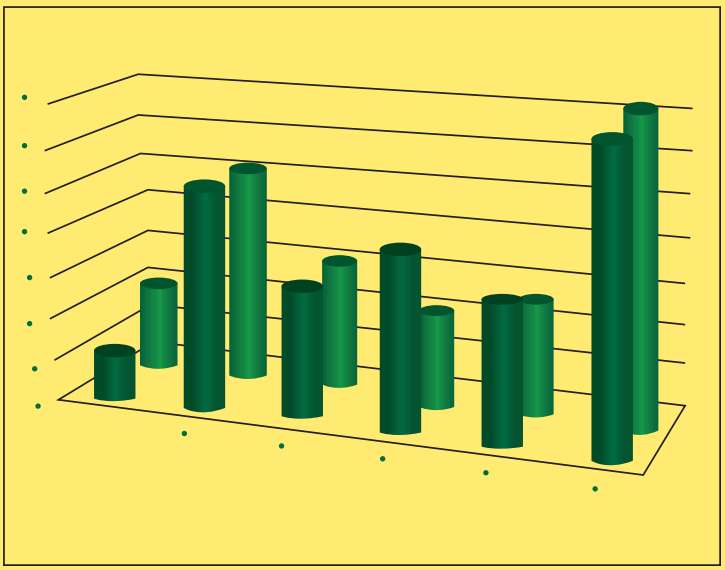
المعهد العربي للتدريب والبحوث الإحصائية

مجلة العلوم الإحصائية



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شروط النشر في مجلة العلوم الإحصائية

1 – تنشر المجلة البحوث والدراسات العلمية في المجالات الإحصائية والمعلوماتية المكتوبة باللغة العربية والانكليزية والفرنسية على أن لا يكون البحث المقدم للنشر قد نشر او قدم للنشر في مجلات او دوريات أخرى او قدم ونشر في دوريات لمؤتمرات أو ندوات.

2 – ترسل البحوث والدراسات الى أمين التحرير على أن تتضمن اسم الباحث او الباحثين وألقابهم العلمية وأماكن عملهم مع ذكر عنوان المراسلة وأرقام الهواتف والبريد الالكتروني. وان يرسل البحث المراد نشره الكترونيا (على قرص او بالبريد الالكتروني) وفق المواصفات أدناه:

أ – أن يكون مطبوعاً على ورق حجم A4 وان يكون على شكل عمود واحد ويستخدم للغة العربية نوع حرف (Simplified Arabic) و(Times New Roman) للإنجليزية والفرنسية وبحجم خط (12). وباستخدام Microsoft Word وعلى وجه واحد للورقة.

ب – الهامش مسافة 2.5 سم لجميع جوانب الورقة.

ج – يرفق الباحث ملخصاً عن بحثه باللغتين العربية والانجليزية والفرنسية بما لا يزيد عن صفحة واحدة.

د - يتم الإشارة الى المصادر العلمية في متن البحث وفي نهايته، مع مراعاة أن لا يتضمن البحث سوى المصادر التي تم الإشارة إليها في المتن ووفق الأصول المعتمدة في ذلك (اسم المؤلف، سنة النشر، عنوان المصدر، دار النشر، البلد).

هـ– ترقم الجداول والرسوم التوضيحية وغيرها حسب ورودها في البحث، كما توثق المستعارة منها بالمصادر الأصلية.

و– أن لا يزيد عدد صفحات البحث اوالدراسة عن (25) صفحة.

3 – يتم إشعار الباحث باستلام بحثه خلال مدة لا تتجاوز يومين عمل من تاريخ استلام البحث.

4 – تخضع كافة البحوث المرسلة الى المجلة للتقييم العلمي الموضوعي ويبلغ الباحث بالتقييم والتعديلات المقترحة إن وجدت خلال مدة لا تتجاوز اسبوعان من تاريخ استلام البحث.

5 – لهيئة تحرير المجلة الحق في قبول او رفض البحث ولها الحق في إجراء أي تعديل او إعادة صياغة جزئية للمواد المقدمة للنشر بما يتماشى والنسق المعتمد في النشر لديها بعد موافقة الباحث.

6 – يصبح البحث المنشور ملكاً للمجلة ولا يجوز إعادة نشره في أماكن أخرى.

7 – تعبر المواد المنشورة بالمجلة عن آراء أصحابها، ولا تعكس وجهة نظر المجلة او المعهد العربي للتدريب والبحوث الإحصائية.

8 – ترسل البحوث على العنوان الالكتروني للمجلة:

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المحتويات

Using Mathematical Approach by Measuring the Impact of Capital Formation on the Priority Sectors which are Included in Economic Modernization Vision

(As a Pioneer Sectors in Jordan Economy)

Amin Osama Shammout Osama Suliman ALSalaheen Tamara Elias Janho

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Using Mathematical Approach by Measuring the Impact of Capital Formation on the Priority Sectors which are Included in Economic Modernization Vision

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Amin Osama Shammout Osama Suliman ALSalaheen Tamara Elias Janho

Abstract

This research evaluates the economic interlinkages and multiplier effects of sectors included in Jordan's "Economic Modernization Vision" using Leontief's Input-Output (I-O) model. This study aims to quantify the strength forward and backward linkages, and to calculate output multiplier, income, value-added, and import multipliers. Additionally, it assesses the macroeconomic impact of increasing Gross Capital Formation (GCF) in target sectors under three scenarios increasing (10%, 30%, 50%) respectively.

Findings indicate that sectors like fish processing, water and waste management, bakery products, construction, and chemical industries have high output multipliers (ranging from 1.51 to 1.8). Conversely, sectors such as petroleum refining and basic metals and bakery products as well show relatively low output multipliers but high import dependencies. Increasing in Gross Capital Formation GCF in targeted sectors results in proportional well increases in imports, taxes, employee compensation, and gross value added, with the most significant rise observed in direct imports inputs greater than Intermediate imported input for production resulting from Capital Formation increasing.

The study recommends strengthening weak sectoral linkages, developing a local supplier database, and supporting industries with strong multiplier effects. Import substitution strategies, legislative reforms, and enhanced R&D are also advised to reduce import reliance and boost domestic production capacity. These interventions aim to maximize the economic impact of modernization efforts and support sustainable, inclusive growth.

This study is distinguished by its comprehensiveness of the sectors of value included in the economic modernization vision, and by its individual analysis of each sector by applying mathematical approach.

Keywords: Economic Modernization Vision, Leontief model, Jordan

استخدام النموذج الرياضي لقياس أثر تكوين رأسمالي الثابت على القطاعات ذات الأولوية المشمولة في رؤية التحديث الاقتصادي (كقطاعات رائدة في الاقتصاد الأردني)

امين أسامة شموط أسامة سليمان الصلاحين تمارا الياس جنحو

الملخص

يُقيّم هذا البحث الروابط الاقتصادية المتشابكة والآثار المضاعفة للقطاعات المشمولة في "رؤية التحديث الاقتصادي" الأردنية باستخدام نموذج" ليونتيف للمدخلات والمخرجات". كما تهدف هذه الدراسة إلى تحديد قوه الروابط الأمامية والخلفية ، وحساب مضاعفات الإنتاج ، والدخل، والقيمة المضافة، والواردات. كما يُقيّم الأثر الاقتصادي الكلي لزيادة تكوين رأس المال الثابت لثلاث سيناريوهات تزايد (10%، 30%، 50%) على التوالي للقطاعات المستهدفة .

تشير النتائج إلى أن قطاعات مثل تصنيع الأسماك، وإدارة المياه والنفايات، ومنتجات المخابز، والبناء، والصناعات الكيميائية، تتمتع بمضاعفات إنتاج عالية (تتراوح بين 1.51 و1.8). في المقابل، تُظهر قطاعات مثل تكرير البترول والمعادن الأساسية ومنتجات المخابز مضاعفات إنتاج منخفضة نسبيًا، إلا أنها تعتمد بشكل كبير على الواردات. كما اشارت النتائج ان ان الزيادة في التكوين الرأسمالي الثابت الإجمالي (GCF) على القطاعات المستهدفة أدت الى زيادات واضحة في الواردات والضرائب وتعويضات الموظفين والقيمة المضافة الإجمالية، مع ملاحظة أكبر ارتفاع الواردات المباشرة مقارنةً بالمدخلات الوسيطة المستوردة للإنتاج الناتجة عن هذه الزيادة في التكوين رأس المالي.

