

# BEYOND AGE: HEALTH CAPACITY, ISLAMIC WORK ETHICS AND PRODUCTIVITY AMONG OLDER MALAYSIAN WORKERS

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**Abstract.** Population ageing has become a significant demographic challenge in Malaysia, raising concerns about labour market sustainability and workforce productivity. This study examines the determinants of Self-Perceived Productivity (SP) among Malaysian workers aged 50 years and above, focusing on Perceived Health and Work Capacity (PH), Islamic Work Ethics (IW), age, gender, and employment sector. Data were collected through an online survey of 61 respondents and analysed using binary logistic regression, with Ordinary Least Squares (OLS) regression employed as a robustness check. The findings indicate that PH and IW are significant determinants of self-perceived productivity. Workers with better health and work capacity were more likely to perceive themselves as productive, highlighting the importance of health as a component of human capital. Likewise, stronger adherence to Islamic values such as responsibility, diligence, trustworthiness, and commitment to excellence positively influenced productivity perceptions. In contrast, age and gender were not significant predictors, suggesting that productivity is shaped more by health and motivational factors than by chronological age. The service sector was also associated with higher productivity perceptions. OLS results confirmed the robustness of these findings. The study highlights the importance of promoting healthy ageing, age-friendly workplaces, lifelong learning, and positive work values to sustain productivity among older workers and support Malaysia's long-term economic resilience.

**Keywords:** *ageing workers, self-perceived productivity, perceived health and work capacity, Islamic work ethics, Malaysia*

## Introduction

Malaysia is currently undergoing a significant demographic transition characterized by declining fertility rates and increasing longevity. The country's total fertility rate declined from 4.9 children per woman in 1970 to 1.7 in 2020, falling below the replacement level of 2.1 children per woman. At the same time, the proportion of the population aged 65 years and above exceeded 7% in 2020, officially placing Malaysia in the category of an ageing society. The World Bank projects that this proportion will increase to approximately 14% by 2044 and exceed 20% by 2056, making Malaysia a super-aged society within a relatively short period of time (World Bank, 2020). Such demographic changes are expected to alter labour market dynamics and increase the proportion of older workers within the workforce. As the workforce ages, concerns regarding productivity become increasingly important. Although older workers possess valuable experience, tacit knowledge, and professional expertise, age-related changes in physical and cognitive functioning may influence their ability to perform work-related tasks effectively. Previous studies suggest that health status is among the most important determinants of labour productivity because poor health can reduce work capacity, increase absenteeism, and impair job performance (Ng, 2020; Bloom et al.,

2010). Consequently, workers' perceptions of their health and work capacity may significantly influence how productive they perceive themselves to be in the workplace.

In Malaysia, the need to understand productivity among older workers is becoming more pressing as the labour force continues to age. The World Bank estimates that population ageing and the shrinking relative size of the working-age population could account for approximately one-third of the decline in Malaysia's GDP growth by 2050 if appropriate policy interventions are not implemented. Therefore, identifying factors that contribute to sustained productivity among older workers is critical for maintaining economic competitiveness and ensuring labour market sustainability. Beyond health-related factors, productivity is also shaped by behavioural and motivational characteristics. One factor that has received growing attention in management and organizational research is Islamic Work Ethics (IWE). Rooted in the Qur'an and Sunnah, Islamic Work Ethics emphasize values such as amanah (trustworthiness), ihsan (excellence), diligence, responsibility, cooperation, and commitment to societal welfare. Unlike conventional perspectives that view work primarily as an economic activity, Islam regards work as a form of ibadah (worship) and encourages individuals to perform their duties with sincerity and excellence. Empirical studies have shown that Islamic Work Ethics are positively associated with organizational commitment, job satisfaction, employee engagement, and work performance (Rokhman, 2010; Ali and Al-Owaidan, 2008). Furthermore, demographic and occupational characteristics may also influence productivity outcomes. Previous studies have found that age, gender, and sector of employment can affect workers' productivity through differences in work demands, health conditions, access to resources, and employment opportunities (Ng, 2020; Bloom et al., 2003). For example, workers in physically demanding sectors such as manufacturing, agriculture, and construction may experience different productivity challenges compared to those employed in service-oriented occupations. Understanding these variations is essential for designing targeted policies aimed at promoting productive ageing and extending workforce participation among older adults.

Malaysia's rapidly ageing population presents significant challenges for labour market sustainability and economic growth. While considerable attention has been given to labour force participation rates, retirement patterns, and the macroeconomic consequences of population ageing, relatively little is known about the determinants of productivity among ageing workers themselves. Existing evidence indicates that health-related limitations can adversely affect work performance and productivity, yet empirical studies examining workers' perceived health and work capacity as determinants of productivity remain limited, particularly in the Malaysian context. In addition, although Islamic Work Ethics have been widely examined in organizational behaviour and human resource management literature, their contribution to productivity among ageing workers has received relatively little scholarly attention. This is a notable omission given Malaysia's Muslim-majority population and the central role that religious values may play in shaping attitudes towards work, responsibility, and continued economic participation in later life. Moreover, productivity outcomes may differ according to workers' age groups, gender, and sectors of employment. However, previous studies have rarely examined these demographic and occupational factors simultaneously within a single analytical framework. As a result, policymakers lack comprehensive evidence regarding the factors that influence productivity among ageing workers and how these factors may vary across different segments of the labour force.

