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# Household Energy Conservation Behaviour: A Socio-Economic Perspective

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**Abstract-** Studies on energy conservation and household behavior were predominantly based on econometrics using secondary data, with limited studies employing primary data. In addition, secondary data from developing countries are not without their inadequacies due to missing data points. However, generating data may lead to over or underestimations which led to this study deploying a structural equation model and using cross-sectional data from a developing country perspective. With 329 respondents from each household in Akure Metropolis, Nigeria, who were chosen at random to fill the structured questionnaire provided the data. The Partial Least Square Structural Equation Modeling method was used for the study. The study's findings demonstrated that socioeconomic factors such as home size, income, number of appliances, and weather substantially impact people's behavior regarding energy conservation, with income having the highest structural weight. This suggests that income is crucial to residents' electricity-saving habits since households with higher incomes use more electricity and conserve it less. Therefore, it is advisable that policies to save energy focus on limiting the purchasing power per unit at the household level, where the wealthy pay more tax than the poor. This would encourage improvements in energy conservation in the Nigerian economy's household sector.

**Keywords**: *Energy conservation behaviour, energy efficiency, socio-economic factors, income, weather, gender attributes*

## 1.0 Introduction

For a very long time, households in Nigeria have been plagued by power outages and an endless supply of electricity. All national efforts to solve the electrical supply issue have been met with difficulty. As a result, most States have come up with local solutions to this endless supply of electricity in their own communities. Being the State capital, the situation in Akure metropolis is similar. Most households in the capital city experience an inequitable allocation of power supplies. In the city, it has been noted that most families only have a meager two to three hours of electrical supply each day, while a smaller percentage have it for more than ten (10) hours. This does not exclude locations with sporadic access to energy. Residents have made multiple attempts to install alternative energy sources; however, doing so frequently results in high costs, noise, and increased carbon emissions from dirty energy sources like diesel or gasoline generating sets. As there is a clear correlation between inadequate electricity supply and subpar economic development, this issue has increased poverty and a decline in the standard of living for people [1].

In order to increase the citizens' access to electricity, Akure Metropolitan urgently needs a dependable, affordable, clean, and technology-driven source of electrical energy [2]. The behavioral preservation of the finite supply is crucial above all else. According to existing research, the situation can be improved by consuming less energy and doing it to encourage greater efficiency because this is more affordable and effective at reducing carbon emissions than increasing production [3]. A fuller knowledge of the mechanisms and driving forces behind household energy-saving goals is necessary to create energy conservation policies and promote energy-efficient behavior in households.

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Earlier studies have employed the theory of planned behavior (TPB) to forecast or clarify family energy-saving behavior [4] [5] [6]. The TPB framework states that the intention to engage in a particular behavior (perceived behavioral control) is determined by three psychological predictors: a positive evaluation of the action (attitude), social pressure to engage in the behavior (subjective norm), and perceived ease of engaging in the behavior. However, according to some researchers [7] [8], while few studies have examined the effects of socio-economic factors on household energy-saving intention or behaviors, the TPB framework pays less attention to the interactions between behavioral intention and energy conservation practices. Most empirical studies have also concentrated on Asian, European, and American households' energy-saving behaviors. For instance, Jiang et al. [9] investigated the residential building sector's energy conservation and emission reduction approach in Jiangsu Province, China. Based on an econometric analysis of data from Danish smart meters, Andersen et al. [10] evaluated residential power usage and household characteristics. A study entitled "Saving from Home! How Income, Efficiency, and Curtailment Behaviors Shape Energy Consumption Dynamics in US Households" was conducted by Kumar et al. [11]. In Malaysia, Ali, [12], investigated the key variables influencing home electricity use. However, there are few empirical research on this topic in the context of Sub-Saharan Africa.

Studies on energy efficiency and household behavior were also primarily focused on econometrics utilizing secondary data, with just a small number of studies using primary data. Additionally, secondary data from developing nations is limited due to missing data points. To assess the impact of socioeconomic factors on energy conservation behavior, and to analyze the socioeconomic constructs and indicators affecting Household energy conservation behavior in Akure Metropolis, this study employed a structural equation model and used cross-sectional data from a developing country perspective. This study, therefore, sought to fill the knowledge gap. By identifying the socio-economic drivers of energy conservation behavior and how they affect electricity usage, this study adds to our body of knowledge. This is crucial for boosting electricity conservation and end-use effectiveness in Nigeria's domestic economy. The results of this study explain energy-saving behavior that supports activities that advance national development.

The introduction is the first section of the study's structure, followed by a discussion of a review of pertinent literature. Thereafter, the presentation of the tools and techniques used to accomplish the objectives, results were provided and discussion ensued. The conclusion and recommendation were then given.

## 2.0 Literature Review

### 2.1 Energy conservation

Energy conservation, also known as energy saving, is often referred to as the "Fifth Fuel," with the other four fuels being main or "fossil" fuels like coal (solid), oil (liquid), gas, and nuclear/hydroelectricity [40]. This idea supports the need to reduce energy use nationally and internationally. According to the rate of usage, it is a basic reality that the world's fossil fuel reserves will eventually deplete; as a result, if the consumption of these energy sources is decreased, the reserves will last longer [13]. Research might offer ways to increase the currently accessible reserves, thereby extending the time before these non-renewable energy sources inevitably run out.

Electrical energy conservation refers to reducing or eliminating the usage and wastage of superfluous energy [14]. Making scarce resources last as long as possible is not the goal of power conservation; doing so would amount to nothing more than extending a crisis until all available energy sources have been exhausted. According to Parag et al. [15], conservation is lowering demand on a finite supply and allowing that supply to start rebuilding. Reducing demand, protecting, and replenishing supplies, and repairing any harm left behind from previous energy operations are the three main objectives of energy conservation measures.

International policies addressing pollution, global warming, and the depletion of fossil fuels all include energy conservation as a crucial element. The housing market is crucial to these efforts since the residential sector accounts for nearly one-fifth of the world's energy demand [15]. Policymakers, the real estate business, and academics are all interested in finding novel strategies to cut residential energy use [16].

Energy conservation behaviors are those that help people use less energy (electricity) overall, according to the definition used in this study. One example of such behavior is curtailment, which saves energy by reducing use [7]; efficiency, which saves energy by purchasing more energy-efficient electrical appliances; or maintenance,

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which saves energy by performing maintenance on appliances to increase their overall performance and efficiency. Efficiency practices can be divided into two categories: low investment in intensive measures (such as switching from incandescent to compact fluorescent lighting) and high investment in intensive practices [11].

## 2.2 Socio-economic determinants of energy conservation behaviour

Based on prior research, the current study has identified nine (9) socioeconomic characteristics frequently discussed in earlier research and linked to energy-saving behavior in households. It has been discovered that these factors directly affect people's propensity to conserve energy. The socioeconomic factors include: the cost of electricity, income, the household size, the age and gender of the head of the household, the number of rooms in the home, the number of appliances, and the weather. These socioeconomic characteristics are used in this study, as will be discussed in the following paragraphs.

### a. Electricity Price

According to Parag et al. [15], energy prices significantly impact both short- and long-term household energy use. Increased energy prices also lead to changes in the type of energy consumed and reduced energy use [9]. The paper also contends that "slight variations in energy prices do not usually impact residential energy use. It is only possible to observe a decrease in energy demand if the price exceeds a specific threshold.

### b. Income

Energy usage in a nation is significantly impacted by economic growth [1]. A strong economy is necessary to meet people's demands and ensure efficient resource allocation. The economic system, particularly the householder's income, now determines the use of technology and, in turn, impacts the consumption of energy [17]; [18]; [19]. This is due to the increasing engagement of technology in our day-to-day lives.

### c. Household Size

The term "household size" simply refers to the population of each household. According to researchers, occupancy has the biggest impact on changes in energy consumption. Large household sizes were associated with a higher likelihood of using unclean sources of fuel for cooking, according to Ahmad et al., [19] Urban households and those with higher wealth levels were more likely to cook with clean fuel sources. According to Ali et al., [12], socio-demographic factors like income and household size that affect energy use incentives and restraints tend to be strongly linked to household energy usage.

