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The Effect of Knowledge-Based Sectors on Production in the Iranian Economy Using the Social Accounting Matrix and Complexity Approach

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EXTENDED ABSTRACT

INTRODUCTION

During the past two decades, value-added growth in both developing and developed countries has indisputably been driven by knowledge-based economic structures; thus, the knowledge-based economy has become a paramount subject in modern economics. Knowledge is a unique, fluid, and cumulative economic asset that increases the rate of social return and serves as a potent mechanism for enhancing productivity and economic growth. Consequently, nations today recognize that a knowledge-based economy is essential for maximizing productivity and prosperity. Iran must also undergo a transition from an economy dependent on natural resources and raw materials toward a complex and resilient economic structure.

METHODOLOGY

This study is a piece of library-based research conducted through the analysis of secondary data. The 2011 Social Accounting Matrix (SAM), developed for the Parliament Research Center, serves as the primary data source, encompassing all five major economic accounts and 71 economic sectors. Furthermore, data for the Economic Complexity Index (ECI) were calculated for the purpose of this study. The researchers identified and integrated these

variables before performing statistical analysis using the production multiplier method. The research design is descriptive and applied in nature, aiming to contribute to the application of knowledge across various management fields.

This study specifically aims to identify and quantify the significance of knowledge-based sectors within the Iranian economy. To achieve this, the Product Complexity Index and the Social Accounting Matrix (SAM) model were utilized. The statistical foundations of the research consist of export statistics from 2015 to 2020 and the 2011 SAM. Initially, complex (knowledge-based) products were identified via HS-code classifications, utilizing indices such as Revealed Comparative Advantage (RCA), distance, and opportunity gain for the aforementioned years. Subsequently, knowledge-based activities were identified by mapping HS codes to ISIC codes within the Social Accounting Matrix. Finally, the significance of these sectors in the Iranian economy was analyzed by calculating production multipliers as well as the backward and forward linkages of knowledge-based sectors with other economic sectors and the overall economy.

FINDINGS

The results indicate that 97 knowledge-based products were identified within the Iranian economy. By matching HS codes with ISIC sectors, 16 knowledge-based ISIC sectors were evaluated. Although Iran has not yet achieved a competitive advantage in all of these products, strategic policymaking and targeted investment in these sectors and products can facilitate a transition toward knowledge-based production and develop capabilities that align with the country's existing standards.

The sectors exhibiting the highest multipliers include: "manufacture of food products and beverages" with a coefficient of 3.19; "livestock, poultry, silkworm and bee breeding, and hunting" with a coefficient of 3.00; "manufacture of fabricated metal products (excluding machinery and equipment)" with a coefficient of 2.57; and "other buildings" with a coefficient of 2.56. Consequently, an investment in the knowledge-based sector of food products and beverages multiplies the overall economic output by 3.19. The average production multipliers for knowledge-based sectors and other sectors are 2.51 and 2.29, respectively.

The knowledge-based sectors with the strongest backward linkages were "food products and beverages" (1.97 units) and "livestock, poultry, silkworm and bee breeding, and hunting" (1.73 units). Furthermore, the highest forward linkages were observed in "publishing, printing, and reproduction of recorded

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media" (2.56 units), followed by "livestock, poultry, silkworm, and honeybee breeding and hunting" (2.27 units). With a total of 4.06 units, the knowledge-based "publishing, printing, and reproduction of recorded media" sector possessed the highest total linkages, followed by "livestock, poultry, silkworm and honeybee breeding and hunting" (4.00 units), and "food products and beverages" (3.66 units). High linkage coefficients in knowledge-based sectors demonstrate that these industries can play a unique role and hold significant strategic importance for the country.

CONCLUSION

Based on the total linkages between the 16 identified sectors and the Iranian economy, the priority for concentration and policymaking is as follows: livestock, poultry, breeding of silkworms and bees, and hunting; production of food products and beverages; textiles; wood and wood products; paper and paper products; publishing, printing, and dissemination of recorded media; coal; products from petroleum and nuclear fuels treatment; chemical materials and products; rubber and plastics products; and other building sectors. Therefore, the state and policymakers must prioritize investment in these sectors based on the sum of their backward and forward linkage coefficients, as these sectors can support the growth and development of a larger segment of the economy. Regarding resource allocation priorities, policymakers are encouraged to move toward an economic structure characterized by highly complex, knowledge-based products. Consistent with the findings of other research in this field, this study indicates that through appropriate investment, policymakers can steer the country's development toward the production of diverse, knowledge-based, and high-complexity products.

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