



Mechanisms for Diversifying the Sources of Income in the Algerian Economy - An Applied Study Using the Input-Output Analysis Method -

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Abstract:

This study aims to analyze the level of interdependence between the various branches of the manufacturing sector in Algeria, and to identify the branches that have the ability to deepen the economic interdependence to give them developmental priority, which would contribute to diversifying the sources of income of the national economy. According to the method of analyzing the inputs and outputs for the year 2016 (the last year for which data were available), the results showed that the sector lacks a sufficient number of branches that can deepen the entanglement between its various branches, as the leather and shoes industry branch is the only one that can deepen the forward and back entanglement, while all The branch of iron, metal, mechanical, electrical, and electronic industries, the branch of chemistry, rubber, plastic, and the branch of textile industries are characterized by their high ability to deepen the back entanglement, and the while the mines and quarries branches. As for the rest of the branches, they are characterized by their weak ability to deepen the back and forward entanglement.

Keywords: Manufacturing industry , economic interdependence , input–output analysis, Algeria.

JEL Classification Codes: O11 , L16,F15,C67, P26.

1-Introduction:

Anyone observing the reality of the Algerian economy can clearly see its ongoing reliance on the hydrocarbons sector, coupled with the underperformance of its production capacity. This is reflected in the persistent weakness of various economic indicators, both domestic and international. As a result, significant efforts must be made to enhance the performance of the national economy and diversify its income sources.

In this regard, the growth of the manufacturing sector stands out as one of the key avenues for achieving the desired economic progress. This highlights that the primary challenge in diversifying the national economy's sources of income lies in the need to develop and strengthen the manufacturing sector.

One of the most effective ways to achieve this, is to adopt an unbalanced growth strategy by focusing on developing certain branches to be taken as growth poles, that are given priority in development plans, due to its high ability to deepen the degree of front and back intertwining between the various branches of the manufacturing sector in particular, and between different sectors of economic activity in general.

Through what preceded , the research problem is:

Which sectors have the potential to strengthen economic integration and create stronger links between the different branches of the manufacturing industry in Algeria?

In order to answer the previous question, we assume that :

- The manufacturing sector in Algeria in 2016, is characterized by the lack of branches that can deepen the front and back intertwining;
- The iron, metallurgical, mechanical, electrical, and electronic industries, along with the chemical, rubber, and plastics sectors, could be key pillars for the development of the manufacturing sector in Algeria.

2. Leading sectors diagnostic methodology :

The idea of identifying the leading sectors and branches is based mainly on the strategy of unbalanced growth of "A. Hirschman", as well as the growth poles theory of the French economist (F.Perroux), in which he indicated the need for developing countries to focus their development efforts on areas that had comparative advantages, in terms of natural resources or geographical location, and that the development of these sites will attract other regions behind them, and as time passes on, growth will spread to the rest of the country's regions.

« Hirschman » says that it is true that developing countries need a strong push, but they cannot implement and manage a comprehensive investment program for most sectors, because they lack the necessary resources, so Hirschman confirms that Developing countries should focus on some sectors and take them as leading sectors, as « Hirschman » sees that the history of economic facts shows us the development as a series of imbalances in which certain qualified industries (leading sectors) appear that attract Economic growth as a whole, and every imbalance that arises generates a corrective force for it, and correcting this imbalance will generate a new imbalance....

This strategy is based on the experience of development in the capitalist countries in its early stages, that development Which was not made according to a balanced government plan for the development of all sectors in a balanced manner, but rather it is done by the regulator who was relied upon to direct the investments that were self-creating imbalance in the economy, which would help in the emergence of other types of demand in other sectors, which in turn lead to other investments to achieve balance (Ellerman, 2001).

Below is a brief theoretical explanation of the indicators for selecting the leading sectors.

2.1 The overall effect of withdrawal:

The overall impact of withdrawal that a particular sector has on the economy as a whole can be measured by:

2.1.1 Total backlink index (K_j):

The overall backlink attraction index is determined by the direct and indirect inputs from all productive sectors in the national economy that are required to ensure the flow of one unit of products from sector (j) to final demand.