توصي الدراسة بتعزيز الروابط القطاعية الضعيفة، وتطوير قاعدة بيانات للموردين المحليين، ودعم الصناعات ذات التأثيرات المضاعفة القوية. كما اوصت باستراتيجيات إحلال الواردات، والإصلاحات التشريعية، وتعزيز البحث والتطوير لتقليل الاعتماد على الواردات وتعزيز القدرة الإنتاجية المحلية؛ بما يعظم الأثر الاقتصادي لجهود التحديث ودعم النمو المستدام والشامل

تتميز هذه الدراسة بشموليتها لقطاعات ذات القيمة العالية المشمولة في رؤية التحديث الاقتصادي، وتحليل قطاعاتها بشكل فردي باستخدام النموذج الرياضي .

الكلمات المفتاحية: رؤية التحديث الاقتصادي، نموذج "ليونتيف"، الأردن

Introduction:

Input-Output Tables have contributed through several applications, the most prominent of which is in the field of planning in the path of production and use and forecasting within the framework of general equilibrium, including the analysis of value added in economic sectors and activities (Value Added) or its components such as income, operating surplus and labor, and through the application of (Leontief Model). Therefore to enhance the description of an economy with more parameters, mathematical and economic logic requires analyzing economic phenomena from a broader and more comprehensive perspective than partial or total analysis (Hajji, 1985). Therefore, the use of the input-output model, which goes back to the mathematician and economist Leontief, is considered the most important mathematical tool for presenting "parameters" that are used to explain the nature and strength of economic interdependence between different economic sectors and in calculating the production multiplier, income multiplier, and value-added multiplier, including diagnosing their components and effects. This determines the pioneer and vital sectors at the national level or the regional level within a single country, which contributes to directing resources and planning investment, labor force, and foreign trade (Al-Hamadi, 2010), as well as planning the role of small and medium-sized enterprises MSEs (Shammout and Al-Satel,2022).

The Economic Modernization Vision [1] in Jordan serves as a comprehensive strategic framework aimed at achieving a qualitative transformation in the country's economic and social trajectory over the coming two decades. The vision seeks to absorb more than one million young men and women into the labor market, increase real per capita income by an average of 3% annually, and enhance Jordan's standing in global indicators by raising its ranking to the top 30% in the Global Competitiveness Index. It also aspires to achieve an 80% satisfaction rate regarding quality of life and to include a Jordanian city among the world's top 100 cities in terms of livability and urban development.

[1] The Economic Modernization Vision (EMV) was launched under the patronage of His Majesty King Abdullah in June 2022. It serves as a strategic framework for successive governments to implement economic reforms and initiatives aimed at improving the overall economic landscape of Jordan. The vision encompasses 366 initiatives across various sectors and is structured into three main phases over a ten-year period.

The vision is built on eight key drivers of economic growth covering 35 subsectors, with particular emphasis on the priority sectors that attract nearly three-quarters of total planned investments. These priority sectors include transport, logistics, and tourism; mining, energy, and education; chemical industries and textiles; healthcare services; in addition to food, pharmaceuticals, agriculture, and food security. Other sectors such as information and communications technology (ICT), creative and engineering industries, as well as water security—recognized as a strategic necessity—are also at the core of the program . The vision seeks to transform these sectors into development levers capable of generating quality jobs and diversifying the productive base, reducing reliance on traditional sectors. Accordingly, clear policies have been adopted to stimulate investment, boost exports, and build integrated production value chains with higher domestic added value. Empowering the Jordanian workforce lies at the heart of the vision, both through skills development and by expanding women's and youth's participation in the economy. Complementary institutional and legislative reforms have accompanied these goals, such as the launch of the Invest Jo platform to streamline investment procedures, the endorsement of a new Investment Law and National Investment Policy, and amendments to the Public-Private Partnership Law to foster a more attractive investment environment.

At the operational level, the Executive Programme 2023–2025 has incorporated projects such as upgrading transport infrastructure, modernizing airports and border centers, and supporting creative industries like film and gaming

The vision has also received significant international backing. In 2025, the World Bank announced a $1.1 billion financing package to support the vision's priorities, particularly those linked to private-sector-led growth, sustainable energy, innovation, and expanded social safety nets. This highlight international confidence in Jordan's ability to implement its reform agenda and turn economic challenges into opportunities for growth and competitiveness.

Thus, the Economic Modernization Vision is not merely a planning document but a comprehensive roadmap designed to restructure Jordan's economy on the foundations of productivity, innovation, and sustainability. By focusing on priority sectors as the main engines for investment attraction, food and water security, job creation, and

improved quality of life, the vision strengthens Jordan's positioning regionally and globally.

Main Characteristics of the High-value sectors within the framework of the economic modernization vision and Capital Formation:

The following table No.1 present the studied sectors in terms of their annual growth targets in the strategy, contribution to GDP and industrial exports, employment opportunities, as well as the main challenges facing each sector.

Table No.1 Characteristics of high-value sectors within the framework of the economic modernization vision

Sector and Annual Growth in the Strategy	Contribution of GDP and industrial exports	Employment Opportunities	Main Issues
Food Industries Targeted Annual Growth in Strategy: 6%	Represents 27% of the industrial sector in terms of contribution to GDP (equal to 6% of total GDP), and around 17.8% of industrial exports.	38,000 workers	•High cost of production inputs, particularly energy. •Shortage of specialized talent. •Limited availability of raw materials.
Chemical Industries Targeted Annual Growth in Strategy: 7**%**.	Represents 11.7% of the industrial sector in terms of contribution to GDP (equal to 2.7% of total GDP), and about 30.4% of industrial exports.	21,000 workers	•Jordan has a strong position in the production of fertilizers and derivatives. •However, it remains modest in producing paints, detergents, and personal care products.
Pharmaceutical Industries Targeted Annual Growth in Strategy: **10%**.	Represents 10.2% of the industrial sector in terms of contribution to GDP (equal to 2.3% of total GDP), and about 9% of industrial exports.	5,400 workers	•Small market size. •High production costs and taxation. •Slow registration processes and strict local pricing policies.
Engineering Industries Targeted Annual Growth in Strategy: **7%**.	Represents 5% of the industrial sector in terms of contribution to GDP (equal to 1.1% of total GDP), and about 14.1% of industrial exports.	10,000 workers	•Jordan has an emerging base of companies acting as suppliers to assembly companies. •Requires adoption of innovative ideas derived from international experiences and expansion of their application in Jordan.
Garment Industry	Represents 8.1% of the industrial sector in terms of contribution to GDP	76,000 workers	•Heavy dependence on foreign labor (approximately 70%).

Targeted Annual Growth in Strategy: 10%.	(equal to 1.8% of total GDP), and about 27% of industrial export		●Reliance on imported raw materials.

Source: https://www.jordanvision.jo/ar

Fixed Capital Formation in Jordan Economy

Fixed Capital Formation (FCF) is considered to be a main component of the final demand in the frame of GDP account; it refers to the net increase in assets within an economy during a specific period. It measures the value of acquisitions of fixed assets (such as buildings, machinery, equipment, infrastructure, and land improvements) minus disposals of these assets.

The percentage of fixed capital formation contribute to the total final demand in Jordan ranges between 16.8% and 13.8% year 2021,2022 respectively.