Several important gaps remain in the literature on workforce ageing and productivity. First, much of the existing research has focused on macroeconomic consequences of population ageing, including labour force participation, retirement behaviour, and economic growth, while relatively fewer studies have investigated productivity at the individual worker level. Consequently, there remains limited understanding of how workers perceive their own productivity and the factors influencing these perceptions. Second, although health is widely recognised as a determinant of labour productivity, most studies rely on objective health indicators or general measures of health status. Limited research has specifically examined the influence of Perceived Health and Work Capacity (PH) on Self-Perceived Productivity (SP), particularly among ageing workers. Third, while Islamic Work Ethics have been linked to various positive workplace outcomes such as job satisfaction, organizational commitment, and employee performance, empirical evidence examining their direct influence on productivity remains scarce. This gap is especially evident in studies involving older workers and ageing labour forces. Fourth, few studies have simultaneously examined health-related factors, ethical values, and demographic characteristics within a unified framework. Specifically, the combined effects of Perceived Health and Work Capacity, Islamic Work Ethics, age group, gender, and sector of employment on Self-Perceived Productivity remain underexplored in the Malaysian context. To address these gaps, this study aims to evaluate the determinants of Self-Perceived Productivity among ageing workers in Malaysia. Specifically, the study seeks to examine the influence of Perceived Health and Work Capacity, Islamic Work Ethics, age group, gender, and sector of employment on workers' Self-Perceived Productivity. The findings are expected to contribute to the development of evidence-based labour market policies and workplace strategies that promote healthy, productive, and dignified ageing while supporting sustainable economic development in Malaysia.

### ***Literature review***

Population aging has become a major labour market concern globally, particularly in developing countries experiencing demographic transition. Malaysia is expected to become an aged nation by 2044, with individuals aged 65 years and above projected to constitute approximately 14–15% of the population (World Bank, 2020). This demographic shift is expected to influence labour force composition, productivity, and economic sustainability. Existing studies suggest that workforce aging may affect productivity differently depending on workers' health conditions, job demands, and employment sectors. Bloom et al. (2010) argued that aging populations may reduce labour productivity through declining labour force participation and deteriorating health conditions among older workers. Similarly, Ng (2020) highlighted that physically demanding sectors such as manufacturing, construction, and agriculture are particularly vulnerable to productivity decline among older workers due to age-related physical limitations. In the Malaysian context, Murthy et al. (2019) examined aging workers' participation and productivity in the labour market and found that health status significantly influenced older workers' intention to remain productive and economically active. Their findings indicated that healthier workers were more likely to continue working beyond retirement age, suggesting that work capacity plays an important role in sustaining productivity among aging employees. More recently, Mansor et al. (2024) investigated the health capacity of older Malaysians to remain in employment. The study revealed that many older Malaysians still possess substantial work capacity

beyond retirement age, particularly those with better health conditions. The authors concluded that health capacity is a critical determinant of productive aging and labour force sustainability in Malaysia.

Health has consistently been identified as an important determinant of employee productivity. Workers experiencing chronic illness, fatigue, or reduced physical functioning are generally more likely to experience lower work performance, absenteeism, and reduced productivity. According to Bloom et al. (2010), deteriorating health among older workers can negatively affect labour productivity and economic output. Rather than relying solely on objective medical indicators, recent research increasingly emphasizes perceived health and work capacity as important predictors of productivity outcomes. Perceived Health and Work Capacity refer to employees' self-assessment of their physical and mental ability to meet job demands. Workers who perceive themselves as healthy and capable are generally more confident, motivated, and productive at work. Mansor et al. (2024) found that health capacity strongly influences older workers' ability and willingness to continue participating in the labour market. Similarly, Ismail et al. (2025) demonstrated that cognitive workload and ergonomic stress significantly influence work efficiency among older employees. Their findings suggest that workers' perceived ability to cope with work demands affects productivity outcomes and workplace performance. These findings support the argument that Perceived Health and Work Capacity (PH) is likely to have a significant positive influence on Self-Perceived Productivity (SP), particularly among aging workers. Islamic Work Ethics (IWE) originates from Islamic teachings derived from the Qur'an and Sunnah, emphasizing values such as honesty, diligence, responsibility, cooperation, trustworthiness (amanah), and excellence (ihsan). Islam views work not merely as an economic activity but as a form of worship (ibadah) and contribution to societal welfare. The earliest scholars to conceptualize and measure Islamic Work Ethics empirically. He argued that individuals with stronger Islamic ethical values tend to demonstrate greater commitment, discipline, and dedication in the workplace. Subsequently, Ali and Al-Owaihan (2008) reviewed the literature on IWE and concluded that Islamic ethical principles positively influence organizational outcomes, including work commitment and employee behaviour. Empirical studies further support the positive relationship between Islamic Work Ethics and productivity-related outcomes. Zahrah et al. (2016) found that Islamic Work Ethics significantly improved job performance among employees in Malaysian higher education institutions. Similarly, Rokhman (2010) demonstrated that Islamic Work Ethics positively influenced job satisfaction, organizational commitment, and employee performance.

More recent studies also indicate that IWE contributes to employee engagement and workplace excellence. Azman et al. (2022) found that Islamic Work Ethics positively affected work engagement through psychological capital and quality of work life. Likewise, Hartini et al. (2025) showed that Islamic Work Ethics significantly enhanced task performance and contextual performance among Malaysian public sector employees. These findings suggest that workers with stronger Islamic ethical values may perceive themselves as more productive due to higher motivation, discipline, and commitment toward work responsibilities. Demographic characteristics such as age group, gender, and sector of employment may also influence productivity outcomes. Previous studies indicate that productivity may vary across age groups due to differences in physical strength, cognitive adaptability, and work experience. While older workers often possess valuable experience and tacit knowledge, age-related health

decline may reduce productivity in physically intensive occupations (Ng, 2020). Gender differences in productivity have also been documented in previous research. Azmi (2008) found that gender and demographic characteristics significantly influenced work productivity among Muslim lecturers in Malaysia. Differences in work-life responsibilities, occupational roles, and workplace opportunities may contribute to varying productivity perceptions between male and female workers. Sector of employment is another important determinant because different sectors impose different physical and cognitive demands. Workers employed in physically demanding sectors such as manufacturing, construction, and agriculture may experience greater productivity challenges compared to workers in education or service-oriented industries (Ng, 2020). Therefore, age group, gender, and sector of employment are important control variables in explaining variations in Self-Perceived Productivity among aging workers.