(K_j) can be calculated as:

- a) The matrix of production technical coefficients (A) is calculated using the following formula:

$$a_{ij} = \frac{x_{ij}}{x_j}, \quad i, j=1, 2, \dots, n$$

(x_{ij}): represents the amount of intermediate inputs supplied to sector (j) from the production of sector (i). Technical coefficients of production are defined as the quantities needed to produce a unit in a particular sector, depending on the inputs of other sectors.

- b) The inverse of the "Vasily Leontief" matrix, which represents the total backlinks (K), is calculated using the following relationship:

$$K = (I - A)^{-1}$$

Where: (I): Unit Matrix, (I-A): Leontief Matrix.

The total backlinks index for sector (j) is calculated from the matrix (K), representing the total withdrawal effect, using the following relationship:

$$K_j = \sum_{i=1}^n k_{ij}$$

The total backlinks of sector (j) represent the sum of the coefficients in column (j) of the matrix (K). The value "1" is considered the standard for this indicator. If the value exceeds 1 (i.e., $K_j > 1$), it indicates that the sector (or sectors) has strong aggregate backlinks. This suggests that

the sector has a high capacity to deepen the degree of back-entanglement by utilizing the products of other sectors (both directly and indirectly) as intermediate inputs in its production process.

As a reminder, the total backlinks are the sum of the direct backlinks (A_j) and the indirect backlinks (Z_j), therefore:

$$Z_j = K_j - A_j$$

Based on the matrix of production technical coefficients (A), the direct backlink coefficient (A_j) can be calculated as the ratio of purchases of intermediate inputs by a particular sector (j) to the total value of its output, using the following relationship:

$$A_j = \frac{\sum_{i=1}^n x_{ij}}{X_j} = \sum_{i=1}^n a_{ij}$$

Where: $\sum_{i=1}^n x_{ij}$ it represents the sum of the intermediate inputs used by sector (j) to produce X_j .

2.1.2. Modified total backlink index (U_j^b) :

To mitigate the bias in overall back-pulling links, Rasmussen suggested using averages by calculating the mean of the total backlinks for each sector (j) using the following formula (sim, 2007, p. 26):

$$U_j^b = \frac{1}{n} \sum_{i=1}^n k_{ij} = \frac{K_j}{n}$$

He then introduced the standard backlink index, which is calculated as the ratio of the average backlink coefficient for sector (j) to the average backlink coefficient for all economic activities, according to the following formula:

$$U_j^b = \frac{\frac{1}{n} K_j}{\frac{1}{n^2} \sum_{j=1}^n K_j}$$

Its standard value is set to "1." If it exceeds this value (i.e., greater than 1), it indicates that the average total pull impact exerted by sector (j) on the entire economy is higher than the average pull impact of all economic sectors. Consequently, this sector can be considered a leader (according to this indicator), with the ability to enhance back-entanglement by stimulating (both directly and indirectly) other sectors to increase production in order to meet its intermediate input needs. (Eduardo A and al, 2007).

2.2. The overall effect of push:

The aggregate effect of push that a particular sector exerts on the economy as a whole can be measured by:

2.2.1. Total Forward pull links Index (B_i) :

The total forward linkage index is based on the total increase (both direct and indirect) in the production of a specific sector (i) resulting from a one-unit increase in the final demand of all sectors. An increase in production in other sectors (j) leads to a rise in the production of sector (i) to meet the increased demand for intermediate inputs from these sectors. To calculate this indicator, Leory Jones emphasized the importance of using the distribution matrix (H) instead of the production coefficients matrix, as Leontief had done. This can be expressed as follows:

a) To calculate the matrix of distribution coefficients (H) from the input-output table, you typically use the following formula:

$$h_{ij} = \frac{x_{ij}}{X_i} \quad , \quad i, j=1,2,\dots,n$$

Where: x_{ij} Intermediate output from sector (i) to sector (j) ; X_i Aggregate demand for sector (i) output.

