providers, and other financial services are all examples of financial
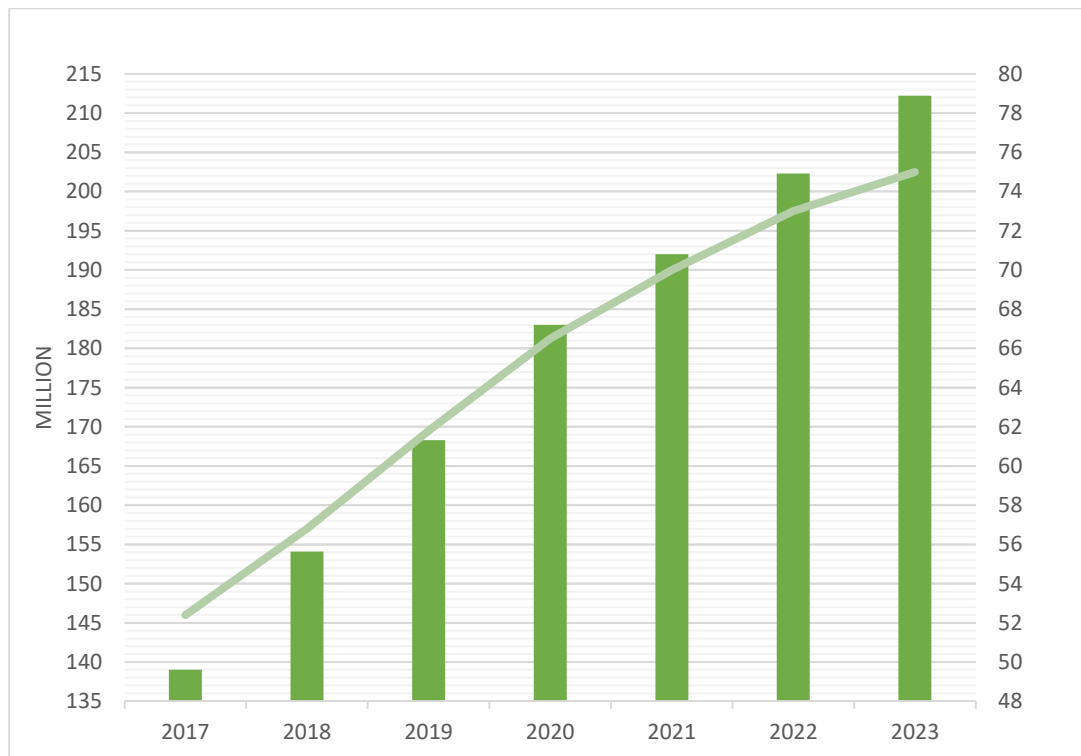


**Figure 1.** Use and Penetration rate of e-commerce in Indonesia (Source of data: Statista, 2019)

technology providers (Rahma, 2018). The following sections describe the functions of financial technology providers:

(a) *Payment system* – The payment system includes authorization, clearing, final settlement, and payment execution. Financial management technology in the payment system category includes the use of blockchain technology or distributed ledgers for fund transfers, electronic money, and mobile payments.

(b) *Support for the market* – This technology uses information and/or electronic technology to provide the public with financial information on financial products or services that is faster or less expensive.

(c) *Risk management or investment management* – The supply of online investment goods or online insurance falls under the category of investment management or risk management.

(d) *Services provider* – Services such as lending, financing or funding, and capital raising. This category provides services such as peer-to-peer lending and crowd-funding activities.

(e) *Financial services in other fields* – Payment systems, market assistance, investment management, risk management, credit, financing, and capital provision are examples of other financial services.

## 2.2 Shopee PayLater

Features are attributes of a product to meet the level of satisfaction of consumer needs and desires, through having the product, using, and utilizing the product (Fahmi, 2016). The indicators for product features are: (1) Ease of operation, (2) Satisfaction with the product, and (3) Design.

Shopee is one of the most popular e-commerce platforms in East Asia and people in the region frequently use it to buy products online (Mesatania, 2022). Shopee PayLater is a new payment feature from the Shopee application. Through Shopee PayLater, Shopee active users will get the convenience of shopping in the form of instant loans with very minimal interest. In contrast to Shopee Pay which can be activated directly, currently, the payment method through Shopee PayLater can only be enjoyed by active users of the Shopee application who are deemed eligible to use Shopee PayLater. The requirements that must be met first, such as:

1. Shopee account must be registered and verified
2. Shopee account is 3 months old
3. Shopee accounts are often used for transactions
4. Must update the latest Shopee application

The user will be required to pay the bill according to the installment period set when making a payment transaction in the Shopee app after making a purchase transaction using Shopee PayLater. Through the Shopee PayLater feature, Shopee offers benefits in the form of instant loan funds with very minimal interest to active users on the Shopee application. Later, each selected active user will get a credit limit whose value is adjusted to how high the level of purchase transactions is. For now, the available credit limits start from IDR 750,000 – IDR 1,800,000.

## 2.3 Consumptive behavior

Consumptive means the nature of consuming, using, using, spending something, and behaving extravagantly to consume goods or services in excess. Consumption is the desire to consume goods and services that are actually less needed in excess to achieve satisfaction (Effendi, 2016:16). Meanwhile, according to Boru *et al.* (2021) consumptive behavior is a behavior that is no longer based on rational considerations, but because of a desire that has reached an irrational level. Based on the above understanding, it can be concluded that consumptive behavior is behavior in which a person has a desire to consume excessively without being based on rational considerations only to obtain happiness or satisfaction. According to literature (Effendi 2016; Erizal, 2021) consumptive behavior consists of three, namely as follows:

a) *Impulsive Buying*, namely excessive buying behavior. Excessive consumer behavior is characterized by excessive attitudes in buying goods and buying expensive goods in shopping.

b) *Non-Rational Buying*, namely irrational buying behavior. Consumers who behave non-rationally have the characteristics of buying less useful goods because of prestige.

c) *Wasteful Buying*, namely buying behavior that is wasteful. Purchasing behavior that is wasteful is characterized by the purchase of goods by consumers that are not adjusted to the needs that must be met or excessive in meeting the needs. Factor Influencing Consumer Behavior.

*2.4 Factors Influencing Consumer Behavior*

Purchase decisions from buyers are strongly influenced by cultural, social, personal, and psychological factors of buyers. Most of them are factors that cannot be directly controlled by marketers, but must be taken into account (Setiadi, 2003; Ajuna, 2020). These are shown in Table 1, and explained below.

1. *Income*. As for what is meant by a person's economic condition, it consists of disposable income, savings and assets, ability to borrow and attitude towards spending versus saving. Income's effect on consumer buying behavior is well known from the literature Mentari and Bendesa (2018) state that income positively affects interest in using electronic money as a transaction tool. Jeong and Kim (2020) argued that there is a positive influence between income and interest in shopping. Consumers with high incomes will be interested and interested in using Paylater, because the higher a person's income, the more need or consumption increases.

2. *Lifestyle*. A person's lifestyle is a pattern of living in the world that is expressed by a person's activities, interests, and opinions (Nugroho & Pradana, 2021). Lifestyle also reflects something behind a person's social class. Lifestyle effect of consumer buying behavior is well known from the literature. Al-Dmour *et al.* (2017) argued that when a person's lifestyle changes, their needs also change, resulting in changes in use or consumption behavior. Therefore, lifestyle is indirectly reflected through a person's activities or behavior in determining the choice of use or consumption

3. *Perceived ease of use*. The perception of ease is importantt in real life. If the user believes the system is easy to use then he will use the system (Jogiyanto, 2008). If the user trusts a technological system that is easy to use, he will be interested in using the system, and vice versa. The perception of convenience affect of consumer buying behavior is well known from the literature. Romadloniyah and Prayitno (2018) argued that the fact that the perception of convenience has a positive and significant effect on customer interest in using E-Money products. complicated considering the current phenomenon that is fast-paced and easy to get something.

4. *Perceived usefulness*. Davis's (1989) perceived usefulness is the extent to which users believe a system will boost its performance if used. Perception of benefits affect of consumer buying behavior is well known from the literature, e.g., Sohn (2017) argued that the perception of individual usefulness affects interest in using e-commerce. Pratama and Suputra (2019) argued that the perception of benefits positively influences interest in using electronic money as a transaction tool. This means that if consumers feel that they have benefited from the paylater payment method, they will be interested in using it. Furthermore, if consumers feel that by using a paylater the transaction process will be faster, then consumers will assume that this service can provide benefits for themselves, so that consumers will happily use the paylater services offered by e-commerce.

5. *Behavioral intention*. Behavioral intention to use is a behavioral tendency to apply a technology (Davis, 1989). The level of use of a technology on a person can be predicted from the attitude and attention of the user towards the technology, an example of this interest is the feeling where Shopee application users will feel attracted to one of the payment facilities provided by Shopee, namely the Shopee PayLater service without coercion or voluntary and users consider Shopee PayLater services will provide benefits for users.

6. *Familiarity*. Familiarity comes from experience and understanding, including knowledge of procedures and services related to the use of technology. Familiarity affect of consumer buying behavior is well known from the literature, e.g., Rouibah *et al.* (2016) argued that the familiarity factor significantly affects the intention to use online payments. suppose consumers judge that the SPayLater feature is familiar and easy to use. In that case, the consumer will feel that the procedures and benefits provided by the SPayLater feature are easy to understand, so that Familiarity also encourages user confidence to use SPayLater as a personal transaction payment.

**Table 1.** Factors influencing the Shopee PayLater adoption in Indonesia

| Code | Factors | Explanation | Reference |
|------|---------|-------------|-----------|
| X1 | Social Influence | When customers buy online sometimes they are influenced by society (e.g., friends, family, colleagues, etc.) | Farah *et al.* (2018) |
| X2 | Perceived Usefulness | Where if the individual has a sense of belief that the information system / technology will be useful, he will use the system | Jogiyanto (2008) |
| X3 | Perceived Ease of Use | Acceptance Model has three important core principles, one of which is the perception of ease of use where this perception must be associated with an increase in behavioral intentions | Hansen *et al.* (2018) |
| X4 | Income | Behavior of low-income households affects the intention to use the product | Mentari and Bendesa (2018) |
| X5 | Lifestyle | When an individual's lifestyle changes, their needs and activities can also change. changed. These changes in needs and activities result in changes in a person's usage or consumption behavior | Al-Dmour *et al.* (2017) |
| X6 | Familiarity | Users who feel they are familiar and have sufficient knowledge and experience of a technology will make it easier to understand the procedures and features provided by the technology | Gefen *et al.* (2017) |
| X7 | Performance Expectancy | Performance expectancy is considered to significantly affect usage interest | Oliveira *et al.* (2016) |
| X8 | Effort Expectancy | Effort expectancy has a significant influence on interest in using a technology. | Alalwan *et al.* (2016) |
| X9 | Facilitating Conditions | Facilitating conditions affect the interest in using a technology | Alalwan *et al.* (2016) |
| X10 | Hedonic Motivation | Satisfaction and happiness that arise when using the technology will increase customer preferences to continue using the technology | Khalilzadeh *et al.* (2017) |
| X11 | Price Value | When customers already have their own price value on a technology, then they will not hesitate to use it | Indrawati and Putri (2018) |
| X12 | Perceived Technology Security | Security concerns are one of the individual barriers to interest in using technology | Cheng *et al.* (2006) |
| X13 | Behavioral Intentions | Consumptive behavior makes a person tend to be materialistic, unable to think rationally and have a great desire to have the desired objects without paying attention to their needs | Pulungan and Febriaty (2018) |

7. *Price value.* Price value is the perception of the benefit gap between the use of technology, the costs incurred to use it will affect the desire to use the technology (Venkatesh *et al.*, 2012). This can be seen from the technology that allows us to shop from home, so consumers can save time and also transportation costs because they don't have to go to the store. So, it can be concluded that the cost structure and price significantly affect consumer intention to adopt technology.

