ISSN: 2710-0170

The impact of population aging on business innovation: a comprehensive overview

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Abstract

Population ageing is defined as the number of people aged 65 and over reaching 7 per cent of a country's total population. As our country enters the twentieth century, it is also entering an ageing society. On the one hand, population aging affects the effective supply of labour, the physical function of workers declines along with their willingness to work, and the burden of supporting the labour force in their prime years increases, which increases the operating costs of enterprises, hinders enterprise innovation, and is not conducive to technological advancement; it also pushes enterprises to increase their investment in human capital and technological innovation, enhances labour productivity, and promotes enterprise innovation. As the technological paradigm shifts, latecomer firms can win the competition, offset the negative effects of population ageing, and achieve technological innovation and economic growth as long as they are at the top of the shift.

Keywords

Population ageing, corporate innovation, technological progress.

1. Introduction

Population aging first appeared in European countries, in 1851, the elderly population aged 60 and above in France was as high as 10%, with the development of time, population aging in all EU countries has become an important factor restricting economic development and enterprise innovation (Li Zhongsheng, 2008). China is both in the midst of aging and in a critical period of development. This paper aims to straighten out the impact of population aging on enterprise innovation, start from the research of scholars at home and abroad, explore its internal logic, provide a multi-faceted perspective, see the value of the aging population, and also help enterprises to better cope with the phenomenon of population aging.

2. A study related to the impact of population ageing on corporate innovation in foreign countries

2.1. Impact of physical indicators of the ageing population on innovation

First of all, from the point of view of physical strength, as people get older, their physical functions will decline, especially their aerobic and muscular capacities. Generally speaking, older workers are not suitable for physical labour because there is an imbalance between the requirements of physical labour and the physiological conditions of the elderly labourers, but the necessities of life force many of them to engage in unsuitable physical labour, which will affect the health of the labourers in the long run and increase the risk of diseases and disabilities. affects the health of the labour force and increases the risk of disease and disability. (DeZwart et al., 1996) Thus, it seems that the older labour force in physical work, due to physical factors, lack of motivation and action, individual innovation incentives are weakened, but also for the

ISSN: 2710-0170

enterprise will bring the risk of employment, increase the cost of employment, is not conducive to the development of enterprise innovation.

Secondly, from the brain and psychological aspects, some studies have shown that in the absence of regular training, the logical reasoning and reaction ability of human beings will decline with the increase of age (Gold et al., 1995), and the ability of these aspects of the elderly population is generally inferior to that of the young and adult population. In terms of psychological analysis, it is generally believed that the work incentives of older employees will be weakened and their work ethic will be reduced, a large portion of the older labour force holds the mentality of working steadily and surviving until retirement, there are also related studies that have demonstrated a negative correlation between age and work motivation, the measurement model has continued to evolve, and in this article published in 2020, the new model places more emphasis on the inter-individual differences by proposing six new dimensions to study intellectual development from prime to old age (Ackerman, Kanfer, 2004, 2020), which can help us to better understand the psychological changes in the aging workforce, and thus analyse their individual innovativeness and impact on corporate innovation. It can be seen that there is a relatively large individual difference between different older labour forces, and this difference is also related to industries and positions. This is conducive to the secondary employment of the older labour force and a theoretical support for the policy of delayed retirement.

2.2. Impact of work level and work characteristics of the ageing population on innovation

The longer the labour force stays in an industry, the more it follows the pattern office and is unable to break out of the circle of relying on experience to do its work (Rybash, 1986), which is a hindrance to business innovation. Depending on the industry, the aging population is not without a contribution to innovation, professions like teachers, professors, researchers, on the contrary, the more experience is the better, because knowledge needs to be precipitated, the older this aging labour force is, the longer it is entrenched in the field, the more authoritative and high quality the outputs are, and the more conducive it is to business innovation. However, in terms of the distribution of industries in society as a whole, there are still more occupations that are less dependent on experience for labour, so from this perspective, it seems that the older labour force has a hindering effect on business innovation.

2.3. Aging labour force affects firms' R&D expenses

When there is a large proportion of older labour in a company, the operating costs of the company increase. Since the physiological and psychological differences between the older labour force and the young adult labour force and the lack of incentives to innovate, the company needs to pay more R&D expenses in innovation and more running costs in the whole company's operation to achieve the innovation of the company, and in this respect, aging will bring more expensive costs to the company's innovation.Shin KwanHo (2005) uses the real wages as an explanatory variable representing labour productivity, and by examining the relationship between real wages and demographic changes, confirms that the development of ageing pushes real wages up and reduces labour productivity. The decrease in output efficiency and the increase in labour costs must be a blow to firms' innovation. Hideo Noda (2011) suggests that firms need to pay more costs and higher wages to hire desirable R&D labour in an ageing population, as the overall age of the population makes skilled and educated young and middle-aged labour scarcer and more desirable in the labour market, thus making it possible for firms to hire more skilled and educated labour. The labour market is more popular and thus prices go up.