### d. Householders' Age

In this study, the term "households' age" refers to the age of the household head. According to Chen et al., [20], householder age is one of the key determinants of the household cooking energy transition in mountainous locations.

### e. Gender Attributes

Issa [21] found that gender diversity on a board positively impacted a company's use of clean energy, drawing on the gender socialization theory and diversity theory. According to research by Kyaw et al. [22], women are more likely to favor using clean energy because they are more concerned with societal and ecological issues. This increases the reduction of carbon emissions and enhances environmental performance.

### f. Dwelling Size (Number of Rooms)

According to Wassie et al. [23], the size of a home is a significant predictor of how much is spent on energy. The overall amount of energy a house uses depends on how many rooms it has. It goes without saying that more energy is needed for space heating, cooling, and lighting the larger the floor size of a house [12].

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### g. Energy Efficient Appliances

Energy consumption in the residential sector can be parsed into five major end uses: space heating, water heating, cooking, lighting, and electric appliances. Appliances can be further broken down into refrigerators, clothes washers, dryers, dishwashers, and even TV. However, the magnitude of each end use differs from country to country. Appliance affordability and the number of a household is one of the leading causes of increases in residential energy demand [24].

### h. Weather Condition

Climate and weather zone Numerous studies have demonstrated the impact of weather variables on energy consumption, specifically on electricity demand, and the numerous human factors affecting domestic energy use [25]. When determining the effect of outdoor temperature on energy use in buildings, energy analysts utilize three quantitative indices: heating degree-days, cooling degree-days, and degree-days. Every building has a minimal energy use temperature, also known as the "balance point" for that particular building, when no heating or cooling occurs. The building is heated or cooled by each degree that it deviates from the balancing point [26].

## 2.3 Studies on Socio-economic Factors influencing Energy Conservation Behaviour

To establish a successful energy policy and forecast future power consumption, it is necessary to understand the factors that influence electricity consumption. As a result, a large body of research employing various techniques on data from various nations and groups of nations is trying to pinpoint and explain the factors that influence energy usage. Piao and Managi [7] looked into life satisfaction, energy consumption, and home energy-saving behavior. The study determined if purchasing energy-saving products at the household level can reduce greenhouse gas emissions and whether an increase in household income can encourage energy-saving behavior. A large-scale survey was carried out in 37 countries using online and in-person methods, gathering 100,956 observations. It was discovered that the wealth effect on household energy expenditure was positive across all countries, demonstrating that energy consumption rises as household wealth increases. There was a positive correlation between home energy use and life satisfaction in 27 out of 37 households, including those in China, India, the US, and Germany. Additionally, it is confirmed that energy-saving behaviors in households have positive impacts. Compared to behavior that reduces energy use, purchasing household energy-saving products minimized energy consumption expenses.

Based on data from the Pakistan Demographic and Health Survey (PDHS) 2017–18, Ahmad et al. [19] did a study on "Dirty versus clean fuel for cooking." An estimating method used was binary logistic regression. The findings indicated that households with agricultural land and livestock, as well as those with large household sizes, were more likely to use dirty sources of fuel for cooking than households with better wealth status and those living in urban areas. Additionally, households with male household heads and higher educational status were also more likely to use clean sources of fuel for cooking.

Ali et al. [12] conducted research on the key factors influencing home power use in a metropolis that is quickly expanding. By investigating relationships and their impacts on energy usage among 620 urban families in Seremban, Malaysia, this study sought to examine the important factors influencing household electricity consumption. According to the findings, the average urban household uses 648.31 kWh of power per month, and when quality of life rises, this figure rises along with monthly household income ($r = 0.360$; $p<0.01$) and the number of rooms ($r = 0.376$; $p<0.01$). Home and kitchen use took up a significant amount of the electricity, followed by cooling and lighting. According to results from multiple linear regressions, married households with high monthly incomes and large household size of three to five individuals are significant predictors of power use in Seremban. According to the study's empirical findings, the number of rooms plays the most important role in determining how much electricity is consumed. Strategies to improve energy efficiency, ensure resource sustainability, and lessen greenhouse gases' damage to the urban ecosystem are essential. To achieve the largest

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potential decrease in energy consumption in metropolitan areas, low carbon initiatives for energy conservation and technology advancement and the implementation of domestic sector laws are crucial.

Similarly, Huang [27] demonstrated that quantiles and variations over time can be used to discern the effects of demographic, socioeconomic, and housing variables on household electricity consumption in Taiwan. According to this study, higher income levels, more household members, and the presence of older individuals in the home are the primary features of those households that are larger energy consumers. Price, income, and weather conditions were identified as the three main determinants of electricity use in Spain by Blazquez et al. [28] using aggregate panel data, with weather variables having the greatest influence on consumption.

According to Ackah et al. [29], households tend to migrate from energy-intensive cooking appliances to energy-efficient ones when their income increases. In developing nations like South Africa, Ye et al. [30] showed that household income and power costs significantly determine the amount of electricity consumed. Additionally, their research revealed that households in metropolitan locations with a high appliance density consume more electricity, particularly if there are more household members and they reside in larger homes. According to [31] analysis of the factors influencing electricity use in Jordan, the GDP, urbanization, economic structure, and total water consumption are all significant and positively correlated with electricity use, while electricity prices are significant and negatively correlated with it. Ownership of an air conditioner, freezer, fan, refrigerator, and television, as well as changes in socioeconomic and building factors like income, household size, and floor space, have been shown to have a high statistical significance in Ghana and collectively account for 57% of the variance in total electricity consumption in households, according to Sakah et al. [32].

Finally, it can be said that every nation, regardless of its degree of development, has its unique set of elements that affect energy consumption. However, the assessment of earlier studies shows that there are still few studies on the socio-economic factors of energy conservation in Nigeria, making the present study crucial.

## 3.0 Methodology

The research area is the Nigerian Ondo State metropolis of Akure. It is one of the 18 local government areas in Ondo State, with its headquarters in Akure, which serves as both the state capital and the area with the highest population in the state. It is one of the six local government areas that make up the Ondo Central Senatorial District. It can be found between latitudes 7’21" and 7’50" north and longitudes 5’50" and 7’25". It has a land mass that is 331 square kilometers in size, 250 meters above sea level. The study used a structured questionnaire as part of its survey research strategy. The survey was meant to gather data on the socioeconomic aspects impacting households in certain neighborhoods in the Akure metropolis’s energy conservation behaviors. According to the Ondo State Ministry of Lands and Housing directory, there are 1,538 households in total, making up the total population. With 329 respondents representing an individual from each household in Akure Metropolis, who were chosen at random to fill the structured questionnaire provided the data on socioeconomic determinants and energy-saving behavior components. A 7-point Likert scale was used as the rating for each indicator in a construct. The Smart-PLS procedure found in [33] was used to execute the objective of the study as expressed in the equation below:

*The effect of socio-economic factors on energy conservation behaviour*

$$dECB= \alpha_0 + \alpha_1 bSEFEP + \alpha_2 bSEFI + \alpha_3 bSEFHS + \alpha_4 bSEFAH + \alpha_5 bSEFGA + \alpha_6 bSEFHO$$

$$+ \alpha_7 bSEFNR + \alpha_8 bSEFNA + \alpha_9 bSEFW + e$$

Where;

dECB is energy conservation behaviour, $\alpha_0$ is constant term, $\alpha_1$ to $\alpha_9$ are parameter coefficients, e is error term, bSEFEP is price of electricity, bSEFI is household income, bSEFHS is household size bSEFGA is gender

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attributes, bSEFAH is age of household head, bSEFHO is home ownership, bSEFNR is number of rooms, bSEFNA is number of appliances, and bSEFW is weather condition.