8. *Hedonic motivation.* It is a shopping motivation based on emotion, feeling comfortable, and happy (Subagio, 2012). Lifestyle is related to hedonism motivation because when user activities are fulfilled through the use of a technology, users will feel happy and comfortable using the technology. Venkatesh *et al.* (2012) added hedonism motivation as a tool to predict consumer behavior related to the use of a technology.

9. *Performance expectancy.* It is defined as the level where an individual believes that using the system will help in improving his performance (Kurniawati, 2010). Performance expectancy using PayLater also incentivizes users to be interested in using PayLater. User perception is simple, namely whether using PayLater can increase their productivity, and can complete their work faster

by using PayLater. The fulfillment of this expectation becomes an explanation of how performance expectancy affects people in using Shopee Paylater.

10. *Effort expectancy.* It is defined as the degree of ease associated with using the system. Effort expectancy is very important for users because it can make it easier for users to use technology and understand the procedures and functions of the features provided. Understanding related to a technology can come from experience gained from use that makes someone feel accustomed to using it, so trust and interest arise in using it (Usman & Lizam, 2016).

11. *Social influence.* It is individual encouragement from other people and social circles that change individual attitudes and beliefs so that they take action related to the use of a technology (Farah *et al.*, 2018). In other words, the information and encouragement provided by people have contributed to a person's awareness of the use of a technology. This is based on the concept of subjective norms and social image where a person is considered to have received behavior that is accepted and chosen by his social peers and other people who are considered important to him in the use of a technology (Mbrokoh, 2016).

12. *Facilitating condition.* It is defined as the extent to which a person believes that organizational resources and support and technical infrastructure are available to support the use of the system. Facilitating conditions are an important factor for users to increase the use of the PayLater application. The provision of knowledge, application compatibility, and the ease of getting help from other parties are the driving forces for using the Shopee PayLater application.

13. *Perceived Technology Security.* It is defined as the buyer's perception of the sellers' inability and unwillingness to protect monetary information (Salisbury *et al.*, 2001). Users will be more inclined to intend using Shopee Paylater if they have a perception that the PayLater services provided by the Shopee have been designed and have a secure system of criminal acts.

## 3. Research methodology

### 3.1 Data collection and research instrument

Primary data was collected through an online survey created in Google Forms. The questionnaire was sent to potential respondents in Indonesia, and 11 people filled it correctly on a 7-point Likert scale. In the current study, N represents the respondents and X represents the criteria. Most of the respondents are young and employed having experience of using Shopee PayLater. The questionnaire had two parts; demographic information (see Table 2) and core questions. The core questions were like this "Does *Social Influence* affect your intention of using Shopee PayLater?" and each question involved one of the factors from Table 1.

**Table 2.** Demographic profile of the respondents

| Characteristic | Classes | Number | % |
|---|---|---|---|
| Profession | Student | 4 | 36.4 |
| | Works in a private organization | 5 | 45.5 |
| | Works in a Public organization | 2 | 18.2 |
| Work experience | Below 1 years | 1 | 9.1 |
| | 1 - 3 years | 3 | 27.3 |
| | 3 - 5 years | 3 | 27.3 |
| | 5 years or more | 0 | 0 |
| Age | Less than 20 | 1 | 9.1 |
| | 21 to 30 | 6 | 54.5 |
| | 31 to 39 | 2 | 18.2 |
| | 40 to 49 | 2 | 18.2 |
| Gender | Male | 4 | 36.4 |
| | Female | 7 | 63.6 |

*3.2 Grey relational analysis*

Grey Relational evaluation (GRA) is a famous MCDM model and is the heart of GST. The primary idea of GRA is to conclude the diploma of relationship between elements by way of evaluating geometrical patterns of information (Javed *et al.*, 2020; Angela & Angelina, 2021). GRA has been carried out to solve supplier selection problems (Diba & Xie, 2019; Yang & Chen, 2006), temperature-sickness transmissibility relationship analysis (Irfan *et al.*, 2021), optimization of engineering parameters (Oyedeji *et al.*, 2022; Abifarin *et al.*, 2021), critiques of limitations to university enrollment (Fahim *et al.*, 2021) and healthcare resource elements (Peng *et al.*, 2021), among others. The GRA relies upon at the correlation elements and being anticipated between the reference orders and all comparative factors in sequences. To summarize the GRG, the comparability collection need to have the highest grade to be the first-class choice.

The foundation of the GRA model rests upon the Grey Relational Grade (GRG), which is a measure of positive correlation (Javed *et al.*, 2022). If $X_0 = \big(x_0(1), x_0(2), \ldots, x_0(N)\big)$ and $X_k = \big(x_k(1), x_k(2), \ldots, x_k(N)\big)$ are the grey data sequences as $\Gamma_{0k}$ and is given by (Abifarin & Ofodu, 2022; Mahmoudi *et al.*, 2020)

$$\Gamma_{0k} = \frac{1}{N}\sum_{j=1}^{N}\gamma_{0k}(j)$$

where the Grey Relational Coefficient (GRC) is,

$$\gamma_{0k}(j) = \frac{min_k\,min_j|x_0(j) - x_k(j)| + \xi * max_k\,max_j|x_0(j) - x_k(j)|}{|x_0(j) - x_k(j)| + \xi * max_k\,max_j|x_0(j) - x_k(j)|}, k = 1,2,\ldots,M$$

Here $\xi \in (0,1]$ is the distinguishing coefficient. In the current study, $\xi = 0.5$. In the current study, $M$ denotes the total number of factors, and $N$ denotes the total number of respondents.

## 4. Results and discussion

Data is collected through an online survey created on Google Forms. It was sent to potential respondents in Indonesia, and 11 people filled it out correctly on a 7-point Likert scale. Most of the respondents are people who have earned and have used Shopee PayLater. In this study, N represents the respondents and X represents the criteria.

The thirteen selection criteria reported in Table 1 were considered for impact Shopee PayLater on people's Consumptive behavior. The equally weighted Grey Relational Analysis (GRA) will be applied to prioritize the Thirteen criteria against the responses of the eleven respondents with MS Excel's aid. The collected data is shown in Table 3.

**Table 3.** The input data

|     | N1 | N2 | N3 | N4 | N5 | N6 | N7 | N8 | N9 | N10 | N11 |
|-----|----|----|----|----|----|----|----|----|----|-----|-----|
| X1  | 7  | 7  | 5  | 4  | 5  | 4  | 5  | 6  | 7  | 7   | 6   |
| X2  | 5  | 4  | 4  | 6  | 5  | 6  | 7  | 5  | 6  | 4   | 7   |
| X3  | 2  | 4  | 4  | 6  | 5  | 6  | 7  | 5  | 6  | 4   | 7   |
| X4  | 4  | 7  | 7  | 6  | 7  | 6  | 7  | 7  | 7  | 7   | 7   |
| X5  | 5  | 7  | 7  | 4  | 5  | 5  | 5  | 7  | 1  | 7   | 6   |
| X6  | 2  | 2  | 5  | 2  | 6  | 4  | 4  | 6  | 4  | 4   | 5   |
| X7  | 6  | 5  | 4  | 5  | 6  | 4  | 6  | 7  | 5  | 7   | 6   |
| X8  | 4  | 4  | 4  | 3  | 4  | 5  | 4  | 4  | 5  | 7   | 5   |
| X9  | 6  | 5  | 5  | 5  | 6  | 4  | 3  | 7  | 7  | 7   | 5   |
| X10 | 2  | 3  | 2  | 2  | 5  | 5  | 5  | 7  | 1  | 4   | 7   |
| X11 | 5  | 4  | 3  | 3  | 4  | 5  | 5  | 4  | 4  | 4   | 5   |
| X12 | 3  | 5  | 5  | 5  | 5  | 6  | 5  | 6  | 7  | 7   | 5   |
| X13 | 5  | 6  | 6  | 3  | 5  | 6  | 5  | 7  | 7  | 7   | 7   |

This study applies the GRA model to the data collected from 11 respondents, and the results are shown in Table 4, which presents the Grey Relational Coefficients and the Grey Relational Grades along with ranking of the thirteen factors. The ranking defines the position of each factor that most influences the use of Shopee PayLater based on those surveyed.

Based on the survey results, the most influential factor on the use of Shopee PayLater is income, followed by Behavioral Intention, Social Influence, Life style, Facilitating Condition, Performance Expectancy, Perceived Usefulness, Perceived Technology Security, Perceived Ease of Use, Effort Expectancy, Hedonic Motivation, Familiarity, Price Value. This is illustrated in Figure 2.

According to the GRA model, Income (GRG = 0.9091) got the first rank. The results are consistent with the literature. It can be concluded that income has a positive and significant effect on interest in using Shopee PayLater services. Income is an important factor in influencing consumer interest in using Shopee PayLater. Consumers with high incomes will be interested and interested in using Shopee PayLater, because the higher a person's income, the more need or consumption increases. The results of this study support the income theory (Sukirno, 2016) and are in line with the results of Mentari and Bendesa (2018), which states that income positively affects interest in using electronic money as a transaction tool. And in the research of Jeong and Kim (2020), there is a positive influence between income and interest in shopping.

According to the GRA model, Behavioral intention (GRG = 0.7708) got the second rank. The results are consistent with the literature. The results show that behavioral intention affects the use of Shopee PayLater in transactions at Shopee. Behavioral Intention (BI) is the extent to which the subject states to use technology in the future (Krempel & Beyerer, 2014). The word "interest" is more likely to be motivation, which affects how much the individual feels attracted or not to a stimulus (Uyun & Warsah, 2021)

According to the GRA model, social influence (GRG = 0.7545) got the third rank. The results are consistent with the literature. Based on the hypothesis test results above, it can be concluded that social influence has a positive and significant influence on the use of Shopee PayLater, so hypothesis one is accepted. This shows that if the social influence is higher, the use of Shopee PayLater will increase, because recommendations from people around it can influence a person's behavior and way of thinking to use Shopee PayLater. The results of this study support the research conducted by Gharaibeh *et al.* (2018) if an individual considers the opinions and recommendations of others to have an influence in deciding to use a technological innovation. This study also supports several studies such as Farah *et al.* (2018); Nustini and Fadhillah (2020) which resulted in the same conclusion, namely social influence has a positive influence on the use of an information technology innovation.

According to the GRA model, Life style (GRG = 0.7258) got fourth rank. The results are consistent with the literature. Furthermore, it can be concluded that lifestyle positively and

**Table 4.** The Grey Relational Coefficients (GRC), Grey Relational Grades(GRG) and ranks

| | GRC | | | | | | | | | | | GRG | Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N1 | N2 | N3 | N4 | N5 | N6 | N7 | N8 | N9 | N10 | N11 | | |
| X1 | 1.00 | 1.00 | 0.60 | 0.50 | 0.60 | 0.50 | 0.60 | 0.75 | 1.00 | 1.00 | 0.75 | 0.7545 | 3 |
| X2 | 0.60 | 0.50 | 0.50 | 0.75 | 0.60 | 0.75 | 1.00 | 0.60 | 0.75 | 0.50 | 1.00 | 0.6864 | 7 |
| X3 | 0.38 | 0.50 | 0.50 | 0.75 | 0.60 | 0.75 | 1.00 | 0.60 | 0.75 | 0.50 | 1.00 | 0.6659 | 9 |
| X4 | 0.50 | 1.00 | 1.00 | 0.75 | 1.00 | 0.75 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.9091 | 1 |
| X5 | 0.60 | 1.00 | 1.00 | 0.50 | 0.60 | 0.60 | 0.60 | 1.00 | 0.33 | 1.00 | 0.75 | 0.7258 | 4 |
| X6 | 0.38 | 0.38 | 0.60 | 0.38 | 0.75 | 0.50 | 0.50 | 0.75 | 0.50 | 0.50 | 0.60 | 0.5295 | 12 |
| X7 | 0.75 | 0.60 | 0.50 | 0.60 | 0.75 | 0.50 | 0.75 | 1.00 | 0.60 | 1.00 | 0.75 | 0.7091 | 6 |
| X8 | 0.50 | 0.50 | 0.50 | 0.43 | 0.50 | 0.60 | 0.50 | 0.50 | 0.60 | 1.00 | 0.60 | 0.5662 | 10 |
| X9 | 0.75 | 0.60 | 0.60 | 0.60 | 0.75 | 0.50 | 0.43 | 1.00 | 1.00 | 1.00 | 0.60 | 0.7117 | 5 |
| X10 | 0.38 | 0.43 | 0.38 | 0.38 | 0.60 | 0.60 | 0.60 | 1.00 | 0.33 | 0.50 | 1.00 | 0.5624 | 11 |
| X11 | 0.60 | 0.50 | 0.43 | 0.43 | 0.50 | 0.60 | 0.60 | 0.50 | 0.50 | 0.50 | 0.60 | 0.5234 | 13 |
| X12 | 0.43 | 0.60 | 0.60 | 0.60 | 0.60 | 0.75 | 0.60 | 0.75 | 1.00 | 1.00 | 0.60 | 0.6844 | 8 |
| X13 | 0.60 | 0.75 | 0.75 | 0.43 | 0.60 | 0.75 | 0.60 | 1.00 | 1.00 | 1.00 | 1.00 | 0.7708 | 2 |

significantly influences the use of Shopee PayLater. In line with the research of Al-Dmour *et al.* (2017) when a person's lifestyle changes, their needs also change, resulting in changes in use or consumption behavior. As with the use of Shopee PayLater as a modern payment feature that users rely on and help users meet their needs in paying transactions more easily. Thus it can be said if someone who uses Shopee PayLater is influenced by lifestyle.