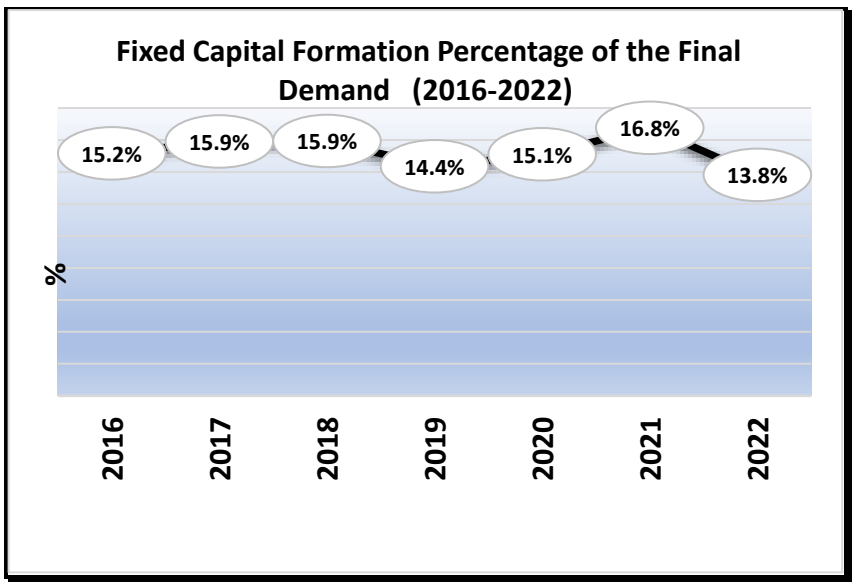

Fig. No.1 Department of Statistics (DoS)

The Aims of the Study:

- Measure the strength of forward & backward linkages between sectors that are Included in "Economic Modernization Vision "and overall sectors in Jordanian Economy.
- Measure the Output multiplier, income multiplier, Value-added multiplier and import direct and Intermediate multiplier by sector that are Included in "Economic Modernization Vision ".
- Measuring the impact of increasing Gross Capital Formation through three scenarios, by 10%, 30%, and 50% respectively for sectors that are included in the Economic Modernization Vision on the Total Output, by demonstrating the most important sectors that are affected by these scenarios in overall Jordanian Economy.

Data Sources & Methodology

Data Sources: Secondary data due to year 2022; That were recently published on the official website of the Jordanian Department of Statistics in the med year (2025). The basic matrix of inputs and outputs was classified to 40 sectors according to preparation by the Jordanian Department of Statistics as shown in (Appendix 1).

Methodology: To achieve the objectives of the study, the "Input-Output Leontief Model" was employed, which is shown in the algebraic equations (Jacques,2006: Chiang& Wainwright, 2005: Miller.R & Blair.P 198; **Shammout et al. 2022**)as the following:

Transaction Matrix:

Total Output = Intermediate Consumption + Final Demand

Xi =Aij+Yi…… (i=1,2,3....40)……**….(1)**

Total Output = Total use + Value added

Xj = Aij+Vj……(j=1,2,3….40)…….. ……..(2)

Based on the design and classification of the input-output tables that were implemented and published by the Jordanian Department of Statistics for about 40 sectors or activities; therefore, the analysis was based on the following equations (Al- Zu 'bi **et al. 2021;** Shammout **and Al-Satel, 2022: Shammout et al. 2023):**

$\sum_{i=1}^{40} \mathrm{Aij} + \sum_{j=1}^{1} \mathrm{Yj} = \mathrm{Xi}$…….. (3)

$\sum_{i=1}^{40} \mathrm{Aij} = \sum_{j=1}^{40} \mathrm{aij} * \mathrm{Xj}$……..(4)

$\frac{\mathrm{Aij}}{\mathrm{Xj}} \mathrm{aij} = \sum_{i=1}^{4} \mathrm{Vij} + \sum_{i=1}^{40} \mathrm{Aij} = \mathrm{Xj}$ ……(5)

$\sum_{i=1}^{4} \mathrm{Vij} = \sum_{j=1}^{40} \mathrm{uij} * \mathrm{Xj}$……(6)

$\frac{Vij}{Xj}$ uij =

Yi= $(I - aij)$ *Xi ..... (7)

Xi= $((I - aij)^{-1})$* Y i ..... (8)

$$\sum_{i=1}^{n} Aij \neq \sum_{j=1}^{n} Aij$$

$$\sum_{i=1}^{n} Yi = \sum_{j=1}^{n} Vj$$

Where:

Aij: Transaction Matrix.

Xi: Vertical vector representing the total output produced by sector i and received by sector j.

Xj: Horizontal vector representing the inputs received from sector j and produced by sector i.

aij: Technical Coefficients Matrix showing what sector i sold to sector j as a percentage of sector. Xj: Total Output.

Yi: Final Demand vector.

Vj: Value added vector, which is (current production minus intermediate consumption), where value added includes the following: compensation of workers + depreciation of fixed capital + Operating surplus + (Indirect taxes on production - Subsidies on production).

uij: The technical matrix of Primary Inputs, which is equal to (Total Value added of the Sector) and (Imports) and (Tax on products) separately divided by the total production of that sector Xj.

I: Identity matrix.

Measuring the Economic Interdependence:

The structural analysis process requires a methodology for measuring economic interdependence to arrive at indicators that describe the nature and level of interdependence. This determines the pivotal or pioneer sectors in the national economy, which are usually of two basic types:

1- Forward linkages: (Permissive effect). The distribution coefficient matrix was applied according to the" Leory Jones" method.

2- Backward linkages: (Causal effect). The direct technical coefficient matrix was applied according to the "Hirschman" method. `

The strength of forward linkages index measures the sector's ability to create investment opportunities in the Economy, While the strength of backward linkages represents the sector's ability to create demand and expand its market base(Al-Hamadi, 2010).

Total Forward Linkage (Direct & Indirect):

The Inverse Matrix method was applied for the distribution coefficients after the identity matrix was subtracted as shown in the following equation:

$$Ui\ total\ ^{f} = \sum_{J=1}^{n=40} kij \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (9)$$

$$kij=(I\text{-}sij)^{-1}$$

$$\frac{Aij}{Xi}\ sij =$$

The results from the previous equations No (9) indicate that if the row coinfection sum for a specific sector was (greater than one) which indicates that it has high overall forward attraction linkages.

Total Backward Linkages (Direct & Indirect)

The inverse matrix method was applied for technical transactions after the identity matrix was subtracted from it, as shown in the following equation:

$$Uj\ total\ ^{b} = \sum_{i=1}^{n=40} Bij \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (10)$$

$$Bij = (I\text{-}aij)^{-1}$$

$$\frac{Aij}{Xj}\ aij =$$

The results from the previous equations indicate that if the total column sum for a specific sector was (greater than one) which indicates that it has high back-attraction linkages.

Output Multiplier[2]: It is the same formula as in equation No (10); Which can be Interpret as results the increase in the Total output of the national economy by a specific value as a result of an increase in demand by one unit for a specific economic activity**.**

[2] Simple Output Multiplier /Miller.R & Blair.P 2009.

Value Added Multiplier: It measures the effect of the increase in the returns some of primary inputs as a result of increasing the final demand for this specific sector by one unit, and is calculated through the vertical sum of the elements of the matrix in the following equation No (11).

= uij *(I-aij)-^{1} …… (11) Value Added Multiplie**r**

Income Multiplier: It measures the effect of the increase in income (employee compensation + operating surplus) as a result of an increase in final demand for this specific sector by one unit, and it is calculated through the vertical sum of the matrix elements in Equation No.(12) .

Income Multiplier[3] = Oij *(I-aij)-^{1} ……(12)

Oij: Technical income matrix equals (compensation of employees + operating surplus) divided by the Total Output of that Sector Xj .

Import Multiplier (Sectors) = mij *(I-aij)-^{1} ……(13)

mij: Technical income matrix equals (Imports for each sector separated) divided by the Total Output of same Sector Xj.

The Impact of increase in Capital formation[4] Scenarios on the Total Output

The demand components equation can be derived as following equations (Blair, 2009 & Miller: Zu'bi. **et al. 2021).**

X = (A*X) + Y …….. (14)

Y= X - (A*X)

Y= (I*X) - (A*X)……(15)

$$I=\begin{bmatrix}1 & 0 & . & .\\ . & 1 & . & .\\ . & . & . & .\\ 0 & 0 & . & 1\end{bmatrix}$$

Y= (I-A)*X ……..(16)

$$\text{I-aij}=\begin{bmatrix}1-a12 & -a12 & . & . & -a1n\\ . & . & . & . & .\\ -am1 & . & . & . & 1-a40n\end{bmatrix}$$

$$\boldsymbol{X = Yi * (I - aij)^{-1}} \quad \textbf{……..(17)}$$

[3] Simple Output Multiplier /Miller.R & Blair.P 1985.

