MANUFACTURING AND ECONOMIC DEVELOPMENT IN THE WORLD FOR 2000-2015: MAIN FEATURES AND CHALLENGES

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Abstract:
We analyze the evolution of manufacturing and non manufacturing activities in 132 countries for the period 2000-2015, including a summary based on 4 previous studies. For the period 2000-2010 we find that the average real value-added of manufacturing per capita in Africa has been very low in both years, from 278 to 282 Dollars at 2005 prices and PPPs. The average of Asia has increased from 903 in year 2000 to 1443 in year 2010. The averages of America and the group of Europe and Eurasia have reached values higher than 3000 both in year 2000 and 2010, with a slight decrease for the period 2000-2010. We include the estimation of an econometric model to show the positive impact of manufacturing on non-manufacturing production and on economic development. This results, as well as other studies, are an strong support to the Kaldor´s perspective on the important role of industry on economic development. In order to reach the Social Development Goals (SDGs) of the United Nations, we think that it is important to increase the presence of this type of studies and economic policies related with World development in the televisions, newspapers and other social media, in order to foster international cooperation to the eradication of poverty and increase of quality of life.
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1. Introduction

This study presents an overview of the main challenges of World development related with manufacturing, education, investment and quality of life. These variables are of uppermost importance to foster sustained and sustainable development.

Here we focus particularly on the evolution and challenges of manufacturing all over the World, but also we cite some studies related with other main factors of development. It has been possible thanks to many years of research devoted to select relevant and accurate data, and empirical investigation analyzing direction of causality in economic development, and analyzing and estimating econometric models and other empirical research.

Section 2 presents a review of the literature, particularly of studies related with the Kaldor´s perspectives on the important role of industry on the evolution of productivity and development.

Section 3 presents an overview of manufacturing and World development in year 2015, and section 4 the evolution of 132 countries for the period 2000-2015.

Section 4 includes a summary of econometric models by area, based on previous studies, and the estimation of a cross-section model of 132 countries, that show the positive an important impact of manufacturing on the real-value-added of non-manufacturing sectors.

Section 5 presents the main conclusions and several Annexes provide supplementary information, data series and comments on some readers related with special cases. If we conclude that a great concern to eradicate poverty should be made favouring manufacturing and international cooperation. A great challenge is how to get this important question to be present on the social means of communication and policies.

2. Revision of the literature

There are many factors, theories and empirical studies that can help to find solutions to poverty and favour sustained and sustainable World development, but few people speaks about how to solve the current problems, both in academic environments and in television, newspapers or other means of social communication .

After the declarations of the Millennium Development Goals (MDGs) and the Sustainable Development Goals (SDG) of the United nations, addressed to eradication of poverty, decent work and development, it is important to promote debates about the international cooperation to development based on the analysis of indicators and measures addressed to effective increase of development.

One author of great relevance in this regard has been Kaldor, with his analysis of the role of industry on economic development and increase of productivity. Klein has analyzed the role of demand and supply and several authors have studied the role of education on development.

Nowadays the theories related with the role of education have been accepted for a a wide percentage of economists and politicians, but the importance of industrial development is, unfortunately, very often missing in many economic analysis and policy measures for development.

In previous studies we have analyzed the evolution of industry and development, for the periods 1980-1999 and 2000-2010 in countries of Africa (Guisan and Exposito (2002) and Guisan(2017)), America (Guisan and Aguayo (2002) and (2015)), Asia-Pacific (Guisan and Exposito (2003) and (2015), Europe and Eurasia (Guisan and Aguayo (2003) and Guisan(2017). Here we present a summary of the main features of the evolution for the period 2000-2015 in countries of Europe and Eurasia, America, Africa and Asia-Pacific.

We have found empirical evidence that supports the Kaldor´s laws that express the positive role of industrialization on economic development. Several econometric studies, like those cited in the bibliography, show that inter-sectoral relationships are important for economic development, and that industry and foreign trade are, usually, of uppermost importance in this regard.

As seen in Valadkhani(2005) and Guisan and Exposito(2017) from a macro-econometric point of view we select the perspective of disequilibrium models from supply and demand, including the role of industry and foreign trade as important variables, not only from the demand side but also from the supply side. Guisan(1980), (2005) and (2013) and Welfe(2011) present interesting econometric models in this regard.

Some recent studies related with the role of industrial development in different areas of the World are the following ones:

Guisan, M.C. (2008) analyses de the positive impact of manufacturing on economic development in Europe, America, Africa and Asia-Pacifi for the period 1999-2006.

Kniivila, M. (2007), insists of the importance of industrial development on economic growth and its implications for poverty reduction. Analyses the cases of the following countries: Brazil, Mexico, China, Indonesia, India, Japan and Taiwan.

Hofman, Aravena and Friedman (2017). Analyze the sources of Productivity and Economic Growth in Latin America and the Caribbean, 1990-2013, and conclude that *"While some services, such as telecommunications, can contribute to the growth of productivity, it can be difficult to improve productivity in certain services. Moreover, once a certain production level has been reached, there may be limited opportunities to continue growing at high rates"*.

In fact we notice that several empirical studies confirm that very often there is little increase of productivity in Services when the industrial development is low, while the increase of real value-added per capita in the Industry usually increases real income of families what is an important variable that contributes to increase expenditure on Services and to increase the productivity of labour and capital. The increase of real value-added per worker in Services depends, at a great extent, of the demand side, when the customers are richer and can demand more and better Services.

Ndikumana, L.(2005) Can Macroeconomic Policy Stimulate Private Investment in South Africa? New Insights from Aggregate and Manufacturing Sector-Level Evidence. Political

Page (2011) promotes that Africa should industrialize and says: *"Without structural change it cannot sustain recent growth. Economies with more diverse and sophisticated industrial sectors tend to grow faster. But since 1980 Africa has deindustrialized. The paper shows that between 1975 and 2005 the size, diversity and sophistication of industry in Africa have all declined. An industrialization strategy containing two elements is needed. The first is straightforward: refocusing current investment climate reforms on infrastructure, skills, and regional integration. These actions alone will not be sufficient, however. Africa must also learn to compete through strategies to create an export push, develop industrial clusters, and attract task-based production"*.

We agree with his concern about the low levels of manufacturing in many African countries, and the need to foster international cooperation to development in Africa.

Finally we mention here some quantitative studies related with industrialization in several areas of the World:

Guisan(2011) analyses the role of industry and fair competition on economic development of OECD countries, with concern about the excessive austerity policy of the European Union which did not help to economic development and have implied stagnation and even diminution of production per capita in some cases.

Guisan and Cancelo(2005) analyses the effects of industrial development on productivity, employment and development in 96 European regions.