Laurie Jones highlighted that the coefficients of this matrix represent the direct effect of forward linkage, reflecting the ratio of each sector's sales to other productive sectors relative to the total demand (both final and intermediate) for that sector. In other words, the direct forward linkages of sector (i) are defined by the following relationship:

$$H_i = \frac{\sum_{j=1}^n x_{ij}}{X_i} = \sum_{j=1}^n h_{ij}$$

b) The matrix of the total forward coefficients of attraction (B) is calculated according to the following relationship: $B = (I - H)^{-1}$.

From the matrix (B), the total forward pull link index for sector (i) is calculated, which represents the total impact index of the push according to the following relationship:

$$B_i = \sum_{j=1}^n b_{ij}$$

Viz, the total forward links of sector (i) represent the sum of the coefficients of line (i) in the matrix (B), and the integer one is considered a standard value for this indicator, where if it exceeds it ($B_i > 1$) This indicated that the sector(s) is characterized by high (strong) total forward pull link index, which means its great ability to deepen the degree of forward entanglement by providing its outputs as intermediate inputs to other productive sectors.

For reference, the total frontal attractiveness is also the sum of the direct forward attractive (H_i) and the indirect forward (Z_i), thus: $Z_i = B_i - H_i$

2.2.2. Modified total forward pull links index (U_i^f) :

To mitigate the degree of bias, "Rasmussen" modified the total forward pull links index twice, and the formula for the standard forward pull links index becomes the following (Sim, 2007):

$$U_i^f = \frac{\frac{1}{n} B_i}{\frac{1}{n^2} \sum_{i=1}^n B_i}$$

It is a coefficient that gives the ratio of the average of total forward links for a particular sector (i) to the average of total forward links for all sectors of economic activity, The integer one (1) is considered its standard value, since if its value in a particular

sector is greater than one ($U_i^f > 1$). Then the average impact of push for this sector on the economy is greater than the average effect of push for all sectors of the economy (and vice versa), and thus, this sector is considered a pioneer (according to this indicator) that can deepen the degree of forward interdependence in the economy as a whole.

2.3. Variation coefficients (V_j^b & V_i^f) :

The coefficients of variation can be calculated using the following two formulas (al, (Saurabh sharma, 2022):

$$V_i^f = \frac{\sqrt{\frac{1}{n-1} \sum_{j=1}^n (b_{ij} - \frac{B_i}{n})^2}}{\frac{B_i}{n}} \quad V_j^b = \frac{\sqrt{\frac{1}{n-1} \sum_{i=1}^n (k_{ij} - \frac{K_j}{n})^2}}{\frac{K_j}{n}}$$

Where: k_{ij} : are the coefficients of the total backlink matrix.

b_{ij} : are the coefficients of the total forward bond matrix.

Therefore, the coefficients of variation help address the issue of identical values for the total pull effect index or the total push effect index across two different sectors, which may arise when ranking the leading sectors. The total forward pull links and the coefficients of variation for the columns of the total pulling backlinks matrix are considered according to the following principles:

- When the total push effect index values are equal for two different sectors, priority is given to the sector with the lower coefficient of variation. A lower coefficient of variation indicates that this sector distributes its output more evenly across a broad range of economic sectors to meet an increase of one unit in final demand. Conversely, a higher coefficient of variation suggests that sector (i) supplies its output to just one or a few sectors.
- When the total pull effect index values are equal for two different sectors, priority is given to the sector with the lower coefficient of variation. As the coefficient of variation increases, it indicates that sector (j) sources its intermediate inputs from only one or a small number of sectors, meaning that the pull effect is concentrated within this sector or a limited number of sectors.