### 3.1 Partial least squares methods

This study used the partial least square structural equation modeling (PLS-SEM) approach to obtain adequate information from the model developed for the objective. Due to the procedure's ability to handle reflectively and formatively measured entities. To analyze the model, the study used SmartPLS version 3.3.3. The measurement model evaluation of the outer and inner models for the structural routes is part of the PLS-SEM methodology. Before any relevant conclusions about the correlations could be made, these two sequences were carried out to demonstrate that each construct's indicators are genuine and trustworthy. As a result, the study provides a report on the measurement model for each of the employed indicators and constructs.

All the categories and variables assessing socioeconomic factors and households were used in the original model. The model contained 13 constructs and 37 items or indicators but, because of low outside loadings, four items (bSEFHO5, dECBPS3, dECBSCC1 and dECBSCC2) were eliminated due to a composite reliability issue. Although, the construct dECBSCC's Cronbach Alpha (0.505) was below the cutoff point (0.7), the construct was retained since the average value extracted (AVE) was higher (0.502) than the threshold value (0.500). The factors were subsequently reduced from 37 items to 33 items and 13 constructs. The AVE evaluates convergent validity, whereas the Cronbach Alpha and composite reliability measure the internal consistency and reliability of the constructs and indicators. Each item was modeled as an indicator representing the relevant construct (Figure 1).

As a result, the study adhered to the standards set forth for the evaluation of the reflective model. These comprise of the convergent validity, discriminant validity, and internal consistency reliability. Based on the approaches suggested by Hair et al. [33] and Cronbach's alpha (CA) and Composite reliability (CR), the internal consistency of the constructs was assessed. Both CA and CR have a threshold of 0.700, according to Herath and Rao [34], with higher values denoting a higher degree of reliability. While the other validity coefficient was anticipated to be satisfactory, certain fields of study agreed that a suitable reliability range between 0.600 and 0.700 is appropriate [33].

**Table 1: Construct Reliability and Validity**

| | Cronbach's Alpha | Composite Reliability | AVE |
|---|---|---|---|
| **bSEFAH** | 0.842 | 0.894 | 0.678 |
| **bSEFEP** | 0.683 | 0.806 | 0.513 |
| **bSEFGA** | 0.741 | 0.838 | 0.569 |
| **bSEFHO** | 0.759 | 0.849 | 0.589 |
| **bSEFHS** | 0.876 | 0.915 | 0.728 |
| **Bsefi** | 0.762 | 0.847 | 0.581 |
| **bSEFNA** | 0.698 | 0.815 | 0.524 |
| **bSEFNR** | 0.770 | 0.850 | 0.587 |

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| | | | |
|---|---|---|---|
| **bSEFW** | 0.724 | 0.83 | 0.551 |
| **dECBPS** | 0.662 | 0.816 | 0.600 |
| **dECBSCC** | 0.505 | 0.751 | 0.502 |
| **dECBSCM** | 0.719 | 0.826 | 0.544 |
| **dECBSCU** | 0.703 | 0.818 | 0.531 |

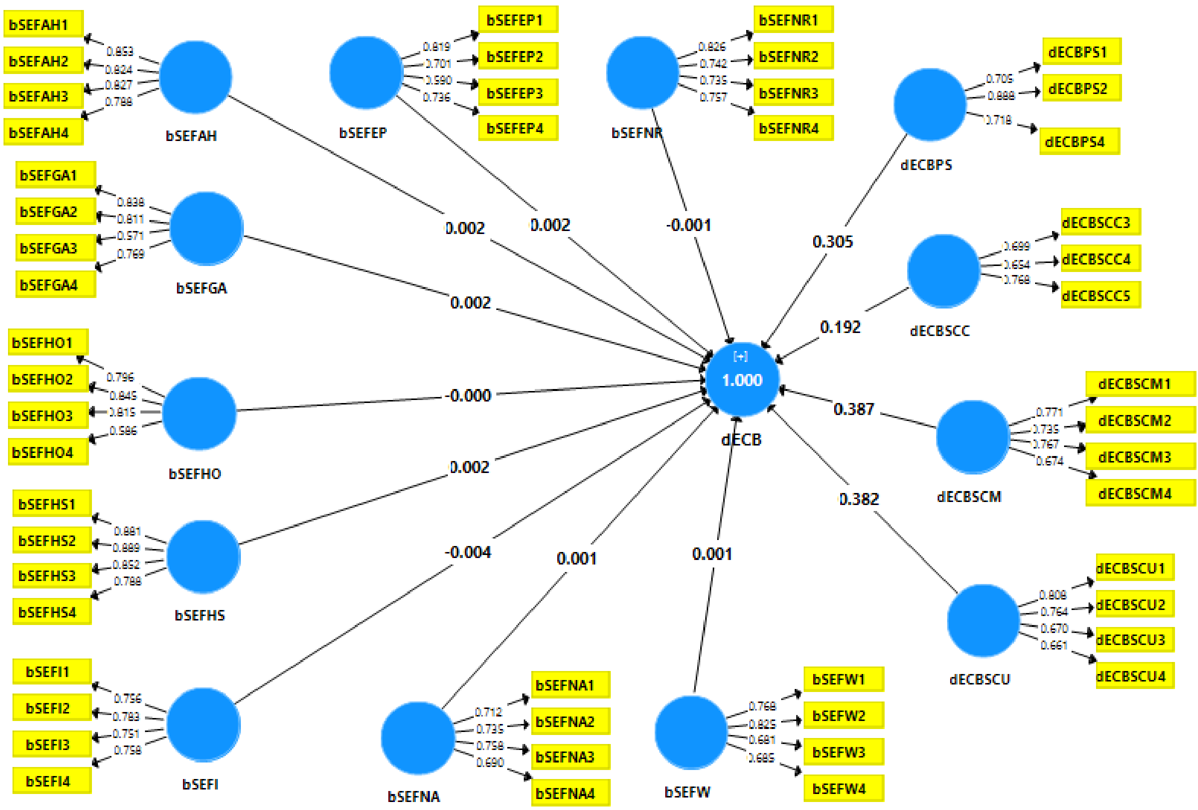


Figure 1: Measurement Model for Socio-Economic Factors and Energy Conservation Behaviour (Algorithm)

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Table 1 clearly shows that the CR values range from 0.751 to 0.915 and the CA values range from 0.505 to 0.876. The fact that these findings are above the suggested thresholds for both tests show that the constructs have no issues of reliabilities [33]. The results of the average variance extracted (AVE), a measure of convergent validity, were also provided in Table 1. The value ranged from 0.513 to 0.728, which is higher than the suggested value of 0.5 [33].

According to Hair et al. [33], discriminant validity assesses a construct's uniqueness by determining if the phenomenon it captures is distinct from other constructs in the model. This work used the Fornell-Larcker criterion and cross-loadings to evaluate discriminant validity. This was accomplished by contrasting the latent variable correlations with the square root of the AVE values. The diagonal of the correlation matrix displays the square roots of the AVE coefficients. To demonstrate discriminant validity, the squared root of each concept's AVE should be larger than its highest correlation with any other construct [33]. The study assessed the discriminant validity of the constructs based on their cross-loadings, Fornell-Larcker criterion, and the assessment of the correlation that is Heterotrait-Monotrait ratio (HTMT), which is presented in the measurement model in more detail. According to the cross-loading results, an indicator's outer loading on its latent construct (as indicated in Appendix I) needs to be more important than its cross-loadings on the other constructs in the model. There is no issue of cross-loading when the outer loadings of each indicator are larger on their respective constructs as compared to their cross-loadings on any other construct, with a minimum difference of 0.10, as indicated by Gefen and Straub [35] and Adepoju and Adeniji [34]. The Fornell-Lacker criterion is an additional method for proving the discriminant validity. It was suggested that the squared inter-construct correlation between each construct's AVE and any other reflectively assessed constructs within the structural model should be used to compare each construct's AVEs [33]. In essence, the shared variance for every model construct shouldn't be higher than their AVEs. The findings in Table 2 have shown that the AVE recommendation has been met for all constructs.