According to the GRA model, Facilitating conditions (GRG = 0.7545) got the fifth rank. The results are consistent with the literature. Facilitating conditions positively and significantly influence interest in using Shopee PayLater services. The facilitating condition factor shows that respondents have knowledge of using Shopee PayLater, the compatibility between the technology used and Shopee PayLater, and the possibility of assistance from other parties when experiencing difficulties in using the Shopee PayLater application. Habit, as one of the factors that explains interest in using the Shopee PayLater application, is shown by several things. Many respondents are addicted to using Shopee PayLater, there is a kind of compulsion always to use Shopee PayLater, and there is even a desire to increase the frequency of using Shopee PayLater. This habit is one of the factors that encourage interest in using the Shopee PayLater application.

According to the GRA model, Performance expectancy (GRG = 0.7091) got the sixth rank. The results are consistent with the literature. The factor of performance expectancy using Shopee PayLater is also a driving force for Shopee users to be interested in using Shopee PayLater, Shopee users are simple, namely whether using Shopee PayLater can increase their productivity and can complete their work faster by using Shopee PayLater. The fulfillment of this expectation becomes an explanation of how performance expectancy affects the interest of Shopee PayLater users.

According to the GRA model, Perceived usefulness (GRG = 0.6864) got the seventh rank. The results are consistent with the literature. The results found that the perceived benefit variable had a positive and significant effect on interest in using Shopee PayLater services. These results indicate that the perceived benefit variable is an important factor in updating payment methods in the e-commerce business. If consumers feel that they have benefited from the payLater payment method, they will be interested in using that payment method. The results of this study support the theory
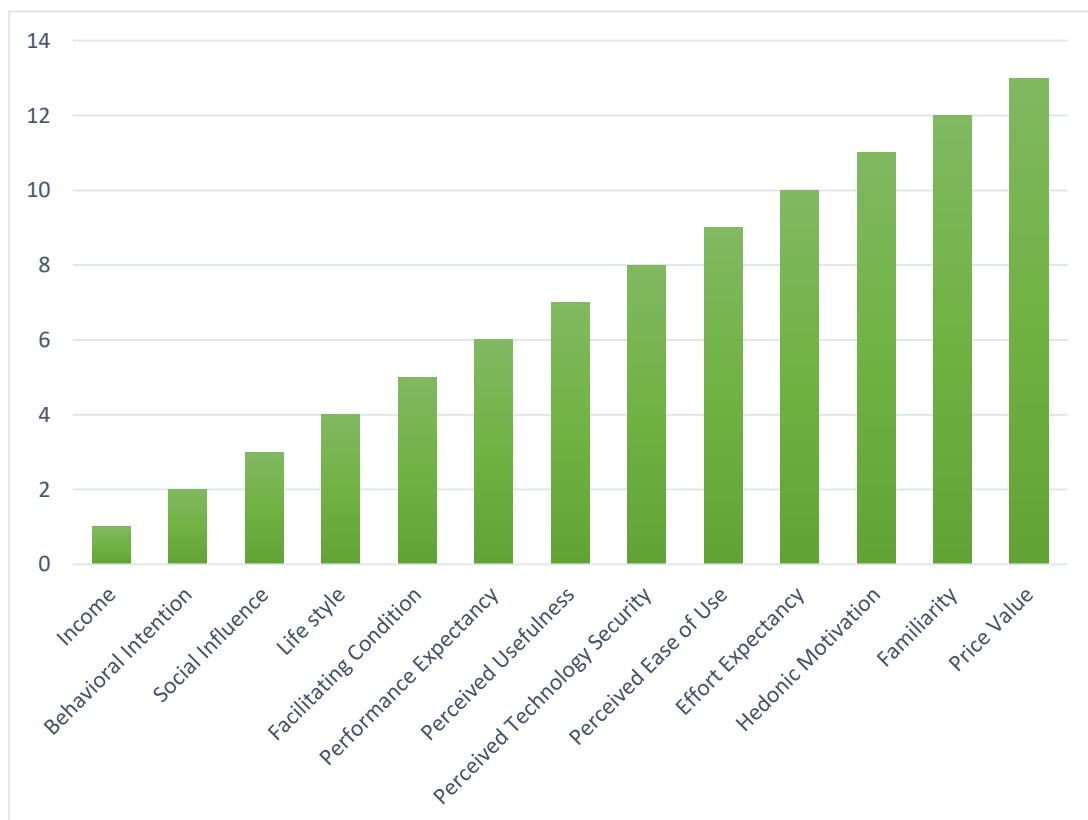


**Figure 2.** Ranking of the factors influencing Shopee PayLater usage

of technology acceptance model (TAM) Davis (1989) and are in line with the results of Sohn (2017) that the perception of individual usefulness affects interest in using e-commerce. Pratama and Suputra (2019) state that perceived benefits positively influence interest in using electronic money as a transaction tool.

According to the GRA model, Perceived Technology Security (GRG = 0.6844) got eighth rank. The results are consistent with the literature. The results show that Perceived Technology Security affects the use of Shopee PayLater in transactions at Shopee. This is in line with research conducted by Nanggala (2020) where the results of the study show that perceived web security affects attitudes towards fintech, then the intention to use fintech. While the research results of Nuriska *et al.* (2018) show that Habits, Facility Conditions, and Price Values significantly affect interest in using Shopee. This result is also supported by the research of Siahaan and Legowo (Siahaan & Legowo, 2019).

According to the GRA model, Perceived Ease (GRG = 0.6659) got the ninth rank. The results are consistent with the literature. It can be concluded that the perception of convenience significantly influences interest in using Shopee PayLater services. The results of the research above are in line with the theory of technology acceptance model (TAM) Davis (1989) as well as the results of study by Joan and Sitinjak (2019) which states that the perception of convenience has a positive and significant influence on interest in using the Go-Pay payment method. Then Romadloniyah and Prayitno (2018) argued that the perception of convenience had a positive and significant effect on customer interest in using E-Money products, and Witami and Suartana (2019) stated that PEOU had a positive and significant effect on intentions to use the blockchain system.

According to the GRA model, Effort Expectancy (GRG = 0.5662) got the tenth rank. The results are consistent with the literature. Effort expectancy affects the use of Shopee PayLater in transactions at Shopee. This is because respondents learned to use the Shopee PayLater application, as well as the interactions they had while using it were clear and understandable.

According to the GRA model, Hedonic motivation (GRG = 0.5624) got the eleventh rank. The results are consistent with the literature. Hedonic motivation positively and significantly affects interest in using Shopee Paylater services. Hedonic motives encourage respondents to use the Shopee PayLater application. This is because they feel joy in using Shopee PayLater, and most importantly, it is also very entertaining for the Shopee Paylater users. These two things encourage Shopee PayLater users to use the Shopee PayLater application.

According to the GRA model, Familiarity (GRG = 0.5295) got the twelfth rank. The results are consistent with the literature. The next factor can be said that familiarity has a positive and significant influence on the use of Shopee PayLater. This proves that the higher the use of Shopee PayLater, the more. The results of this study support several other studies such as the research of Rouibah *et al.* (2016), which states that familiarity has a significant effect on intentions to use online payments, and research by Afshan and Sharif (2016); Wulandari *et al.* (2017) which resulted in the same conclusion.

According to the GRA model, Price value (GRG = 0.5234) got the thirteenth rank. The results are consistent with the literature. The results show that behavioral intention affects the use of Shopee PayLater in transactions at Shopee. This is in line with Oktafani and Sisilia (2020) research, which found that price value had a significant positive effect on behavior intention to use digital wallets.

Based on the results achieved above and inspired by the conceptual framework of Widari et al. (2022), it can be concluded that using Shopee PayLater has a significantly positive effect on consumptive behavior, so the hypothesis is accepted. This indicates that the more frequently people use Shopee PayLater, the more frequently they spend. Shopee PayLater is a payment function that provides sufficient financial support, allows payments in installments, and processes are quick and easy. Since the Shopee PayLater service provider has a large funds available and can be used at any time, it has an impact on the user's consumption behavior, because the user can continue to purchase consumer goods on the spot without waiting for sufficient funds, and can pay at a later time. Consumption behavior is excessive consumption without awareness of necessary needs (Lina and Rosyid, 1997), because it is more concerned with the desire and satisfaction of obtaining

satisfaction and comfort. It can be seen that the use of Shopee PayLater can affect consumers' consumption behavior. The results of this study support several other studies such as Kumala and Mutia (2020) and Nustini and Fadhillah (2020), who also concluded that if the use of technological innovations has a positive impact on consumer behaviour. Meanwhile, Akram et al. (2018) also argued that the use of credit cards has a positive effect on impulse buying while Sihombing et al. (2019) positive affect of the use of installments on students' consumptive behaviour. Thus, it is argued that Shopee PayLater is likely to succeed in Indonesia, especially among young users with limited income but greater desire to buy online.

## 5. Conclusion

The current study aims to identify and evaluate (rank) different factors that might play an important role in influencing the usage of Shopee PayLater. The results of this study can be concluded that all the factors studied such as income, behavioral intentions, social influences, lifestyle, facilitation conditions, performance expectations, perceived usefulness, perceptions of technology security, perceptions of ease of use, business expectations, hedonic motivation, familiarity, and price value have an effect positive and significant about the use of Shopee PayLater.

In this study, researchers experienced limitations when conducting research, namely, the data collection method only used a questionnaire, so the results of the data were subjective, it would be better to add an interview method so that the research results obtained were more complete. The sample used in this study is also small so it does not represent the description of Shopee PayLater users in Indonesia, so it is possible that different results will be obtained if using a different and larger sample. Further research is recommended to use different populations, samples and methods from this study in order to get better research results. In the future, more advanced techniques like the Grey Ordinal Priority Approach can also be used for the evaluation.

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# Human Rights Issues at Amazon Corporation

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**Abstract:** Multinational corporations like Amazon play important role in socio-economic development of the capitalist countries like the United States. The study aims to identify and analyze the problems and issues faced by the Amazon employees. It is found that the Amazon's work environment consists of harsh working conditions, excessive productivity quotas, and screening methods that put its employees at risk with serious consequences for their safety and well-being. Guided by media testimonies and published reports, the work presents one of the first detailed and balanced reports of human rights issues at the Amazon. It is suggested that to protect workers' rights the legislators and government agencies must develop and enforce robust workplace safety regulations. Also, by facilitating the Amazon workers form unions, a right granted by the International Labour Organization and the US Constitution, and guaranteeing the role of humans (and not machines) in employee terminations several human right issues can be resolved before reaching courts.