[4] Sectors only which are Included in Economic Modernization Vision.

Y=C*q' …… …….....…….…… (18)

Whereas the components of the final demand are… (q1, q2, q3…. q9)

q1: Government Final Consumption Expenditure
q.2: Household Final Consumption Expenditure
q.3: Final Consumption Expenditure
q.4: Exports-Goods
q.5: Exports-Reexports
q.6: Exports-Services
q.7: Exports-Travel
q.8: Fixed Capital Formation
q.9: Changes in Stocks

$$\begin{matrix} Y1 \\ Y2 \\ Y3 \\ . \\ . \\ Y40 \end{matrix} = \begin{bmatrix} C11 & C12 & . & . & . & C1j \\ C21 & C22 & . & . & . & . \\ . & . & . & . & . & . \\ C40j & C40j & . & . & . & Ci9 \end{bmatrix} * \begin{bmatrix} q1 \\ q2 \\ q3 \\ . \\ q8 \\ q9 \end{bmatrix} \quad \text{……(19)}$$

yij: (40 x 9) Matrix containing demand coefficients of the 40 sectors i: 1,1,3….40, while J :1,2, 3,..9 sectors.

$$\boldsymbol{cij = \frac{yij}{Xj}}$$

Therefore, the final equation as the following:

X=$(\boldsymbol{I - aij})^{-1} * c^* (\boldsymbol{q'} + \Delta)$……(20)

Where (q8): Capital Formation component as in the Demand components order (I-O "DOS , 2022) as the following :

$$\begin{bmatrix} q1 \\ q2 \\ q3 \\ . \\ q8 + \Delta \\ q9 \end{bmatrix}$$

Δ: $which\ are\ 3\ \ Scenarios$:

$$\Delta\ 1\ = q8 * 10\%$$
$$\Delta\ 2\ = q8 * 30\%$$
$$\Delta\ 3\ = q8 * 50\%$$

Impact of increase in Capital Formation[5] Scenarios on the Primary Inputs[6]

The Cumulative Input – Output Coefficients of primary input requirements on the Demand side can be calculated as in the following formula**:**

$\sum_{i=1}^{7} pij = [uij^{*}(\boldsymbol{I} - \boldsymbol{aij})^{-1} * c + hij] * \boldsymbol{q}'.$ .....(21)

Where:

Hij: Primary input requirements on the Demand side consist of as the following:

1. Imports
2. Taxes on Products
3. Subsidies on Products
4. Subsidies on production
5. Taxes on production
6. Compensation of employees
7. Gross operating surplus / mixed income

pij: Cumulative Input – Output Coefficients of primary inputs

$$\text{h1j} = \frac{\text{Imports for a specific demand componant}}{\text{Xj}}$$

$$\text{h2j} = \frac{\text{Taxes on Products for a specific demand componant}}{\text{Xj}}$$

[5] Sectors only which are Included in Economic Modernization Vision.

[6] Include the Total value Added.

Estimating the Impact of increase in Capital Formation[7] Scenarios on the Primary input can be calculated by the following formula:

$$\text{Primary input} = \sum_{i=1}^{n=7} \boldsymbol{Hij} + \sum_{i=1}^{n=7} \boldsymbol{Uij} \quad \text{.....(22)}$$

$$Zij = [\boldsymbol{U}(I-a)^{-1} * C + h] * (q' + \Delta) \quad \text{..... (23)}$$

Δ: $Scenarios\ are$:

$$\Delta 1 = q8 * 10\%$$
$$\Delta 2 = q8 * 30\%$$
$$\Delta 3 = q8 * 50\%$$

Rij=hij*q´.....(24)

Rij : Requirement (imports+ Indirect taxes on products) in order to meet the Demand Component's.

$\sum_{i=1}^{n=7} \boldsymbol{Uij}$ = **Zij- Rij .....(25)**

The previous equations can be summarized as in the following Tables.

Table No.2 Transaction Matrix

	1 ,2.... 40	1,2,3.....9		Total Output
1 2 . . 40	Aij	yij	Y	Xi
imports	(mij) Intermediate Imports	(Mij) Direct Imports	R1	Z1
Indirect Taxes on products	U	H	R2	Z2
Value Added				Zij
Total Output	Xj	q1.....q9		Xij

Table No.3 Cumulative Input-Output Coefficients

$(I-aij)^{-1}$	$C*(I-aij)^{-1}$

[7] Sectors only which are Included in Economic Modernization Vision.

uij*(I-aij)-¹	$uij*(\boldsymbol{I}-\boldsymbol{aij})^{-1}*c+hij$

Al-Karkhi ,2010

literature Review

Olutumise, and others (2024) examine the influence of various sources of capital formation on total factor productivity (TFP) within Nigeria's agricultural sector from 1980 to 2021. Employing an empirical-analytical methodology that integrates Malmquist Data Envelopment Analysis (DEA) and Tobit regression models, the study finds an average annual productivity gain of 2.2% (TFP change of 1.022), mainly driven by technological progress rather than improvements in technical efficiency. Tobit regression results reveal that domestic capital formation—manifested through government agricultural expenditure and GFCF—has a significant, albeit modest, positive effect on agricultural TFP, while human capital formation also contributes positively. In contrast, foreign direct investment (FDI) shows no significant correlation with TFP. The study underscores the need for robust policy frameworks that align capital disbursement with production cycles to enhance productivity outcomes.

Shammout and Al-Satel (2022) under the title "Analyzing the Value Added by the Impact of increased Exports and Capital Formation of the Industrial activities in the Jordanian Economy Using the Leontief Model" That investigates the impact of increased exports and capital formation on the value-added (GVA) of Jordan's industrial sector, which employed 19.7% of the labor force and contributed 22.2% of the national value added in 2020. Employing the Leontief Model, a mathematical framework that captures multipliers and identifies pivotal sectors, the research analyzed 13 industrial activities to assess how changes in exports and capital formation influence GVA and its components, including labor compensation and operating surplus. Results highlighted chemical and pharmaceutical products as the primary generators of value added, while recommendations focused on enhancing capital formation in the manufacture of basic metals, formed metal products, non-metallic mineral products, the beverage industry, and mining. The study is notable for its detailed component-level analysis of value added under different economic scenarios, distinguishing it from prior research.

Al-Zubaidi (2021) studded the fixed capital formation on Iraq's GDP, aiming to assess how investments in physical and human capital

contribute to economic growth while identifying structural obstacles to efficient capital accumulation. Using an empirical analytical approach with time-series data and econometric estimation, combined with a descriptive analysis of Iraq's economic structure, the study finds that while capital formation has a positive and significant effect on growth, its effectiveness is constrained by structural imbalances, oil dependency, weak private sector participation, and limited diversification. The conclusions stress that despite relatively high investment levels, inefficiencies and fragile institutions have reduced the long-term developmental benefits of capital accumulation. The study recommends diversifying investment beyond oil, strengthening infrastructure and human capital, supporting private sector growth, and improving governance to create a stable and efficient investment environment that maximizes the developmental role of capital formation in Iraq.

Al- Zu 'bi and other (2021) performed a study "Analysing the Impact of the Most Important Components of (Final Demand) on the Economic Sectors in Jordan by using "Leontief Model" This study uses the Leontief Input-Output model to analyze the impact of changes in key components of final demand—government expenditure, private consumption, commodity exports, and capital formation, which account for 87.4% of demand—on Jordan's total economic output across 40 sectors, using secondary data from the Jordanian Department of Statistics. The results show that a 20% increase in commodity exports (≈879 million JD) leads to a total output rise of approximately 1,285.1 million JD, with the largest gains in textiles and leather (≈216.8 million JD), chemicals (≈171.5 million JD), mining and quarrying, and pharmaceuticals (≈128 and 112.8 million JD, respectively), representing a 31% higher output increase than the value of export growth itself. Based on these findings, the study recommends that policymakers prioritize plans, policies, and programs to support commodity exports, particularly through fostering small and medium enterprises (SMEs), to stimulate sectoral production and broader economic growth.