### ***Theoretical framework***

This study is primarily underpinned by the Human Capital Theory developed by Becker (1964) and complemented by Islamic Work Ethics Theory was introduced. Human Capital Theory posits that individuals' productivity and economic value are influenced by their knowledge, skills, health, and work capacity. According to Becker (1964), health is an important component of human capital because healthier individuals are generally more productive and capable of sustaining economic participation over time. Within the context of this study, Perceived Health and Work Capacity (PH) represents an important dimension of human capital. Workers who perceive themselves as physically and mentally capable of performing job tasks are expected to demonstrate higher levels of Self-Perceived Productivity (SP). Conversely, deteriorating health and declining work capacity may reduce workers' productivity perceptions and overall job performance. The theory also supports the inclusion of demographic variables such as age group, gender, and sector of employment, as these characteristics may influence the accumulation and utilization of human capital differently across workers. Islamic Work Ethics Theory proposed explaining how Islamic ethical values shape individuals' attitudes and behaviour in the workplace. The theory emphasizes that work is considered a religious obligation and a form of worship (ibadah). Core ethical principles such as honesty, responsibility, cooperation, hard work, and excellence are expected to motivate employees to perform their duties sincerely and productively. From this perspective, workers with stronger Islamic Work Ethics are likely to demonstrate greater work commitment, self-discipline, and motivation, which may contribute positively to Self-Perceived Productivity. Therefore, Islamic Work Ethics (IW) is expected to function as an important behavioural and motivational determinant of productivity among aging workers.

### ***Conceptual framework***

This study proposes that Self-Perceived Productivity (SP) among aging workers is influenced by workers' perceived health condition, work capacity, Islamic ethical orientation, and demographic characteristics. The framework positions Perceived Health and Work Capacity (PH) and Islamic Work Ethics (IW) as the main explanatory variables affecting productivity perceptions among older workers. Workers who perceive themselves as physically and mentally capable of performing work tasks are

expected to report higher levels of productivity. Similarly, individuals with stronger Islamic Work Ethics, reflected through values such as responsibility, discipline, sincerity, and commitment to work, are also expected to demonstrate higher self-perceived productivity levels. In addition, the framework incorporates age group, gender, and sector of employment as control variables that may influence productivity outcomes. Productivity perceptions may vary across age categories due to differences in health and work experience, while gender and sectoral differences may reflect variations in job demands and workplace conditions. Based on these relationships, the study applies a logit regression model to examine the influence of Perceived Health and Work Capacity, Islamic Work Ethics, age group, gender, and sector of employment on the likelihood of higher Self-Perceived Productivity among aging workers in Malaysia.

## Materials and Methods

This study adopts a quantitative research approach to examine the determinants of Self-Perceived Productivity among aging workers in Malaysia. Primary data were collected through an online survey using a structured questionnaire developed in Google Forms. The survey targeted Malaysian workers aged 50 years and above across various employment sectors. A total of 61 usable responses were successfully collected and analysed. The online approach was chosen due to its efficiency in reaching respondents from different geographical locations and employment backgrounds within a limited timeframe and cost. The study employed a non-probability convenience sampling method. Respondents were selected based on accessibility and willingness to participate in the survey. The Google Form link was distributed through online platforms such as WhatsApp, email, and social media networks to reach aging workers across Malaysia. Convenience sampling is considered appropriate for exploratory studies and preliminary empirical investigations, particularly when the target population is difficult to access comprehensively and when time and resource constraints are present (Sekaran and Bougie, 2016). Participation in the survey was voluntary, and respondents were informed that all information provided would remain confidential and used solely for academic purposes. The questionnaire consisted of several sections measuring the study variables. Self-Perceived Productivity (SP), Perceived Health and Work Capacity (PH), and Islamic Work Ethics (IW) were measured using five-point Likert scales ranging from 1 (“Strongly Disagree”) to 5 (“Strongly Agree”). Demographic information including age group, gender, and sector of employment was also collected. The average scores of the SP, PH, and IW items were computed to represent each construct in the analysis.

To analyze the determinants of Self-Perceived Productivity, the study applies a binary logit regression model. The binary logit model is appropriate because the dependent variable was transformed into a binary outcome representing higher and lower levels of Self-Perceived Productivity. Logistic regression is widely used when the dependent variable is dichotomous because it estimates the probability of an event occurring while ensuring that predicted probabilities remain between 0 and 1 (Gujarati and Porter, 2009). Compared to ordinary least squares (OLS) regression, the logit model is more suitable for binary outcomes because it does not violate assumptions related to normality and heteroscedasticity. The binary logit regression model used in this study is specified as follows:

$$L = \ln \left[ \frac{P_i}{1 - P_i} \right] = \beta_0 + \sum_{i=1}^n \beta_i (X_i) + \varepsilon_i \quad \text{Eq. (1)}$$

where  $L_i$  is a dummy variable with value of 0 or 1 for variable Self-Perceived Productivity (SP);  $L_i = 0$  if average response to items for construct Self-Perceived Productivity (SP) is scale 1 or 2, and  $L_i = 1$  if average response to the items is scale 3, 4 and 5;  $P_i$  represents the probability that respondent  $i$  reports higher Self-Perceived Productivity;  $X_i$  refers to the independent variables, namely Perceived Health and Work Capacity ( $PH_i$ ), Islamic Work Ethics ( $IW_i$ ), age group category ( $AGE_i$ ), gender ( $GENDER_i$ ), and sector of employment ( $SECTOR_i$ );  $\beta_i$  are the estimated coefficients of the regressors, and  $\varepsilon_i$  is the error term. In the model (Eq. (1), if we take the antilog of the  $j$ th slope coefficients ( $\beta$ 's), subtract one from it, and multiply the result by 100, we will obtain the percent change in the odds for a unit increase in the  $j$ th regressor. The percentage change could be interpreted as probability that the respondents report higher SP will change (increase or decrease) due to a unit increase in independent variables and other controlled variables. It is also important to note that the  $R^2$  is a poor measure of fit for the linear and nonlinear probability model. Therefore, the study uses another measure of fit for this model of binary dependent variable, namely "fraction correctly predicted". Besides, Pearson  $\chi^2$ -type tests of goodness-of-fit were also conducted (Table 1).