Guisan and Aguayo (2001) and (2015) analyse, respectively, the evolution of industry in American countries for 1980-1999 and 2000-2010. In the latter study they conclude: "*We find that the average of America experienced a diminution in domestic manufacturing per head, from 3312 Dollars at 2005 PPPs in year 2000 to 3052 in year 2010. In spite of the high levels of the United States and Canada, and the evolution around World average of many Latin American countries, we find poverty and lack of industrialization in many countries, particularly in those with manufacturing values below World average. The main causes of the low values of manufacturing are related with the educational level of population and with the circumstances that do not favour investment. It is of uppermost importance to diminish financial risk, through national and international guarantees, in order to favour international investment and other ways of cooperation to development".*

Guisan and Exposito (2002) and (2015), respectively, analyse industry in Africa for the period 1980-1999 and for the period 2000-2010. They analyze manufacturing in countries of Asia-Pacific and conclude*: "The main purpose of this study has been to evaluate the real evolution of manufacturing and development in 30 countries of Asia-Pacific during the period 2000-2010. We find that each country, and the average, has experienced an important increase. The increase in China and India has been very important. The impact of manufacturing on non manufacturing activities has been positive and significant.... In spite of the positive evolution, the average of Asia-Pacific is below World average and it*

should be convenient to increase both manufacturing and non manufacturing activities in many countries of this area, particularly in those with the lowest values"

Guisan(2017 a, b) analyzes the evolution of real value-added of Manufacturing in Africa and in Europe and Eurasia, and recommends to increase sustainable and sustained economic development with higher levels of manufacturing per head.

Guisan, M.C. (2011) urges to develop international policies of cooperation to foster investment per capita In this study the author presents comparative data for 21 areas and 132 countries worldwide, in order to assess the evolution of investment, production, poverty and international development. The main conclusion is that economic development for the period 2000-2010 was not enough to get fast improvements on economic development and poverty diminution in many less developed countries. It is urgent to design more cooperative policies in this regard, in order to increase education, production and investment in many areas and countries.

Education is important to increase investment per head, because the educational level of population has several positive effects, moderating excessive rates of population growth and increasing real income per head, as seen in Guisan, Aguayo and Exposito(2001) and in other studies.

Health care and quality of life are very important as development goals and thus economic policies addressed to development should have into account the effects on this regard. As our main conclusion if that manufacturing production per capita should be increased in many countries, in order to reach economic capacity to eradicate poverty and improve quality of life, it is also very important to minimize the negative effects on health and quality of the environment.

WHO(2016) has published an interesting report and map with the quality of air, and other variables, all over the World. The most outstanding conclusion, in this and in other previous studies, is that besides some industrial problems there are also other factors of contamination linked to the increase of population in non-industrial environments. In fact the most contaminated areas of the World correspond very often to countries with low levels of industrial development. The Director of Public Health, Environmental and Social Determinants of Health, in the Preface of that report (see Neira(2016)) says: "*Only one person in ten lives in a city that complies with the WHO Air quality guidelines.... Air pollution continues to rise at an alarming rate, and affects economies and people´s quality of life; it is a public health emergency.... WHO has responsibility for stewarding three air pollution-related indicators for monitoring progress ... in health (Goal 3 of the SDGs), in cities (Goal 11) and in energy (Goal 7)... Saving people´s lives is the overarching aim to implemente policies aiming at tacking air pollution in the health, transport, energy and urban development sectors".*

Education contributes to foster cooperation for health and environment quality, contributes to moderate excessive average fertility rates in many areas , to give priorities to economic policies addressed to improve quality of production and increase of productivity and real income per head, and has also other positive effects on development as seen in Guisan and Neira(2006), and in Guisan and Aguayo(2011) and in other studies.

Manufacturing should be more addressed to the domestic demand of countries and nearby areas, focused to economic development. Foreign trade may be useful to export what is in excess of supply and to import what is in shortage in the country. Manufacturing is important both in developed and developed countries. This means that to reach the SDGs (objectives of the United Nations) globalization should be reshaped, with more focus on economic development and quality of life both instead of globalized markets at the service of ambitious profit-seekers. The great challenge is to get more televisions and newspapers focusing more on education, investment and development.

3. Manufacturing and World Development in 2010-2015, at 2011 prices and PPPs.

Table 1 presents the list of 132 countries of this study, in descending order accordingly to their value-added of manufacturing per head in year 2015. In comparison with year 2000 there have been several remarkable changes, with countries that have diminished their manufacturing activity per head and other ones that have increased this activity and have moved to the highest levels of the ranking.

Table 1. Manufacturing Value-Added per head in year 2015 (Dollars at 2011 prices and PPPs)

Group	Qmh 2015	Countries
1	>7000	Ireland, Singapore, Korea R, Switzerland, Germany, Austria, Czech R, Japan, Sweden
2	5001-7000	Slovenia, Denmark, Finland, USA, Saudi Arabia, Slovak R, Hungary, Belgium, Malaysia, Italy, Netherlands, Lithuania, Norway, Poland
3	4001-5000	Spain, Turkey, Estonia, Kuwait, France, Thailand, Belarus, Canada*, Romania*
4	3001-4000	United Kingdom, Portugal, Russian Fed., Argentina, Mexico, Croatia
5	2001-3000	Uruguay, Australia, Latvia, Chile, Bulgaria, Kazakhstan, Greece, Indonesia, Dominican R, Iran, IR, Venezuela
6	1501-2000	Sri Lanka, Costa Rica, Tunisia, Brazil, Peru, Ecuador, Egypt AR, Macedonia, South Africa, El Salvador, Colombia, Jordan
7	1001-1500	Guatemala, Philippines, Morocco, Lebanon, Panama, Georgia, Myanmar, Ukraine, Paraguay
8	501-1000	Botswana, Azerbaijan, India, Mongolia, Namibia, Vietnam, Bolívia, Armênia, Honduras, Jamaica, Nicarágua, Albânia, Moldova Pakistan, Hong-Kong SAR Cn, Cambodia, Bangladesh, Nigéria, Kyrgyz R.
9	251-500	Lao PDR, Cote d´Ivoire, Cameroon, Congo R, Lesotho, Kenya, Yemen R., Zambia, Benin
10	<250	Mauritania, Ghana, Zimbabwe, Uganda, Nepal, Tanzania, Congo DR, Malawi, Mozambique, Rwanda, Burkina Faso, Guinea, Ethiopia, Burundi, Togo, Chand, Central African R, Sierra Leone
	Not Available*	Algeria, Angola, China, Eritrea, Haiti, Israel, Madagascar, Mali, New Zealand, Niger, Papua NG, Romania, Senegal, Syrian AR, Tajikistan, Turkmenistan, Uzbekistan, Venezuela

*Not available at WB(2017) World Development Indicators on 12th October 2017 for year 2015 nor year 2010. In the cases of Canada, Romania and Venezuela we classified the country accordingly to their available data of year 2010.

Accordingly to several econometric studies that relate manufacturing and non manufacturing activities, as those cited in the bibliography, there is a strong empirical evidence in favour of Kaldor´s laws of industrialization as a motor of development of services and an important factor in the increase of labour productivity. Of course there are other important factors that have a positive impact on Services and other non-manufacturing activities, like energy, tourism, harbour activities, foreign trade and other ones.

