Empirical Analysis of Salt Production from Non-physical Factors

Eni Puji Estuti[(⊠)], Wachidah Fauziyanti, and Silvia Hendrayanti

Management Department, STIE Semarang, Semarang, Indonesia
enipuji001@gmail.com

Abstract. Salt productivity in Indonesia still needs to be done in-depth analysis. Indonesia as a maritime country has not maximized its sea potential, it is proven that the government is still carrying out salt imports. This study aims to analyze the productivity of salt seen from human capital of salt farmers, namely age, skills and experience. This study uses multiple regression analysis, path analysis, and 75 people as respondents. Results found from this study showed the direct influence of age did not affect salt productivity, skills affected salt productivity, and experience has no effect on productivity. In this study, the skill was able to mediate age variables and experience to salt productivity. The conclusion obtained from this study is that the skills of farmers are very important in increasing salt productivity because understanding and taking the right activities are needed in producing salt. The experience variable does not affect productivity because the experience that farmers currently have is a legacy experience, there is no new experience they get.

Keywords: Age · Skill · Experience · Productivity

1 Introduction

Productivity growth patterns are a major problem in the transformation of economic structures in all sectors of the economy. Economic growth is achieved by increasing output, which must then increase productivity in all sectors of the economy [1]. The allocation of resources must be shifted from low-productivity sectors to high-productivity sectors. Africa seeks to find innovative ways to increase its agricultural productivity by conducting research, developing technology and forging relationships with the world globally. Productivity research in China conducted by Huang et al., [2] demonstrate that productivity in China uses green development (GD) to maintain the sustainability of the next generation of agricultural development.

There are agricultural productivity gaps in various countries in the world. There is an assumption that the human resources needed in the agricultural sector are relatively lower than other sectors. This productivity gap is an interesting reason to research and look further about productivity as a whole. This study was conducted by Gollin et al., in 151 countries around the world using data from the International Labour Organization. Productivity gaps arise between the agricultural sector and sectors other than agriculture.

Labor distribution is responsible for the productivity gap between the agricultural and non-agricultural sectors.

Indonesia with an ocean area that reaches 2/3 of the total area, salt should be one of the mainstay products. Domestic demand for salt is very large, but Indonesia has not been able to meet this need. Salt imports are still carried out from Australia and other countries, this is one thing that must receive attention. Government policies are very important to increase salt production. Expectations of salt exports must be slowly reorganized from top to bottom and bottom to top. This means both from the policies made by the government as well as from the physical and non-physical efforts of farmers so that Indonesia can optimize marine resources for a more advanced economy of a prosperous society. Salt productivity in Indonesia every year is only sufficient for less than 1/3 of the need for salt, this is certainly unfortunate because it sees the potential of marine resources. Local salt still does not meet the standards both in terms of quantity and quality. This should be repaired and the right solution is sought to maximize the potential of the sea, so that salt farming communities increase their quantity and quality and will ultimately have an impact on their income and welfare.

Salt can be categorized as consumer goods and industrial goods. Consumer goods because every day people do consume salt both in the household and in places to eat. Salt is an industrial item because in various industries such as fish processing, chemical factories all use salt. The frequently occurring national salt problem is related to production, that is, the quality part of national salt production is still at the 40% quality level, the quantity of national salt production has not been able to meet industrial needs, the import of industrial salt increases every year, there is still a circulation of non-iodized consumption salt. Problems related to human resources and technology, namely the use of technology in people's salt is still not optimal, the capacity of communities to apply technology remains low and the distribution of salt production infrastructure remains underutilized.

Productivity can be approached by physical or non-physical concepts. The physical concept includes factors such as machine tools, land size, climate and others. The non-physical concept includes human factors related to humans implementing production activities. Many academics have conducted studies on the concept of productivity to explain agricultural patterns and spatial organization, one of them by Dharmasiri [3] who uses the Average Productivity Index.