The study by Taraki and Arslan (2019) investigates the role of capital formation in driving economic development, particularly within developing economies. Using a theoretical and comparative approach grounded in classical, neoclassical, and endogenous growth models, alongside Hirschman's unbalanced growth theory, the research evaluates how investment in physical, human, and knowledge capital stimulates productivity, employment, innovation, and structural transformation.

The findings highlight that capital formation is fundamental to breaking poverty cycles, fostering industrialization, and sustaining long-term growth by mobilizing savings and channeling them into productive investments. The study concludes that both balanced and unbalanced growth strategies underscore industrialization as a catalyst for development and recommends that developing countries adopt policies that promote savings and investment, strengthen financial institutions, support SMEs, and strategically invest in sectors that generate strong linkages, innovation, and diversification to ensure stability and poverty reduction.

The study by Țigănașu, Simona, and Danuletiu (2018) analyzes the impact of gross fixed capital formation (GFCF) on Romania's overall economic output by applying Leontief's input-output model to the country's 2007 input-output tables, aggregated into 10 key sectors. Through constructing technical and inverse coefficient matrices, the authors simulated the effects of investment variations and sectoral reallocations, finding that a 5% increase in GFCF raised Romania's global output by 0.815%, with construction and equipment manufacturing emerging as the most responsive sectors. The results underscore that not only the volume but also the structure of investments matters, as directing resources toward technology-intensive and construction sectors amplifies growth outcomes. The study concludes that investment policy plays a decisive role in both short-term recovery and long-term development, recommending that Romania expand investment programs in high-multiplier sectors, refine input-output analyses with more detailed data, and integrate forecasting models to better account for technological change and evolving demand, thereby enhancing policy effectiveness and economic resilience.

Application, Result and Discussion

Output Multiplier vs Import Multiplier Rank for 20 sub- Sector that are Included in Economic Modernization Vision.

From Figure No. (2), the following interpretations can be reached, which relate to the change in the value of the total activities of the national economy, Total Output, and what it includes in terms of added value when the demand for a specific activity increase (by one Jordanian dinar).

The most prominent activities that have a high output multiplier:

1. An increase in demand for the meat and fish processing and preservation industry by one dinar requires an increase in inputs for all national economic activities, including their added value, of approximately 1.8 dinars.
2. An increase in demand for the manufacture of other non-metallic mineral products by one dinar requires an increase in inputs for all national economic activities, including their added value, of approximately 1.7 dinars.
3. An increase in demand for water supply, sanitation, and waste management and treatment by one dinar requires an increase in inputs for all national economic activities, including their added value, of approximately 1.65 dinars.
4. An increase in demand for the bakery products industry by one dinar requires an increase in inputs for all national economic activities, including their added value, of approximately 1.62 dinars.
5. An increase in demand for construction by one dinar requires an increase in inputs for all national economic activities, including their added value, of approximately 1.55 dinars.
6. When demand for the chemical materials and products industry increases by one dinar, it requires an increase in inputs for all national economic activities, including their added value, of approximately 1.51 dinars.
7. When demand for pharmaceutical products manufacturing increases by one dinar, it requires an increase in inputs for all national economic activities, including their added value, of approximately 1.50 dinars.
8. When demand for livestock production increases by one dinar, it requires an increase in inputs for all national economic activities, including their added value, of approximately 1.50 dinars.

The most prominent activities that have a low Output multiplier and a high import multiplier:
1. Increasing demand for the coke and refined petroleum products industry by one dinar leads to an increase in total output for all national economy activities by approximately 1.16 dinars, while requirements for imported production inputs by approximately 0.69 dinars.
2. Increasing demand for the basic metals and fabricated metal products industry by one dinar leads to an increase in total output for all national economy activities by approximately 1.12 dinars, while requirements for imported production inputs by approximately 0.58 dinars.

3. Increasing demand for the rubber and plastic products industry by one dinar leads to an increase in total output for all national economy activities by approximately 1.39 dinars, while requirements for imported production inputs by approximately 0.55 dinars.

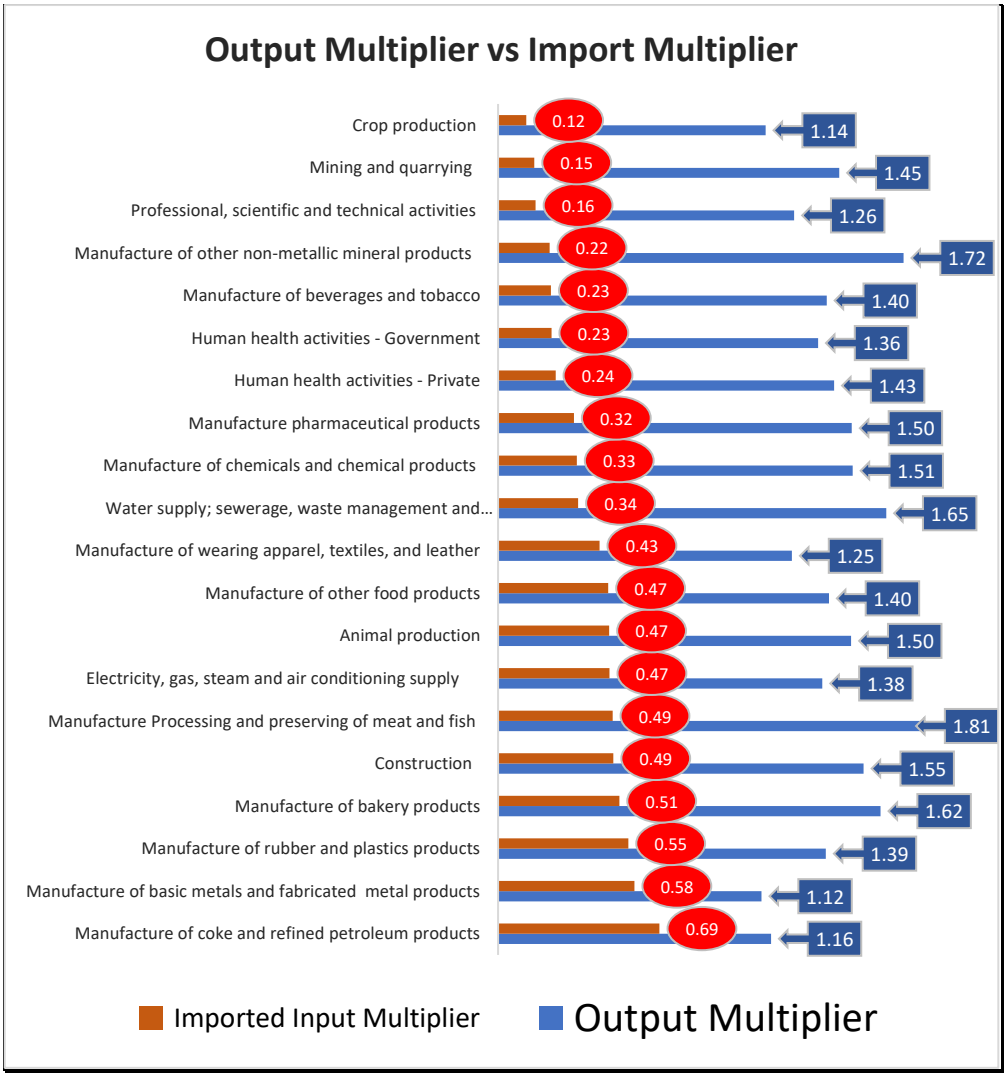

Fig. 2. Output Multiplier vs Import Multiplier
Source: Department of Statistics (DoS)

Analysis of high-value sectors separately within the framework of the economic modernization vision (Linkages and Multipliers)

1- Food Industries

2- Chemical Industries

3- Pharmaceutical Industries
4- Engineering Industries
5-Garment Industry

1- Food Industries

As shown in table No.4 The following sub-sectors had the highest output multiplier (Manufacture Processing and preserving of meat and fish, Manufacture of bakery products, Animal production) respectively, and are capable to expand Demand, While Total Forward Linkages were low for those sub-sectors except Animal production which means that this sector had the ability for investment opportunity.