Graph 1 shows the high correlation between QMH (value-added per head in manufactugin) and QNMH (value-added per head in non-manufacturing activities), with a correlation of 78%. This graph is based on 112 observations of the countries with

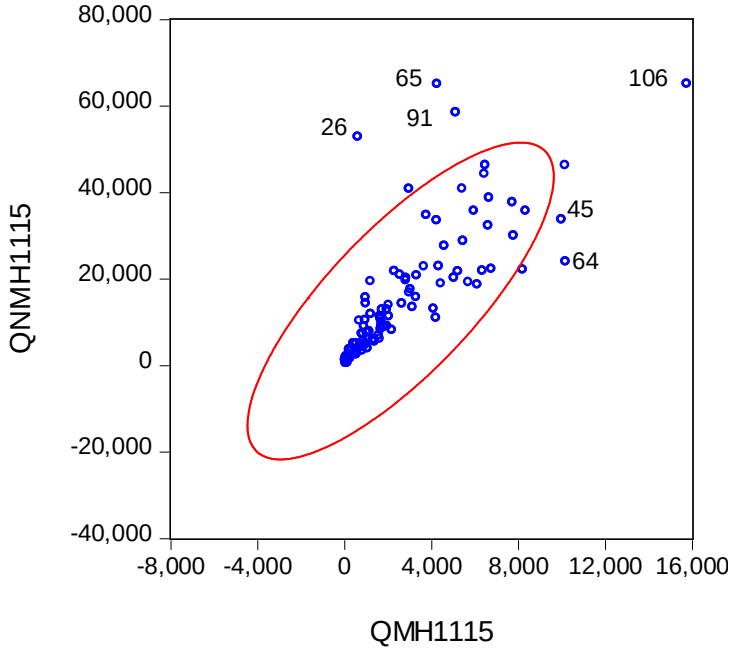
available data in table 1 excluding Ireland due to the strong and sudden increase of QMH in year 2015, which is commented in the Annex.

There are a few outliners that are not included in the confidence ellipse:

1) Three countries or territories with levels of QNMH higher that expected as function of QMH: These are the cases of countries 65 (Kuwait) and 91 (Norway), explained by the energy sector (not included in manufacturing) and the special case of the territory of Hong-Kong in China, with a lot of services and exports activities based on the manufacturing activities of other Chinese regions.

2) Two countries with a high level of manufacturing per head and a level of development of services in the domestic market lower than expected: country 45 Germany and country 64 Korea R. It happens that some countries with a high level of manufacturing invest and spend in Services, or other activities, in non-domestic markets, and they usually have a highly positive NIP (Net International Position).

Graph 1. Manufacturing (QMH) and non Manufacturing (QNMH) per head in 112 countries ((US Dollars at 2011 prices in international parities in year 2015)



Note: Numbers of countries outside the confidence interval: 26 (China Hong-Kong), 45 (Germany), 64 (Korea R.), 65 (Kuwait), 91 (Norway), and 106 (Singapore).

4. Manufacturing and World development in 2000-2015, at 2005 prices and PPPs.

Table 2 shows the average results by big areas and continents of the evolution of real value-added of Manufacturing per head (QMH) and real Gross Domestic Product per head, in Dollars (USD) per capita at 2005 prices and Purchasing Power Parities (PPPs).

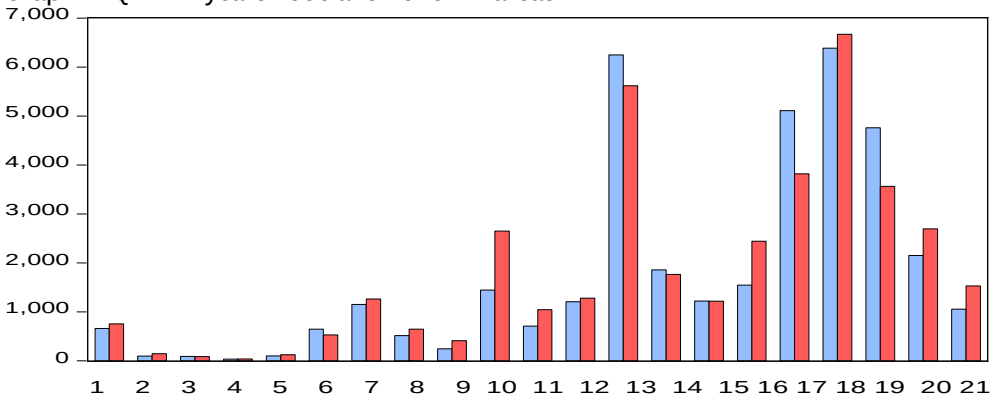
Graph 2 shows the great differences among 21 areas of the World in the degree of development of Manufacturing per head. The highest values correspond to areas 13 and 18, followed by 17 and 19. The highest increases for the period 2000-2010 corresponded to area 10 (China and North East), area 15 (South West Andean America) and area 20 (Central Eastern Europe).

Table 2 Real values per head of Manufacturing and GDP per capita
(Dollars per capita at 2005 prices and PPPs)

Area	qmh 2000	qmh 2010	gdph 2000	gdph 2010
1. Northern Africa	659	752	4412	5851
2. North West Africa	94	144	1359	1894
3.Sahel-Central Africa	87	86	729	878
4. North East Africa	33	38	534	907
5. Eastern Africa	100	124	965	1246
6. Southern Africa	645	529	3924	4859
7. Western Asia	1149	1262	10800	12237
8. Iran and Pakistan	513	646	3741	4836
9. India and South	245	411	1635	2887
10. China and N.E.	1444	2648	5547	9606
11.Indochina	708	1044	2555	4039
12.South Pacific	1207	1278	5320	6978
13. USA and Canada	6249	5617	38456	41594
14. Mexico & Central A.	1858	1764	9237	9848
15. SW:Andean America	1219	1217	7064	9181
16. SE America	1544	2442	8748	11921
17. Nordic and British E.	5109	3819	30081	33474
18. Central-Western Europe	6387	6668	31306	34227
19. Latin Europe	4761	3562	27173	27659
20. Central-Eastern E.+Baltic+E.Med.	2150	2695	10812	15093
21. Russia and CIS	1052	1527	6038	10208
Africa	278	282	2080	2638
Asia-Pacific	903	1443	4004	6333
America	3312	3052	19865	21908
Europe and Eurasia	3220	3191	17408	20828
World	1494	1728	7905	9852

Source: Guisan(2014) from WB statistics. List of countries of each area in Annex 2.

Graph 2. QMH in years 2000 and 2010: 21 areas



Source: Elaborated from Guisan(2014). Areas are in the order of table 2, where is the name of each area. See Annex 1 for the lists of countries by area. Areas 1 to 7 correspond to Africa, 8 to 12 to Asia and Pacific, 13 to 16 to America, and 17 to 21 to Europe and Eurasia.