**Keywords:** Safety culture; difficult working conditions; worker rights; capitalism; Amazon corp

## 1. Introduction

The Amazon was founded by Jeff Bezos in 1994 as a website for selling books. Today, the Amazon is renowned as the "everything store" since it allows customers to buy a wide selection of products with just a click of a button. While the Amazon facilitates cheaper and faster transactions between buyers and sellers of books, electronics, household items, music, and movies, it also facilitates transactions between consumers and manufacturers/sellers of both high and low quality products.

The Amazon has been the subject of numerous allegations alleging safety and health dangers for its employees at its warehouses and distribution centers over the last decade. Various criticisms have been raised in the reports, including workplace cultures that urge employees to work harder and quicker. Some of the reports have a different opinion about it they say that Amazon has been an interesting place to work and managers make sure their employees feel valued and respected (Antin & Shaw, 2012). And others indicate that Amazon has been troubled by grueling working conditions in its warehouses, particularly during peak seasons. Long hours, timed toilet breaks, work productivity/speed surveillance, acute isolation from others, physically demanding quotas, and other harsh working circumstances have been reported by employees (Boewe & Schulten, 2019). Workers suffer a physical and mental toll as a result of these working conditions, as they are frequently treated more like a data set or a robot than as humans (Green America, 2022). Some reports had a different perspective on the incident. Logically, problems arise when one has to

manage a multibillion-dollar worldwide corporation with over a million employees. When you notice a pattern, it's time to wonder if the errors are being neglected on purpose or if something else is going on (Kelly, 2021).

If one looks at the literature, most studies have limited themselves to the production, distribution, financing, and selling related issues and only a few have dared to study human rights/workers' rights issues. For instance, Paul (2019) studied Microsoft's grueling working conditions and the "996" standard in the industry. Schiffer and Clark (2021) studied google violating labor laws by surveilling and terminating workers who organized employee protests. Shen and Zhang (2021) studied Alibaba, Tencent, and other major internet firms that need to protect gig workers' basic rights. Their rights include being provided a basic income, work safety, food safety, a decent working environment, and access to insurance coverage. The key issues concerning the rights of Amazon workers is presented in the succeeding section. One can see from these studies that even though several studies have explored Amazon or other MNCs' human rights/workers' rights issues, there is hardly a study that has yet presented a comprehensive overview of Amazon workers' rights and issues on different dimensions. That was the research gap that prompted this study.

The paper studies the human rights issues and work conditions in the Amazon workforce. Considering the fact that Jeff Bezos is both the owner of Amazon and the Washington Post newspaper, one can argue that the Amazon bosses enjoy significant influence on the media and it's not easy for the mainstream media to report the human rights abuses and worker rights violations directly resulting from their policies or oversight. Also, the Amazon is a big corporation, and the livelihood of almost 1.2 million people around the world depends on it, studying the Amazon work culture is a topic of great socio-economic significance. The current study presents one of the first comprehensive overviews of the key issues and challenges the Amazon is facing in terms of human rights issues and work conditions issues based on secondary data. The rest of the study is organized as followed: After the introduction, a review of literature has been done where important workers' human rights issues have been identified. In the succeeding section, these factors/issues are discussed and their implications for the health of workers and the company itself. In the end, the study is concluded with important insights and policy recommendations.

## 2. Human rights issues at Amazon

The Amazon began as an online book retailer in 1994 and is now considered to be a "company where people can find and discover anything they want to buy online," from books to groceries, to automotive, industrial equipment, etc. Amazon is the second largest private employers in the world having a total number of employees 1,608,000 full- and part-time employees (Statista, 2022), as shown in Figure 1. Despite the constructive role it plays in the economy and the lives of its customers there is another side of it that is hardly a secret. The human right issues at Amazon are no small concern considering its size and influence (Rager Law Firm, 2022; Naizghi, 2015). In this section, guided by the literature (research papers, news, reports, etc.), some of the factors have been identified and are listed in Table 1, and are discussed in the succeeding sub-sections.

### 2.1 Inadequate safety culture

The Amazon's organizational culture is described as "breakneck-paced and notoriously cost-conscious, as befits a company that has run only a small profit, or a loss" (Dudovskiy, 2022). The Amazon was named among the "Dirty Dozen" list of the most dangerous U.S. employers through the National Council on Occupational Safety and Health (Wasserman, 2021). According to surveys, the Amazon warehouse employees are three times more likely to be injured than the national rate (Sainato, 2020a; 2020b). The explanation is attributed to Amazon's unrealistic overall performance goals, a fear-based work atmosphere, and a lack of appreciation of employee contributions (BBC, 2021). Pressure to complete difficult duties quickly can have a substantial impact on workers' safety
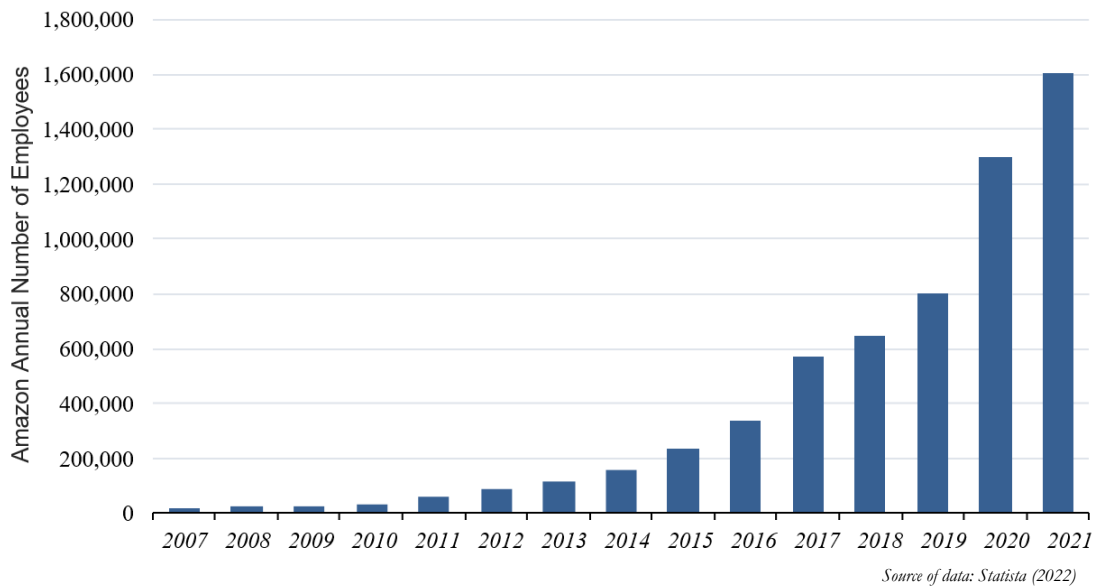
**Figure 1.** Number of Amazon employees from 2007 to 2021

and health (WHO, 2020). Physical strain and postural stress can have a significant impact on muscles, joints, and bones. Employees who perform manual handling duties are more prone to develop musculoskeletal disorders (NYCOSH, 2019). The Amazon warehouse workers are suffering from injuries that can stay with them for the rest of their lives (NELP, 2020). The most serious injuries require workers to be moved to light duty or miss work (Yahoo News, 2021). Also, unsafe work conditions make the Amazon work environment stressful. Work-related stress at one of the Amazon fulfilment centers is illustrated in Figure 2.

## 2.2 Difficult working conditions

The working conditions of the Amazon have drawn widespread criticism (Yohn, 2020). Over the previous few years, the media has been overwhelmed with reports from local and international journalists. Working conditions in Amazon's warehouses, delivery centers, and even corporate headquarters have been criticized as unsafe and hazardous (Kelly, 2021). A union-backed assessment of safety statistics found that Amazon workers sustained 5.9 major injuries per 100 workers, which was more than 80 percent higher than the rest of the industry (BBC, 2021). Mind you that the amazon workers only make up a third of US warehouse employees (SOC, 2022), as shown in Figure 3. According to a survey done by HIP (2021) shows that the Amazon employees suffer not only physical injuries but also psychological distress, as shown in Figure 4.

## 2.3 Fear of employment termination

Job security is an important factor that improves employees' belongingness with the organization and improved their urge for thriving (Nawaz *et al.*, 2021). Fear of losing job can affect their relationship with the organization. Technology should be used to overcome these fears and not to infuse these fears. The Amazon has attempted to replace its middle management and human resources workers with artificial intelligence (LaMagna, 2017). The Amazon's algorithms and tracking systems constantly monitor workers' productivity throughout the workday (Joita, 2019). So, when workers failed to meet the rate, they get fired without the involvement of a human manager (Sainato, 2020a; 2020b). This has caused a lot of difficulty for the amazon workers; more than 60% of UK warehouse workers have avoided going to the toilet because they were scared of missing their performance targets (Liao, 2018). Some even went as far as to relieve themselves in a bottle (Ghosh, 2018). The Amazon fired two employees who were outspoken critics of the company's labor practices, including how it treated warehouse workers during the COVID-19 outbreak (Palmer, 2020a; 2020b). The company also offers up to $10,000 for employees to quit

**Table 1.** Key human right issues allegedly being faced by the Amazon workers

| Issues | Description | Reference |
|---|---|---|
| Inadequate Safety Culture | Absence of sense of safety at workplace | Sainato (2020a; 2020b); Gurley (2022); Wasserman (2021); Evans (2020); Zhang (2022); Selyukh (2020) |
| Difficult working conditions | Grueling work conditions in warehouses and pressure to work faster | Green America (2022); Palmer (2021); Gruenberg (2022); August & Rock (2021); Blackwell (2020); Taddonio (2020) |
| Fear of termination | Job insecurity and fear of getting fired for missing the performance targets | LaMagna (2017) Liao (2018); O'Brien (2020); Crispin (2021); Pigram (2019); Tung and Berkowitz (2020) |
| Disregard for workers' needs | Workers are not robots and so they have individualized needs that are not always taken care of | Kelly (2021); Tung and Berkowitz (2020) |
| Payroll system malfunctions and underpayment | A long list of issues with the Amazon's system for handling paid and unpaid leaves resulting in underpayment | Kantor et al. (2021); Brancaccio et al. (2021); Hamilton (2021); O'Connell (2021); Enderle (2022) |
| Toxic workplace culture | High job performance quotas, as well as other poor working conditions such as timed toilet breaks and working in social isolation, all contribute to work stress | Virzi (2019); Carmichael (2022); Jackson (2022); Hinchliffe (2021); NBC (2020) |
| Lack of transparency | The treatment of workers throughout the Amazon's global supply chain is neither consistent nor transparent | Green America (2022).; Glaser et al. (2020); Yohn (2020); O'Donnell (2019) |
| Race and gender discrimination | The Amazon has come under criticism for alleged discrimination against female employees as well as individuals of diverse skin colors | Greene (2021); Lewis (2021); Stempel (2021); Wilkinson (2021); Keck (2021); Long (2021); Larson and Bloomberg (2021); Charlotte (2021) |
| Disability discriminations | The Amazon has come under criticism for allegedly discriminating against pregnant employees and employees with disabilities | Young (2022); Engelson (2020); Hadero (2022); Kramer (2022); Fickenscher (2022) |
| Religion discrimination | Religious discrimination against the Amazon's Muslim and Christian employees has been reported. | GeekWire (2016); Esq. (2019); O'Kane (2019); Farooq (2019); Shellnutt (2022) |
| Opposition to unionization | The Amazon is well-known for its historic opposition to the unionization of its workforce | Sherman (2022).; Palmer (2020a; 2020b); Nickelsburg (2020); Apicella and Hildebrandt (2019) |

their job (Berkowitz *et al.* 2020). Kantor and Streitfeld (2015) reported that sometimes ideas in meetings are so harshly criticized that some employees are afraid to voice their opinions.