Table No. 4 Food Industries" Linkages and Multipliers "

No. Sector Reference I-O "DOS"	Sub-Sectors	Total Forward Linkages	Total Backward Linkages	Import Multiplier	Value Added Multiplier	Income Multiplier	Output Multiplier " Rank between Sub-Sectors "
5	Manufacture Processing and preserving of meat and fish	1.24	1.81	0.49	0.51	0.40	**1.81**
7	Manufacture of bakery products	1.24	1.62	0.51	0.54	0.28	**1.62**
2	Animal production	1.80	1.50	0.47	0.52	0.43	**1.50**
6	Manufacture of other food products	1.50	1.40	0.47	0.53	0.43	**1.405**
8	Manufacture of beverages and tobacco	1.25	1.40	0.23	0.66	0.55	**1.395**
1	Crop production	1.21	1.14	0.12	0.87	0.78	**1.14**

Source: Department of Statistics (DoS)

2- Chemical Industries

As shown in table No.5 The following sub-sectors had the highest output multiplier (Manufacture of other non-metallic mineral products, Water supply; sewerage, waste management and remediation activities, Manufacture of chemicals and chemical products) respectively with a high Total Backward Linkages which means that are capable to expand Demand. While Manufacture of chemicals and chemical products sub-sector had a lowest Total Forward Linkage even though with a high value-added Multiplier.

Table No. 5 Chemical Industries "Linkages and Multipliers "

No. Sector Reference I-O " DOS"	Sub-Sectors	Total Forward Linkage	Total Backward Linkages	Import Multiplier	Value Added Multiplier	Income Multiplier	Output Multiplier " Rank between Sub-Sectors "
13	Manufacture of other non-metallic mineral products	2.16	1.72	0.22	0.76	0.50	**1.72**
18	Water supply; sewerage, waste management and remediation activities	1.50	1.65	0.34	0.63	0.22	**1.65**
10	Manufacture of chemicals and chemical products	1.20	1.51	0.33	0.65	0.42	**1.51**
12	Manufacture of rubber and plastics products	1.61	1.39	0.55	0.44	0.25	**1.39**
17	Electricity, gas, steam and air conditioning supply	1.75	1.38	0.47	0.48	0.27	**1.38**
4	Manufacture of coke and refined petroleum products	1.76	1.16	0.69	0.29	0.17	**1.16**

Source: Department of Statistics (DoS)

3- Pharmaceutical Industries

As shown in table No.6 The following sub-sectors had the highest output multiplier (Manufacture pharmaceutical products, Human health activities – Private) respectively, with a high total backward Linkages which can be interpreted as the capability to expand demand. moreover, manufacture pharmaceutical products sub-sector is capable to investment opportunity (High Total Forward Linkage) and high-income multiplier as well.

Table No. 6 Pharmaceutical Industries "Linkages and Multipliers "

No. Sector Reference I-O " DOS"	Sub-Sectors	Total Forward Linkage	Total Backward Linkages	Import Multiplier	Value Added Multiplier	Income Multiplier	Output Multiplier " Rank between Sub-Sectors "
11	Manufacture pharmaceutical products	1.52	1.50	0.32	0.67	0.42	1.50
35	Human health activities - Private	1.04	1.43	0.24	0.74	0.23	1.43
36	Human health activities - Government	1.01	1.36	0.23	0.76	0.11	1.36

Source: Department of Statistics (DoS)

4- Engineering Industries

As shown in table No.7 The following sub-sectors had the highest output multiplier (Construction, Mining and quarrying) respectively, with a high Total Backward Linkages which can interpret for the capability for expand demand. while the Professional, scientific and technical activities sub-sector had the capability for investment opportunity (High Total Forward Linkage) with a high Value-added Multiplier.

Table No. 7 Engineering Industries "Linkages and Multipliers "

No. Sector Reference I-O " DOS"	Sub-Sectors	Total Forward Linkage	Total Backward Linkages	import multiplier	Value Added Multiplier	Income Multiplier	Output Multiplier
19	Construction	1.17	1.55	0.49	0.49	0.22	1.55
3	Mining and quarrying	1.29	1.45	0.15	0.82	0.64	1.45
30	Professional, scientific and technical activities	2.07	1.26	0.16	0.83	0.39	1.26
14	Manufacture of basic metals and fabricated metal products	1.45	1.12	0.58	0.41	0.31	1.12

Source: Department of Statistics (DoS)

5-Garment Industry

As shown in table No.8 The output multiplier and value- added Multiplier are medium high, while the total backward linkages are greater than the total forward linkage which can be interpreted as providing more opportunities to expand demand.

Table No. 8 Garment Industry "Linkages and Multipliers "

No. Sector Reference I-O " DOS"	Sub-Sectors	Total Forward Linkage	Total Backward Linkages	Import Multiplier	Value Added Multiplier	Income Multiplier	Output Multiplier
16	Manufacture of wearing apparel, textiles, and leather	1.11	1.25	0.43	0.56	0.25	**1.25**

Source: Department of Statistics (DoS)

Measuring the impact of increasing Gross Capital Formation

Table No. 9 Shows the impact of increasing Gross Capital Formation through three scenarios, 10%, 30%, and 50% respectively for sectors that are included in the Economic Modernization Vision on the Total Output.

The results are by applying equation No. 20 as the following: (X= $(I-a)^{-1} * C *$ q').

1- Construction: The percentage of increase in the total Output about 3.9%, 11.7and 19.4% respectively according to scenario No 1 ,2,3.
2- Manufacture of other non-metallic mineral products: The percentage of increase in the total Output about 2 .4%, 7.1% and 11.8% respectively according to scenario No 1 ,2,3.
3- Manufacture of basic metals and fabricated metal products: The percentage of increase in the total Output about 1.3%, 3.8% and 3.6% respectively according to scenario No 1 ,2,3.
4- Professional, scientific and technical activities: The percentage of increase in the total Output about 0.9%, 2.6% and 4.3% respectively according to scenario No 1 ,2,3.
5- Manufacture of rubber and plastics products: The percentage of increase in the total Output about 0.5%, 1.4% and 2.4% respectively according to scenario No 1 ,2,3.

Table No. 9 Measuring the impact of increasing Gross Capital Formation (in thousand J.D)

No	No. Sector Reference I-O "ROS"	Sub-Sectors	Actual Total Output	Difference in Total Output according to scenario 1	Difference in Total Output according to scenario 2	Difference in Total Output according to scenario 3	The percentage of increase in total Output according to scenario No 1	The percentage of increase in total Output according to scenario No 2	The percentage of increase in total Output according to scenario No 3
1	19	Construction	3554249	138145	414433	690722	3.9%	11.7%	19.4%
2	13	Manufacture of other non-metallic mineral products	941223	22139	66417	110695	2.4%	7.1%	11.8%
3	15	Manufacture of other products	1153752	20064	60192	100321	1.7%	5.2%	8.7%
4	14	Manufacture of basic metals and fabricated metal products	1524418	19108	57324	95540	1.3%	3.8%	6.3%
5	30	Professional, scientific and technical activities	525453	4494	13483	22472	0.9%	2.6%	4.3%
6	12	Manufacture of rubber and plastics products	729674	3482	10447	17411	0.5%	1.4%	2.4%
7	23	Transport by road	2183668	9842	29526	49210	0.5%	1.4%	2.3%
8	21	Wholesale trade	2160491	9585	28755	47924	0.4%	1.3%	2.2%
9	9	Manufacture of wood and paper and printing	930323	3204	9613	16021	0.3%	1.0%	1.7%
10	32	Public administration and defence compulsory social security	4454864	14368	43105	71841	0.3%	1.0%	1.6%

11	1	Crop production	1486331	4663	13988	23313	0.3%	0.9%	1.6%
12	4	Manufacture of coke and refined petroleum products	1701833	4223	12670	21117	0.2%	0.7%	1.2%
13	28	Financial and insurance activities	3003218	6252	18757	31261	0.21%	0.62%	1.04%
14	22	Transportation by air, rail, pipeline, and water	656969	1287	3861	6436	0.20%	0.59%	0.98%
15	31	Administrative and support service activities	483299	785	2356	3926	0.16%	0.49%	0.81%
16	18	Water supply; sewerage, waste management and remediation activities	483323	626	1878	3131	0.13%	0.39%	0.65%
17	17	Electricity, gas, steam and air conditioning supply	1041623	1342	4027	6712	0.13%	0.39%	0.64%
18	27	Information and communication	1655031	1804	5412	9020	0.11%	0.33%	0.54%
19	24	Warehousing, postal, courier, and transportation support activities	596730	581	1743	2904	0.10%	0.29%	0.49%
20	29	Real estate activities	4364462	3518	10555	17591	0.08%	0.24%	0.40%
21	10	Manufacture of chemicals and chemical products	1602328	1211	3633	6054	0.08%	0.23%	0.38%
22	2	Animal production	1402459	779	2338	3896	0.06%	0.17%	0.28%
23	3	Mining and quarrying	1744784	889	2667	4446	0.05%	0.15%	0.25%