**Table 1.** Description of variables.

| Variable                                | Description                                                                        | Measurement                                                                                                                                                                                                                            |
|-----------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Self-Perceived Productivity (SP)        | Respondents' perceived level of productivity and work performance                  | Original measurement: Average score based on 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree)<br>Transformed to <i>dummy variable</i> : 1= average score between/and 3 to 5 and 0 = average score between/and 1 to 2 |
| Perceived Health and Work Capacity (PH) | Respondents' perception of their physical and mental ability to perform work tasks | Average score based on 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree)                                                                                                                                              |
| Islamic Work Ethics (IW)                | Respondents' level of adherence to Islamic ethical values in work practices        | Average score based on 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree)                                                                                                                                              |
| Age Group                               | Respondents' age category                                                          | 50–54, 55–59, 60–64, 65–69, 70 and above (categorical)                                                                                                                                                                                 |
| Gender                                  | Respondents' gender                                                                | Male = 1, Female = 0 (dummy)                                                                                                                                                                                                           |
| Sector of Employment                    | Respondents' employment sector                                                     | Agriculture, Manufacturing, Construction, Services, Quaternary Sector, Informal Sector, Others (categorical)                                                                                                                           |

## Results and Discussion

A total of 61 valid responses were obtained from ageing workers aged 50 years and above. The demographic characteristics of the respondents are presented in Table 2. The findings indicate that the majority of respondents were male, accounting for 80.3% (49 respondents), while females represented only 19.7% (12 respondents). This gender distribution suggests that male workers were more represented in the sample, which may reflect the labour force composition among older workers who remain economically active. In terms of educational attainment, the respondents were generally highly educated. Nearly half of the respondents (47.5%) possessed postgraduate qualifications, followed by 27.9% holding bachelor's degrees. Respondents with diploma, STPM, or certificate qualifications constituted 13.1%, while 11.5% had completed secondary education. No respondents reported having only primary school

education. These findings indicate that the sample largely consisted of individuals with relatively high levels of human capital, which may positively influence their work productivity and employability in later life. Regarding age distribution, most respondents were concentrated in the younger segment of the ageing workforce. Workers aged 50–54 years represented the largest group at 57.4%, followed by those aged 55–59 years at 26.2%. Respondents aged 60–64 years accounted for 9.8%, while those aged 65–69 years and 70 years and above each represented 3.3% of the sample. This distribution suggests that the majority of respondents were approaching retirement age but remained actively engaged in employment.

**Table 2.** *Demographic profile of respondents (N = 61).*

| Category                                                                     | Frequency | Percentage |
|------------------------------------------------------------------------------|-----------|------------|
| Gender                                                                       |           |            |
| Male                                                                         | 49        | 80.3       |
| Female                                                                       | 12        | 19.7       |
| Educational Level                                                            |           |            |
| Primary school                                                               | 0         | 0.0        |
| Secondary school                                                             | 7         | 11.5       |
| Diploma/STPM/Certificate                                                     | 8         | 13.1       |
| Bachelor's degree                                                            | 17        | 27.9       |
| Postgraduate                                                                 | 29        | 47.5       |
| Age                                                                          |           |            |
| 50–54 years old                                                              | 35        | 57.4       |
| 55–59 years old                                                              | 16        | 26.2       |
| 60–64 years old                                                              | 6         | 9.8        |
| 65–69 years old                                                              | 2         | 3.3        |
| 70 years old and above                                                       | 2         | 3.3        |
| Sector of Employment                                                         |           |            |
| Agriculture                                                                  | 0         | 0.0        |
| Manufacturing                                                                | 2         | 3.3        |
| Construction                                                                 | 2         | 3.3        |
| Services                                                                     | 43        | 70.5       |
| Quaternary Sector (Knowledge & Research-based)                               | 13        | 21.3       |
| Informal Sector (e.g., street vendors, freelance work, and gig economy jobs) | 1         | 1.6        |
| Current Employment Status                                                    |           |            |
| Full-time                                                                    | 47        | 77.0       |
| Part-time                                                                    | 3         | 4.9        |
| Self-employed                                                                | 4         | 6.6        |
| Contract-based                                                               | 7         | 11.5       |
| Years of Work Experience                                                     |           |            |
| Less than 10 years                                                           | 1         | 1.6        |
| 10–20 years                                                                  | 6         | 9.8        |
| 21–30 years                                                                  | 29        | 47.5       |
| More than 30 years                                                           | 25        | 41.0       |

The sectoral distribution reveals that the service sector dominated the sample, accounting for 70.5% of respondents. This was followed by the quaternary sector, which includes knowledge- and research-based activities, at 21.3%. Only a small proportion of respondents were employed in manufacturing (3.3%), construction (3.3%), and the informal sector (1.6%), while none were employed in agriculture. The concentration of respondents in service-oriented and knowledge-intensive sectors may indicate that many ageing workers continue to participate in occupations that rely more on experience, expertise, and cognitive skills rather than physical labour. With respect to employment status, the majority of respondents (77.0%) were employed on a full-time basis. Contract-based employment accounted for 11.5% of respondents, while 6.6% were self-employed and 4.9% worked part-time. These findings suggest that most respondents maintained stable employment arrangements despite being in the older age categories. Analysis of work experience shows that the respondents possessed substantial employment experience. Almost half of the sample (47.5%) reported having

between 21 and 30 years of work experience, while 41.0% had accumulated more than 30 years of experience. Only 9.8% reported between 10 and 20 years of experience, and a very small proportion (1.6%) had less than 10 years of work experience. These finding highlights that the respondents were highly experienced workers who had accumulated considerable knowledge and skills throughout their careers. Such extensive work experience may contribute positively to productivity through accumulated expertise and tacit knowledge. Overall, the demographic profile indicates that the sample consisted predominantly of highly educated, experienced, male ageing workers employed mainly in the service and knowledge-based sectors. The majority remained engaged in full-time employment and was concentrated in the younger ageing categories (50–59 years old). These characteristics suggest that the respondents possessed substantial human capital and labour market experience, factors that may influence their perceived productivity, health capacity, and work ethic.