*2.4 Disregard for workers' needs*

The Amazon workers are being neglected because the company places more focus on satisfying the customers and overlooks about the needs of their employees (Naizghi, 2015). There were heart-breaking stories of blocked disability payments, cars repossessed, the need to sell a wedding ring, and mistaken firings due to supposedly faulty programs (Kelly, 2021). Amazon workers urged the company to improve its public transit services (Sainato, 2020a; 2020b) and improve the role of human managers. Nevertheless, Amazon claims that the robots make the job safer and easier (Evans, 2020). The company forces its workers to skip lunch breaks and work through their lunches in order to meet its targets (HIP, 2021). Amazon has also been reported for not providing proper training for workers. Sometimes workers at Amazon are not given proper training and situations arise where injuries or deaths happen (Rubio, 2021).
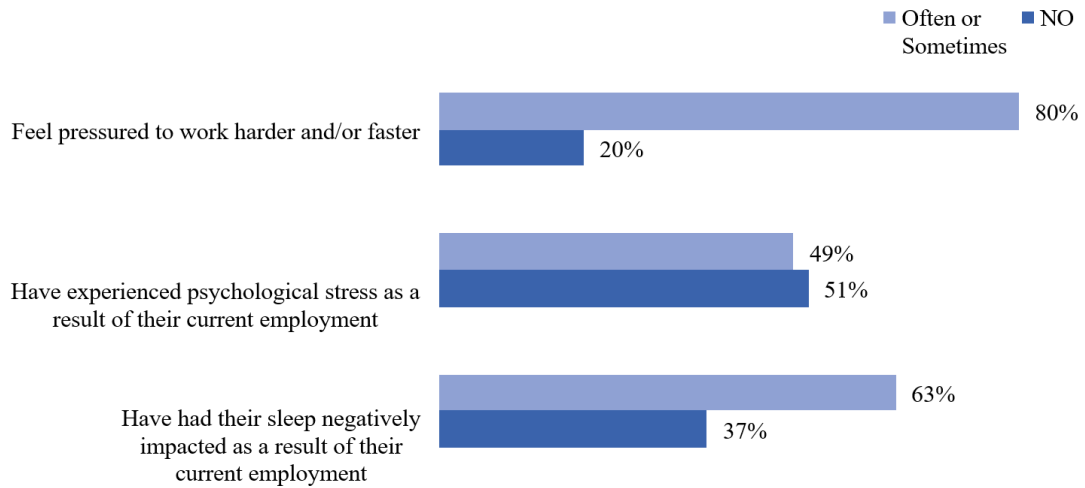
**Figure 2.** Work-related stress at the Amazon fulfilment center Staten Island
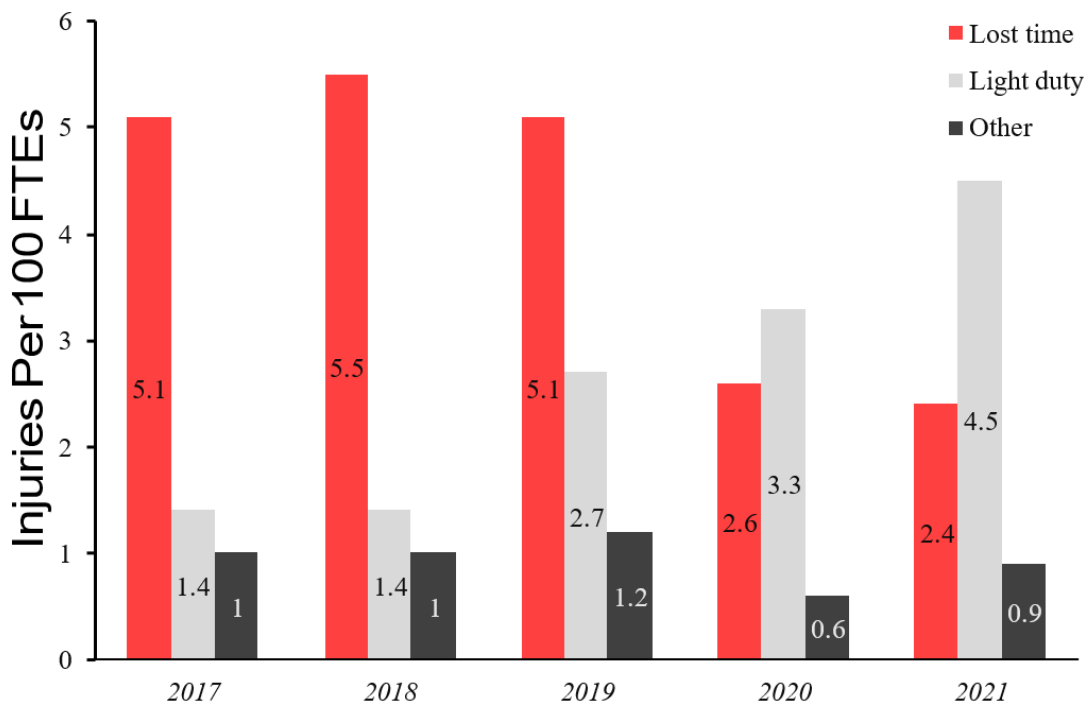


*Source of data: SOC (2022)*

**Figure 3.** Annual injury rates by type at the amazon facilities, 2001-2021

## 2.5 Payroll system malfunctions and underpayment

Although the Amazon is known for its fast and accurate package delivery, a new report details the top issues the company has in managing paid and unpaid time off for its employees, leading to mistakes (Kantor *et al.* 2021). As the Amazon leave management system involves several electronic automated systems, this appears to be one of the biggest causes of confusions (Brooker, 2022). The Amazon workers are suffering from Amazon's system for handling paid and unpaid leaves where workers were accidentally fired because they were being marked as abandoning their job when in fact they were on approved leave (Kantor *et al.* 2021). Human resource difficulties have caused problems for both blue-collar and white-collar employees. According to a New York Times study, there has been a slew of regulatory errors that have harmed employees (Daniels, 2020).

Percent of Respondents (Out of 26)
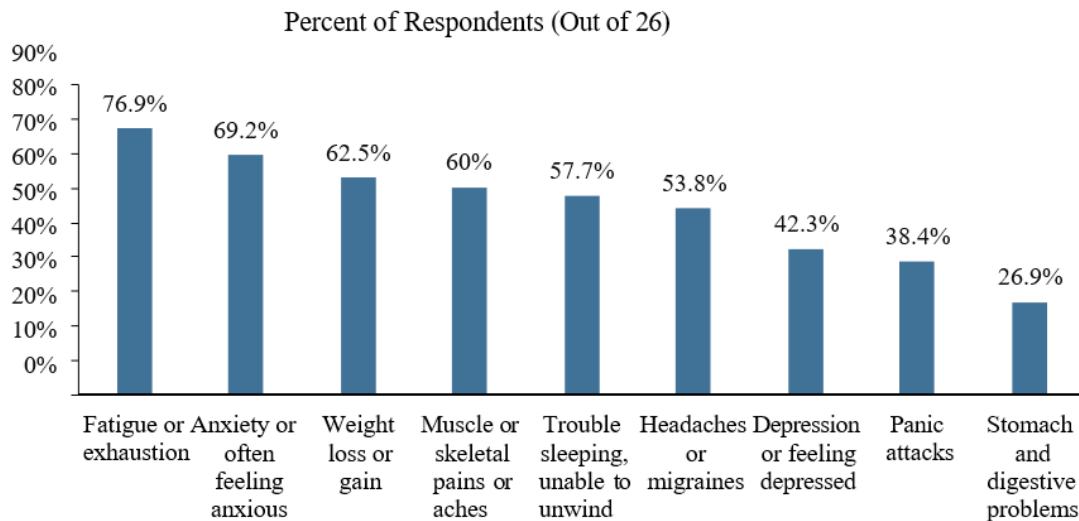
**Figure 4.** Health concerns developed or worsened since beginning work at Amazon

Another New York Times investigation found that the company's leave process jammed during the pandemic (Weber, 2021). As a result of these problems, people like James Watts, 54, who worked for Amazon in Chattanooga, Tennessee (USA), lost benefits while on disability leave. Watts was on leave after suffering multiple heart attacks and strokes, and his automobile was repossessed due to the loss of his disability benefits. Watts and his wife eventually had to sell their wedding bands in order to buy food and pay medical costs. After a few months, the Amazon advantages reappeared with no explanation (Cave, 2021).

## 2.6 Toxic workplace culture

If the workplace environment is uncivil or toxic, it causes emotional exhaustion among employees and negatively influence their desires to thrive within organization (Nawaz *et al.*, 2022; 2020). the It has been reported that Amazon's offices valued productivity above all else, pushing their employees to their physical, mental, and emotional limits (Green America, 2022; Hill & Hill, 2021). The journalist Brad Stone in his best-selling book revealed few incidents where Jeff Bezos insulted or mocked his employees (Stone, 2014). In another investigative report, reporters from the Daily Beast found that over a period of five years, 189 emergency calls were made from 46 Amazon warehouse sites for employee mental health episodes — many of which were suicide-related (Virzi, 2019). Not only that workers at the Amazon are encouraged to criticize each other's ideas in meetings. The internal phone directory explains how to send confidential feedback to their employers. It is routinely used to sabotage others, according to employees who have seen the directories' text-to-speech software for use by managers (Kantor & Streitfeld, 2015). Amazon's various platforms and services are used by hate groups to promote their ideas and generate revenue. The company's weak and inadequately enforced policies provide several channels through which hate groups can generate revenue, propagate their ideas, and grow their movement (RWDSU, 2018; Boewe & Schulten, 2019). Furthermore, Amazon warehouse workers are under pressure from supervisors to keep up with a rate of 240 to 400 boxes per hour or face being fined if they fall behind (Ranger Law Firm, 2018).

## 2.7 Lack of transparency

The treatment of workers throughout the Amazon's global supply chain is not transparent. The Amazon stated "Our point is to guarantee business choices and activities depend just on business-related contemplations — zeroed in exclusively on a singular's capacity to play out the work, not their qualities. As framed in our Code of Business Conduct and Ethics, we don't endure

segregation, savage and compromising way of behaving, or provocation" (Amazon, 2019). Given the claims against it, Amazon needs to put a greater emphasis on workplace safety and security, as well as the well-being of its employees. During the outbreak of the COVID-19 pandemic, because of Amazon's lack of transparency and the lack of federal protections for the U.S. workers who got infectious diseases at work, tracking the spread of COVID-19 at one of America's largest employers during a coronavirus-driven boom in online retail is nearly difficult. Some of the company's 500,000 warehouse workers at its 110 fulfilment centers in the United States which were designated critical during the lockdown are now attempting to fill the information void (Glaser *et al.*, 2020).

*2.8 Race and gender discrimination*

Amazon has been criticized for not doing enough to address racial inequality in its own workforce. Shareholders have asked the company to report on median pay gaps across race and gender. Median gaps are an indicator of access to high-paying roles. Their disclosure would provide investors with insight into Amazon's performance on pay inequality (CWC, 2021). An investigation shows that 550 employees signed a petition saying Amazon Web Services (AWS) has "an underlying culture of systemic discrimination, harassment, bullying, and bias against women and under-represented groups" (Rodack, 2021). The women range in age from early 20s to mid-60s, and all allege that they were retaliated against by white managers for complaining internally about race, gender, or sexual harassment or discrimination that they experienced (Rey, 2021). A former Amazon employee, Cuervo, has sued the company for gender and racial discrimination. "It's a systemic problem, and they know it," says attorney Lawrence Pearson. Cuervo moved across the country for what she hoped was an entry-level job that turned out to be a nightmare (Wilkinson, 2021). An organizational psychologist who worked for Amazon on the management team at a distribution center in Spokane, Washington, alleges she was sacked for speaking out against bullying and unethical behavior by a key leader at the vast, robotized warehouse (Pulkkinen, 2022).

*2.9 Disability discrimination*

Amazon, the online retailer, has repeatedly been named in lawsuits alleging workplace discrimination. The family of Ronald Ashley, 53, alleged that their relative died as a result of Amazon's inability to give disability compensation and other contractually mandated benefits. It was filed by a discrimination attorney in Los Angeles (Ranger Law Firm, 2018). Another employee of Amazon that has also faced disability discrimination told the media that she has impaired vision and is required by law to receive disability accommodations for her job. But she said new managers consistently try to place her in other departments she is unable to do the work in. The entire time you're there, you're being tracked by a computer. Managers do not report you or write you up. "You're written up by an algorithm," Geller explained. "You're quite aware that an algorithm is keeping track of you, ensuring that you keep moving as quickly as possible because if there is too much delay between items, the computer will notice, write you up, and dismiss you" (Sainato, 2020a; 2020b).