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**Table 2 Fornell-Larcker Criterion**

| | bSEFAH | bSEFEP | bSEFGA | bSEFHO | bSEFHS | bSEFI | bSEFNA | bSEFNR | bSEFW | dECBPS | dECBSCC | dECBSCM | dECBSCU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| bSEFAH | 0.823 | | | | | | | | | | | | |
| bSEFEP | 0.461 | 0.716 | | | | | | | | | | | |
| bSEFGA | 0.618 | 0.493 | 0.755 | | | | | | | | | | |
| bSEFHO | 0.190 | 0.302 | 0.276 | 0.767 | | | | | | | | | |
| bSEFHS | 0.662 | 0.567 | 0.612 | 0.245 | 0.853 | | | | | | | | |
| bSEFI | 0.248 | 0.375 | 0.224 | 0.301 | 0.229 | 0.762 | | | | | | | |
| bSEFNA | 0.375 | 0.410 | 0.399 | 0.397 | 0.490 | 0.447 | 0.724 | | | | | | |
| bSEFNR | 0.172 | 0.206 | 0.139 | 0.324 | 0.169 | 0.517 | 0.384 | 0.766 | | | | | |
| bSEFW | 0.422 | 0.376 | 0.446 | 0.417 | 0.507 | 0.396 | 0.655 | 0.372 | 0.742 | | | | |
| dECBPS | 0.436 | 0.614 | 0.453 | 0.265 | 0.565 | 0.338 | 0.438 | 0.206 | 0.447 | 0.775 | | | |
| dECBSCC | 0.338 | 0.255 | 0.268 | 0.238 | 0.249 | 0.371 | 0.321 | 0.270 | 0.398 | 0.365 | 0.709 | | |
| dECBSCM | 0.425 | 0.409 | 0.478 | 0.330 | 0.527 | 0.388 | 0.539 | 0.285 | 0.583 | 0.481 | 0.342 | 0.738 | |

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| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| dECBSCU | 0.425 | 0.394 | 0.402 | 0.352 | 0.491 | 0.465 | 0.610 | 0.336 | 0.572 | 0.541 | 0.406 | 0.593 | 0.729 |

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In light of the limitations of the AVE approach, the study then evaluated the Heterotrait-Monotrait ratio (HTMT) to ascertain the discriminant validity of the components. [36]. It was suggested that a value greater than 0.90 indicated a lack of discriminant validity. Additionally, the value 1 should not be included in the HTMT confidence interval. Table 3 demonstrates that the results has met the HTMT requirements. The assessment of the measurement model, which determines the caliber of the indicators in relation to their constructions, is the final section of the HTMT report. The study looked at the structural models, which revealed information on the study's goals. Results and discussion contained the evaluation of the structural model.

## 4.0 Results and Discussion

Only 329 of the 400 copies of the questionnaire issued as part of the study were correctly filled out and used, representing 82% completion rate. According to the respondents' demographic breakdown, men made up 55.3% of the sample, while the remaining respondents were all women. Additionally, households between the ages of 20 and 30 made up the majority of respondents (42.6%). About 28.0% of the population is between the ages of 30 and 40. Whereas, about 6.6% of respondents are over 65, and lastly, 22.8% are between the ages of 40 and 60. Accordingly, the study's representatives were more middle-aged, making them a good study sample.

In addition, the findings of respondents' family structures show that 16.7% of single respondents have no dependents, 17.0% of single respondents have dependents, 21.3% of married respondents have no dependents, and 45.0% of married respondents have dependents. This means that about 62% of the respondents require control and monitoring of their households' electricity consumption due to the associated dependents. The study comprised of 4.0% of respondents with Ph.D. degrees, followed by 16.7% Master's degree holders, 44.1% First Degree holders, 18.2% Higher National Diploma holders, 10.3% Ordinary National Diploma holders, 5.8% Senior School Leaving Certificate holders, and 0.9% Primary School Leaving Certificate holders. As a result, it can be inferred from the respondents' educational backgrounds that at least 93.3% of them held degrees from postsecondary institutions, making them appropriately educated to understand the content and context.

The results also show that 8.5% of respondents have one person living with them, 11.9% have two people living with them, 18.8% have three people living with them, 23.7% have four people living with them, 16.4% have five people living with them, 13.4% have six people living with them, 4.0% have seven people living with them, 2.7% have eight people living with them, 0.3% have nine people living with them, and 0.3% have ten people living with them. With all of these statistics, we would not be surprised to have positive relationships between socio-economic indicators and energy conservation. The results of the monthly income survey indicate that 45.6% of the respondents earn less than ₦100,000 (or $130) per month. In addition, 39.5% of respondents have monthly incomes between ₦100,000 and ₦250,000, 10.6% have incomes between ₦250,000 and ₦500,000, 3.6% have incomes between ₦500,000 and ₦1,000,000, and 0.6% have incomes over ₦1,000,000 each month. According to the Consumer News and Business Channel (CNBC) research from 2019, the monthly income findings indicate that most of the respondents are middle-income earners. The results of the respondents' monthly electricity bills also reveal that 36.8% of the respondents have monthly electricity bills under ₦5,000, 40.4% have monthly bills between ₦5,000 and ₦10,000, 11.2% have monthly bills between ₦10,000 and ₦15,000, 5.2% have monthly bills between ₦15,000 and ₦20,000, and 6.4% have monthly electricity bills over ₦20,000, according to the characteristics of the respondents.

## 4.1 Effect of Socio-economic Factors on Energy Conservation Behaviour

The relationships between socioeconomic characteristics and home energy-saving practices in Akure metropolis is discussed in this section. The structural model technique was carried out after verifying measurement quality. Collinearity, R-square or coefficient of determination, path coefficient, and f-square or effect size are all involved. First and foremost, the values of the inner VIF (Table 4) showed that for the endogenous composite variable (dECB), the values were 2.085, 1.728, 1.971, 1.329, 2.491, 1.638, 2.072, 1.487, and 2.089, respectively. Given

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that all of the latent constructs are below the cutoff value of 5, the VIF test results, which checks multicollinearity among the variables, has demonstrated that there is no problem with multicollinearity among the latent constructs [34]. The PLS-algorithm (Figure 2) and bootstrapping (Figure 3) were carried out with 5000 resamples using PLS 3.3.3 to obtain the standard path coefficient, t-statistics values, standard deviations, and p-values [33]. This was done after the VIF test for the exogenous constructions had been shown to be adequate.

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**Table 3: Heterotrait-Monotrait Ratio (HTMT)**

| | bSEFAH | bSEFEP | bSEFGA | bSEFHO | bSEFHS | bSEFI | bSEFNA | bSEFNR | bSEFW | dECBPS | dECBSCC | dECBSCM | dECBSCU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| bSEFAH | | | | | | | | | | | | | |
| bSEFEP | 0.571 | | | | | | | | | | | | |
| bSEFGA | 0.765 | 0.661 | | | | | | | | | | | |
| bSEFHO | 0.246 | 0.421 | 0.387 | | | | | | | | | | |
| bSEFHS | 0.771 | 0.698 | 0.74 | 0.286 | | | | | | | | | |
| bSEFI | 0.293 | 0.542 | 0.308 | 0.393 | 0.26 | | | | | | | | |
| bSEFNA | 0.467 | 0.573 | 0.543 | 0.554 | 0.601 | 0.62 | | | | | | | |
| bSEFNR | 0.21 | 0.335 | 0.213 | 0.414 | 0.183 | 0.669 | 0.539 | | | | | | |
| bSEFW | 0.533 | 0.519 | 0.597 | 0.573 | 0.623 | 0.53 | 0.921 | 0.484 | | | | | |
| dECBPS | 0.59 | 0.891 | 0.634 | 0.364 | 0.746 | 0.45 | 0.633 | 0.331 | 0.63 | | | | |
| dECBSCC | 0.517 | 0.421 | 0.415 | 0.369 | 0.365 | 0.582 | 0.551 | 0.402 | 0.651 | 0.605 | | | |
| dECBSCM | 0.538 | 0.569 | 0.642 | 0.453 | 0.652 | 0.515 | 0.755 | 0.378 | 0.807 | 0.686 | 0.553 | | |
| dECBSCU | 0.533 | 0.543 | 0.553 | 0.482 | 0.594 | 0.63 | z0.863 | 0.45 | 0.789 | 0.755 | 0.683 | 0.825 | |