We may notice great differences by area and continent in the degree of industrialization related with Manufacturing, with very low values in African average with less than 300 Dollars both in year 2000 and 2010. We may notice an increase in Asia-Pacific from 903 to 1442 Dollars per capita in the period 2000-2010. The averages of America and of the group of Europe and Eurasia, have experienced an small decay in that period, being both values slightly over 3000 Dollars. The World average has increased as a consequence of the increase in Asia-Pacific.

Tables 3.1 to 3.10 show the evolution of production per capita (net production measured by real-value-added per head) of Manufacturing (QMH) (non-Manufacturing (QNMH) and total production per head (PH). Data are expressed in Dollars of the United States (USD) at 2005 prices and PPPs). Data of the period 2000-2010 have been elaborated from World Bank statistics by Guisan and Aguayo(2015) for American countries, Guisan and Exposito (2015) for Asia-Pacific and Guisan(2017 a,b) for Africa, Europe and Eurasia. Data for year 2015 have been elaborated fo this study as explained in the Annex. For the 20 countries with problem of not availability of data for the year 2015 we indicate as "NA, and we expect to update the information in the Annex in the future.

. Table 3.1. Production per capita over 35000 Dollars at 2005 prices and PPPs

		Manufacturing per head			Non manufacturing per head			Production per head		
		2000	2010	2015	2000	2010	2015	2000	2010	2015
21	Canada	6171	6692	NA	26306	28531	NA	32477	35223	NA
112	Sweden	6087	5403	5235	22899	28368	30635	28986	33771	35870
7	Austria	6430	6368	6582	25719	29011	29531	32149	35379	36113
45	Germany	6734	7351	8183	23877	26063	28001	30611	33414	36185
6	Australia	3760	2753	2290	25166	31658	34209	28926	34411	36500
86	Netherlands	5036	4809	4853	28540	32186	32811	33576	36995	37664
113	Switzerland	6260	7141	6799	28518	30442	31445	34778	37583	38245
125	United States	6257	5499	5796	32851	36798	39424	39108	42297	45221
65	Kuwait	1008	1498	1539	32595	48436	44354	33603	49934	45893
26	China Hong-Kong	1489	834	609	28296	40879	45731	29785	41713	46339
91	Norway	4364	3284	3338	39278	43625	44630	43642	46909	47968
56	Ireland	8358	8277	18915	23788	27711	29743	32146	35988	48657
106	Singapore	10445	10393	10628	26859	41573	47760	37304	51966	58388

Source: Elaborated by M.C.Guisan from WB statistics. See Annex. Not Available = NA.

The top countries by Production per head in year 2015 where already prosperous in year 2000. Nine of them have a high value of manufacturing per head, over 4800 Dollars at 2005 prices and PPPs in year 2015.

In three cases the high value of production per head is, at a great extent, explained by the positive effects of energy industry, not included in manufacturing, as it happens in Australia, Kuwait and Norway. There are also one special cases of the Chinese territory of Hong-Kong with low value of industrial production per head but with a great activity exporting industrial production from other Chinese areas.

Manufacturing production per head has experienced a great increase in Ireland, as explained in the Annex. In the other cases of table 3.1 there has been little change for the period 2010-2015.

Table 3.2. Production per capita between 25000 and 35000 Dollars at 2005 prices and PPPs

		Manufacturing per head			Non manufacturing per head			Production per head		
		2000	2010	2015	2000	2010	2015	2000	2010	2015
108	Slovenia	5127	5260	6149	14591	19788	19306	19718	25048	25455
58	Italy	5544	4342	4133	22176	22795	21538	27720	27137	25671
57	Israel	4154	4702	NA	18837	21321	NA	22991	26023	NA
110	Spain	4521	3502	3721	20598	23438	22972	25119	26940	26693
43	France	4384	2964	3031	24841	26676	27328	29225	29640	30359
64	Korea. Rep.	5072	8378	9139	12417	18648	21290	17489	27026	30428
42	Finland	7140	4724	4016	20323	26769	27030	27463	31493	31045
60	Japan	6009	5503	5728	22604	25070	26633	28613	30573	32361
34	Denmark	4758	3546	4233	26963	28690	28992	31721	32236	33226
11	Belgium	5751	4265	4199	24515	28543	29138	30266	32808	33337
124	UK	4668	3247	3376	24504	29227	31174	29172	32474	34549

Source: Elaborated by M.C.Guisan from WB statistics. See Annex.

Two countries of this group have increased Manufacturing production per head for the period 2000-2010 and 2010-2015: Slovenia and Korea R. Seven European countries of this group have experienced important decreases of Manufacturing production per head for 2000-2010 and/or 2010-2015: Italy , Spain, France, Finland, Denmark, Belgium and the UK. Some of them have experienced a decrease of total production per head for the period 2000-2010 (Italy) or 2010-2015 (Italy, Spain and Finland). Austerity policy have been excessive in the European Union, for several reasons as we comment in the Annex.

Table 3.3. Production per capita between 18001 and 25000 Dollars at 2005 prices and PPPs

		Manufacturing per head			Non manufacturing per head			Production per head		
		2000	2010	2015	2000	2010	2015	2000	2010	2015
52	Hungary	3263	3900	4942	10334	13058	14005	13597	16958	18947
71	Lithuania	1789	2951	3892	7628	12582	15994	9417	15533	19885
40	Estonia	1879	2484	3013	9174	14077	16887	11053	16561	19900
98	Poland	2231	3123	4079	9512	14229	16095	11743	17352	20174
47	Greece	2183	2421	2351	18391	21785	18016	20574	24206	20366
99	Portugal	3468	3032	3093	16934	18628	18028	20402	21660	21121
107	Slovak R	3181	4234	5131	9542	15929	17517	12723	20163	22648
103	Saudi Arabia	1972	2037	2620	17744	18337	20093	19716	20374	22713
33	Czech R	4390	5644	6972	12496	16931	17345	16886	22575	24317
87	New Zealand	3736	2958	NA	18239	21691	NA	21975	24649	NA

Source: Elaborated by M.C.Guisan from WB statistics. See Annex.

Several countries of this group have experienced important increases of Manufacturing and total Production per head for the period 2000-2010 and 2010-2015, as they are the cases of Hungary, Lithuania, Estonia, Poland, Slovak R. and Czech R., all of them with an increase higher than 5000 Dollars of total Production per head for 2000-2015.

Other countries of this group show stagnation, both in Manufacturing and Total Production per head, as they are the cases of Greece and Portugal. Saudi Arabia an increase of Manufacturing and total production.