*2.10 Religious discrimination*

Discrimination in the employment process at Amazon is not limited to racial and disability discrimination. Muslim workers protested against the Amazon over quotas that prevent them from praying due to strict packing hours. Amazon employees have the right to use PTO, unpaid time off, or vacation for religious holidays. Muslims have been impacted more than others due to prayer obligations. Muslim employees also have less time than non-Muslim co-workers to take off when their kids are sick (O'Kane, 2019). In 2019, the Amazon delivery service provider terminated the contract of a Christian delivery worker for refusing to work on Sundays to attend church. Later, the company agreed to pay $50,000 to settle the religious discrimination law suit (Clarey, 2022).

*2.11 Opposition to unionization*

The right of employees and employers to form and join organizations of their choice is an important part of a free and open society (ILO, 2022). Amazon has consistently opposed unionization among its 1.1 million employees in the US alone (Sainato, 2022). While it is illegal to restrict employees from joining unions, Amazon, like many other retailers, holds sessions to discourage them. The use of mostly temporary labor further weakens union organizing efforts because the workforce is constantly changing and few workers have been there long enough to participate in or lead organizing efforts (Naizghi, 2015).

It is widely believed that Amazon employees face discrimination or unfair treatment on the job as a result of their union membership or participation in strikes (Miah, 2021; Hill & Hill, 2021). The most common forms of discrimination faced by strikers or union members include being assigned unpopular tasks or being passed over for promotions. "Union members are kept away from specific tasks," one shop steward said. They won't be able to get better employment because they will be rejected. They'll never be able to make a living." They receive their former jobs back if they quit striking (Boewe & Schulten, 2017). The most obvious and crucial answer to many of these labor issues is to ensure that workers have the power to negotiate with management about poor working conditions or any other concerns they have without the fear of retaliation and the discrimination that comes with it (Naizghi, 2015).

Employees of Amazon's largest New York City warehouse have voted to unionize, overcoming the trillion-dollar company's ferocious opposition, to become its first American workers to successfully organize (RT, 2022). This is the first win for the Amazon workers' union but the battle is not over yet since Amazon has other branches across the globe. However, it sets a positive precedent for others.

## 3. Discussion

In this article, eleven factors that have been affecting the amazon workers' rights and the working environment have been identified. In literature, nobody has identified these many factors. While looking at the factors one can see that the factors are connected. As we know that amazon's main goal is satisfying its customer but at what cost?

The high standards and unreasonable expectations have caused the Amazon workers to have the highest and most severe injuries in the industry and caused a huge mental burden on the amazon employees the way the Amazon's management treats its employees seems to be unforgiving and insensitive (IvyPanda, 2021) supports this hypothesis. If the approach of the managers when comes to employees' issues, for example, health, disability, employees with different skin color, etc.… were different than what it is the working environment will be much better than what it is now. MNCs like the Amazon have much-diversified employees than any other company they should use it to their advantage, and it should not be their weakness. The Amazon leadership has been solely focused on their customer pleasure, and that's one of the main causes of the issues listed in Table 1. These factors are important for the Amazon company's health and wealth because they will help them understand the effects that have been brought into the overall Amazon employees' safety and health issues so, they should take this as a hint and care more about the safety and the wellbeing of its employees. A safe and healthy workplace not only protects employees from injury and sickness, but can also lower injury and illness expenses, reduce absenteeism and turnover, boost productivity and quality, and boost employee morale (IOSH, 2022).

## 4. Conclusion

The true values of an organization can be seen in the way it treats its employees and customers. The testimonies of the employees, if allowed to speak, are of greater value than the content of their employers' websites and reports. Keeping all this in view, the study was performed where reports and publications across the internet were read and summarized. The study identified eleven key factors /issues that the Amazon employees face during work. The Amazon's working environment,

including deteriorating working conditions, high productivity objectives, labor quotas, and continuous monitoring and surveillance, is harming Amazon workers' health, safety, and well-being. It should take this as a sign and work on their safety and healthy working environment. In addition to the negative impact on employee health and safety, the Amazon's rapid system creates additional costs that the company cannot afford which could overshadow public services such as unemployment insurance and public health insurance programs and create instability for families' employees and society. Policymakers need to act quickly to ensure fair and consistent workload expectations for warehouse workers who are largely composed of people of color/race. Taking action on this issue is an important step in providing healthy and safe working conditions for workers in this important and growing industry. The paper's limitations include limited access to information (Amazon operates in 13 countries, but this paper does not cover all of them) and a lack of previous studies in this field, particularly around the topics of race and gender (most of the literature focuses on a few cases with similar evidence), which should be considered in future studies. The silence of some media outlets like the Washington Post on the exploitation faced by the Amazon workers is another issue of concern and requires deeper and more objective analysis. Evaluation of these factors based on primary data from the Amazon workplace is a daunting but much-needed endeavor in the future. In future, issues such as dictatorships within high tech multinational corporations should also be studied. Also, what issues the Amazon employees are facing in different countries can be studied. The relationship between the Amazon organizational structure and its work culture can also be explored. The current study is priliminary in nature with a very limited scope. It can guide the potential Amazon employees from the issues they may face when they join this infleuncial organization however it cannot serve as the 'character certificate' of Amazon. Objective quantification and measurment of the issues being faced by the workers is the area future researchers should focus on.

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# Assessment of Perceived Performance of Solar-Powered Borehole Projects in Nigeria

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**Abstract:** This study aimed at the assessment of the perspective of the people of Kano-south senatorial district, Nigeria on solar powered borehole projects. This research sought to establish the performance of solar-powered boreholes in terms of presence, their importance, their performance, and maintenance culture as well as provide solutions to possible problems that the senatorial district may be encountering in the usage of these amenities to ensure good sustainability. The survey research method was adopted for this study, and data were collected from 400 people who represented the sample size. The analysis of the data collected showed that 88.6% of the respondents affirmed the presence of solar-powered boreholes in the study area, which is in line with the hypothesis analysis. Similarly, the result showed that although the solar-powered borehole projects have positive impacts on the standard of living of the populace, most of these amenities are not functional due to the low regularity of borehole maintenance. Based on the views of the end-users, it was recommended that the involvement of community leaders and other end-users, proper training of the end-users, provision of channels of reporting damages, the building of more solar-powered boreholes and adequate provision for maintenance are some of the ways to ensure better sustainability of solar-powered boreholes projects in the senatorial district.

**Keywords:** Solar-powered; borehole; projects; functionality; impact assessment

## 1. Introduction

The provision of socio-economic activities to the populates of a nation is both the responsibility of the government and the people, however, in most cases, the government is considered the major party with this obligation (Ozbudun, 2015). Development in rural communities in the bid to meet the need of the people by providing the social-economic infrastructure in these regions can be done with or without the support of the government (Uguru & Meldrum, 2019). Usually, constituency projects are carried out by the Federal Government of Nigeria (the executive) on behalf of the National Assembly (the legislature) since it is the duty of the national assembly to approve policy while it is the duty of the Federal Government to implement those policies as indicated in the annual budget (Udefuna *et al.*, 2013).

The idea of Nigeria's senatorial district is the division of a territorial into parts so as to produce a senator which will be charged with the responsibility of providing the representation to the people

of that part in the Upper Chamber of Nigeria's bicameral legislature. The major responsibilities of the Upper Chamber of Nigeria's bicameral legislature are the introduction of legislation bills and the provision of checks and balances of the other elements of the Federal Government of Nigeria (Chilaka *et al.*, 2021; Daudu & Fagbadebo, 2019). In the allocation of funds for the provision of social amenities in Nigeria, the senatorial district methods are usually employed by the Federal Government of Nigeria. Hence, the senatorial district of Nigeria can be described as a viable method for correspondence between the government on one hand and the citizens on the other hand with the intention of advancing socio-economic development in all regions without neglecting any (Muheeb, 2019).

Constituency projects are those works, or undertakings executed by either the federal government or in some cases state government usually as a consequence of the support of such constituent by providing representation to the Federal Government (Oni, 2013). These projects include access to safe and portable drinking water, sanitation facilities, health care facilities, empowerment programs to alleviate poverty, provision of employment opportunities, etc. The idea of constituency project is not only found in Nigeria as it is found in several democracy-practising countries, though it is usually referred to as Constituency Development Projects (CDP) (Udefuna *et al.*, 2013).

The provision of sustainable and healthy water in developing countries is a major concern at various governmental levels in which Nigeria is not an exception (Kernick, 2014; Uguru & Meldrum, 2019). Water is a precious natural resource that sustains life in all of its forms and although the 71% of the earth is made up of water, the availability of good and healthy water is scarce and consuming the unhealthy water leads to adverse health challenges such as kidney and gastric disorder, typhoid, diarrheal cholera, etc. Water-related diseases are the most critical health-related problems associated with people in developing countries and it represents 80% of all health issues (Etim *et al.*, 2021; Kernick, 2014; Olalemi & Akinwumi, 2022).

With the nature of the deleterious health implication of consumption of highly contaminated water, especially the well-dung and the natural water bodies, borehole water is considered the next safe water especially for a large population (Shimamura *et al.*, 2022). The popularly found borehole water in most developing communities is the electrically pumped ones, however, the epileptic power generation and distribution in Nigeria are affecting the performance of these boreholes which results in the lots of abandoned boreholes in our communities (Yorkor & Leton, 2017). This and many more were the reasons behind the shift from the electrically-powered borehole systems to the solar-powered borehole systems in our communities. However, the introduction of solar-powered boreholes did not eliminate existing problems in the provision of healthy water to the people. Some of these problems include a lack of quick access to spare parts and repairs, bad maintenance culture, and an inadequate number of solar-powered boreholes for a large number of people (Oloruntade *et al.*, 2014).

Problems regarding the implementation and sustainability of constituency projects, especially in rural communities, despite the large fund allocated in the budget for the provision of some essential amenities for the people is main push of this study. A recent study according to UNICEF shows that only 26.5% of the population of Nigeria has access to clean water as well as good sanitation facilities (UNICEF, 2019). Yet, an average of US$15 million is allocated to water supply annually for each states (Oloruntade *et al.*, 2014).

Therefore, to put into context, due to problems associated with solar-powered boreholes as a community project and the slow progress in the implementation and sustainability of these projects, this study aims to assess the perspective of constituents of Kano-south senatorial district, Nigeria on solar powered borehole projects. In line with the aim, research questions on the performance as a function of adequacy, functionality and impact of solar-powered borehole projects in the senatorial district were developed. Also, research hypotheses in that line of thought were developed and tested. The main contribution of this study is in the provision of an on-site assessment of constituency projects in a senatorial district of Nigeria based on the perspective of the end-users of these projects, and proffering solutions to some of the challenges identified in

terms of functionality of these projects which can be applied to similar case studies. The introduction of this study is covered in Section 1, literature review in Section 2, research methodology in Section 3, results and discussion in Section 4, and conclusion in Section 5.

## 2. Literature review

### 2.1 Solar-powered boreholes

The quintessence of solar-powered water pumps includes the change of the sun's radiation energy into valuable pumping energy to either give water dynamic energy or potential energy when being put away in a reservoir or storage medium (Short & Mueller, 2002). This innovation, similar to wind and diesel power, can only be viewed as a proper innovation for providing clean water on the off chance that it is very well executed in such a manner as, that it is sustainable by the community they are located and helps in the improvement of the well-being of the people in that community (Choudhary *et al.*, 2017).

In rural communities where access to the national grid is difficult and not financially savvy, independent systems, such as those structured around solar-powered energy give a decent and suitable choice for water provision (Dursun & Ozden, 2012). Studies have proved that even with the presence and access to the national grid, the utilization of solar-powered pumps or boreholes is an increasingly feasible choice (Kumar *et al.*, 2020).