ISSN: 2710-0170

3. A study related to the impact of population ageing on corporate innovation in the country

3.1. Impact of labour costs of an ageing population on innovation

Liu Weixian (2022) points out that since the outbreak of the "migrant labour shortage" in the early twentieth century, the phenomenon of a shortage of labour in the prime of life has become increasingly serious, the average age in the labour market has risen, and China's demographic dividend has gradually disappeared, so that China's labour force participation rate has generally been lower than that of developed countries. It can thus be seen that ageing has brought about a reduction in the labour participation rate, which is undoubtedly a blow to the development of enterprises.

Feng Yongqi et al. (2018), through the study of the problem of labour cost, proposed that the rise of labour cost does not hinder the innovation of enterprises, although the labour cost has risen, it does not make the overall operating cost of enterprises rise, but rather it has an incentive effect, which can promote the innovative activities of enterprises and improve labour productivity. So does this conclusion still apply when the labour market in general is ageing? Zhang Bo et al. (2022) take Chinese A-share listed companies as a research sample from 2005-2017, and measure the degree of aging in each province by the proportion of elderly people in the resident population of each province in China, and prove that population aging has a significant impact on the stickiness of labour costs of enterprises. It is more obvious in labour-intensive industries and private enterprises.

3.2. Impact of an ageing population on technological innovation

In the innovation of enterprises, the most intuitive results are technology patents. Chang Zhongze (2022) analysed the impact of the aging population on technological progress from five aspects and different regions, namely the age effect, the industrial transformation effect, the environmental effect, the experience accumulation effect, and the factor forcing effect. Some of these effects will have a positive impact on technological progress, while others will have a negative impact. Among them, the more significant effects are age effect, environmental effect, experience accumulation effect. On the whole, if we simply consider the aging of the labour force, it will certainly have a negative impact on technological innovation, but as the labour force grows older, the more experience it has and the more skilled it becomes, which may either give rise to technological innovation or limit it due to the inertia of the aging labour force.

Zhang Bo et al. (2022) demonstrated that the ageing population is negatively correlated with corporate innovation and technological innovation by using data from a sample of listed companies in China from 2007-2017, suggesting that it is a hindrance to corporate innovation. However, it is suggested that education can mitigate the negative impact of an ageing population on business innovation, which encourages firms to give regular training activities to the ageing population to ensure that they keep up with the times and contribute in innovation.

4. Conclusions

This paper combs and summarises the impact of the aging population on enterprise innovation in terms of its physical indicators, work level and characteristics, share of the labour team, labour costs, and consumption habits. The aging population will have an impact on work efficiency and labour productivity due to its increasing age, declining physical functions, and psychological changes, as well as on the operation and innovation activities of enterprises due to the increased cost of using the aging labour force. However, whether it will have a negative impact is related to the industry, position, and individual, some industries require the accumulation of experience, then the older the employee the more popular; but some industries

ISSN: 2710-0170

rely more on physical strength, the older labour force is naturally not as good as the young and strong labour force. Therefore, when conducting analyses, different methods of analysis should be adopted according to different circumstances before convincing and impartial results can be produced. Overall, the aging population can help enterprise innovation, of course, this requires the joint efforts of all parties, the aging population as an innovative individual, can not give up on themselves, lose their enthusiasm, and can not give up on creating value; and enterprises should care for the aging labour force, create a good working environment for them, and can take some incentives (e.g., shareholding incentives), and at the same time, increase the investment in human capital, and focus on research and development; although this paper does not mention too much about this issue, we should take different analysis methods according to different situations to produce convincing and fair results. Although this paper does not mention much about the government, but the government also plays an important role in this, such as the release of favourable policies for the elderly population, to enhance their sense of security, the elderly population can be no worries in the post to shine.

In addition, scholars at home and abroad rarely take gender as an indicator when analysing the behaviour of the ageing population. The physiological conditions and psychological attitudes of the two genders are quite different, and the retirement time of the two genders in China is also different, so the incentives and behavioural motives of the aging population of different genders will be quite different. Therefore, I believe that gender is also a representative and meaningful indicator, which can be included in future research by scholars.

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