Research on productivity has been carried out in various countries, one of which [4] Russia, conducted research on mining companies which showed the results that this human factor is one way to increase productivity. Machuca-Villegas et al. conducted a productivity study of software, which explains that software is strongly influenced by social and human factors. Both of these factors must be developed because they will affect productivity. The role of human resources in increasing agricultural productivity in Russia has been researched and proven by Rada et al., [5]. The Cameroonian Productivity Study [6] analyzes the importance of human capital to agricultural productivity. The study was conducted using household surveys that showed results that experience and education had an effect on improving agricultural productivity. Human resources are urgently needed in agricultural productivity. Increasing the intensity of human capital will have an impact on increasing productivity of farmers.

Based on research from Jia et al., [7] agricultural productivity in China has been shown to increase with institutional reforms, the existence of a land transfer platform and a land rental market. Workers from their own households, on the one hand, would further increase agricultural productivity by not having to pay wages, but on the other hand would lose their competitiveness due to limited land. This type of agricultural crop variety (genetically modified/GM) can save production costs, save resources and can increase productivity. Labor productivity is expected to increase agricultural productivity in Africa, technological innovation is also needed to save costs per unit, especially labor costs.

Productivity that influencing by human factors will reviewing in this study. Human factors consist of natural characteristics and social psychology. Western countries have invested heavily in human capital, which shows the importance of the role of people in the economic system. Take advantage of free time by increasing knowledge and skills, this will improve human quality and will increase productivity. Regarding the positive relationship between human capital and economic growth, it can be concluded that countries experiencing higher growth rates also have higher levels of human capital and higher levels of investment in human capital. These countries may also have higher agricultural productivity, as well as a better ratio between skilled and unskilled. Countries that invest more in human capital tend to have faster economic growth [8].

The classification of productive age is still a matter of debate. Working age is said to be above 15 years, and under 65 years [9]. There is a common assumption that after the age of 40 and 50 years, labor productivity begins to decline. It is difficult to find a connection between age and productivity of farmers because age changes from year to year, productivity is a complex problem and the limitations of individual data collection. Age will change work experience, cognitive abilities and physical strength. Experience will increase with age. However, health and physical strength will decrease. The impact of age on cognitive abilities is not the same. Work related to learning, problem solving and speed will noticeably decline after the age of 50.

In jobs that require experience and verbal skills over the age of 50 are not so impactful. Cognitive abilities related to the speed and power of remembering will decline with age. Different types of jobs also require different physical and cognitive abilities. The effect of age on productivity depends on the need for skills in the work process [10]. Research on productivity in Cameroon [6] that showed results that experience and education had an effect on improving agricultural productivity.

Skill changes can accelerate the desired behavior. Skills are directed at 2 reward components: finding good objects (object skills) and acting on objects (action skills), which occur sequentially. Object skills are based on high-capacity memory for object-value relationships [11]. Both hard skills and soft skills are must-haves for humans. Hard skills can be seen in high-quality work results, while soft skills are difficult to assess, because the assessment may be influenced by prejudice [12].

2   Methods

2.1   Research Approach

This study uses a quantitative descriptive method. Descriptive method is a method that examines a group of people, a group of objects by describing facts, characteristics, and relationships between research phenomena systematically, accurately and factually [13]. Descriptive methods are defined as those used to describe what is happening now, and are intended to describe the circumstances and conditions under which the research was conducted. Descriptive quantitative research method means a method that describes an event or situation that is currently happening by using numbers [14].

2.2   Research Design

This research design uses age and skills as independent variables, and experience as an intervening variable to explain productivity. See Fig. 1.

2.3   Operational Definition and Variable Indicators

Age is a person's place at a certain time related to the social order, namely conditions, stages, places in history (Eckert in Chotimah [15]). Indicator of age is: a. Age of the farmers, b. Experience, c. Responsibility [15].

Skills are the ability to carry out tasks or work using existing limbs and equipment (Wiranti in Anwar [16]). Indicators of skills from the dimensions of skills are: a. Skills in mastering the job, b. Ability to complete work, c. Accuracy in completing work [16].

Experience is the number of types of work carried out by a person, as well as the length of time a person works in each job [17].

Work experience indicator [18]: a. Length of time - a measure of the length of time a person takes to understand and carry out a job well, b. The level of knowledge and skills a person has, c. One's mastery of the work and techniques of existing equipment.