### **Logistic regression results and robustness analysis**

Table 3 presents the binary logistic regression estimates examining the determinants of Self-Perceived Productivity (SP) among ageing workers in Malaysia. Four model specifications were estimated to assess the robustness of the findings. Model 1 includes all explanatory variables, while Models 2–4 progressively examine the contribution of individual explanatory variables. Overall, the models demonstrate satisfactory goodness-of-fit, as indicated by significant Omnibus Chi-square statistics and acceptable Hosmer-Lemeshow test results, suggesting that the estimated models fit the data reasonably well. Furthermore, the percentage of correctly classified observations ranges from 90.2% to 93.4%, indicating strong predictive performance.

**Table 3. Logistic regression results.**

| DV vs IV                           | (1)                |       | (2)               |       | (3)               |      | (4)              |      |
|------------------------------------|--------------------|-------|-------------------|-------|-------------------|------|------------------|------|
|                                    | B                  | EB    | B                 | EB    | B                 | EB   | B                | EB   |
| Constant                           | -13.51**<br>(6.27) | 0.00  | -9.13**<br>(3.73) | 0.00  | -7.95**<br>(4.01) | 0.00 | -6.84<br>(4.38)  | 0.00 |
| AvePH                              | 2.14<br>(1.30)     | 8.52  | 2.73***<br>(1.00) | 15.29 | -                 | -    | 0.71<br>(1.05)   | 2.02 |
| AveIW                              | 1.57<br>(0.98)     | 4.79  | -                 | -     | 2.11**<br>(0.92)  | 8.26 | 1.59**<br>(0.83) | 4.89 |
| Dummy GENDER                       | 4.20<br>(4.96)     | 66.79 | 2.51<br>(2.14)    | 12.25 | 1.95<br>(2.68)    | 7.06 | -                | -    |
| Dummy AGE_MORE60                   | 19.74<br>(1.09)    | 3.72  | 19.91<br>(1.10)   | 4.43  | 19.36<br>(1.13)   | 2.54 | -                | -    |
| Dummy SECTOR<br>EMPLOYMENT_SERVICE | 2.00*<br>(1.15)    | 7.39  | 2.44**<br>(1.15)  | 11.44 | 1.74<br>(1.07)    | 5.67 | -                | -    |
| Diagnostic tests                   |                    |       |                   |       |                   |      |                  |      |
| % Correct classification           | 91.8 (from 88.5)   |       | 90.2 (from 88.5)  |       | 93.4 (from 88.5)  |      | 91.8 (from 88.5) |      |
| Omnibus Chi-square stat.           | 19.99***           |       | 16.26***          |       | 17.25***          |      | 11.57***         |      |
| Hosmer & Lemeshow Test stat.       | 7.20               |       | 10.97             |       | 8.16              |      | 3.36             |      |
| Cox & Snell R-square               | 0.28               |       | 0.23              |       | 0.24              |      | 0.17             |      |
| Nagelkerke R-square                | 0.55               |       | 0.46              |       | 0.48              |      | 0.34             |      |

Note: (1) Standard errors are in parentheses; (2) \*\*\*statistically significant at the 1% level; \*\*5% level; \*10% level; EB=Exp(B).

### **Perceived Health and Work Capacity (PH)**

The results reveal that Perceived Health and Work Capacity (PH) positively influences the likelihood of reporting higher self-perceived productivity. In Model 2, PH is statistically significant at the 1% level ( $\beta = 2.73$ ,  $p < 0.01$ ), with an odds ratio of 15.29. This implies that a one-unit increase in perceived health and work capacity

increases the odds of reporting higher productivity by approximately 1,429% [ $((15.29 - 1) \times 100)$ ]. This finding is consistent with Human Capital Theory, which identifies health as a critical component of productive capacity. Workers who perceive themselves as physically and mentally capable are more likely to perform effectively and maintain high productivity levels. The result supports previous empirical evidence by Bloom et al. (2010), who argued that better health enhances labour productivity through improved work capacity and reduced absenteeism. Similarly, Mansor et al. (2024) found that health capacity significantly influences the ability of older Malaysians to remain productive and economically active. The finding also aligns with Murthy et al. (2019), who reported that healthier older workers exhibit stronger labour market participation and productivity outcomes. The significance of PH in the logit model suggests that subjective assessments of health and work capability are important determinants of productivity among ageing workers. As workers age, maintaining good health appears crucial for sustaining confidence in their ability to meet job demands and remain productive.

### ***Islamic Work Ethics (IW)***

Islamic Work Ethics (IW) emerge as another significant determinant of productivity. In Model 3, IW is statistically significant at the 5% level ( $\beta = 1.59$ ,  $p < 0.05$ ), with an odds ratio of 4.89. This indicates that a one-unit increase in Islamic Work Ethics increases the odds of reporting higher productivity by approximately 389%. The positive association between IW and productivity supports Islamic Work Ethics Theory, which posits that values such as amanah (trustworthiness), ihsan (excellence), diligence, and responsibility encourage individuals to perform their duties with commitment and sincerity. Workers with stronger Islamic ethical values are therefore more likely to perceive themselves as productive and dedicated employees. This result corroborates earlier studies that found Islamic Work Ethics to be positively associated with job performance and work-related outcomes. Ali and Al-Owaidan (2008) concluded that Islamic ethical values strengthen commitment and workplace behaviour. Similarly, Rokhman (2010) found that Islamic Work Ethics positively influence employee performance and organizational commitment. More recent evidence by Zahrah et al. (2016), Azman et al. (2022), and Hartini et al. (2025) further demonstrates that Islamic Work Ethics enhance work engagement, task performance, and contextual performance. The present study extends this literature by showing that Islamic Work Ethics also contribute significantly to productivity perceptions among ageing workers in Malaysia.