24	25	Accommodation	480207	213	638	1063	0.04%	0.13%	0.22%
25	20	Retail trade	1909942	511	1532	2554	0.03%	0.08%	0.13%
26	38	Other service activities	268635	64	191	318	0.02%	0.07%	0.12%
27	26	Food and beverage service activities	609365	115	346	576	0.02%	0.06%	0.09%
28	5	Manufacture Processing and preserving of meat and fish	1526077	282	847	1412	0.02%	0.06%	0.09%
29	7	Manufacture of bakery products	689244	122	366	610	0.02%	0.05%	0.09%
30	6	Manufacture of other food products	2505197	275	826	1377	0.01%	0.03%	0.05%
31	11	Manufacture pharmaceutical products	1326169	132	395	658	0.01%	0.03%	0.05%
32	33	Education - Private	1900509	182	545	908	0.01%	0.03%	0.05%
33	37	Arts, entertainment and recreation	210094	15	45	76	0.01%	0.02%	0.04%
34	16	Manufacture of wearing apparel, textiles, and leather	1486694	92	277	461	0.01%	0.02%	0.03%
35	35	Human health activities - Private	1166971	62	187	312	0.01%	0.02%	0.03%
36	8	Manufacture of beverages and tobacco	758479	33	99	164	0.00%	0.01%	0.02%
37	40	* NPISHs - All activities	466975	19	56	93	0.00%	0.01%	0.02%
38	36	Human health activities - Government	811906	7	20	34	0.00%	0.00%	0.00%
39	34	Education - Government	1140898	7	20	33	0.00%	0.00%	0.00%
40	39	Activities of households as employers of	497745	0	0	0	0.00%	0.00%	0.00%

		domestic personnel							

Source : Department of Statistics (DoS)

Demand Component Multipliers

Final-demand multipliers or **Demand Component Multipliers** refers to the total increase in economic output generated by a unit increase in one of the components of final demand as the following:

1-Government Final Consumption Expenditure
2-Household Final Consumption Expenditure
3-Final Consumption Expenditure
4-Exports-Goods
5-Exports-Reexports
6-Exports-Services Exports-Travel
7-Fixed Capital Formation
8-Changes in Stocks

The results indicate by applying equation (second column in the first row) in Table No.3 results indicate that multiplayer for the demand components such as Final Consumption Expenditure, Exports-Goods and Exports-Services are 1.41, 1.37 and 1.32 respectively.

Which can interpret that the Total Output will increase by (1.41 J. D) due to increase of one J.D in the Final Consumption Expenditure.

Also, can interpret that the Total Output will increase by (1.37 J. D) due to increase of one J.D in the Exports-Goods component of the final demand.

Table No.10 $(\boldsymbol{I}-\boldsymbol{a})^{-1}*\boldsymbol{C}$

Demand Components	Government Final Consumption Expenditure	Household Final Consumption Expenditure	Final Consumption Expenditure	Exports-Goods	Exports-Reexports	Exports-Services	Exports-Travel	Fixed Capital Formation	Changes in Stocks
Multipliers	**1.27**	**0.91**	**1.41**	**1.37**	**0.04**	**1.32**	**1.10**	**0.810**	**0.24**

Source: Department of Statistics (DoS)

Cumulative Input – Output Coefficients (Primary Inputs)

8. Imports
9. Taxes on Products
10. Subsidies on Products
11. Subsidies on production
12. Taxes on production
13. Compensation of employees
14. Gross operating surplus / mixed income

According to equation No. The results indicate by applying equation (second column with the second row) in Table No.3 results indicate as the following:

By Increasing Fixed Capital Formation (One Jordanian J.D) will require (0.6 J.D) of imports, Taxes on Products (0.089 J.D), Compensation of employees (0.156 J.D), Gross operating surplus / mixed income (0.143 J.D) and the total value added can be calculated by (0.30 J. D).

Table No. 11 Coefficient Requirement according to equation

$$\boldsymbol{U(I-a)^{-1} * C + h}$$

Demand Components	Government Final Consumption Expenditure	Household Final Consumption Expenditure	Final Consumption Expenditure	Exports-Goods	Exports-Reexports	Exports-Services	Exports-Travel	Fixed Capital Formation	Changes in Stocks
Imports	0.137	0.354	0.148	0.350	0.976	0.248	0.326	0.609	0.929
Taxes on Products	0.013	0.122	0.017	0.027	0.001	0.082	0.085	0.089	0.006
Subsidies on Products	-0.001	-0.002	0.000	-0.001	0.000	0.000	-0.001	0.000	0.000
Subsidies on production	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Taxes on production	0.002	0.010	0.009	0.005	0.000	0.011	0.012	0.003	0.000
Compensation of employees	0.740	0.185	0.610	0.199	0.007	0.306	0.349	0.156	0.022
Gross operating	0.108	0.331	0.216	0.421	0.016	0.354	0.229	0.143	0.044

surplus / mixed income									
Gross Value Added	0.851	0.526	0.835	0.625	0.023	0.671	0.590	0.302	0.065

Source: Department of Statistics (DoS)

Increasing Value of Primary Inputs

Table No. 12 Shows the Impact of increasing Gross Capital Formation through three scenarios by increasing 10%, 30%, and 50% respectively for sectors that are included in the Economic Modernization Vision on the primary input as a value.

By applying equation No.23 results indicated as the following:

1-increase in total imports about 1%, 2.9 %and 4.9% respectively according to scenario No 1 ,2,3.

2-increase in Taxes on Products about 0.6%, 1.9% and 3.2% respectively according to scenario No 1 ,2,3.

3-increase in Taxes on production about 0.2%, 0.7%and 1.2%% respectively according to scenario No 1 ,2,3.

4- increase in Compensation of employees about 0.4%, 1.1%and 1.9% respectively according to scenario No 1 ,2,3.

5- increase in Gross operating surplus / mixed income about 0.3%, 0.9% and 1.6% respectively according to scenario No 1 ,2,3.

6- increase in Gross Value Added about 0.3%, 1% and 1.7% respectively according to scenario No 1 ,2,3.

Table: 12 $\boldsymbol{Z = [U(I - a)^{-1} * C + h] * q'}$

Primary Inputs	Actual Primary Inputs Value **(in thousand J.D)**	Difference in Primary Inputs according to scenario 1	Difference in Primary Inputs according to scenario 2	Difference in Primary Inputs according to scenario 3	**The percentage of increase** Primary Inputs **according to scenario No 1**	**The percentage of increase** Primary Inputs **according to scenario No 2**	**The percentage of increase in** Primary Inputs **according to scenario No 3**
Imports	21113107.2	206283.9	618851.3	1031418.7	1.0%	2.9%	4.9%
Taxes on Products	4679641.5	30186	90557.9	150929.8	0.6%	1.9%	3.2%
Subsidies on Products	-53976.09	-9.55	-28.66	-47.7	0.0%	0.1%	0.1%
Subsidies on production	-6024.59	-3.34	-10.04	-16.73	0.1%	0.2%	0.3%

Taxes on production	422382.4	1055.6	3166.9	5278.3	0.2%	0.7%	1.2%
Compensation of employees	14030212	53002.5	159007.3	265012.2	0.4%	1.1%	1.9%
Gross operating surplus / mixed income	15563229	48387.1	145161.1	241935.2	0.3%	0.9%	1.6%
Gross Value Added	30009799	102441.9	307325.4	512209	0.3%	1.0%	1.7%

Source: Department of Statistics (DoS)

Total Imports

Total imports are divided by the input-output table into:

A-Direct Imports that constitutes 49.5% of the Total Imports.