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**Table 4: Variance Inflation Factor (Inner VIF) with Endogenous Variable (dECB)**

| Construct | VIF |
|---|---|
| **bSEFAH** | 2.085 |
| **bSEFEP** | 1.728 |
| **bSEFGA** | 1.971 |
| **bSEFHO** | 1.329 |
| **bSEFHS** | 2.491 |
| **bSEFI** | 1.638 |
| **bSEFNA** | 2.072 |
| **bSEFNR** | 1.487 |
| **bSEFW** | 2.099 |

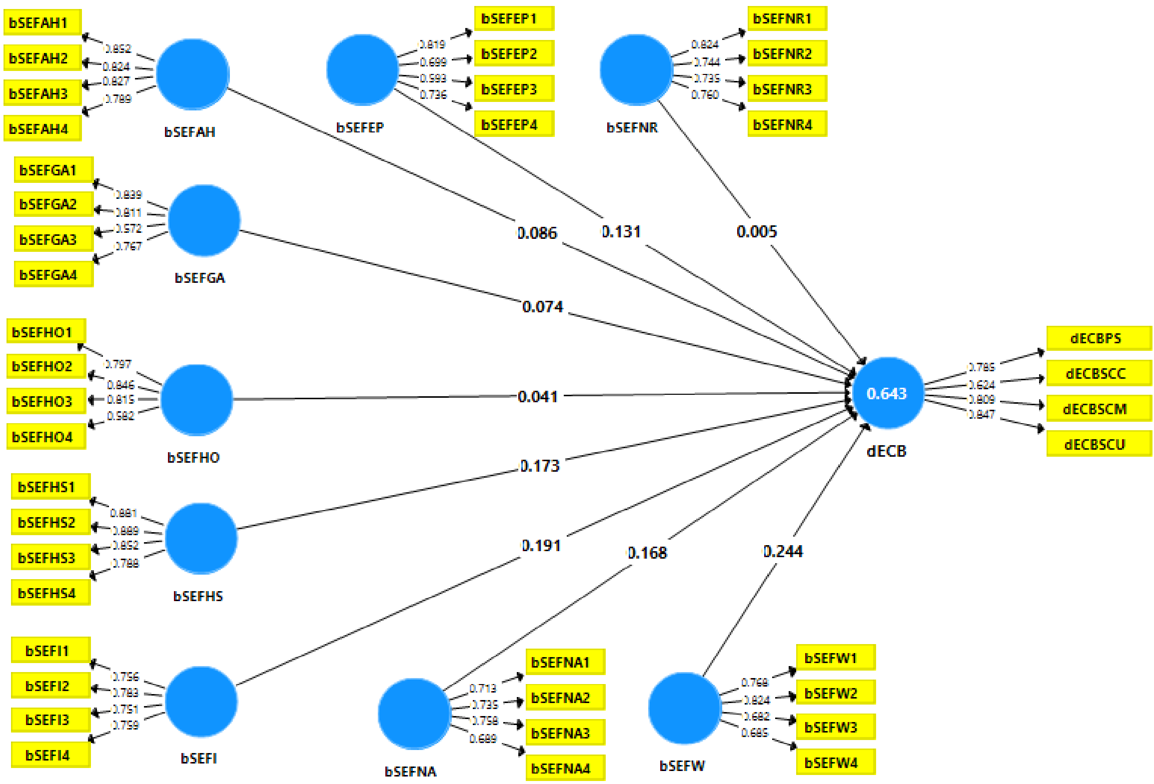


Figure 2: PLS Algorithm for Socio-economic factors and energy conservation behaviour (SM)

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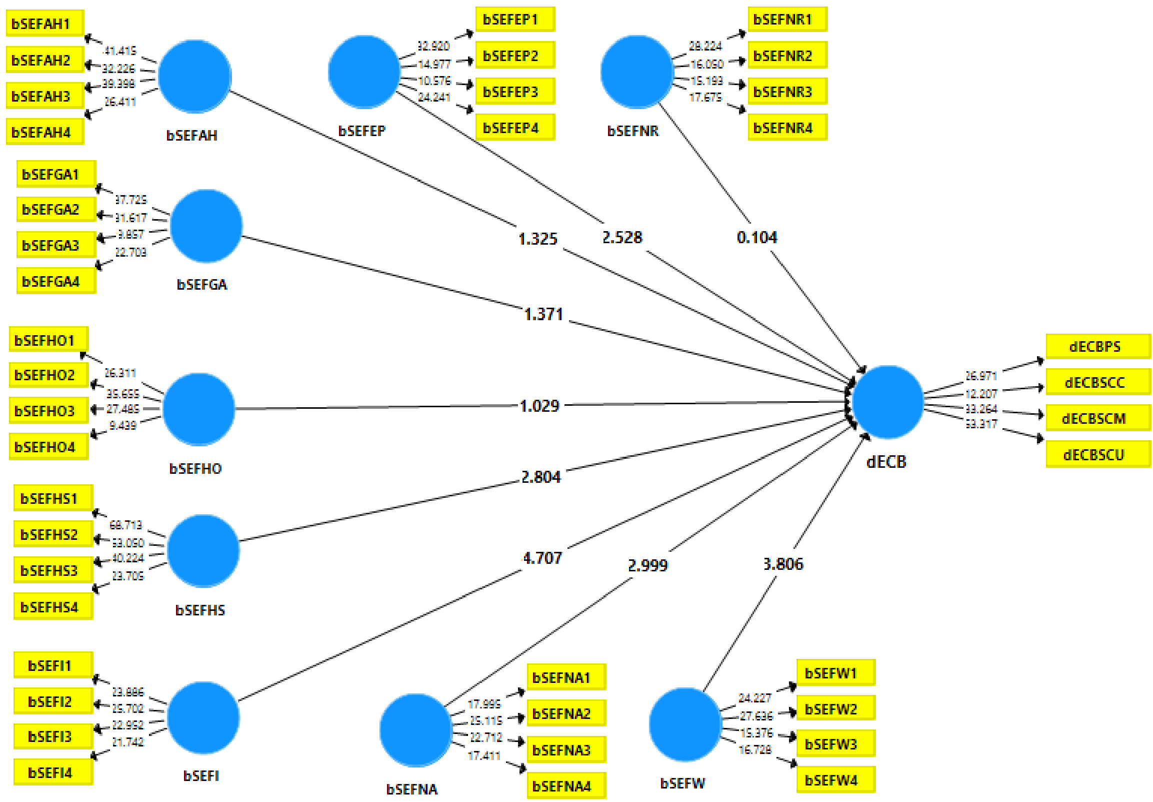


Figure 3: Bootstrapping for Socio-economic factors and energy conservation behaviour (SM)

**Table 5: Structural Path Analysis for Socio Economic Factors of Energy Conservation Behaviour**

| Paths | Beta | (STDEV) | T Statistics (\|O/STDEV\|) | 2.5% | 97.5% | P Values | Decision |
|---|---|---|---|---|---|---|---|
| bSEFAH -> dECB | 0.086 | 0.065 | 1.325 | -0.041 | 0.211 | 0.185 | Not Supported |
| bSEFEP -> dECB | 0.131 | 0.052 | 2.528 | 0.030 | 0.229 | 0.011 | Supported |
| bSEFGA -> dECB | 0.074 | 0.054 | 1.371 | -0.034 | 0.179 | 0.170 | Not supported |
| bSEFHO -> dECB | 0.041 | 0.040 | 1.029 | -0.041 | 0.116 | 0.304 | Not Supported |
| bSEFHS -> dECB | 0.173 | 0.062 | 2.804 | 0.056 | 0.296 | 0.005 | Supported |
| bSEFI -> dECB | 0.191 | 0.041 | 4.707 | 0.108 | 0.270 | 0.000 | Supported |
| bSEFNA -> dECB | 0.168 | 0.056 | 2.999 | 0.055 | 0.277 | 0.003 | Supported |
| bSEFNR -> dECB | 0.005 | 0.047 | 0.104 | -0.097 | 0.092 | 0.917 | Not Supported |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| bSEFW -> dECB | 0.244 | 0.064 | 3.806 | 0.124 | 0.378 | 0.000 | Supported |