A common solar-powered pump/borehole, as shown in Figure 1, comprises a solar array which changes over sunlight into usable power, a controller to direct activity to give energy to an electric motor which thusly controls a pump that lifts the water from the water source to the surface.

However, the arrangement of this system varies from place to place and individual. Either an Alternating Current (AC) inverter is required to change over the DC power obtained from the solar boards into AC power, as utilized by most electric pumps, or a Direct Current (DC) inverter if a DC power pump is being utilized, using the DC power from the boards directly (Senthil Kumar *et al.*, 2020). Variation in the system also exists in terms of motors being used as powered by the solar panels. The DC-powered brushed and brushless motors can be used; however, the brushless DC motor is a better option for solar-powered pumps because they have better power matching with the photovoltaic (PV) panels as well as lower friction which makes them require less start-up power. Similarly, brushed DC motors are not preferred because they regularly need brush replacement which makes them have a high maintenance cost (Aliyu *et al.*, 2018).
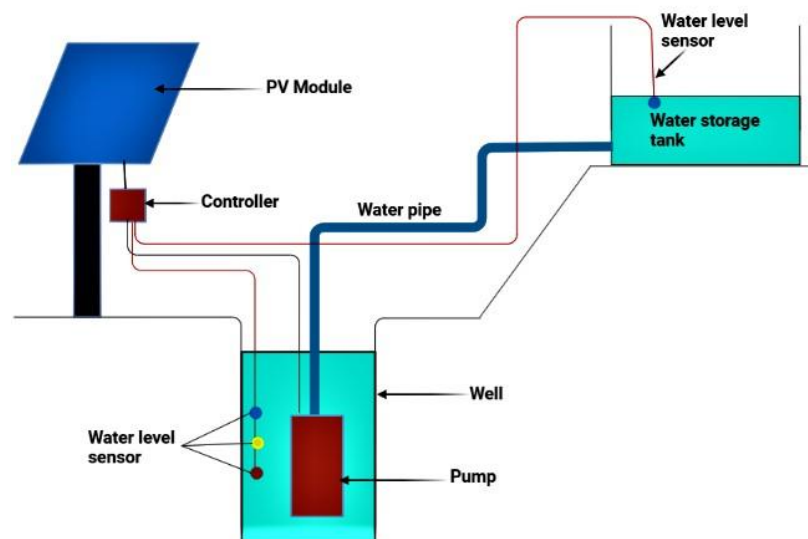


**Figure 1.** General Schematic of Solar-Powered Pump/Borehole (Girma *et al.*, 2015)

In the process of selecting the components of a solar-powered pump/borehole, it is important to carry out proper calculations so that these components match with each other, otherwise, unmatched components result in an inefficient overall system even if the components are efficient individually (Short & Mueller, 2002). The solar-powered pumps themselves can likewise differ with the most widely recognized one being the submerged multistage centrifugal pump which is regularly found in the town water supply (Aliyu *et al.*, 2018). This type of solar-powered pump is portrayed by its simple installation and equipment protection due to being submerged pumps and can be AC or DC. The disadvantage, however, is that maintenance of this category of the pump is not easy since it is submerged (Muhsen *et al.*, 2017). The schematic of the solar-powered submerged multistage centrifugal pump is shown in Figure 2.

In the bid of overcoming the maintenance challenge of solar-powered submerged multistage centrifugal pumps, submerged pumps with surface mounted motors are being used which give easy access for maintenance as shown in Figure 3.

Another category of the solar-powered pump in use is the reciprocating positive displacement pumps which are highly suitable to deliver the high head, applicable for low flow applications, and
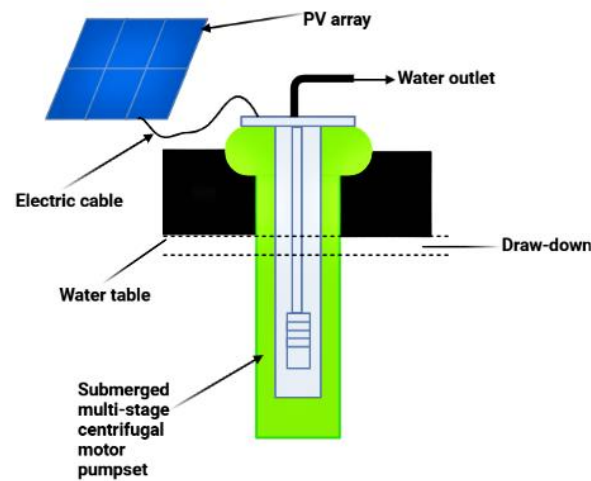


**Figure 2.** Schematic of Solar-Powered Submerged Multistage Centrifugal Pump (Muhsen *et al.*, 2017)
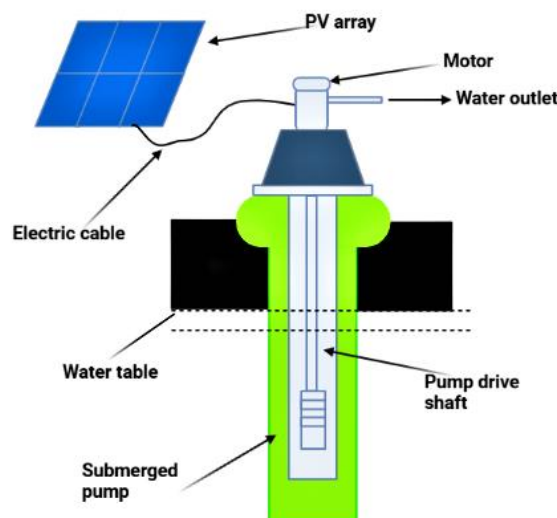


**Figure 3.** Schematic of Submerged Pumps with Surface Mounted Motors (Muhsen *et al.*, 2017)

do not require large above-ground components and power controllers (Muhsen *et al.*, 2017). The schematic of the reciprocating positive displacement solar-powered pump is shown in Figure 4.

## *2.2 Review of related works*

Table 1 gives the review of related past works in terms of the author(s), year of publication, aim of study, methodology used, and research findings.

The findings of the review literature showed that deficiency of resources, unnecessary duplication and overlap in organizational functions, uncoordinated activities in the water-related agencies at the Federal, State and Local Government levels, and lack of effective water and environmental protection laws are the major problems of ineffective water policies in developing communities (Gbadegesin & Olorunfemi, 2007). Furthermore, in cases where the participation of the community in the implementation of the constituency project was good, the people involved were only the influential ones (Nyaguthii & Oyugi, 2013). These have resulted to constituency projects not having significantly impact on infrastructure development in these areas (Ezeobi, 2021).

In terms of effective implementation and maintenance of constituency projects, applying monitoring and evaluation tools has proven to enable the completion of projects in the stipulated time (Mwangu & Iravo, 2015; Sulemana *et al.*, 2018). Other techniques include project planning, community participation, monitoring and evaluation, and training are the major determinants responsible for effective implementation of constituency development fund projects (Chesiyna & Wanyoike, 2016). The development of national policy, and if necessary, legislative approach, is another way to address the problem of project failure in developing societies (Eja & Ramegowda, 2020).

From the review of related past works, it was observed that there has been no study that considered the functionality of solar-powered borehole projects as constituency projects despite the huge allocation of budget to these projects. Furthermore, most of the constituency projects in this review considered only the completion phase of these projects, without covering the scope of in-service functionality of these projects.
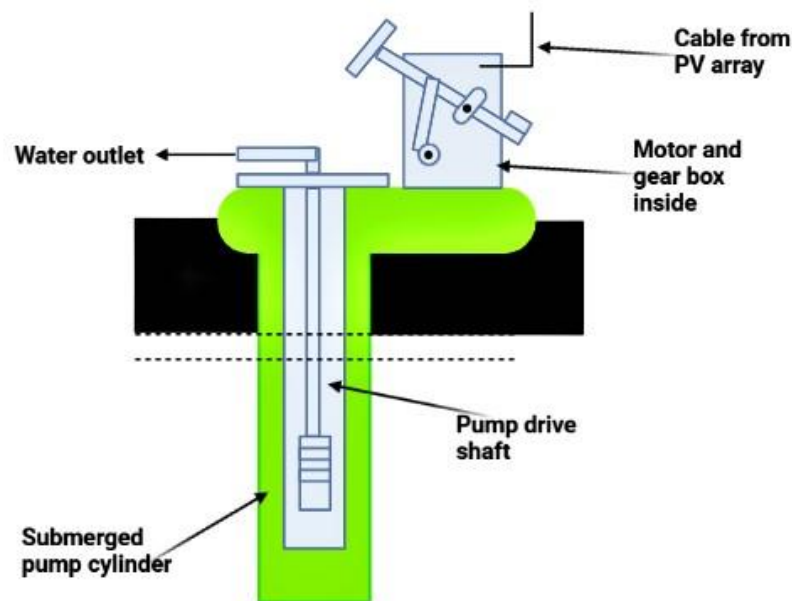


**Figure 4.** Schematic of Reciprocating Positive Displacement Solar-Powered Pump (Muhsen *et al.*, 2017)

**Table 1.** The review of related literature

| Literature | Aim | Methodology |
|---|---|---|
| Gbadegesin and Olorunfemi (2007) | Assessment of rural water supply management in selected rural areas of Oyo State, Nigeria | Descriptive research design |
| Nyaguthii and Oyugi (2013) | Influence of community participation on successful implementation of constituency development fund projects in Kenya: case study of mwea constituency | Descriptive research design |
| Ngacho and Das (2014) | A performance evaluation framework of development projects: An empirical study of Constituency Development Fund (CDF) construction projects in Kenya. | Descriptive research design |
| Mwangu and Iravo (2015) | How Monitoring and Evaluation Affects the Outcome of Constituency Development Fund Projects in Kenya: A Case Study of Projects in Gatanga Constituency. | Descriptive research design |
| Chesiyna and Wanyoike (2016) | Determinants of Effective Implementation of Constituency Development Fund Projects in Baringo Central Constituency, Kenya | Descriptive research design |
| Kalu and Chikwe (2017) | Political Economy of Constituency Projects in Imo State (2011-2015). | Descriptive research design |
| Sulemana *et al.* (2018) | An assessment of stakeholder participation in monitoring and evaluation of district assembly projects and programmes in the Savelugu-Nanton Municipality Assembly, Ghana | Descriptive research design |
| Khaemba and Sang (2020) | Sustainability of Constituency Development Funded Projects In Kanduyi Constituency, Bungoma County, Kenya | Descriptive research design |
| Eja and Ramegowda (2020) | Government project failure in developing countries: a review with particular reference to Nigeria | Review paper |
| Kanyesige (2021) | Internal Stakeholder Engagement, Organizational Support, Project Team Efficacy and Project Success. A Case of USAID aided Projects in Uganda. | Descriptive research design |
| Ezeobi (2021) | National Assembly Constituency Projects and Infrastructural Development in Anambra State, Nigeria, 2011-2015 | Qualitative research design |

## 3. Research methodology

The survey research method was adopted in the current study. It is defined as collecting data by sending a questionnaire to relevant persons (Shah *et al.*, 2021). In this case, the relevant persons are the end-users of these solar-powered boreholes.

The sample size (SS) used for this research with a total population of 3,859,300 constituents was determined using Taro Yamane's formula as given in Eq. (1).

$$SS = \frac{N}{1 + Ne^2} \tag{1}$$

Here, $N$ is the finite (known) size of the population, and $e$ is the sampling error (taken as 5%). Hench, the sample size of 400 respondents was obtained and the questionnaires were shared among them.

A blend of primary and secondary data collection was adopted for this study due to its nature. Precedence was given to primary data sourced through hard copies questionnaire designed for that purpose. The primary data sources were obtained directly from the Kano-south senatorial district within December 2021 and January 2022 and this process was supervised by two of the authors and consisted of copies of the questionnaire distributed and administered to the 400 people as obtained from the sample size. Focus was placed on the people who were available when the researchers visited the senatorial district. Care was taken in making sure that all the 400 questionnaires were filled and the people in the senatorial district were guided on the process. The

questionnaire was designed and formulated based on the stated hypothesis. The questionnaire was divided into two sections;

Section A: contains demographic information such as gender, age group, academic qualification, occupation and name of local government (4 questions).