B- Intermediate Imports that constitutes 50.5 % of the Total Imports.

A-Direct Imports

Requirement of (Direct Imports & Indirect Taxes on Products) in order to meet the Demand Components as in table No.3 By applying equation No.24 (R=h*q´) results indicated as the following:

1-Increase in **Direct** Imports about 1.2%, 3.5 % and 5.9% respectively according to scenario No 1 ,2,3.

2- Increase in Taxes on Products about 0.7%, 2.1 % and 3.4% respectively according to scenario No 1 ,2,3.

Table No. 13 (Direct Imports & Indirect Taxes on Products) (in thousand J.D)

Primary Inputs	**(Direct Imports + Indirect taxes on products)**	Difference in **(Direct Imports + Indirect taxes on products)** scenario 1	Difference in **(Direct Imports + Indirect taxes on products)** scenario 2	Difference in **(Direct Imports + Indirect taxes on products)** scenario 3	**The percentage of increase (Direct Imports+ Indirect taxes on products) scenario No 1**	**The percentage of increase (Direct Imports+ Indirect taxes on products) scenario No 2**	**The percentage of increase in (Direct Imports+ Indirect taxes on products) scenario No 3**
Direct Imports	10479884	123734.6	371203.5	618672.5	1.2%	3.5%	5.9%
Taxes on Products	3972086	27154.54	81463.54	135772.6	0.7%	2.1%	3.4%

Source: Department of Statistics (DoS)

B-Intermediate Imports

Requirement of (**Intermediate** Imports & Indirect Taxes on Products) in order to meet the Demand Components as in table No.3 By applying equation No.25 (Z-R) results indicated as the following:

1-Increase in **Intermediate** Imports about 0.8%, 2.3 % and 3.9% respectively according to scenario No 1 ,2,3 respectively.

2- Increase in Taxes on Products about 0.4%, 1.3 % and 2.1% respectively according to scenario No 1 ,2,3 respectively.

Table No. 14 (Direct Imports & Indirect Taxes on Products) (in thousand J.D)

	R-Z Intermediate	Difference in **(Direct Imports + Indirect taxes on products)** scenario 1	Difference in **(Direct Imports + Indirect taxes on products)** scenario 2	Difference in **(Direct Imports + Indirect taxes on products)** scenario 3	**The percentage of increase (Intermediate Imports+ Indirect taxes on products) scenario No 1**	**The percentage of increase (Intermediate Imports+ Indirect taxes + Indirect taxes on products) scenario No 2**	**The percentage of increase in (Intermediate Imports+ Indirect taxes on products) scenario No 3**
Imports	10633224	**10715773**	**10880871.**	**11045970**	0.8%	2.3%	3.9%
Taxes on Products	707556	**710587**	**716650**	**722713**	0.4%	1.3%	2.1%

Source: Department of Statistics (DoS)

Conclusions and Recommendations

Conclusions

By applying Leontief's mathematical model, the study was able to reach many features that served the study's objectives.

The most prominent activities that are included in “Economic Modernization Vision” that have a high output multiplier as the following:

1. Fish processing and preservation industry increase in demand by one dinar will increase the Output of national economic activities of approximately 1.8 dinars.

2. Water supply, sanitation, and waste management and treatment increase in demand by one dinar will increase the Output of national economic approximately 1.65 dinars
3. Bakery products industry increase in demand by one dinar will increase the Output of national economic approximately 1.62 dinars.
4. Construction increased in demand by one dinar will increase the Output of national economic approximately 1.55 dinars.
5. Chemical materials and products industry increase in demand by one dinar will increase the Output of national economic approximately 1.51 dinars.

The most prominent activities that have a low Output multiplier and a high import multiplier:

1. Output multiplier of Coke and refined petroleum products is about 1.16 dinars, while requirements for imported production inputs approximately 0.69 dinars.
2. Output multiplier of Basic metals and fabricated metal products industry is about 1.12 dinars, while requirements for imported production inputs approximately 0.58 dinars.
3. Output multiplier of Rubber and plastic products is about 1.39 dinars, while requirements for imported production inputs approximately 0.55 dinars.

The Impact of increasing Gross Capital Formation through three scenarios by increasing 10%, 30%, and 50% respectively for sectors that are included in the Economic Modernization Vision on the primary input as a value resulted as the following:

1. Increase in total imports about 1%, 2.9 %and 4.9% respectively according to the above the scenarios.
2. Increase in Taxes on Products about 0.6%, 1.9% and 3.2% respectively according to the above the scenarios.
3. Increase in Taxes on production about 0.2%, 0.7%and 1.2%% respectively according to the above the scenarios.

5- Increase in Compensation of employees about 0.4%, 1.1%and 1.9% respectively according to the above the scenarios.

4. Increase in Gross operating surplus / mixed income about 0.3%, 0.9% and 1.6% respectively according to the above the scenarios.
5. Increase in Gross Value Added about 0.3%, 1% and 1.7% respectively according to the above the scenarios.

Imports were also analyzed in terms of their direct and intermediate classification from the (I-O) Table. The results showed that the effect of

increased fixed capital formation on direct imports was greater than its effect on imports used in production processes.

Increase in Direct Imports about 1.2%, 3.5 % and 5.9% respectively according to the above the scenarios.

Increase in Intermediate Imports about 0.8%, 2.3 % and 3.9% respectively to the above the scenarios.

Recommendations

1. Concerned authorities should focus on industries with weak linkages, whether forward, backward, or both, by working to strengthen these links. This should be achieved by reviewing the legislation and facilities provided to these industries with the aim of enhancing their reciprocal relationships with other sectors. Additionally, they should study their actual situation and identify the most prominent challenges they face.
2. To Develop a national database of local suppliers, including small and medium-sized enterprises (SMEs) specializing in sectors with strong backward interconnections, such as food industries, non-metallic minerals, and water and wastewater treatment.
3. Support the development of local supplier capacities through training and technical and administrative qualification programs for suppliers in industries that rely on high backward interconnections, particularly in the meat and fish, non-metallic minerals, and construction sectors.
4. Direct funding and technical support to sectors with high production multipliers, such as meat and fish, non-metallic minerals, construction, and water and sanitation, to maximize their impact on the national economy.
5. Prepare an import substitution map, using major results of this study, based on the import multiplier index for production inputs, with a focus on activities with the highest imports, such as coke and petroleum products, imported inputs in the basic metals industry, imported inputs in the rubber and plastics industry, and imported inputs in construction activities.
6. Review relevant legislation, with the participation of all stakeholders, including chambers of industry and other relevant official and unofficial institutions, to provide facilities and incentives to industrial sectors that substitute imported products with local products, serving the national economy.

7. Support research and development in industries that rely on imported production inputs through the import multiplier index, to find local alternatives in terms of quality and price, thus enhancing the competitiveness of the national economy.

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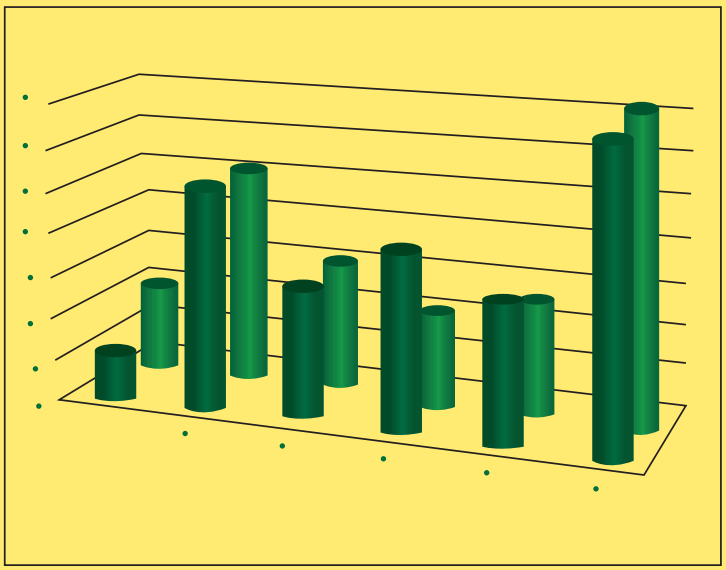

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