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ICT AS DOMINANT IN MANAGEMENT

Abstract. Education and literacy are very important to obtain ICT skills, which are necessary for modern management. Technology can make a difference in improving services and cutting costs, but it can do more than that. ICT makes a business more efficient, and effective and promptly responds to customers' needs.

6.4 percent of enterprises introduced new or significantly improved goods on the market, while share of enterprises, that introduced new or significantly improved services. Innovations of goods and services in most cases were originally developed by the enterprises (accordingly 68.7 percent and 73.5 percent). In other cases, they received support from other enterprises or institutions. 60.6 percent of implemented innovations were new to enterprises, while 39.4 percent were new to the market.

As analyze shows Georgia has some experience to develop ICT as dominant role in management of enterprises.

Keywords (ICT, Education, Statistics)

Introduction

Education and literacy are very important to obtain ICT skills, which are necessary for modern management. Technology can make a difference in improving services and cutting costs, but it can do more than that. ICT makes a business more efficient, and effective and promptly responds to customers' needs. ICT can assist business activities including design, manufacturing, R&D, distribution, and sales and feedback⁶.

Georgia is a country of universities⁷, but we need more orientation to the modern program of Information technologies. Universities have been assigned a special role in the digital economy⁸. The increasing demand for ICT specialists stands an absolutely different situation for education

⁶ <https://www.bau.edu.lb/Research/Information-and-Communication-Technology-in-Business#:~:text=Therefore%2C%20ICT%20is%20concerned%20with,distribution%20and%20sales%20and%20feedback>

⁷ Lia Charekishvili, Higher education system in Georgia: Reforms and modern challenges, International Institute of Social and Economic Sciences, 2015.

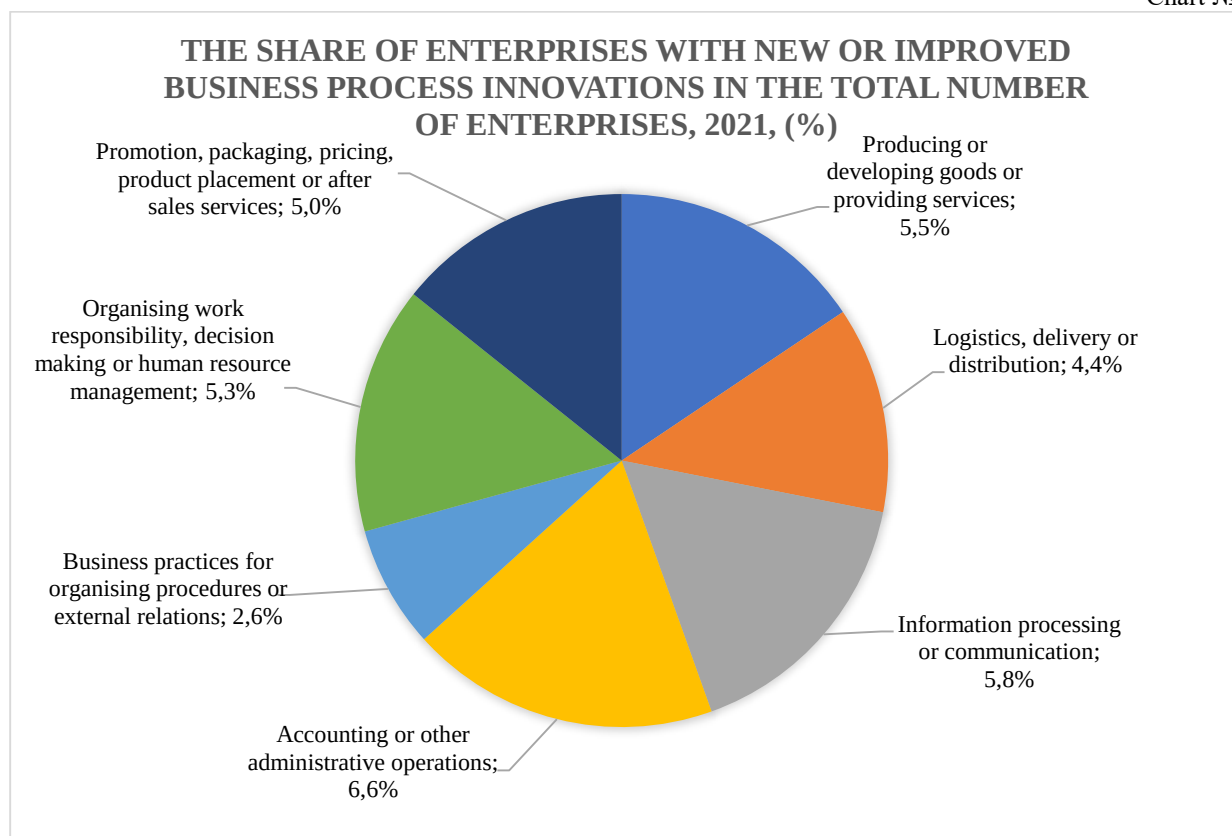
⁸ Dominici, G., and Gagnidze, I. (2021). 'Effectiveness of Entrepreneurial Universities: Experiences and Challenges in Digital Era (A Systemic Approach)', *Interdisciplinary Description of Complex Systems*, 19(1), pp. 13-30. <https://doi.org/10.7906/indecs.19.1.2>