3. Selection of the leading branches of the Algerian manufacturing sector in 2016 according to the two indicators (U_j^b) and (U_i^f) and the coefficients of difference (V_j^b & V_i^f) :

Depending on the table of inputs and outputs for the year 2016 [4], the various values of the selection indicators (the four) were calculated using the Excel program, then the branches of the manufacturing industry in Algeria were classified in 2016 according to the following four groups:

3.1. The group of branches that have a great ability to deepen the back and forward entanglement:

From Table (3) in the appendix, we note the absence of any branch characterized by the great ability to deepen the back and frontal entanglement at the same time, as the results showed the

absence of any branch characterized by a high value of its indicators of the total effect of pull (U_j^b) and the total effect of push (U_j^f) and at the same time low coefficients of variation (V_j^b & V_j^f).

From Table (3) in the appendix, it is evident that no sector exhibits a strong ability to deepen both backward and forward linkages simultaneously. The results show the absence of any sector that possesses high values for both the total pull effect index (U_j^b) and the total push effect index (U_j^f), while also having low coefficients of variation (V_j^b & V_j^f).

However, from the same table, we note that the leather and footwear industry tops the various branches with a high index value for the total impact index of push ($U_j^f = 1,90632682$), which means that the average of total impact of the push exercised by this branch on the manufacturing sector is equal to 1,90632682 compared to the average impact of push for all branches of this sector.

This total effect of push is distributed relatively evenly over a large number of branches due to the low value of the coefficient of variation ($V_j^f = 1,407729508$), In other words, the branch has a great ability to deepen the forward entanglement by

selling its outputs (directly and indirectly) in a relatively equal manner to a large number of branches of the manufacturing industry in order to cover the increase of one unit in the final demand. As for the branch's ability to deepen the back entanglement, it is also high.

The average total pull effect exerted by the sector on the manufacturing industry is equivalent to 1,231967359 compared to the average total effect of the pull for all branches of the sector, but the high value of its coefficient of variation ($V_j^b = 2,791468284$) (Compared to the average coefficients of variation :2,22533164) it means that this total effect of the $\bar{V}^b = \frac{1}{n} \sum_{i=1}^n V_j^b =$ clouds is concentrated on a few branches, and in other words the branch has a high ability to develop the back entanglement, but this high ability is concentrated on a few branches (which is why this branch was not classified as a leading branch with a great ability to deepen the tangles back and forward at the same time), which are the branches that supply it (directly and indirectly) with the intermediate inputs.

3.2. The group of branches that have a great ability to deepen the back entanglement and a weak ability to deepen the forward entanglement:

From Table No. (03) in the appendix, we observe that this group includes three sectors, with the iron, metallurgical, mechanical, electrical, and electronic industries leading the way. This sector ranks second overall due to its high ability to develop backward linkages, as evidenced by the widespread distribution of its total pull effect across a large number of manufacturing sectors. This is reflected in the high value of its total pull effect index ($U_j^b = 1,153094428$) and a coefficient of variation that is below the average ($V_j^b = 1,684321774$),).

However, its ability to develop forward linkages is weaker, as indicated by its average push effect, which is lower than the overall average push effect for all sectors ($0.79885288 =$). Moreover, this weaker push effect is concentrated on a limited number of sectors, as seen in the high value of its coefficient of variation ($V_j^f = 2,97983946$).

The branch of chemistry, rubber and plastics came third, and its advantage was the high ability to deepen the back tangle due to its high value for the overall effect of the pull ($U_j^b = 1,126129263$) And a low value of the coefficient of variation ($V_j^b = 2,165841707$), As for its ability to develop the forward entanglement, it is the same as in the previous section, where it is characterized by weakness due to the low value of the total impact index of push ($U_j^f = 0,85963385$) Moreover, this low effect is

concentrated on a limited number of branches due to the high coefficient of variation of the branch ($V_j^f = 2,844507426$).

As for the textile industries branch, it came fourth in the ranking with a low overall effect ($U_j^f = 0,97032217$) And a high coefficient of difference ($V_j^f = 2,666380979$), viz, in addition to the weakness of the branch's ability to deepen the forward entanglement, its overall effect of thrust is concentrated on a limited number of branches, while its high ability to develop the back entanglement ($U_j^b = 1,575630528$) It is concentrated on a few branches, which is evident from the high value of the coefficient of variation ($V_j^b = 2,62841132$), Which is the reason that prevented this branch from being issued to the second group, as it has the greatest value for (U_j^b) Absolutely.