Table 3.4. Production per head between 12000 and 18000 Dollars at 2005 prices and PPPs

		Manufacturing per head			Non manufacturing per head			Production per head		
		2000	2010	2015	2000	2010	2015	2000	2010	2015
62	Kazakhstan	973	1310	1389	4433	9606	11387	5406	10916	12776
16	Bulgaria	1234	1953	2502	5620	9537	10358	6854	11490	12860
10	Belarus	1859	3748	3692	3951	8746	9512	5810	12494	13203
78	Mexico	2414	2239	2609	9657	10202	10749	12071	12441	13358
14	Botswana	587	748	775	9196	115	13596	9783	12463	14371
4	Argentina	1544	2442	2277	8748	11921	12414	10292	14363	14691
126	Uruguay	1241	1772	1999	7621	10883	12700	8862	12655	14699
101	Russian F	1465	2127	2063	7150	12055	12741	8615	14182	14804
75	Malaysia	3184	3171	3651	7087	10043	11990	10271	13214	15641
24	Chile	1781	1496	1853	8694	12100	13899	10475	13596	15752
120	Turkey	2041	2258	3246	7235	10288	13105	9276	12546	16351
68	Latvia	1195	1554	1797	7338	11395	14585	8533	12949	16381
93	Panama	815	732	754	7334	11474	15674	8149	12206	16428
32	Croatia	2114	2581	2750	8456	13548	13808	10570	16129	16558

Source: Elaborated by M.C.Guisan from WB statistics. See Annex.

The highest values of Manufacturing per capita of this group in year 2015 correspond to Belarus, Malaysia and Turkey, followed by Mexico, Bulgaria, Argentina and Russian Federation. Three countries of table 3.4 have experienced an important increase of Manufacturing per capita higher than 1000 for the period 2000-2015: Bulgaria, Belarus, Turkey. They have experienced important increases of total Production per head: around 6000 in Bulgaria, more than 7000 in Belarus and in Turkey. A few countries have a high level of non manufacturing production in spite of low or very low values of manufacturing per head. They are special cases like Panama, with a high level of activity in Services related with the Channel, and Botswana which impressive development has been founded in diamond production and other mining activities, as cited in the Annex. The lowest increase, below 2000 Dollars, of total production per head in table 3.4 correspond to Mexico. It is particularly important for Mexico to increase industrial production per head in order to foster economic development.

Table 3.5. Production per head between 10001 and 12000 Dollars at 2005 prices and PPPs

		Manufacturing per head			Non manufacturing per head			Production per head		
		2000	2010	2015	2000	2010	2015	2000	2010	2015
35	Dominican R	1289	1929	2158	3668	6458	7869	4957	8387	10027
27	Colombia	965	1102	1176	5468	7377	8936	6433	8479	10112
96	Peru	950	1283	1294	4636	7272	8853	5586	8555	10147
69	Lebanon	1083	1136	1016	7245	11485	9138	8328	12621	10154
15	Brazil	1347	1307	1036	6574	8749	9158	7921	10056	10194
72	Macedonia	1519	1103	1417	5712	8089	8921	7231	9192	10338
100	Romania	1094	1747	NA	5744	9174	NA	6838	10921	NA
128	Venezuela. RB	1913	1536	NA	7651	9437	NA	9564	10973	NA
30	Costa Rica	2029	1764	1679	6088	8613	10197	8117	10377	11876

Source: Elaborated by M.C.Guisan from WB statistics. See Annex.

The highest increase of manufacturing per capita, for the period 2000-2015, in table 3.5, correspond to Dominican R. with almost 1000. Non Manufacturing per head have increased in all the countries with available data of this table, due to other factors like tourism, but to foster sustained economic development all of them need to increase manufacturing production per head.

3.6. Production per head between 6001 and 10000 Dollars at 2005 prices and PPPs

		Manufacturing per head			Non manufacturing per head			Production per head		
		2000	2010	2015	2000	2010	2015	2000	2010	2015
44	Georgia	211	592	823	2131	3960	5280	2342	4552	6103
38	El Salvador	1244	1196	1307	3731	4785	5120	4975	5981	6427
25	China	852	2181	NA	1812	4635	NA	2664	6816	NA
84	Namibia	509	755	594	3407	5053	6223	3916	5808	6817
59	Jamaica	633	619	682	5125	6264	6295	5758	6883	6977
121	Turkmenistan	403	816	NA	3265	6605	NA	3668	7421	NA
2	Algeria	426	530	NA	5661	7035	NA	6087	7565	NA
36	Ecuador	1043	936	1208	4448	6265	7077	5491	7201	8286
1	Albania	335	689	748	4452	6969	7752	4787	7658	8499
117	Thailand	1948	2609	2621	3781	5064	6007	5729	7673	8628
119	Tunisia	980	1456	1405	4464	7110	7425	5444	8566	8830
8	Azerbaijan	149	357	423	2341	8556	8894	2490	8913	9317
55	Iran. Islamic	997	1368	1330	6670	9158	8338	7667	10526	9668
109	South Africa	1421	1137	1094	6059	8340	8714	7480	9477	9808

Source: Elaborated by M.C.Guisan from WB statistics. See Annex.

The countries with available data for year 2015 in table 3.6 that experienced an increase higher than 500 Dollars in Manufacturing per head for the period 2000-2015 have been Georgia, and Thailand. China has experienced an increase higher than 1000 Dollars for the periodo 2000-2010. Other countries have experienced smaller increases or stagnation, and only one country (South Africa) has experienced a decrease of Manufacturing per head. Some countries of this group have experienced high percent increases of total Production per head, what is an important step for a process of sustained development.

3.7. Production per head between 4000 and 6000 Dollars at 2005 prices and PPPs

		Manufacturing per head			Non manufacturing per head			Production per head		
		2000	2010	2015	2000	2010	2015	2000	2010	2015
53	India	258	430	533	1460	2643	3490	1718	3073	4023
29	Congo. Rep.	91	152	315	2930	3656	3763	3021	3808	4078
97	Philippines	633	748	858	2004	2813	3517	2637	3561	4376
61	Jordan	581	980	847	3051	4177	3776	3632	5157	4623
48	Guatemala	832	858	918	3131	3434	3743	3963	4292	4661
114	Syrian Arab R	261	332	NA	3464	4409	NA	3725	4741	NA
54	Indonesia	760	931	1089	1954	2949	3675	2714	3880	4764
81	Morocco	507	634	743	2473	3593	4032	2980	4227	4775
13	Bolivia	534	565	645	3029	3784	4611	3563	4349	5256
80	Mongolia	162	253	411	1867	3367	4944	2029	3620	5355
95	Paraguay	618	757	867	3174	3891	4633	3792	4648	5500
3	Angola	79	333	NA	2554	5216	NA	2633	5549	NA
37	Egypt. Arab R	800	832	835	3411	4712	4846	4211	5544	5681
123	Ukraine	702	904	808	2994	5125	4944	3696	6029	5752
111	Sri Lanka	522	820	933	2546	3735	4970	3068	4555	5903
5	Armenia	435	539	624	1855	4362	5357	2290	4901	5981

Source: Elaborated by M.C.Guisan from WB statistics. See Annex.

Table 3.7 includes countries with levels of development below World average (Production per head 9852 Dollars in year 2015). All the countries of this group with available data

have experienced a positive evolution of Manufacturing per head and total Production per head for the period 2000-2015. Increases higher than 200 Dollars in manufacturing per head correspond to: India, Congo R., Philippines, Jordan, Indonesia, Morocco, Mongolia and Sri Lanka. It is important to foster manufacturing to get sustainable development and poverty eradication.