Productivity is a mental attitude that has a perspective of improving the quality of life continuously from time to time [19]. The productivity indicators in this study are competence, work ethic, quality, and efficiency [20].
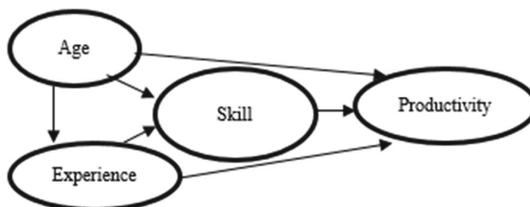

Fig. 1. Framework of mind.

2.4 Population and Sample

Pati Regency has the highest potential as a center for salt production in Central Java because it has 42.9% of the total area of salt ponds in Central Java Province. Pati Regency is an agrarian area and coastal area/area where most of the people make a living as farmers, and are well-known as salt producers. This is also the basis for the Pati district to be the population of this study. The sampling technique in this study used simple random sampling, this random sampling is sampling that allows each item from all members of the population have the same chance as the sample [21]. This random sampling technique gives all the population the same chance as the sample, and the selection of the sample is random, so the results are not biased. The number of samples used as many as 75 respondents.

2.5 Technical Analysis and Hypotheses

The analytical technique used in this research is multiple regression analysis and mediation test using Smart PLS. Direct and indirect tests are used to explain whether the mediating variable plays a role or not.

The hypothesis in this study is:

- The age variable has a positive effect on productivity.
- The age variable has a positive effect on experience.
- The age variable has a positive effect on skill.
- The experience variable has a positive effect on skill.
- The skill variable has a positive effect on productivity.
- The experience variable has a positive effect on productivity.
- The experience variable mediates the effect of age on skill.
- The effect of age variable on productivity through experience and skill.
- The skill variable mediates the effect of age on productivity.
- The skill variable mediates the effect of experience on productivity.

3 Results and Discussion

3.1 Data Analysis Test Results

See Fig. 2 and Fig. 3.

It is valid if the number is at least 4, according to the loading factor criteria of the Syam research loading factor criteria. Composite reliability, value from age variable (0,731), experience variable (0,822), skill variable (0,782) and productivity variable (0,857). The value of composite reliability is above 0.7, so it can be saying that all variables have reliable indicators.
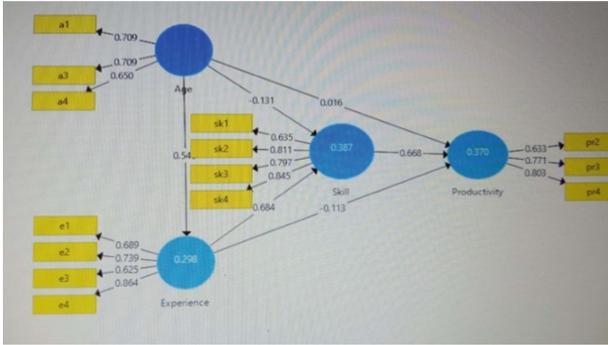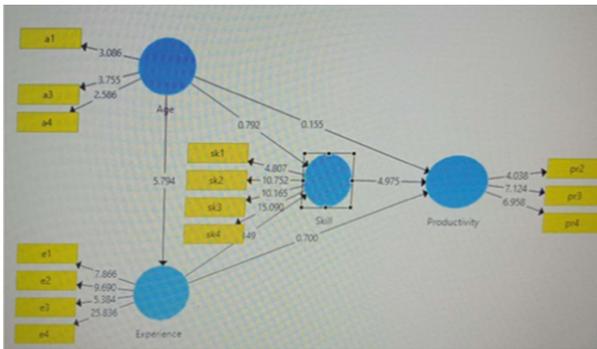
Fig. 2. Validity and reliability results.

Fig. 3. Hypothesis test results.

3.1.1 The Effect of Age on Productivity

According to the above graph, the t-count value is $0,155 < 1,994$ (t table), which means that the age variable has no effect on productivity. As you get older, productivity will increase. Increasing age will be able to increase productivity, but only when the productive age limit is reached will age be consistent with subsequent productivity. The results of this study are not in accordance with this statement.