Section B: contains the respondent's opinion about the assessment of the performance of the federal constituency solar-powered borehole constituency project in the district through the use of direct questions (16 questions). The data was collected using 5-point Likert scale ranging from *Strongly Agree* to *Strongly Disagree*. These questions were obtained from previous studies of Ngacho and Das (2014), Chesiyna and Wanyoike (2016) and Kalu and Chikwe (2017).

Inferential statistics were employed in the analysis of the data collected through the use of frequency counts and percentages using the Microsoft Excel (Version 2019) software. In answering the research questions, the mean respondent and standard deviation of the respondents were used. However, in the analysis of the research hypothesis, using the SPSS (Version 26) Software, the independent one-sample t-test was used. Independent one sample t-test determines the existence of a statistical difference between the know or hypothesized population mean and the sample mean based on the significance level. In this study, a significance level of 5% (0.05) was adopted.

## 4. Results and discussion

### 4.1 Demographic information of the respondents

Information about the gender, age group, academic qualification and occupation of the populace of the district based on the sample size are shown in Table 2.

From Table 2, the gender distribution of the study area showed that the majority of the responders were male (91.75%) while only 8.25% of the responders were female. Furthermore, it was observed that the age group distribution of the respondents had a maximum percentage of 30-34 years (50.75%), while the age group of 25-29 years, 45 years and above, and up to 24 years had a close range of 17.5%, 13.75%, and 12.25% respectively. However, the age group of 35-39 years had the least representation of 1%.

Table 2 also shows the distribution of academic qualifications of the respondents in which the academic qualification with the highest record was the SSCE (25.5%) and OND/HND (21.25%) qualifications. The "others" category of academic qualification had a record of 19.75% which included respondents without any form of formal education and the respondents with handwork. About 12.5% and 11.5% of the respondents had Primary education and B.Sc/B.Ed education respectively. However, none of the respondents had an M.Sc qualification. Also, the result shows that the majority of the respondents (43.25%) are Business Owners or Traders, 17% are Civil Servants, 11.5% are Community Leaders, and 6.25% are unemployed. The result also showed that 22% of the respondents were categorized under the "others" occupation group which included occupations such as farmers, hunters, etc.

### 4.2 Availability of solar-powered borehole projects in the district

From the result of the findings of this study (Table 3), the majority of the respondents (88.6%) affirmed the availability of solar-powered boreholes in their district, while only about 8.3% of the respondents disagreed with the availability of such projects in their community. This result is an affirmation of the mandate of the Ministry of Water Resources of Nigeria and Hadejia Jama'are River Basin Development Authority on providing accessible, and clean water to all regions through the establishment of the solar-powered boreholes (FMWR, 2018).

The result of the independent one-sample t-test on availability of solar-powered borehole projects (Table 4) showed that at the mean response of 1.832, variance of 0.733, the critical t-value value from the table ($t_{critical}$) at the degree of freedom of 1999 (1.646) is less than the calculated t-value ($t_{calc}$) of 34.8897. Based on the decision rule, since $t_{calc}$ is greater than $t_{critical}$, the alternate hypothesis is accepted. This implies that there is adequate availability of solar-powered borehole projects in the senatorial district.

**Table 2.** The demographic information of the respondents

| Variable | Number | Percentage |
|---|---|---|
| **Gender** | | |
| Male | 367 | 91.75 |
| Female | 33 | 8.25 |
| **Age Group** | | |
| Up to 24 | 49 | 12.25 |
| 25-29 | 70 | 17.5 |
| 30-34 | 203 | 50.75 |
| 35-39 | 4 | 1 |
| 40-45 | 19 | 4.75 |
| 45 and above | 55 | 13.75 |
| **Academic Qualification** | | |
| Primary | 50 | 12.5 |
| SSCE | 102 | 25.5 |
| NCE | 38 | 9.5 |
| OND/HND | 85 | 21.25 |
| B.Sc/B.Ed | 46 | 11.5 |
| *M.Sc* | 0 | 0 |
| *Others* | 79 | 19.75 |
| **Occupation** | | |
| Unemployed | 25 | 6.25 |
| Civil Servant | 68 | 17 |
| Business Owner/Trader | 173 | 43.25 |
| Community Leaders | 46 | 11.5 |
| Others | 88 | 22 |

*4.3 Functionality level of solar-powered borehole projects in the district*

From the critical analysis of result of the findings of this study (Table 3), although the majority of the respondents (70.17%) affirmed on the functionality of solar-powered boreholes in their community majority of the respondents disagreed on the regularity of borehole maintenance. This result is attributed to lack of proper maintenance culture on the part of the monitoring bodies, difficulty in accessing spare parts of solar-powered boreholes, and insufficient technical know-how as posited by Short & Mueller (2002) and Kalu & Chikwe (2017) who observed poor maintenance culture in most constituency projects in Imo State Nigeria. This result is in agreement with the findings of Muhsen *et al.* (2017) who highlighted maintenance as one of the difficulties attached with the use of solar-powered boreholes.

The result of the independent one-sample t-test on functionality of solar-powered borehole projects (Table 4) showed that at the mean response of 2.487, variance of 0.823, the critical t-value value from the table ($t_{critical}$) at the degree of freedom of 2399 (1.645) is greater than the calculated t-value ($t_{calc}$) of 0.697. Based on the decision rule, since $t_{calc}$ is less than $t_{critical}$, the null hypothesis is accepted. This implies that most of the available community solar-powered boreholes are not functional.

*4.4 Impact of solar-powered borehole projects in the district*

From the result of the findings of this study (Table 3), the majority of the respondents (82.15%) affirmed the importance and the positive impact that solar-powered borehole projects have on

**Table 3.** Responses to the questions on the availability, functionality, and impact of solar-powered borehole projects in the district

| Responses | Availability | | Functionality | | Impact | |
|---|---|---|---|---|---|---|
| | Frequency | % | Frequency | % | Frequency | % |
| *Strongly Agree* | 741 | 37.05 | 75 | 3.13 | 737 | 36.85 |
| *Agree* | 1031 | 51.55 | 1609 | 67.04 | 906 | 45.30 |
| *Undecided* | 62 | 3.10 | 272 | 11.33 | 192 | 9.60 |
| *Disagree* | 155 | 7.75 | 360 | 15.00 | 162 | 8.10 |
| *Strongly Disagree* | 11 | 0.55 | 84 | 3.50 | 3 | 0.15 |

**Table 4.** T-Test result on the hypothesis of the availability, functionality, and impact of solar-powered borehole projects in the senatorial district

| | *Mean* | *Variance* | *Observation* | *Hypothesized Mean* | *Degree of Freedom* | *t-calculated* | *t-critical* |
|---|---|---|---|---|---|---|---|
| **Availability** | 1.832 | 0.733 | 2000 | 2.5 | 1999 | 34.8897 | 1.646 |
| **Functionality** | 2.487 | 0.823 | 2400 | 2.5 | 2399 | 0.697 | 1.645 |
| **Impact** | 1.894 | 0.791 | 2000 | 2.5 | 1999 | 30.469 | 1.646 |

their standard of living. This result is in agreement with the objectives of Constituency projects which serves as instruments that bring about change and tend to solve a problem or utilize an opportunity (Alacevich, 2013). Also, this finding is in agreement with the stated visions of the Ministry of Water Resources of Nigeria in providing sustainable access to safe and sufficient water resources demands of the citizens of the country. The vision also entailed impacting the public health, food security, and poverty alleviation of the country (FMWR, 2018).

The result of the independent one-sample t-test on impact of solar-powered borehole projects (Table 4) showed that at the mean response of 1.894, variance of 0.791, the critical t-value value from the table ($t_{critical}$) at the degree of freedom of 1999 (1.646) is less than the calculated t-value ($t_{calc}$) of 30.469. Based on the decision rule, since $t_{calc}$ is greater than $t_{critical}$, the alternate hypothesis is accepted. This implies that the solar-powered borehole projects have an impact on the well-being of the members of the community.

The limitations of this study are the scope of discussions is limited to Kano-south senatorial district; however, the findings can be implemented in similar settings, and some of the respondents had biased views, due to the political agendas associated with federal constituency projects.

## 5. Conclusion

This study evaluated the impact, functionality and availability of solar-power borehole projects as federal constituency projects in Kano-south senatorial district, Nigeria with a population of about 4million people. The hypothesized that the solar-powered borehole projects in the senatorial district are inadequate, not functional, and have no impact on the well-being of the members of the community. Using survey research method (in which questionnaire was distributed to relevant persons), inferential statistics and independent one-sample t-test was used for data analysis.

According to the results of the data analysis, the majority of respondents confirmed the presence of solar-powered boreholes in the research area, which is consistent with the hypothesis analysis. Similarly, the findings revealed that, while solar-powered borehole projects have a good impact on the population's standard of living, most of these amenities are not operational due to borehole maintenance's irregularity. It was recommended that the involvement of community leaders and other end-users, proper training of the end-users, provision of channels of reporting damages, building more solar-powered boreholes and adequate provision for maintenance are some of the ways to ensure better sustainability of solar-powered boreholes as a community project.

## **Appendix**

The following is the research instrument that was used to collect data.

SECTION A: DEMOGRAPHIC INFORMATION OF THE RESPONDENT

*Instruction: Please tick (√) appropriately the response as applied to you*

**1.   Gender**

Male ☐                    Female ☐

**2.   Age Group**

Up to 24 Years ☐          25-29 Years ☐          30-34 Years ☐

35-39 Years ☐             40-44 Years ☐          45 and Above ☐

**3.   Academic Qualification**

Primary ☐        SSCE ☐        NCE ☐        OND/HND ☐

B.Sc. / B.Ed. ☐   M.Sc. ☐       Others (Please Specify) _____

**4.   Occupation**

Unemployed ☐     Civil Servant ☐     Business Owner/Trader ☐     Community Leader ☐

Others (Please Specify) _____

SECTION B: ASSESSMENT OF THE PERFORMANCE OF SOLAR POWERED BOREHOLE CONSTITUENCY PROJECTS IN KANO-SOUTH SENATORIAL DISTRICT

| *Questions on availability of solar-powered borehole projects in the senatorial district* | | | | | |
|---|---|---|---|---|---|
| | SA | A | U | D | SD |
| There are solar-powered borehole projects available in my local government area. | | | | | |
| As the population of my local government area increases, the number of solar-powered borehole projects increases over the years. | | | | | |
| I am satisfied with the numbers of solar-powered borehole projects in my local government area. | | | | | |
| The locations of the available solar-powered borehole projects available in my local government are strategically located to satisfy everyone | | | | | |
| During the rainy season where, solar radiation is not much, the solar-powered borehole projects are still available. | | | | | |

| *Questions on functionality level of solar-powered borehole projects in the senatorial district* | | | | | |
|---|---|---|---|---|---|
| | SA | A | U | D | SD |
| The solar-powered borehole projects available in my local government area are functioning to maximum capacity. | | | | | |
| The solar-powered borehole projects available in my local government area usually have regular maintenance. | | | | | |
| There is a proper channel available in reporting cases of damage to the solar-powered boreholes in my local government area. | | | | | |
| There is 24 hours access to water from the solar-powered boreholes in my local government area | | | | | |
| The solar-powered borehole projects in my local government are more reliable than the manual hand pump water boreholes | | | | | |
| There is a forewarning from the authorities if there will be maintenance activities on the solar-powered boreholes in my area | | | | | |

| *Questions on impacts of solar-powered borehole projects in the senatorial district* | | | | | |
|---|---|---|---|---|---|
| | SA | A | U | D | SD |
| The presence of solar-powered borehole projects has improved the standard of living of my local government area | | | | | |
| The presence of solar-powered borehole projects has solved the problem of drought and insufficient water in my local government area | | | | | |
| Solar-powered boreholes save time and energy than well or manual hand pump borehole | | | | | |
| Both the old and young can use the solar-powered boreholes in my local government area. | | | | | |
| The presence of solar-powered borehole in my local government area has enhanced my daily business, work or life. | | | | | |

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