Note: Electricity Price (denoted "bSEFEP"), Income (bSEFI), Household Size (bSEFHS), Age of Householder (bSEFAH), Gender Attributes (bSEFGA), Home Ownership (bSEFHO), Number of Rooms (bSEFNR), Number of Appliance (bSEFNA), Weather (bSEFW), Energy Conservation Behaviour (dECB)

**Table 6: $R^2$ Result of the model**

| Endogenous | R Square | R Square Adjusted |
|---|---|---|
| ECB | 0.643 | 0.633 |

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Table 5 shows the structural path analysis of the relationship between the independent variables and the dependent variable for the study. The Beta represents the coefficient of each construct, 'STDEV' shows the standard deviation, both 't Statistics' and 'P values' show the significance of the path when t-value is greater than 1.96 and P < 0.05, while both '2.5% and '97.5% represent the boundary of the confidence interval at which the 'P values' can be accepted.

The results from Table 5 and Figures 2 and 3 show positive and significant relationships with bSEFEP (beta = 0.131, t = 2.528, P<0.05), bSEFHS (beta = 0.173, t = 2.804, P< 0.05), bSEFI (beta = 0.191, t = 4.707, P< 0.05), bSEFNA (beta = 0.168, t = 2.999, P <0.05), and Additionally, Table 6 lists the coefficient determination (R-sqaure) value as 0.643 and the corrected R-sqaure value as 0.633. Based on Tehseen [37] citing Cohen [38] study, advised that R-square values of 0.26, 0.13, and 0.02 be regarded as substantial, moderate, and weak, respectively. Because the R-sqaure for this study is greater than 0.26, as stated, it can be regarded to be substantial. As a result, 64.3% of the variances in the endogenous construct (dECB) could be accounted for by the exogenous constructs (bSEFAH, bSEFEP, bSEFGA, bSEFHO, bSEFHS, bSEFI, bSEFNA, bSEFNR, and bSEFW). The effect sizes were further considered in the study. The values of the f-square or effect size 0.02, 0.15, and 0.35 are regarded as small, medium, and large or significant, respectively according to Cohen's [38] suggested thresholds. Based on the results obtained the bSEFEP, bSEFHS, bSEFI, bSEFNA, and bSEFW do not have modest effect sizes: 0.028, 0.034, 0.063, 0.038, and 0.080 respectively, according to this rule they all have small effects on the endogenous construct. In the study area, bSEFAH, bSEFGA, bSEFHO, and bSEFNR have no impact on household energy conservation behavior. The findings contrast with a study by Blazquez et al. [28] that used aggregated panel data and identified price, income, and weather conditions as Spain's main determinants of electricity usage. However, the results demonstrated that weather variables had the greatest influence on consumption.

According to the most important indicator for policy implications could be found in Table 7 by the structural path analysis' outer weights. The findings of this study's analysis suggested that bSEFI (Income) in Figure 2 has the greatest structural weight, and Table 7 demonstrates that bSEFI1 ("I put my disposable income into account when buying electricity units") demonstrates that the householders or residents in the study area have acknowledged that their income is a very important factor in their energy consumption and that an increase in earning will cause them to purchase more electricity units. Therefore, any government initiative to promote energy efficiency and conservation behavior must acknowledge that households use more electricity and conserve less of it when their income is higher. The goal of energy conservation policy should be to limit home purchases of electricity. This can be done by taxing energy use to make individuals who buy and consume more electricity pay more [39]. This would encourage improvements in energy conservation in the Nigerian household sector.

## 5.0 Conclusion

The study empirically established the link between Akure metropolis residents' energy conservation behavior and socioeconomic variables. As a result of this finding, the study came to the conclusion that there is a substantial positive and significant relationship between socio-economic factors (SEF) and energy conservation behavior (ECB), as the exogenous constructs (bSEFAH, bSEFEP, bSEFGA, bSEFHO, bSEFHS, bSEFI, bSEFNA, bSEFNR, and bSEFW) were able to explain about 64% of the variances in the endogenous construct.

According to the study's conclusions, it is advised that policies for energy conservation focus on limiting household purchases of electricity. This can be done by taxing energy consumption to make people who use more electricity pay more (OECD, 2019). This would promote energy efficiency improvements and reduce electricity carelessness in the Nigerian domestic sector.

Only areas with a regular supply of electricity for more than 10 hours per day were covered in this study, which was focused on evaluating the impact of socio-economic factors on household energy conservation behavior in the study area. Areas with frequent power outages and irregular supply were left out. Therefore, additional

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research could include regions with erratic power supply to see if their energy-saving practices are congruent with those examined in this study.

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**Table 7: Outer Weight of Indicators**

| | bSEFAH | bSEFEP | bSEFGA | bSEFHO | bSEFHS | bSEFI | bSEFNA | bSEFNR | bSEFW | dECB |
|---|---|---|---|---|---|---|---|---|---|---|
| **bSEFAH1** | 0.355 | | | | | | | | | |
| **bSEFAH2** | 0.290 | | | | | | | | | |
| **bSEFAH3** | 0.294 | | | | | | | | | |
| **bSEFAH4** | 0.273 | | | | | | | | | |
| **bSEFEP1** | | 0.409 | | | | | | | | |
| **bSEFEP2** | | 0.350 | | | | | | | | |
| **bSEFEP3** | | 0.231 | | | | | | | | |
| **bSEFEP4** | | 0.385 | | | | | | | | |
| **bSEFGA1** | | | 0.407 | | | | | | | |
| **bSEFGA2** | | | 0.317 | | | | | | | |
| **bSEFGA3** | | | 0.249 | | | | | | | |
| **bSEFGA4** | | | 0.337 | | | | | | | |
| **bSEFHO1** | | | | 0.336 | | | | | | |
| **bSEFHO2** | | | | 0.346 | | | | | | |
| **bSEFHO3** | | | | 0.355 | | | | | | |
| **bSEFHO4** | | | | 0.258 | | | | | | |
| **bSEFHS1** | | | | | 0.361 | | | | | |
| **bSEFHS2** | | | | | 0.288 | | | | | |
| **bSEFHS3** | | | | | 0.277 | | | | | |
| **bSEFHS4** | | | | | 0.241 | | | | | |
| **bSEFI1** | | | | | | 0.376 | | | | |
| **bSEFI2** | | | | | | 0.311 | | | | |
| **bSEFI3** | | | | | | 0.263 | | | | |
| **bSEFI4** | | | | | | 0.363 | | | | |
| **bSEFNA1** | | | | | | | 0.343 | | | |
| **bSEFNA2** | | | | | | | 0.385 | | | |
| **bSEFNA3** | | | | | | | 0.344 | | | |
| **bSEFNA4** | | | | | | | 0.307 | | | |
| **bSEFNR1** | | | | | | | | 0.426 | | |
| **bSEFNR2** | | | | | | | | 0.256 | | |
| **bSEFNR3** | | | | | | | | 0.274 | | |
| **bSEFNR4** | | | | | | | | 0.339 | | |
| **bSEFW1** | | | | | | | | | 0.339 | |
| **bSEFW2** | | | | | | | | | 0.348 | |
| **bSEFW3** | | | | | | | | | 0.335 | |
| **bSEFW4** | | | | | | | | | 0.329 | |
| **dECBPS** | | | | | | | | | | 0.334 |
| **dECBSCC** | | | | | | | | | | 0.235 |
| **dECBSCM** | | | | | | | | | | 0.353 |
| **dECBSCU** | | | | | | | | | | 0.361 |