systems⁹. In the modern world, knowledge focused on self-development is becoming more and more important¹⁰.

Discussion

According to survey results, in 2021, 6.4 percent of enterprises introduced new or significantly improved goods on the market, while share of enterprises, that introduced new or significantly improved services during this period, was 5.4 percent. Innovations of goods and services in most cases were originally developed by the enterprises (accordingly 68.7 percent and 73.5 percent). In other cases, they received support from other enterprises or institutions. 60.6 percent of implemented innovations were new to enterprises, while 39.4 percent were new to the market. The structural percentage distribution of innovations of new or significantly improved business processes introduced by enterprises is presented in the chart below:

Chart №1.



Innovations of business processes in most cases were originally developed by the enterprises, accordingly 79.7 percent. In other cases, 20.6 percent were developed with other enterprises or organizations, 18.9 percent were developed by enterprises by adapting or modifying processes originally developed by other enterprises or organisations and 17.6 percent by other enterprises or organizations.

According to economic activity strategies, focusing on high quality was rated as a high degree of importance by 43.0 percent of enterprises, while 32.3 percent of enterprises rated focusing on improving existing goods/services as a high degree of importance.

⁹ Lia Charekishvili, Using ICT by Enterprises as Indicator of Higher Education in Georgia, International Scientific and Practical Conference, ORGANIZATION'S STRATEGY VS REALITIES OF THE VUCA-WORLD, Kiev, Ukraine, November 10, 2021.

¹⁰ Giga Kikoria, Sima Gachechiladze, Salome Pataridze, Distance Education and E-learning in Georgia, ECONOMICS AND BUSINESS, 2019, No2, pp. 209-220

According to the business environment, the main challenge was price increases in goods and services, which leads to the loss of customers.

As survey results, 0.9 percent of enterprises purchased or licensed-in patents, of which 57.7 percent were purchased from private business enterprises or individuals.

According to consequences of climate change, increasing costs or input prices resulting from climate change was rated as a high degree of importance by 41.5 percent of enterprises.

The share of enterprises that used ERP type software¹¹ by January 1st of the 2022 year 6.9%¹².

Table 1.

CRM (Customer Relationship Management)¹³ Software use in enterprises, by the January 1st of the relevant year, %

	2021	2022
The collection, storing and making available information on customers to various business functions	52.6%	56.8%
The analysis of information on customers for marketing purposes (e.g. setting prices, sales promotion, choosing distribution channels, etc.)	47.4%	43.2%
Total	100.0%	100.0%

The share of enterprises that used CRM software for the collection, storing and making available information on customers to various business functions in 2022 – 3.4% instead 2.8 % in 2021; for the analysis of information on customers for marketing purposes (e.g. setting prices, sales promotion, choosing distribution channels, etc.) – 2.6 %.