The results of this study suggest that age variables do not affect productivity. It is difficult to determine how age affects productivity. Productivity is said to be very personal. Individual productivity is very complex and can interpreting multidimensional [10]. Productive age groupings change from time to time. The characteristics of individual changes across generations will vary. People who are used to working hard will be stronger than people who are not used to working. Aging has no effect on workers. In the village there are many salt farmers with old age who are still working hard. Young salt farmers also continue to show the same results. Working age is said to be above 15 years, and under 65 years [9], in this study 3% which does not include working age.

3.1.2   The Effect of Age on Experience

According to the above graph, the t-count value is 5.794 > 1.994 (t table), which means that the age variable has a positive and significant effect on experience. Aging is central to the human experience [22]. Age will change work experience, cognitive abilities and physical strength. Experience will increase with age as people age, they will have more experience. Older people, although usually already experienced, have relatively little and limited physical strength. This experience is closely related to age [23].

3.1.3   Effect of Age on Skill

According to the above graph, the t-count value is 0,792 < 1.994 (t-table), which means that the age variable has no effect on skill. Age affects practical and written skills as studied by Papalexopoulou [24]. Age increases skills until age 40, after which diet decreases skill levels with age [25]. The age of the respondents in this study who were less than 40 years was 42 people or 56% of the total sample which means that most respondents are still at a linear age with skill development.

3.1.4   Effect of Experience on Skill

According to the graph above, the t-count value is 0,684 < 1,994 (t-table), which means that the experience variable has no effect on skill. The results of this study experience variable do not affect skills, this is the same result as the research ever done by Moxley and Charness [25]. Experience has no effect on salt farming skills here, probably because your current experience is just past experience, not developed, so you can't improve your skills.

3.1.5   Effect of Skill on Productivity

According to the graph above, the t-count value is 4,975 > 1,994 (t-table), which means that the skill variable has a positive and significant effect on productivity. Work productivity and job skills are interrelated variables. Productivity will be achieving if the workforce has work skills that are applied in how they work [26]. Someone who has good work skills will have more attention, thoroughness, enthusiasm and creativity in carrying out work, and this will encourage greater output in a certain period of time. With the skills at hand, it is hoped that someone will be able to work productively, overcome existing obstacles, and achieve goals faster. It is the attainment of physical and social capacities and skills, the continuing disclosure of the individual's participation in the world, the construction of personal history, and movement through the history of communities and societies [22].

3.1.6   Effect of Experience on Productivity

Based on the picture above, the t-count value is 0.700 < 1.994 (t table) which means that the experience variable has no effect on productivity. Experience is also an important factor in determining productivity. Humane resources are urgently needing in agricultural productivity. Increasing the intensity of human capital will have an impact on increasing

the productivity of farmers. This is possible because the salt farmers' experience is limited to the knowledge and skills passed on by their ancestors, and no attempt is made to find new salt-making experiences, stagnating their experience.

3.1.7   The Effect of Age on Skill Through Experience

According to Fig. 3, the direct and indirect effects can be calculated as follows:

Direct effect Age $\rightarrow$ Skill $= -0{,}131$
Indirect effect Age $\rightarrow$ Experience $\rightarrow$ skill $= 0{,}546 \times 0{,}684 = 0{,}373$

The indirect effect of age variable on skills through experience is greater than the direct effect of age variable on skills. Experience variables can mediate age-age influences on skills.

3.1.8   The Effect of Age on Productivity Through Experience and Skill

According to Fig. 3, the direct and indirect effects can be calculated as follows:

Direct effect Age $\rightarrow$ Productivity $= 0{,}016$
Indirect effect: Age $\rightarrow$ Experience $\rightarrow$ skill $\rightarrow$ Productivity $= 0{,}546*0{,}684*0{,}668 = 0{,}249$

The indirect effects of age variables on productivity through experience and skills are greater than the direct effects of age variables on skills. Experience variables and skill variables are able to mediate age - age influence on productivity.