Note: Electricity Price (denoted "bSEFEP"), Income (bSEFI), Household Size (bSEFHS), Age of Householder (bSEFAH), Gender Attributes (bSEFGA), Home Ownership (bSEFHO), Number of Rooms (bSEFNR), Number of Appliance (bSEFNA), Weather (bSEFW), Energy Conservation Behaviour (dECB), Price Sensitivity

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(dECBPS), Self-Control Cutting (dECBSCC), Self-Control Monitoring (dECBSCM), Self-Control Upgrading (dECBSCU)

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Appendix I

**Cross-Loading**

| | bSEFAH | bSEFEP | bSEFGA | bSEFHO | bSEFHS | bSEFI | bSEFNA | bSEFNR | bSEFW | dECB | dECBPS | dECBSCC | dECBSCM | dECBSCU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| bSEFAH1 | 0.853 | 0.477 | 0.594 | 0.272 | 0.622 | 0.289 | 0.396 | 0.179 | 0.406 | 0.509 | 0.419 | 0.281 | 0.421 | 0.419 |
| bSEFAH2 | 0.824 | 0.34 | 0.432 | 0.076 | 0.5 | 0.238 | 0.218 | 0.173 | 0.357 | 0.414 | 0.285 | 0.319 | 0.34 | 0.341 |
| bSEFAH3 | 0.827 | 0.341 | 0.526 | 0.214 | 0.523 | 0.146 | 0.326 | 0.126 | 0.349 | 0.421 | 0.346 | 0.252 | 0.374 | 0.311 |
| bSEFAH4 | 0.788 | 0.341 | 0.467 | 0.029 | 0.522 | 0.12 | 0.275 | 0.079 | 0.261 | 0.386 | 0.379 | 0.264 | 0.246 | 0.315 |
| bSEFEP1 | 0.486 | 0.819 | 0.523 | 0.214 | 0.548 | 0.274 | 0.289 | 0.139 | 0.342 | 0.457 | 0.505 | 0.225 | 0.352 | 0.315 |
| bSEFEP2 | 0.451 | 0.701 | 0.464 | 0.134 | 0.552 | 0.065 | 0.282 | -0.022 | 0.256 | 0.393 | 0.463 | 0.152 | 0.309 | 0.258 |
| bSEFEP3 | 0.118 | 0.59 | 0.159 | 0.243 | 0.152 | 0.414 | 0.223 | 0.273 | 0.167 | 0.254 | 0.269 | 0.147 | 0.188 | 0.191 |
| bSEFEP4 | 0.198 | 0.736 | 0.205 | 0.291 | 0.296 | 0.378 | 0.367 | 0.246 | 0.28 | 0.429 | 0.475 | 0.197 | 0.293 | 0.341 |
| bSEFGA1 | 0.566 | 0.435 | 0.838 | 0.178 | 0.565 | 0.186 | 0.363 | 0.134 | 0.404 | 0.488 | 0.45 | 0.283 | 0.416 | 0.342 |
| bSEFGA2 | 0.474 | 0.286 | 0.811 | 0.223 | 0.429 | 0.171 | 0.291 | 0.079 | 0.347 | 0.384 | 0.262 | 0.224 | 0.357 | 0.312 |
| bSEFGA3 | 0.329 | 0.298 | 0.571 | 0.312 | 0.25 | 0.328 | 0.258 | 0.214 | 0.22 | 0.299 | 0.23 | 0.146 | 0.213 | 0.309 |
| bSEFGA4 | 0.462 | 0.449 | 0.769 | 0.163 | 0.543 | 0.04 | 0.28 | 0.021 | 0.345 | 0.41 | 0.384 | 0.136 | 0.423 | 0.259 |
| bSEFHO1 | 0.126 | 0.242 | 0.231 | 0.796 | 0.209 | 0.279 | 0.314 | 0.271 | 0.323 | 0.306 | 0.246 | 0.17 | 0.235 | 0.282 |
| bSEFHO2 | 0.166 | 0.269 | 0.255 | 0.845 | 0.255 | 0.236 | 0.323 | 0.283 | 0.309 | 0.316 | 0.251 | 0.181 | 0.257 | 0.273 |
| bSEFHO3 | 0.144 | 0.278 | 0.198 | 0.815 | 0.189 | 0.203 | 0.308 | 0.205 | 0.315 | 0.325 | 0.216 | 0.208 | 0.267 | 0.3 |
| bSEFHO4 | 0.15 | 0.115 | 0.155 | 0.586 | 0.078 | 0.21 | 0.27 | 0.241 | 0.348 | 0.24 | 0.074 | 0.17 | 0.261 | 0.217 |
| bSEFHS1 | 0.559 | 0.497 | 0.529 | 0.283 | 0.881 | 0.274 | 0.498 | 0.242 | 0.527 | 0.64 | 0.529 | 0.283 | 0.534 | 0.559 |
| bSEFHS2 | 0.564 | 0.531 | 0.561 | 0.236 | 0.889 | 0.176 | 0.411 | 0.095 | 0.418 | 0.511 | 0.49 | 0.192 | 0.48 | 0.349 |
| bSEFHS3 | 0.556 | 0.457 | 0.491 | 0.13 | 0.852 | 0.176 | 0.367 | 0.08 | 0.411 | 0.489 | 0.492 | 0.185 | 0.385 | 0.392 |
| bSEFHS4 | 0.597 | 0.45 | 0.51 | 0.163 | 0.788 | 0.128 | 0.375 | 0.133 | 0.341 | 0.428 | 0.4 | 0.167 | 0.371 | 0.331 |
| bSEFI1 | 0.247 | 0.339 | 0.252 | 0.168 | 0.212 | 0.756 | 0.37 | 0.372 | 0.304 | 0.428 | 0.311 | 0.327 | 0.359 | 0.347 |
| bSEFI2 | 0.154 | 0.245 | 0.187 | 0.202 | 0.105 | 0.783 | 0.311 | 0.309 | 0.281 | 0.356 | 0.186 | 0.288 | 0.301 | 0.337 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| bSEFI3 | 0.114 | 0.162 | 0.045 | 0.189 | 0.072 | 0.751 | 0.309 | 0.357 | 0.288 | 0.3 | 0.187 | 0.225 | 0.248 | 0.277 |
| bSEFI4 | 0.213 | 0.354 | 0.163 | 0.346 | 0.27 | 0.758 | 0.359 | 0.517 | 0.328 | 0.414 | 0.314 | 0.276 | 0.261 | 0.434 |
| bSEFNA1 | 0.24 | 0.206 | 0.139 | 0.262 | 0.247 | 0.439 | 0.712 | 0.436 | 0.473 | 0.455 | 0.237 | 0.321 | 0.39 | 0.445 |
| bSEFNA2 | 0.443 | 0.462 | 0.456 | 0.262 | 0.571 | 0.142 | 0.735 | 0.092 | 0.48 | 0.515 | 0.441 | 0.226 | 0.45 | 0.415 |
| bSEFNA3 | 0.194 | 0.308 | 0.266 | 0.272 | 0.329 | 0.342 | 0.758 | 0.323 | 0.471 | 0.459 | 0.359 | 0.176 | 0.375 | 0.444 |
| bSEFNA4 | 0.18 | 0.179 | 0.271 | 0.365 | 0.236 | 0.404 | 0.69 | 0.289 | 0.475 | 0.412 | 0.206 | 0.206 | 0.336 | 0.47 |
| bSEFNR1 | 0.251 | 0.229 | 0.164 | 0.325 | 0.189 | 0.396 | 0.375 | 0.826 | 0.37 | 0.347 | 0.193 | 0.239 | 0.337 | 0.292 |
| bSEFNR2 | 0.011 | 0.111 | 0.065 | 0.221 | 0.059 | 0.415 | 0.218 | 0.742 | 0.244 | 0.203 | 0.126 | 0.177 | 0.135 | 0.21 |
| bSEFNR3 | 0.139 | 0.132 | 0.073 | 0.197 | 0.118 | 0.385 | 0.276 | 0.735 | 0.26 | 0.222 | 0.151 | 0.124 | 0.191 | 0.208 |
| bSEFNR4 | 0.069 | 0.127 | 0.096 | 0.219 | 0.121 | 0.405 | 0.274 | 0.757 | 0.236 | 0.269 | 0.147 | 0.264 | 0.158 | 0.298 |
| bSEFW1 | 0.351 | 0.337 | 0.38 | 0.297 | 0.425 | 0.297 | 0.513 | 0.259 | 0.768 | 0.492 | 0.354 | 0.267 | 0.458 | 0.4 |
| bSEFW2 | 0.332 | 0.283 | 0.403 | 0.3 | 0.444 | 0.263 | 0.547 | 0.235 | 0.825 | 0.504 | 0.352 | 0.303 | 0.461 | 0.411 |
| bSEFW3 | 0.286 | 0.225 | 0.28 | 0.4 | 0.262 | 0.345 | 0.448 | 0.367 | 0.681 | 0.484 | 0.304 | 0.305 | 0.38 | 0.482 |
| bSEFW4 | 0.278 | 0.269 | 0.253 | 0.239 | 0.367 | 0.27 | 0.43 | 0.243 | 0.685 | 0.475 | 0.315 | 0.305 | 0.428 | 0.403 |
| dECBPS1 | 0.201 | 0.409 | 0.218 | 0.281 | 0.215 | 0.551 | 0.412 | 0.412 | 0.402 | 0.629 | 0.705 | 0.392 | 0.38 | 0.507 |
| dECBPS1 | 0.201 | 0.409 | 0.218 | 0.281 | 0.215 | 0.551 | 0.412 | 0.412 | 0.402 | 0.629 | 0.705 | 0.392 | 0.38 | 0.507 |
| dECBPS2 | 0.429 | 0.545 | 0.463 | 0.194 | 0.602 | 0.159 | 0.368 | 0.062 | 0.38 | 0.663 | 0.888 | 0.278 | 0.42 | 0.449 |
| dECBPS2 | 0.429 | 0.545 | 0.463 | 0.194 | 0.602 | 0.159 | 0.368 | 0.062 | 0.38 | 0.663 | 0.888 | 0.278 | 0.42 | 0.449 |
| dECBPS4 | 0.398 | 0.474 | 0.375 | 0.123 | 0.51 | 0.021 | 0.205 | -0.04 | 0.229 | 0.469 | 0.718 | 0.145 | 0.3 | 0.265 |
| dECBPS4 | 0.398 | 0.474 | 0.375 | 0.123 | 0.51 | 0.021 | 0.205 | -0.04 | 0.229 | 0.469 | 0.718 | 0.145 | 0.3 | 0.265 |
| dECBSCC3 | 0.16 | 0.117 | 0.108 | 0.088 | 0.091 | 0.26 | 0.239 | 0.155 | 0.297 | 0.378 | 0.234 | 0.699 | 0.171 | 0.281 |
| dECBSCC3 | 0.16 | 0.117 | 0.108 | 0.088 | 0.091 | 0.26 | 0.239 | 0.155 | 0.297 | 0.378 | 0.234 | 0.699 | 0.171 | 0.281 |
| dECBSCC4 | 0.299 | 0.21 | 0.18 | 0.123 | 0.289 | 0.2 | 0.154 | 0.082 | 0.189 | 0.396 | 0.251 | 0.654 | 0.212 | 0.291 |
| dECBSCC4 | 0.299 | 0.21 | 0.18 | 0.123 | 0.289 | 0.2 | 0.154 | 0.082 | 0.189 | 0.396 | 0.251 | 0.654 | 0.212 | 0.291 |
| dECBSCC5 | 0.256 | 0.208 | 0.265 | 0.271 | 0.153 | 0.322 | 0.281 | 0.314 | 0.35 | 0.475 | 0.287 | 0.768 | 0.328 | 0.292 |
| dECBSCC5 | 0.256 | 0.208 | 0.265 | 0.271 | 0.153 | 0.322 | 0.281 | 0.314 | 0.35 | 0.475 | 0.287 | 0.768 | 0.328 | 0.292 |