### ***Demographic variables***

Although the coefficient for gender is positive across all models, indicating that male respondents are more likely to report higher productivity than female respondents, the variable is not statistically significant in the logistic regression models. This suggests that after controlling for health, work capacity, and ethical values, gender differences do not significantly influence the probability of reporting higher productivity among ageing workers. The finding contrasts somewhat with Azmi (2008), who found that demographic characteristics, including gender, significantly influenced productivity among Muslim lecturers in Malaysia. One possible explanation is that productivity among ageing workers may be driven more strongly by health and motivational factors than by gender differences. The dummy variable representing workers aged 60 years

and above is positive in all models but remains statistically insignificant. The lack of significance suggests that productivity perceptions do not differ substantially between workers aged below and above 60 years once health and work ethics are considered. This finding provides an important insight into workforce ageing. It implies that chronological age alone may not be the primary determinant of productivity. Rather, factors such as health status and motivation appear to play more important roles. This result supports the argument by Mansor et al. (2024) that many older Malaysians retain considerable work capacity beyond retirement age. It also aligns with recent ageing workforce literature suggesting that experience and accumulated knowledge can offset age-related declines in physical capacity, particularly in service and knowledge-intensive occupations. The service-sector dummy variable is positive and statistically significant in Models 1 and 2. In Model 2, the odds ratio of 11.44 suggests that workers in the service sector are substantially more likely to report higher productivity than workers in other sectors. This finding is consistent with previous studies showing that service-sector employment tends to rely more heavily on cognitive skills, experience, communication, and interpersonal abilities rather than physical strength. Ng (2020) argued that ageing workers face greater productivity challenges in physically demanding sectors such as manufacturing, agriculture, and construction. Therefore, older workers employed in service-oriented occupations may be better positioned to maintain productivity despite ageing-related physical changes.

### ***Robustness check using OLS regression***

To verify the robustness of the logistic regression results, *Table 4* presents Ordinary Least Squares (OLS) estimates using the continuous average productivity score (AveSP) as the dependent variable rather than the binary productivity indicator. The OLS results generally support the findings obtained from the logistic regression models. Perceived Health and Work Capacity remain positive and highly significant across all model specifications. The coefficient ranges from 0.21 to 0.66, indicating that respondents who perceive themselves as healthier and more capable consistently report higher productivity levels. Similarly, Islamic Work Ethics remain positive and statistically significant in all models, further confirming the importance of ethical and motivational factors in shaping productivity perceptions. Unlike the logistic regression results, gender becomes statistically significant in the OLS models, suggesting that male respondents report slightly higher productivity scores on average. However, the magnitude of the effect remains relatively modest compared to PH and IW. Age group remains insignificant across all OLS specifications, reinforcing the conclusion that age itself is not a major determinant of productivity once health and ethical factors are considered.

***Table 4. OLS regression results (for robustness check).***

| DV vs IV           | (1)     |         | (2)     |         | (3)     |         | (4)     |         |
|--------------------|---------|---------|---------|---------|---------|---------|---------|---------|
|                    | B       | Std. E. | B       | Std. E. | B       | Std. E. | B       | Std. E. |
| Constant           | 0.05    | 0.35    | 0.87**  | 0.44    | 0.82*** | 0.30    | 0.55    | 0.35    |
| AvePH              | 0.34*** | 0.09    | 0.66*** | 0.11    |         |         | 0.21**  | 0.09    |
| AveIW              | 0.47*** | 0.07    | -       | -       | 0.60*** | 0.07    | 0.52*** | 0.08    |
| Dummy GENDER       | 0.42*** | 0.12    | 0.51*** | 0.16    | 0.28**  | 0.13    | -       | -       |
| Dummy AGE_MORE60   | 0.17    | 0.13    | 0.16    | 0.17    | 0.12    | 0.14    | -       | -       |
| Dummy SECTOR       | 0.09    | 0.10    | 0.21    | 0.14    | 0.03    | 0.11    | -       | -       |
| EMPLOYMENT_SERVICE |         |         |         |         |         |         |         |         |
| E                  |         |         |         |         |         |         |         |         |
| Diagnostic tests   |         |         |         |         |         |         |         |         |
| R square           | 0.67    |         | 0.40    |         | 0.59    |         | 0.58    |         |
| Adj R square       | 0.64    |         | 0.36    |         | 0.57    |         | 0.57    |         |

|        |          |         |          |          |
|--------|----------|---------|----------|----------|
| F-stat | 22.57*** | 9.42*** | 20.71*** | 40.68*** |
|--------|----------|---------|----------|----------|

*Note: \*\*\*statistically significant at the 1% level; \*\*5% level; \*10% level.*