Thus, it can be concluded that the three sectors in this group have the potential to significantly enhance the performance of the manufacturing sector in Algeria. This could be achieved by utilizing the outputs from other sectors (thereby creating a market) as intermediate inputs in their production processes.

The reason for the weak ability of these sectors to develop forward linkages is that they are primarily oriented towards meeting final demand, rather than focusing on intermediate demand. This results in a limited capacity to stimulate further economic activity in downstream industries.

Relying on the table of inputs and outputs for the year 2016, it is noted that the total production of the iron, metallic, mechanical, electrical and electronic industries accounted for only 17.31% It goes (directly) to feed the intermediate demand, while the remaining 82.69% feeds the final demand, of which 64.11% goes to the formation of fixed capital and 27.48% to the change in the stock, which made this branch contribute 32.24% to the formation of the total fixed capital and 76.91% In the total change in inventory, the same applies to the branch of chemistry, rubber and plastics, as 37.82% goes (directly) to feed the intermediate demand, while the remaining 62.18% feeds the final demand, as well as the case for the textile industries branch, where we find that it feeds the intermediate demand with 31.47% of its production while the remaining 68.53% goes to feed the final demand.

3.3. The group of branches that have a great ability to deepen the forward entanglement and a weak ability to deepen the back entanglement:

From Table No. (03) in the Appendix, it is clear that the Mining and Quarrying Branch topped this group, followed by the

Energy and Water Branch. Both branches are characterized by a weak ability to deepen the back entanglement as a result of the low value of the total impact index of pulling (U_j^b). In both branches, viz, the average of total effect of pull practiced by the Mines and Quarries Branch on the manufacturing sector is equal to 0.883982619 compared to the average total effect of pull for all branches of this sector.

Also, the average total impact of withdrawals practiced by the Energy and Water Branch on the manufacturing sector is equal to 0.924713522 compared to the average total effect of pull for all branches of this sector, and with the weakness of the total impact of withdrawals in both sectors, it is noticeable that it is distributed relatively evenly over a large number of branches due to the low value of the coefficient of variation (V_j^b) in both branches.

As for the ability to deepen the forward entanglement, it is high in both branches, because the value of the total impact index (U_j^f) is high (exceeding 1) in both branches.

Moreover, this effect is distributed relatively evenly between a large number of branches as a result of a decrease (V_j^f) in both branches, meaning that each of the two branches has a high ability to deepen the forward entanglement by selling its products (directly and indirectly) in a relatively equal number of A large number of branches.

3.4. A group of branches characterized by a weak ability to deepen the front and back intertwining:

From Table No. (03) in the appendix, it is clear that it includes the remaining four branches, preceded by the branch of the wood, paper and cork industry, which is characterized by the low value of its index of the overall effect of pulls, as it was estimated at 0.980722364, which means the weak ability of this branch to deepen the back entanglement.

However, this weak effect, It is distributed relatively evenly over a large number of branches due to the low value of the coefficient of variation ($V_j^b = 2.097249337$). As for the branch's ability to deepen the frontal entanglement, it is also low due to the decrease in its value (U_j^f). Moreover, this weak effect is concentrated on a few sectors due to the high value of coefficient of difference (V_j^f).

Returning to the ability of the wood, paper, and cork branch to deepen the back entanglement (although it is classified as weak), we note that it is approximately equal to the average total effect of the pulls for all branches, because the value of the total impact index of pulling for the branch is very close to the integer 1 ($U_j^b = 0.98072236$). Which means that inducing and activating the performance of this branch will allow to raise its ability to develop back entanglement, especially with its low value of the coefficient of variation.