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| dECBSCM1 | 0.204 | 0.27 | 0.248 | 0.282 | 0.274 | 0.493 | 0.408 | 0.401 | 0.448 | 0.637 | 0.343 | 0.359 | 0.771 | 0.437 |
| dECBSCM1 | 0.204 | 0.27 | 0.248 | 0.282 | 0.274 | 0.493 | 0.408 | 0.401 | 0.448 | 0.637 | 0.343 | 0.359 | 0.771 | 0.437 |
| dECBSCM2 | 0.218 | 0.233 | 0.279 | 0.263 | 0.269 | 0.361 | 0.351 | 0.219 | 0.389 | 0.579 | 0.286 | 0.267 | 0.735 | 0.414 |
| dECBSCM2 | 0.218 | 0.233 | 0.279 | 0.263 | 0.269 | 0.361 | 0.351 | 0.219 | 0.389 | 0.579 | 0.286 | 0.267 | 0.735 | 0.414 |
| dECBSCM3 | 0.469 | 0.379 | 0.529 | 0.199 | 0.536 | 0.159 | 0.403 | 0.041 | 0.484 | 0.625 | 0.438 | 0.193 | 0.767 | 0.393 |
| dECBSCM3 | 0.469 | 0.379 | 0.529 | 0.199 | 0.536 | 0.159 | 0.403 | 0.041 | 0.484 | 0.625 | 0.438 | 0.193 | 0.767 | 0.393 |
| dECBSCM4 | 0.361 | 0.32 | 0.351 | 0.23 | 0.472 | 0.128 | 0.426 | 0.175 | 0.395 | 0.6 | 0.346 | 0.187 | 0.674 | 0.507 |
| dECBSCM4 | 0.361 | 0.32 | 0.351 | 0.23 | 0.472 | 0.128 | 0.426 | 0.175 | 0.395 | 0.6 | 0.346 | 0.187 | 0.674 | 0.507 |
| dECBSCU1 | 0.268 | 0.201 | 0.25 | 0.271 | 0.268 | 0.461 | 0.52 | 0.406 | 0.482 | 0.649 | 0.361 | 0.286 | 0.451 | 0.808 |
| dECBSCU1 | 0.268 | 0.201 | 0.25 | 0.271 | 0.268 | 0.461 | 0.52 | 0.406 | 0.482 | 0.649 | 0.361 | 0.286 | 0.451 | 0.808 |
| dECBSCU2 | 0.29 | 0.269 | 0.261 | 0.249 | 0.322 | 0.382 | 0.505 | 0.291 | 0.459 | 0.638 | 0.391 | 0.306 | 0.434 | 0.764 |
| dECBSCU2 | 0.29 | 0.269 | 0.261 | 0.249 | 0.322 | 0.382 | 0.505 | 0.291 | 0.459 | 0.638 | 0.391 | 0.306 | 0.434 | 0.764 |
| dECBSCU3 | 0.458 | 0.486 | 0.443 | 0.255 | 0.576 | 0.174 | 0.415 | 0.072 | 0.43 | 0.675 | 0.537 | 0.293 | 0.496 | 0.67 |
| dECBSCU3 | 0.458 | 0.486 | 0.443 | 0.255 | 0.576 | 0.174 | 0.415 | 0.072 | 0.43 | 0.675 | 0.537 | 0.293 | 0.496 | 0.67 |
| dECBSCU4 | 0.191 | 0.158 | 0.19 | 0.25 | 0.227 | 0.35 | 0.312 | 0.212 | 0.265 | 0.508 | 0.253 | 0.299 | 0.323 | 0.661 |
| dECBSCU4 | 0.191 | 0.158 | 0.19 | 0.25 | 0.227 | 0.35 | 0.312 | 0.212 | 0.265 | 0.508 | 0.253 | 0.299 | 0.323 | 0.661 |