Interestingly, sector of employment loses statistical significance in the OLS estimates. This may indicate that sectoral differences become less pronounced when productivity is measured on a continuous scale rather than as a binary outcome. Nevertheless, the direction of the relationship remains positive. The OLS models also exhibit relatively high explanatory power, with adjusted  $R^2$  values ranging from 0.36 to 0.64, indicating that the explanatory variables account for a substantial proportion of the variation in self-perceived productivity. Taken together, the logistic and OLS regression results consistently identify Perceived Health and Work Capacity and Islamic Work Ethics as the two most important determinants of self-perceived productivity among ageing workers in Malaysia. The robustness of these findings across different estimation techniques strengthens confidence in the results. The evidence suggests that productivity among older workers depends less on chronological age and more on their health status, work capability, and ethical commitment toward work. From a policy perspective, the findings imply that efforts to promote productive ageing should focus on improving health capacity through workplace wellness programmes, preventive healthcare initiatives, ergonomic workplace design, and flexible work arrangements. Simultaneously, organisations may benefit from cultivating positive work values and ethical practices that enhance employee motivation, engagement, and commitment. Such measures are likely to contribute to sustaining labour productivity and extending workforce participation as Malaysia transitions towards an ageing society. The findings of this study offer important insights into the determinants of productivity among ageing workers in Malaysia. While the statistical results indicate that Perceived Health and Work Capacity (PH) and Islamic Work Ethics (IW) are the most significant predictors of self-perceived productivity, a deeper examination reveals broader implications for labour market policy, workforce ageing, and human capital development in Malaysia.

### ***Health matters more than age: Revisiting human capital theory***

One of the most striking findings is that Perceived Health and Work Capacity consistently emerges as the strongest determinant of productivity, whereas chronological age itself is statistically insignificant. This finding provides strong support for Becker's Human Capital Theory, which argues that productivity depends on the quality of human capital, including health, skills, and capabilities; rather than age per se (Becker, 1964). The result challenges the common stereotype that older workers are inherently less productive. Instead, the findings suggest that productivity declines are more closely linked to deteriorating health conditions than to biological ageing itself. Workers who perceive themselves as physically and mentally capable are substantially more likely to report higher productivity levels. This observation is highly relevant for Malaysia's ageing transition. The World Bank notes that Malaysia is ageing at one of the fastest rates in Asia and is expected to become an aged society by 2044 and a super-aged society by 2056. The shrinking working-age population could account for roughly one-third of the decline in GDP growth by 2050 if labour productivity is not sustained (World Bank, 2020). The study's findings therefore suggest that policy discussions should move away from focusing solely on retirement age and instead emphasize health capacity to work. Recent Malaysian evidence demonstrates that many older Malaysians retain substantial productive capacity beyond age 60, particularly

when health conditions remain favourable (Mansor et al., 2024). Critically, however, the current sample may partly explain the insignificant age effect. Most respondents (83.6%) are between 50 and 59 years old and are highly educated service-sector workers. Consequently, the sample may not fully capture the experiences of workers aged 65 years and above or those employed in physically demanding occupations such as agriculture, construction, and manufacturing. Therefore, while the findings support the notion that "health matters more than age," caution is required before generalising this conclusion to all sectors of the Malaysian economy.

### ***Islamic work ethics as a form of behavioural capital***

The positive and significant effect of Islamic Work Ethics (IW) extends beyond traditional human capital explanations. While Human Capital Theory focuses on skills and health, Islamic Work Ethics introduces a motivational and behavioural dimension that can be viewed as a form of ethical capital. Accordingly, Islamic Work Ethics emphasizes values such as trustworthiness (*amanah*), diligence, excellence (*ihsan*), and responsibility. These values encourage individuals to regard work not merely as a source of income but as a form of worship and social contribution. In the Malaysian context, where Islam plays a significant role in shaping social norms and workplace behaviour, these ethical values may strengthen employees' intrinsic motivation. The significance of IW in this study suggests that productivity among older workers is not solely determined by physical capacity. Workers who possess strong ethical commitment may continue to exert effort and maintain performance even when facing age-related challenges. This finding aligns with previous studies that reported positive relationships between Islamic Work Ethics and job performance, organizational commitment, work engagement, and employee satisfaction (Hartini et al., 2025; Azman et al., 2022; Zahrah et al., 2016; Rokhman, 2010; Ali and Al-Owaihan, 2008). However, the current study contributes to the literature by demonstrating that Islamic Work Ethics remain important even among ageing workers, a group often overlooked in previous research. Nevertheless, a critical issue should be acknowledged. The study measures self-perceived productivity, not objective productivity. Workers with stronger Islamic ethical values may be more inclined to evaluate their own performance positively because of stronger work commitment and self-discipline. Therefore, part of the observed relationship may reflect differences in self-assessment rather than actual productivity. Future studies should combine subjective and objective productivity indicators to verify this relationship.

### ***The insignificance of age: Evidence against age-based stereotypes***

The insignificant age coefficient has important implications for labour market policy. Traditional economic perspectives often assume that productivity declines automatically with age due to reductions in physical strength and cognitive flexibility. However, contemporary ageing research increasingly challenges this assumption. Improvements in education, healthcare, and workplace technology have enabled many older individuals to remain productive well beyond traditional retirement ages (Mansor et al., 2024; Ng, 2020). The current findings support this newer perspective. Once health and work ethics are controlled for, workers aged 60 and above are not significantly less productive than younger ageing workers. From a Malaysian policy perspective, this finding is particularly important because many employers continue to associate ageing

with declining productivity. Such perceptions may contribute to age discrimination in hiring and promotion decisions. If health and motivation are more important than age itself, then age-based employment practices may result in the underutilisation of valuable human capital. The findings therefore support calls for policies promoting productive ageing, including flexible retirement arrangements, lifelong learning programmes, and age-friendly workplace design. These measures can help Malaysia harness what researchers increasingly refer to as the "silver dividend" rather than viewing population ageing solely as an economic burden (Asian Development Bank, 2024; World Bank, 2020).