3.1.9   Effect of Age on Productivity Through Skill

The amount of direct and indirect influence based on the picture above can be calculated as follows:

Direct effect Age $\rightarrow$ Productivity $= 0{,}016$
Indirect effect Age $\rightarrow$ skill $\rightarrow$ Productivity $= -0{,}131 \times 0{,}668 = 0{,}087$

The indirect effect of age variable on productivity through skills is greater than the direct effect of age variable on productivity. Skill variables are able to mediate age-age influences on productivity.

3.1.10   Effect of Experience on Productivity Through Skill

The amount of direct and indirect influence based on the picture above can be calculated as follows:

Direct effect Experience $\rightarrow$ Productivity $= -0{,}113$
Indirect effect Experience $\rightarrow$ Skill $\rightarrow$ Productivity $= 0{,}684 \times 0{,}668 = 0{,}456$

Skill is able to be a mediating variable of the experience variable on productivity. The indirect effect of experience variables on productivity through skills is greater than the direct effect of experience variables on productivity.

As can be seen from Fig. 1, the coefficient of determination of age on experience is 29.8%, and the remaining 70.2% is explained by other variables outside the study. Age can explain a person's experience. Usually, someone with a more mature age will have a better experience. The effect of age and experience on skills accounted for 38.7%, and the remaining 61.3% was explained by other variables outside the study. Age, skills and experience had a 37% coefficient of determination for productivity, with the remaining 63% explained by variables outside the study.

Differences in production technologies are factors that determine labor productivity in various countries [27] Indonesian salt farmers can be said to be behind technology in increasing their productivity both in terms of quantity and quality of local salt. From time to time only a small group of farmers receive technological assistance, because the assistance provided is only to a few salt farmers. Given that technological change is very expensive and every farmer has a high cost for this technology transfer. The salt problem is a complex problem, not only in terms of salt farmers, therefore a more in-depth study is needed to comprehensively uncover and find solutions. Technological change plays a very important role in agriculture in Africa. This transformation can be relied upon to increase productivity (1).

4   Conclusion

In this study, the experience was able to mediate age variables on skills. The experience and skill were able to mediate age variables on productivity. The conclusion of this study is that farmer skills are important for increasing salt production, as producing salt requires understanding and taking the right actions. Experience does not affect productivity because the experience that farmers currently have is a legacy experience, there is no new experience they get, but experience variables can have an indirect effect on productivity through skills.

Suggestions for further research can examine the productivity of the salt business as a whole, both physically and non-physically. Physically, industrial innovation may be something that needs to be researched to increase salt productivity.

References

1. Oyejide, T. A. (2010). World trade order and agricultural transformation in Africa. *Journal of African Economies, 19*(Suppl. 2), 40–59.
2. Huang, H., Mo, R., & Chen, X. (2021). New patterns in China's regional green development: An interval Malmquist-Luenberger productivity analysis. *Structural Change and Economic Dynamics, 58*, 161–173.
3. Dharmasiri, L. M. (2012). Measuring agricultural productivity using the average productivity index (API). *Sri Lanka Journal of Advanced Social Studies*, *1*(2).
4. Pinigina, G., Kondrina, I., Smagina, S., Tatsienko, V., & Meshkov, A. (2017). The impact of human factor on labor productivity at the mining enterprises. *E3S Web Conference*, *15*, 1–5.