The distribution of the use of artificial intelligence by the enterprises is different by technologies¹⁴: Technologies performing analysis of written language (text mining) – 23.7%, Technologies converting spoken language into machine-readable format (speech recognition) – 8.7%, Technologies generating written or spoken language (natural language generation) – 8.4%, Technologies identifying objects or persons based on images (image recognition, image processing) – 24.6%, Machine learning (e.g. deep learning) for data analysis – 11.7%, Technologies automating different workflows or assisting in decision making (Artificial Intelligence based software robotic process automation) – 11.6%, Technologies enabling physical movement of machines via autonomous decisions based on observation of surroundings (autonomous robots, self-driving vehicles, autonomous drones) – 11.3%.

The share of enterprises that used the following technologies of artificial intelligence: Technologies performing analysis of written language (text mining) – 35.8%, Technologies converting spoken language into machine-readable format (speech recognition) – 13.1%, Technologies generating written or spoken language (natural language generation) – 12.6%, Technologies identifying objects or persons based on images (image recognition, image processing) – 37.1 %, Machine learning (e.g. deep learning) for data analysis – 17.6%, Technologies automating different workflows or assisting in decision making (Artificial Intelligence based software robotic process automation) – 17.5%, Technologies enabling physical

¹¹ An ERP (Enterprise Resource Planning) is a software package used to manage resources by sharing information among different functional areas (e.g. accounting, planning, production, marketing, etc)

¹² The percentage is calculated only for those enterprises that had access to the Internet during the relevant period.

¹³ CRM (Customer Relationship Management) refers to any software application for managing information about customers.

¹⁴ Artificial intelligence systems can be purely software based, e.g.:

- Chat bots and business virtual assistants based on natural language processing;
- face recognition systems based on computer vision or speech recognition systems;
- machine translation software;
- data analysis based on machine learning, etc.;

or embedded in devices, e.g.:

- autonomous robots for warehouse automation or production assembly works;
- autonomous drones for production surveillance or parcel handling, etc.

movement of machines via autonomous decisions based on observation of surroundings (autonomous robots, self-driving vehicles, autonomous drones) – 17.0%.

The distribution of the use of artificial intelligence by purposes: For marketing or sales – 24.4%, For production processes – 13.8%, For organisation of business administration processes – 6.8%, For management of enterprises – 15.6%, For logistics – 5.9%, For ICT security – 18.0%, For human resources management or recruiting – 15.4%.

Conclusion

As analyze shows Georgia has some experience to develop ICT as dominant role in management of enterprises. It is very important process and hope in next year's analyzing will be more detailed as nowadays.

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FROM INDUSTRY 4.0 TO INDUSTRY 5.0 -THE WAY FOR WELFARE OF SOCIETY 5.0

Abstract. *The concepts of Industrial Revolution 4.0 and Industrial Revolution 5.0 are discussed in the paper. As a result of Industry 5.0, the welfare of Society 5.0 is described by the model developed by the author. The model combines the approaches by H.R. Varian (2010) and by D. Begg, S. Fischer, and R. Dornbush (1991).*

Keywords: *Industry 4.0, Industry 5.0, Society 5.0*

The modern world faces many challenges. Among them are the Industrial Revolution 4.0 (Industry 4.0) and the Industrial Revolution 5.0 (Industry 5.0). The World Economic Forum has been publishing reports on the expected results of Industry 4.0 since 2016. These reports include predictable changes in the field of education (1), the future of jobs (2-3), the green economy (4), and other areas. Many publications have been devoted to the study of these issues by OECD, McKinsey Global Institute, and others (5-8). In addition to international organisations, many researchers discuss predictable changes in the world economy, and some countries, in the coming decades (9-14).

Many organisations and scholars anticipate these changes within the labour market, alongside the need to upgrade certain skills – the scale of which is quite impressive (15-20). For example, one study by McKinsey & Company suggests that by 2030, up to 375 million workers will need to switch occupational categories due to automation, and all workers will need to adapt in order to co-exist alongside increasingly capable machines. A 2017 McKinsey Global Institute survey reported that 62% of business executives