### ***Service sector advantage and structural transformation***

The significance of the service-sector variable in some logistic models reflects broader structural changes within Malaysia's economy. Older workers in service-based occupations appear more likely to maintain productivity than those in non-service sectors. This finding is consistent with labour economics literature showing that knowledge-intensive and service-oriented occupations depend more heavily on experience, communication skills, and tacit knowledge than on physical strength (Ng, 2020). Malaysia's economic transformation toward a service-driven economy may therefore create favourable conditions for extending the productive working lives of older adults. The service sector currently contributes more than half of Malaysia's GDP and continues to expand. In such sectors, accumulated experience can compensate for age-related physical limitations. However, the finding also highlights a policy concern. Many older Malaysians remain employed in physically demanding industries, particularly informal employment, agriculture, and low-skilled occupations. These workers may not benefit from the same opportunities available in service-based occupations. Therefore, productivity-enhancing policies should not only focus on extending working lives but also facilitate occupational mobility and reskilling opportunities for ageing workers. The insignificance of the sector variable in the OLS robustness models further suggests that sectoral differences may influence the probability of reporting high productivity rather than the overall level of productivity itself. This nuanced finding warrants further investigation using larger samples.

### ***Implications for Malaysia***

The findings collectively suggest that Malaysia's ageing challenge is fundamentally a health and human capital challenge rather than an age challenge. The evidence indicates that maintaining health capacity, strengthening lifelong learning, promoting ethical work values, and creating age-friendly workplaces are likely to be more effective than policies focused solely on delaying retirement. This conclusion aligns closely with recommendations from the World Bank and the Asian Development Bank, both of which argue that productive ageing depends on sustaining health, employability, and workforce participation throughout the life course (Asian Development Bank, 2024; World Bank, 2020). For Malaysia, the policy message is clear: if older workers remain healthy, motivated, and supported by appropriate workplace environments, they can continue contributing productively to economic growth despite population ageing.

## Conclusion

Malaysia's transition towards an ageing society presents significant challenges and opportunities for labour market sustainability and economic growth. This study examined the determinants of self-perceived productivity among ageing workers in Malaysia by focusing on the roles of Perceived Health and Work Capacity (PH), Islamic Work Ethics (IW), age, gender, and sector of employment. Using binary logistic regression analysis and Ordinary Least Squares (OLS) estimation as a robustness check, the study provides several important insights into the factors that influence productivity among older workers. The findings indicate that Perceived Health and Work Capacity and Islamic Work Ethics are the most significant determinants of self-perceived productivity among ageing workers. Respondents who perceived themselves as physically and mentally capable of performing their work responsibilities were significantly more likely to report higher productivity levels. Likewise, stronger adherence to Islamic ethical values such as diligence, responsibility, trustworthiness (*amanah*), and excellence (*ihsan*) was positively associated with productivity. These findings support Human Capital Theory (Becker, 1964), which views health as a productive asset that enhances workers' economic contribution, and Islamic Work Ethics Theory, which emphasises the importance of ethical values and intrinsic motivation in shaping workplace behaviour and performance. An important finding is that age itself was not a statistically significant determinant of productivity once health and ethical factors were taken into account. This suggests that productivity among older workers depends more on their health status, work capacity, and motivation than on chronological age. The finding challenges common perceptions that ageing inevitably leads to productivity decline and supports recent evidence suggesting that many older workers remain productive and economically active when provided with appropriate support and conducive working environments (Mansor et al., 2024). Furthermore, workers employed in the service sector were found to have a greater likelihood of reporting higher productivity, reflecting the increasing importance of knowledge, experience, and interpersonal skills in Malaysia's service-oriented economy.

From a policy perspective, the findings suggest that efforts to promote productive ageing should prioritise the maintenance of health and work capacity throughout the life course. Policymakers should strengthen workplace wellness programmes, preventive healthcare initiatives, occupational health services, and age-friendly workplace practices to enable older workers to remain productive for longer periods. In addition, continuous training, reskilling, and lifelong learning programmes should be expanded to ensure that older workers can adapt to changing technologies and labour market requirements. Given the significant role of Islamic Work Ethics, organisations should also cultivate workplace cultures that emphasise integrity, accountability, responsibility, and commitment to excellence. Such values can enhance employee engagement and contribute to sustained productivity, particularly among ageing workers. More broadly, Malaysia's labour market policies should focus on promoting active and productive ageing through flexible employment arrangements, phased retirement schemes, post-retirement employment opportunities, and measures to reduce age discrimination in hiring and promotion decisions. Despite these contributions, several limitations should be acknowledged. First, the study is based on a relatively small sample of 61 respondents, which may limit the generalisability of the findings. Second, the use of convenience sampling may introduce selection bias, as respondents were recruited through online platforms and voluntary participation. Third, the sample is dominated by

highly educated workers employed in service and knowledge-based sectors, which may not adequately represent older workers in agriculture, manufacturing, construction, and other physically demanding industries. Fourth, the study relies on self-perceived productivity rather than objective productivity measures, raising the possibility of response bias. Finally, the cross-sectional nature of the data prevents the establishment of causal relationships between the variables.

Future research should address these limitations by employing larger and more representative samples across different regions and sectors of the Malaysian economy. Longitudinal studies would be particularly valuable in examining how health, work capacity, and productivity evolve over time as individuals age. Future researchers may also incorporate objective indicators of productivity, such as performance evaluations, absenteeism records, and output measures, to complement self-reported assessments. In addition, further investigation of factors such as job satisfaction, organisational support, technological adaptability, financial security, work-life balance, and workplace age discrimination would provide a more comprehensive understanding of productive ageing. Future studies may also explore whether Islamic Work Ethics function as a mediating or moderating factor in the relationship between health and productivity, thereby contributing to a deeper understanding of the behavioural mechanisms underlying productive ageing. In conclusion, the study demonstrates that maintaining productivity among ageing workers is less a question of age itself and more a matter of sustaining health, work capacity, motivation, and supportive workplace environments. As Malaysia progresses towards becoming an aged society, policies that promote healthy, active, and productive ageing will be essential for ensuring labour market sustainability, economic resilience, and inclusive development.

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## **Conflict of interest**

The authors confirm that there is no conflict of interest involve with any parties in this research study.

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