The building materials and glass branch came second in this group, and it has the same advantages as the previous branch, i.e. the low ability to deepen the back entanglement ($U_j^b = 0.892234319$) Despite this, the overall effect of the sector's withdrawal is relatively evenly

distributed over a large number of branches due to the low value of the coefficient of variation() It is also $V_j^b = 1,746610268$

characterized by a reduced ability to deepen the forward entanglement, and moreover, to concentrate the overall effect of push on a limited number of sectors.

As for the two branches of the various industries and the agricultural and food industries, they are characterized by their weak ability to deepen the back and forward intertwining as a result of the weak values of the overall impact indicators (In addition to this weakness, we find), U_j^f, U_j^b that the two total effects of pull and push for each branch are concentrated on a limited number of sectors, because the values of the coefficients of difference (V_j^f, V_j^b) are high in both branches.

4-Conclusion:

In light of the urgent need to diversify the national economy's sources of income and reduce its dependence on the hydrocarbon sector, this study aims to contribute to this objective by addressing one of the key factors for enhancing the performance of the national production apparatus and diversifying its income sources. Specifically, we focused on the need to activate and improve the performance of the manufacturing sector. To achieve this, we applied the input-output analysis method to examine the level of forward and backward interlinkages between the various branches of the manufacturing sector in 2016. Subsequently, we identified the branches with the potential to deepen the level of economic interconnection. ...between the various branches of the sector, and the following points summarize the results of this study:

- The leather and shoe industry is the only branch with the capacity to strengthen both the forward and backward linkages between the various branches of the manufacturing sector in Algeria.

- The iron, metallic, mechanical, electrical and electronic industries, the chemistry, rubber and plastics branches, and the textile industries branch are distinguished by their high ability to deepen the back

interlocking, while they are characterized by their weak ability to deepen the forward interlocking;

- The mining, quarrying, energy and water branches are characterized by a high ability to deepen the forward entanglement, while they are characterized by a weak ability to deepen the back entanglement.

- The wood, paper, and cork branch is characterized by its limited ability to strengthen the forward linkages. However, regarding its potential to enhance backward linkages, although it is classified as weak, this potential could be improved if the branch's performance is activated. This is because the value of its total pull effect index is very close to the ideal value ($U_j^b = 0,98072236$).

- The remaining branches are characterized by a weak ability to deepen the forward and back tangles.

Thus, the first result confirms the validity of the first hypothesis, which states that the manufacturing sector in Algeria in 2016 was characterized by the absence of branches capable of deepening the forward and backward interlinkages between its various sub-sectors. At the same time, the second result supports the validity of the second hypothesis, which suggests that the iron, metal, mechanical, electrical, electronic, chemical, rubber, and plastics branches can serve as pivotal sectors to enhance the performance of the manufacturing sector, thereby contributing to the diversification of income sources for the national economy.

In light of the foregoing results, we suggest some recommendations as follows:

- Giving priority to the development plans of the leather and shoe industry branch in order to deepen the forward and back interconnections between the various branches, as well as the iron, metallic, mechanical, electrical and electronic industries branch, the chemistry, rubber and plastic branch, and the wood, paper and cork industry branch due to its high ability to deepen the rear interlocking.

- Striving to create a developed branch of capital industries, which will be an important background for the various branches of the manufacturing industry, providing them with the machines and

production equipment they need, instead of importing from abroad and what this means from the leakage of hard currency;

- Dividing the iron, metallic, mechanical, electrical and electronic industries branch and the other industries branch into independent

branches, as this gives greater accuracy in the planning and decision-making process;

- Separation between domestic and imported intermediate inputs when preparing input and output tables in order to determine the degree of

exposure of industrial branches;

- Not to be late in preparing the input and output tables, as this makes them lose their importance as a planning tool.

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6. Appendices:

Table 1: Indicators of the total effect of push and coefficients of difference for branches of the manufacturing sector in Algeria (2016).