5. Rada, N., Liefert, W., & Liefert, O. (2020). Evaluating agricultural productivity and policy in Russia. *Journal of Agricultural Economics, 71*(1), 96–117.
6. Djomo, J. M. N., & Sikod, F. (2012). The effects of human capital on agricultural productivity and farmer's income in Cameroon. *International Business Research*, *5*(4).
7. Jia, H., Huang, J., Luo, X., & Yan, J. (2019). Agriculture: Science and technology safeguard sustainability properly defining sustainable agriculture. *National Science Review, 6*, 595–600.
8. Dăian, M., & Manova, K. B. (2013). The veil of communism: an analysis of lifespan, GDP per capita, human capital, and agricultural productivity in Eastern Europe. LAP LAMBERT Academic Publishing.
9. García-Ubaque, J. C., Garcia-Ubaque, C. A., & Vaca-Bohórquez, M. L. (2011). Medical consultation in productive age population related with air pollution levels in Bogota city. *Procedia Environmental Sciences, 4*, 165–169.
10. van Ours, J. C., & Stoeldraijer, L. (2011). Age, wage and productivity in Dutch manufacturing. *Economist, 159*(2), 113–137.
11. Hikosaka, O., Yamamoto, S., & Yasuda, M. K. H. (2013). Why skill matters. *Trends in Cognitive Sciences*, *17*(9), 434–441.
12. Grugulis, I. S. D. (2011). Skill and performance. *British Journal of Industrial Relations*, *49*(3), 515–536.
13. Rukajat, A. (2018). Pendekatan Penelitian Kuantitatif - Quantitatif Research Approach [Internet] (p. 1).
14. Margareta, S. (2013). *Hubungan Pelaksanaan Sistem Kearsipan Dengan Efektivitas Pengambilan Keputusan Pimpinan: Study deskriptif analisis kuantitatif di Sub Bagian Kepegawaian dan Umum Lingkungan Kantor Dinas Pendidikan Provinsi Jawa Barat*. Universitas Pendidikan Indonesia.
15. Chotimah, T. (2016).. Pengaruh Disiplin Kerja, Umur Dan Tingkat Upah Terhadap Produktivitas Kerja Karyawan Pabrik Bulu Mata Palsu Di Desa Prembun Kecamatan Prembun Kabupaten Kebumen. Doctoral Diss Pend Ekon.
16. Anwar, S. (2008). Pengaruh Faktor Fundamental Dan Risiko Sistematik Terhadap Harga Saham Perusahaan Sektor Pembiayaan Di Bei Tahun 2007–2008.
17. Dewi, N. L. P. R. (2017). Faktor-Faktor Yang Mempengaruhi Produkstivitas Usaha Tani Dan Keberhasilan Program Simantri Di Kabupaten Klungkung. *E-Jurnal Ekonomi Dan Bisnis Universitas Udayana*, *6*(2).
18. Sedarmayanti, M.P.M. (2001). Sumber daya manusia dan produktivitas kerja. CV. Mandar Maju.
19. Hamali, A. Y. (2013). Pengaruh motivasi terhadap produktivitas Kerja: Studi Kasus pada PT X Bandung. *The Winners, 14*(2), 77.
20. Wahyuningsih, S. (2019). Pengaruh Pelatihan Dalam Meningkatkan Produktivitas Kerja Karyawan. *Journal of War Edition, 60*, 91–96.
21. Etikan, I., & Bala, K. (2017). Sampling and sampling methods. *Biometrics & Biostatistics International Journal, 5*(6), 215–217.
22. Eckert, P. (1998). Age as a sociolinguistic variable. In The Handbook of Sociolinguistics. Willey-Blackwell.
23. Kumbadewi, L. S., Suwendra, I. W., Susila, G. P. A. J., & Se, M. (2016). Pengaruh umur, pengalaman kerja, upah, teknologi dan lingkungan kerja terhadap produktivitas karyawan. *Jurnal Manajemen Indonesia*, *4*(1).
24. Papalexopoulou, K., et al. (2014). Education and age affect skill acquisition and retention in lay rescuers after a European Resuscitation Council CPR/AED course. *Hear Lung, 43*(1), 66–71.
25. Moxley, J. H., & Charness, N. (2013). Meta-analysis of age and skill effects on recalling chess positions and selecting the best move. *Psychonomic Bulletin & Review, 20*(5), 1017–1022. https://doi.org/10.3758/s13423-013-0420-5

26. Latifah, S. (2020). Pengaruh Karakteristik Individu, Keterampilan Dan Pemeliharaan Kerja Terhadap Produktivitas Kerja Konveksi. *Syntax*, *2*(5).
27. Eberhardt, M., & Teal, F. (2010). Department of Economics Discussion Paper Series Productivity Analysis in Global Manufacturing Production Productivity Analysis in. Work Paper, *515*, 1–32.