3.8. Production per head between 2001 and 4000 Dollars at 2005 prices and PPPs

		Manufacturing per head			Non manufacturing per head			Production per head		
		2000	2010	2015	2000	2010	2015	2000	2010	2015
94	Papua NG	157	177	NA	1806	2040	NA	1963	2217	NA
20	Cameroon	385	432	421	1447	1626	1880	1832	2058	2301
66	Kyrgyz R	285	281	276	1216	1727	2074	1501	2008	2351
83	Myanmar	41	122	173	541	1627	2195	582	1749	2368
90	Nigeria	58	151	242	1398	2002	2134	1456	2153	2376
77	Mauritania	208	88	76	1389	2115	2339	1597	2203	2414
19	Cambodia	172	315	448	837	1653	2119	1009	1968	2568
92	Pakistan	290	338	364	1641	2073	2278	1931	2411	2642
127	Uzbekistan	147	362	NA	1485	2424	NA	1632	2786	NA
67	Lao PDR	87	183	304	1365	2105	2821	1452	2288	3125
88	Nicaragua	296	418	510	1819	2195	2707	2115	2613	3218
79	Moldova	233	391	521	1222	2399	2870	1455	2790	3391
129	Vietnam	271	489	635	1326	2386	2999	1597	2875	3635
51	Honduras	667	669	776	2231	2850	3048	2898	3519	3824

Source: Elaborated by M.C.Guisan from WB statistics. See Annex.

3.9. Production per capita between 1001 and 2000 Dollars at 2005 prices and PPPs

		Manufacturing per head			Non manufacturing per head			Production per head		
		2000	2010	2015	2000	2010	2015	2000	2010	2015
118	Togo	69	72	51	700	824	950	769	896	1001
82	Mozambique	61	127	137	445	718	888	506	845	1025
49	Guinea	40	76	70	972	1005	1002	1012	1081	1072
17	Burkina Faso	143	68	62	753	1059	1168	896	1127	1231
85	Nepal	81	75	84	824	1000	1162	905	1075	1245
122	Uganda	62	103	112	713	1039	1143	775	1142	1255
102	Rwanda	45	52	63	595	991	1261	640	1043	1324
41	Ethiopia	32	37	59	494	896	1273	526	933	1332
23	Chad	79	25	77	799	1204	1256	878	1229	1333
130	Yemen R.	124	143	91	1940	2237	1307	2064	2380	1398
116	Tanzania	78	129	117	786	1158	1406	864	1287	1523
131	Zambia	113	126	138	916	1275	1412	1029	1401	1549
12	Benin	94	114	109	1084	1310	1465	1178	1424	1574
70	Lesotho	167	187	176	1029	1250	1505	1196	1437	1681
31	Cote d'Ivoire	317	204	NA	1444	1499	NA	1761	1703	NA
63	Kenya	154	148	139	1133	1333	1567	1287	1481	1705
104	Senegal	210	243	NA	1193	1493	NA	1403	1736	NA
46	Ghana	102	88	86	914	1386	1813	1016	1474	1898
9	Bangladesh	135	268	358	766	1220	1551	901	1488	1909
115	Tajikistan	341	213	NA	662	1727	NA	1003	1940	NA

Source: Elaborated by M.C.Guisan from WB statistics. See Annex.

Countries of table 3.8 had very low levels of total Production per head in year 2000. Some of them, among those with available data in year 2015, have experienced an increase higher than 1000 Dollars for the period 2000-2015: Myanmar, Cambodia, Lao PDR, Nicaragua, Moldova and Vietnam, and other ones have experienced smaller increases. All the countries of this group have very low levels of manufacturing per head.

The only country of tables 3.9 and 3.10 that have experienced and increase of total production per head higher than 1000 Dollars, among those with available data for the period 2000-2015, has been Bangladesh. It is outstanding the need to foster development in all the countries of these areas, particularly in those with the lowest levels.

Table 3.10. Countries with production below 1000 Dollars at 2005 prices and PPPs

Nb		Manufacturing per head			Non manufacturing per head			Production per head		
	Country/Year	2000	2010	2015	2000	2010	2015	2000	2010	2015
18	Burundi	41	33	31	297	333	328	338	366	359
28	Congo. DR	26	31	36	230	280	348	256	311	385
39	Eritrea	68	49	NA	613	441	NA	681	490	NA
22	Central Af R	44	42	32	690	665	467	734	707	498
132	Zimbabwe	441	70	71	2318	430	575	2759	500	645
89	Niger	40	39	NA	528	614	NA	568	653	NA
105	Sierra Leone	15	15	13	366	727	790	381	742	803
74	Malawi	92	95	97	613	696	736	705	791	833
73	Madagascar	103	104	NA	755	765	NA	858	869	NA
76	Mali	34	38	NA	823	917	NA	857	955	NA
50	Haiti	163	137	NA	1027	860	NA	1190	997	NA

Source: Elaborated by M.C.Guisan from WB statistics. See Annex.

5. Econometric models: manufacturing and World development in 2000-2010

As seen in the economic literature cited in this study, several empirical studies have shown, form a perspective of disequilibrium, that both demand and supply are important for development and that supply of intermediate inputs is related with domestic production of raw materials and other intermediate goods and with the capacity to import intermediate inputs not available in the domestic market. As seen in Guisan(2013) the capacity to import usually depends on the capacity to export in order to avoid unsustainable trade deficits. For the purposes of simplification the estimated models that we summarize here do not include the effects of foreign trade, and focus mainly on the effects of manufacturing on non manufacturing activities.

Table 4 presents the results of estimation of a mixed dynamic model, where real Value-Added per head (QNMH) is expressed as a function of its lagged value and the increase of QMH.

Table 4. Econometric models for the period 2000-2010

	Lagged dep.variable	Increase of QMH	R^2
Africa	1.203965	3.582825	0.996992
America	1.201132	2.351296	0.991983
Asia-Pacific	1.253758	0.930252	0.996193
Europe and Eurasia	1.222405	2.541376	0.980595
World	1.222653	2.48 (or 1.04, See Note [1])	0.991372

Notes: [1] As seen in the Annex we have tested the homogeneity of the coefficient of the increase of QMH in the equation of QNMH among different areas, and we have found a significant difference, with a value for Asia-Pacific lower than in other areas.

A most complete analysis should include other variables like the increase of Exports and Imports, as indicated in Guisan(2013) and other studies, but this simple model is enough to show the high degree of dependence of many non Manufacturing activities on the degree of industrial development:

QNMH f(QNMH(-1), D(QMH))

Being D(QMH)=QMH-QMH(-1). The lagged values of each variable, in t-1, are indicated with (-1) within parenthesis.

The estimation results are presented in the Annex and show that all the coefficients are significant and positive. The goodness of fit is very high in all the cases, in spite of the simplified version of the model, because the effects of missing variables are linearly correlated with the included explanatory variables. The effects of missing variables does not diminish the goodness of fit when they are highly correlated with the included variables as seen in Guisan(1997, chapter 5).

