


# Chapter 1

## The Role of Technological Development on Employment

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### **ABSTRACT**

*This chapter aims to investigate the impact of technological development on employment in Turkey. The authors include research and development expenditures, the share of medium and high technology product exports in total exports, and total employment into the dataset. They also use the economic growth rate as a control variable. In this study, ARDL estimation results are reported using annual data for the period 1990-2022. According to the findings of the study, economic growth and research and development expenditures positively affect employment. Exports of technological products do not have an employment-increasing effect. Based on this result, the authors argue that employment should be reskilled and associated with technological developments in Turkey.*

### **1. INTRODUCTION**

The role of technology on employment has been a subject that has been discussed in the economics literature from past to present, since the effects of the division of labour and specialization on labour productivity contributed by Adam Smith. The effect of technology on labour productivity and hence its effect on growth has also been used as a tool to explain the development differences between countries. Many studies have drawn attention to the effect of human capital on growth in this context. Today, it is discussed in the literature whether robots (artificial intelligence) will substitute the labour force and lead to the unemployment of human beings in the future or whether there will be an increase in productivity with more leisure time thanks to technology.

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Martin Ford (2021: 313) drew attention to the impact of technology on employment in his book *The Rise of Robots* with Sprague's (2014) study on the labour markets of the US economy. Accordingly, from 1998 to 2013, the number of services and products produced by American companies increased by 42%, and more than a thousand new companies and jobs were established, but the annual working hours remained constant. In other words, while the number of jobs is increasing, the number of workers demanded is relatively decreasing. Today, with the onset of the Industry 5.0 era, the development of unmanned aerial vehicles and artificial intelligence products is gradually reducing the need for white-collar workers in employment. For example, artificial intelligence programs such as ChatGPT and neural text attract a lot of attention in academia and the business world. Literature reviews written with ChatGPT have started to take place in academic ethics discussions, and studies using artificial intelligence as an author have emerged. Although it is an accepted fact today that technology increases productivity, which means output per input, its possible decreasing effect on employment in the future may lead to injustice in income distribution as it will disrupt the flow of income and expenditure in macro terms.

On the other hand, even though technological development may lead to a decrease in employment, it is not possible to ignore the positive impact of technological development on the growth performance of economies and the marginal productivity of labour in the Industry 5.0 era. When the employment-increasing effect of R&D activities-as a technological development- is evaluated from an economic perspective, first of all; the development of new products creates new demand, an increase in demand may increase income, and an increase in income may increase growth, causing companies to increase their labor demand. Secondly, as in Vernon's product cycle theory and Schumpeter's creative destruction theory, companies need technological development to have a competitive structure and increase their income, and technological development can also have an employment-increasing effect with the emergence of new products and new business processes. Thirdly, companies that develop new products and increase their market share can also increase employment with new investments and business areas. Finally, the need for skilled labor increases in R&D activities and new product development processes, which may increase employment as the demand for skilled labor increases.

Additionally, it is important to reskill the labour force to keep up with the requirements of the age. In this context, upskilling of workers, employers and institutions is necessary for today's national economies to compete both in labour markets and in international markets. Yet, reskilling the workforce does not only mean that the workforce learns to use technology or adapts to digitalization. Besides, learning to work in a different field in the workplace, gaining experience in different organizations and applying it in the organization, employing an experienced employee and teaching other employees, improving skills through corporate or digital training, corporate mergers, SME training, many other practices can be examples of reskilling. Nevertheless, the costs of these programs, the habits of management and their lack of adaptation to innovations, the low visibility of training programs, and the insufficient attention to their importance in terms of competition can be listed as obstacles to the institutionalization of reskilling. Therefore, in our study, we have drawn attention to the issue of reskilling employment for increasing productivity and improving technology in the economy, and we have also discussed strategies for reskilling employment.

In this respect, in this study, we aimed to investigate the effect of technological development on employment in Türkiye. For this purpose, we determined the years 1990-2022 as the period of the study due to the limitation of accessible data. In the model of the study, we used research and development expenditures, the share of medium and high technology products exports in total exports, and total employment data. In line with the aim of the study, we applied time series analysis as the method of the

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