Arrangement	(B_i)	(B_i/n)	(U_i^f)	(V_i^f)
Energy and water sector	1,350003278	0,135000328	1,051476278	2,480007178
Mines and quarries sector	1,405301376	0,140530138	1,094546276	2,12285911
Iron, metal, mechanical, electrical and electronic industries	1,025657	0,1025657	0,798852879	2,979839466
Building materials and glass	1,001853976	0,100185398	0,780313431	2,996453618
Chemistry, rubber and plastics	1,103694428	0,110369443	0,859633846	2,844507426
Agricultural and food industries	1,042408978	0,104240898	0,811900483	2,939681568
textile industries	1,245808527	0,124580853	0,970322172	2,666380979
Leather and shoes industry	2,447556364	0,244755636	1,90632682	1,407729508
Wood, paper and cork industry	1,145679545	0,114567955	0,89233477	2,657679179
different industries	1,071159064	0,107115906	0,834293045	2,788341322
average				2,588347936

Source: Prepared by researchers based on the input-output table (2018) and the Excel program.

Table2: Indicators of the total effect of withdrawal and coefficients of difference for branches of the manufacturing sector in Algeria (2016).

Arrangement	(K_j)	(K_j/n)	(V_j^b)	(U_j^b)
Energy and water sector	1,705808416	0,170580842	1,969444462	0,924713522
Mines and quarries sector	1,630672587	0,163067259	1,752270721	0,883982619
Iron, metal, mechanical, electrical and electronic industries	2,127100052	0,212710005	1,684321774	1,153094428
Building materials and glass	1,645894404	0,16458944	1,746610268	0,892234319
Chemistry, rubber and plastics	2,077357721	0,207735772	2,165841707	1,126129263
Agricultural and food industries	1,066003678	0,106600368	2,9530393	0,577877332
textile industries	2,906547544	0,290654754	2,62841132	1,575630528
Leather and shoes industry	2,272596042	0,227259604	2,791468284	1,231967359
Wood, paper and cork industry	1,809127284	0,180912728	2,097249337	0,980722364
different industries	1,205777451	0,120577745	2,464659223	0,653648266
Average				2,22533164

Source: Prepared by researchers based on the input-output table (2018) and the Excel program

Table 3: Arranging the branches of the manufacturing sector in Algeria according to the indicators (U_j^b) and (U_j^f) and the coefficients of difference (V_j^b) and (V_j^f) (2016).

The first group: the branches that have a great ability to deepen the forward as well as the back ntanglement					
(V_j^b)	high (U_j^b)	(V_j^f)	high (U_j^f)	Activity sector	Arrangement
2,791468284	1,231967359	1,407729508	1,90632682	Leather and shoes industry	01
The second group: the branches that have a great ability to deepen the the back ntanglement and a weak ability to deepen the forward entanglement					
(V_j^b)	high (U_j^b)	(V_j^f)	low (U_j^f)	activity sector	Arrangement
1,684321774	1,153094428	2,979839466	0,79885288	Iron, metal, mechanical, electrical and electronic industries	02
2,165841707	1,126129263	2,844507426	0,85963385	Chemistry, rubber and plastics	03
2,62841132	1,575630528	2,666380979	0,97032217	textile industries	04
The third group: branches that have a great ability to deepen the forward entanglement and a weak ability to deepen the back entanglement					
(V_j^b)	low (U_j^b)	(V_j^f)	high (U_j^f)	activity sector	Arrangement
1,752270721	0,883982619	2,12285911	1,09454628	Mines and quarries sector	05
1,969444462	0,924713522	2,480007178	1,05147628	Energy and water sector	06
The first group: the branches that have a weak ability to deepen the forward as well as the back entanglement					
(V_j^b)	(U_j^b) low	(V_j^f)	low (U_j^f)	activity sector	Arrangement
2,097249337	0,980722364	2,657679179	0,89233477	Wood, paper and cork industry	07
1,746610268	0,892234319	2,996453618	0,78031343	Building materials and glass	08
2,464659223	0,653648266	2,788341322	0,83429305	different industries	09
2,9530393	0,577877332	2,939681568	0,81190048	Agricultural and food industries	10

Source: Prepared by researchers based on the previous tables (1) and (2).