6. Conclusions

The main object of this report is to compare the production per head in 132 countries and to analyze the positive effect of manufacturing on development. We have elaborated values per capita, for the period 2000-2015, in a common currency at constant prices (USD at 2005 PPPs) and include tables in the Annex. We find that the average of real value-added per capita in Africa has been very low in both years, from 278 in year 2000 to 282 in year 2010. The average of Asia has increased from 903 in year 2000 to 1443 in year 2010. The averages of America and the group of Europe and Eurasia have reached values higher than 3000 both in year 2000 and 2010, with a slight decrease for the period 2000-2010. It is important avoid stagnation or decrease in order to foster domestic development.

The econometric models show the positive and significant impact of manufacturing on non-manufacturing production and on economic development. It is important to increase the presence of this type of studies and economic policies related with World development in the televisions, newspapers and other social media, in order to foster international cooperation to the eradication of poverty and increase of quality of life.

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Annex 1.

Countries in Areas of Africa:

1. *Northern Africa*: Algeria, Egypt, Mauritania, Morocco and Tunisia.
2. *North Western Africa*: Cote d´Ivoire, Ghana, Guinea, Nigeria, Senegal, Sierra Leone, Togo
3. *Sahel and Central Africa*: Burkina-Faso, Burundi, Cameroon, Central African R., Chad, Congo D.R. , Congo R., Mali, Niger, Rwanda.
4. *North Eastern Africa*: Eritrea and Ethiopia.
5. *Eastern Africa*: Kenya, Madagascar, Tanzania, Uganda
6. *Southern Africa*: Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Zambia and Zimbabwe.

Countries in Areas of Asia-Pacific

7. *Western Asia*: Israel, Jordan, Kuwait, Lebanon, Saudi Arabia, Syria and Yemen.
8. *South Central Asia*: Afghanistan, Iran and Pakistan.
9. *India and South*: Bangladesh, India, Nepal and Sri Lanka.
10. *China and North East*: China, Hong-Kong, Japan, South Korea and Mongolia.
11. *Indochina or South East*: Cambodia, Lao, Myanmar, Thailand and Vietnam.
12. *South Pacific*: Australia, Indonesia, Malaysia, New Zealand, Papua-New Guinea, Philippines and Singapore.

Countries in Areas of America

13. *USA and Canada*
14. *Mexico and Central America*: Costa Rica, Dominican R., El Salvador, Guatemala, Haiti, Honduras, Jamaica, Mexico, Nicaragua and Panama
15. *West South America (Andean America):* Bolivia, Chile, Colombia, Ecuador, Peru, Venezuela.
16. *East South America*: Argentina, Brazil, Paraguay and Uruguay

Countries in Areas of Europe and Eurasia

17. *Nordic and British Europe*: Denmark, Finland, Ireland, Norway, Sweden, United Kingdom
18. *Central-Western Europe*: Austria, Belgium, Germany, Netherlands and Switzerland.
19. *Latin Europe*: France, Italy, Portugal and Spain
20. *Central-Eastern Europe, Baltic and East Mediterranean*. Includes East Central Europe: Czech Republic, Hungary, Poland, and Slovak. Baltic countries: Estonia, Latvia, and Lithuania. East Mediterranean: Albania, Bulgaria, Croatia, Greece, Macedonia, Romania and Slovenia. In this area we also include Turkey, an Eurasian country that belongs to the Council of Europe.
21. *Russia and CIS*: Includes 3 East European Countries: Belarus, Moldova and Ukraine, 4 Eurasian countries, which belong to the Council of Europe: Russia and the 3 Caucasus countries (Armenia, Azerbaijan, and Georgia), and 5 Central Asian countries which belong to the Community of Independent States (CIS): Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan.

Annexes 2 to 5: on line at the journal Website: http://www.usc.es/econo/RGE/benvidag.htm

Annex 2. Data for the period 2000-2015 in Dollars at 2005 Prices and PPPs

Values in Dollars at 2005 prices and Purchasing Power Parities

		QMH 00	QMH 10	QMH 15	QNMH 00	QNMH 10	QNMH 15	PH00 PP05	PH10 PP05	PH15 PP05
1	Albania	335	689	748	4452	6969	7752	4787	7658	8499
2	Algeria	426	530	NA	5661	7035	NA	6087	7565	NA
3	Angola	79	333	NA	2554	5216	NA	2633	5549	NA
4	Argentina	1544	2442	2277	8748	11921	12414	10292	14363	14691
5	Armenia	435	539	624	1855	4362	5357	2290	4901	5981
6	Australia	3760	2753	2290	25166	31658	34209	28926	34411	36500
7	Austria	6430	6368	6582	25719	29011	29531	32149	35379	36113
8	Azerbaijan	149	357	423	2341	8556	8894	2490	8913	9317
9	Bangladesh	135	268	358	766	1220	1551	901	1488	1909
10	Belarus	1859	3748	3692	3951	8746	9512	5810	12494	13203
11	Belgium	5751	4265	4199	24515	28543	29138	30266	32808	33337
12	Benin	94	114	109	1084	1310	1465	1178	1424	1574
13	Bolivia	534	565	645	3029	3784	4611	3563	4349	5256
14	Botswana	587	748	775	9196	11715	13596	9783	12463	14371
15	Brazil	1347	1307	1036	6574	8749	9158	7921	10056	10194
16	Bulgaria	1234	1953	2502	5620	9537	10358	6854	11490	12860
17	Burkina Faso	143	68	62	753	1059	1168	896	1127	1231
18	Burundi	41	33	31	297	333	328	338	366	359
19	Cambodia	172	315	448	837	1653	2119	1009	1968	2568
20	Cameroon	385	432	421	1447	1626	1880	1832	2058	2301
21	Canada	6171	6692	NA	26306	28531	NA	32477	35223	NA
22	Central Af R	44	42	32	690	665	467	734	707	498
23	Chad	79	25	77	799	1204	1256	878	1229	1333
24	Chile	1781	1496	1853	8694	12100	13899	10475	13596	15752
25	China	852	2181	NA	1812	4635	NA	2664	6816	NA
26	China-Hong Kong	1489	834	609	28296	40879	45731	29785	41713	46339
27	Colombia	965	1102	1176	5468	7377	8936	6433	8479	10112
28	Congo. DR	26	31	36	230	280	348	256	311	385
29	Congo. Rep.	91	152	315	2930	3656	3763	3021	3808	4078
30	Costa Rica	2029	1764	1679	6088	8613	10197	8117	10377	11876
31	Cote d'Ivoire	317	204	NA	1444	1499	NA	1761	1703	NA
32	Croatia	2114	2581	2750	8456	13548	13808	10570	16129	16558
33	Czech R	4390	5644	6972	12496	16931	17345	16886	22575	24317
34	Denmark	4758	3546	4233	26963	28690	28992	31721	32236	33226
35	Dominican R	1289	1929	2158	3668	6458	7869	4957	8387	10027
36	Ecuador	1043	936	1208	4448	6265	7077	5491	7201	8286
37	Egypt. Arab R	800	832	835	3411	4712	4846	4211	5544	5681
38	El Salvador	1244	1196	1307	3731	4785	5120	4975	5981	6427
39	Eritrea	68	49	NA	613	441	NA	681	490	NA
40	Estonia	1879	2484	3013	9174	14077	16887	11053	16561	19900
41	Ethiopia	32	37	59	494	896	1273	526	933	1332
42	Finland	7140	4724	4016	20323	26769	27030	27463	31493	31045
43	France	4384	2964	3031	24841	26676	27328	29225	29640	30359
44	Georgia	211	592	823	2131	3960	5280	2342	4552	6103

45	Germany	6734	7351	8183	23877	26063	28001	30611	33414	36185
46	Ghana	102	88	86	914	1386	1813	1016	1474	1898
47	Greece	2183	2421	2351	18391	21785	18016	20574	24206	20366
48	Guatemala	832	858	918	3131	3434	3743	3963	4292	4661
49	Guinea	40	76	70	972	1005	1002	1012	1081	1072
50	Haiti	163	137	NA	1027	860	NA	1190	997	NA
51	Honduras	667	669	776	2231	2850	3048	2898	3519	3824
52	Hungary	3263	3900	4942	10334	13058	14005	13597	16958	18947
53	India	258	430	533	1460	2643	3490	1718	3073	4023
54	Indonesia	760	931	1089	1954	2949	3675	2714	3880	4764
55	Iran. Islamic	997	1368	1330	6670	9158	8338	7667	10526	9668
56	Ireland	8358	8277	18915	23788	27711	29743	32146	35988	48657
57	Israel	4154	4702	NA	18837	21321	NA	22991	26023	NA
58	Italy	5544	4342	4133	22176	22795	21538	27720	27137	25671
59	Jamaica	633	619	682	5125	6264	6295	5758	6883	6977
60	Japan	6009	5503	5728	22604	25070	26633	28613	30573	32361
61	Jordan	581	980	847	3051	4177	3776	3632	5157	4623
62	Kazakhstan	973	1310	1389	4433	9606	11387	5406	10916	12776
63	Kenya	154	148	139	1133	1333	1567	1287	1481	1705
64	Korea. Rep.	5072	8378	9139	12417	18648	21290	17489	27026	30428
65	Kuwait	1008	1498	1539	32595	48436	44354	33603	49934	45893
66	Kyrgyz R	285	281	276	1216	1727	2074	1501	2008	2351
67	Lao PDR	87	183	304	1365	2105	2821	1452	2288	3125
68	Latvia	1195	1554	1797	7338	11395	14585	8533	12949	16381
69	Lebanon	1083	1136	1016	7245	11485	9138	8328	12621	10154
70	Lesotho	167	187	176	1029	1250	1505	1196	1437	1681
71	Lithuania	1789	2951	3892	7628	12582	15994	9417	15533	19885
72	Macedonia	1519	1103	1417	5712	8089	8921	7231	9192	10338
73	Madagascar	103	104	NA	755	765	NA	858	869	NA
74	Malawi	92	95	97	613	696	736	705	791	833
75	Malaysia	3184	3171	3651	7087	10043	11990	10271	13214	15641
76	Mali	34	38	NA	823	917	NA	857	955	NA
77	Mauritania	208	88	76	1389	2115	2339	1597	2203	2414
78	Mexico	2414	2239	2609	9657	10202	10749	12071	12441	13358
79	Moldova	233	391	521	1222	2399	2870	1455	2790	3391
80	Mongolia	162	253	411	1867	3367	4944	2029	3620	5355
81	Morocco	507	634	743	2473	3593	4032	2980	4227	4775
82	Mozambique	61	127	137	445	718	888	506	845	1025
83	Myanmar	41	122	173	541	1627	2195	582	1749	2368
84	Namibia	509	755	594	3407	5053	6223	3916	5808	6817
85	Nepal	81	75	84	824	1000	1162	905	1075	1245
86	Netherlands	5036	4809	4853	28540	32186	32811	33576	36995	37664
87	New Zealand	3736	2958	NA	18239	21691	NA	21975	24649	NA
88	Nicaragua	296	418	510	1819	2195	2707	2115	2613	3218
89	Niger	40	39	NA	528	614	NA	568	653	NA
90	Nigeria	58	151	242	1398	2002	2134	1456	2153	2376
91	Norway	4364	3284	3338	39278	43625	44630	43642	46909	47968
92	Pakistan	290	338	364	1641	2073	2278	1931	2411	2642
93	Panama	815	732	754	7334	11474	15674	8149	12206	16428

94	Papua NG	157	177	NA	1806	2040	NA	1963	2217	NA
95	Paraguay	618	757	867	3174	3891	4633	3792	4648	5500
96	Peru	950	1283	1294	4636	7272	8853	5586	8555	10147
97	Philippines	633	748	858	2004	2813	3517	2637	3561	4376
98	Poland	2231	3123	4079	9512	14229	16095	11743	17352	20174
99	Portugal	3468	3032	3093	16934	18628	18028	20402	21660	21121
100	Romania	1094	1747	NA	5744	9174	NA	6838	10921	NA
101	Russian F	1465	2127	2063	7150	12055	12741	8615	14182	14804
102	Rwanda	45	52	63	595	991	1261	640	1043	1324
103	Saudi Arabia	1972	2037	2620	17744	18337	20093	19716	20374	22713
104	Senegal	210	243	NA	1193	1493	NA	1403	1736	NA
105	Sierra Leone	15	15	13	366	727	790	381	742	803
106	Singapore	10445	10393	10628	26859	41573	47760	37304	51966	58388
107	Slovak R	3181	4234	5131	9542	15929	17517	12723	20163	22648
108	Slovenia	5127	5260	6149	14591	19788	19306	19718	25048	25455
109	South Africa	1421	1137	1094	6059	8340	8714	7480	9477	9808
110	Spain	4521	3502	3721	20598	23438	22972	25119	26940	26693
111	Sri Lanka	522	820	933	2546	3735	4970	3068	4555	5903
112	Sweden	6087	5403	5235	22899	28368	30635	28986	33771	35870
113	Switzerland	6260	7141	6799	28518	30442	31445	34778	37583	38245
114	Syrian Arab R	261	332	NA	3464	4409	NA	3725	4741	NA
115	Tajikistan	341	213	NA	662	1727	NA	1003	1940	NA
116	Tanzania	78	129	117	786	1158	1406	864	1287	1523
117	Thailand	1948	2609	2621	3781	5064	6007	5729	7673	8628
118	Togo	69	72	51	700	824	950	769	896	1001
119	Tunisia	980	1456	1405	4464	7110	7425	5444	8566	8830
120	Turkey	2041	2258	3246	7235	10288	13105	9276	12546	16351
121	Turkmenistan	403	816	NA	3265	6605	NA	3668	7421	NA
122	Uganda	62	103	112	713	1039	1143	775	1142	1255
123	Ukraine	702	904	808	2994	5125	4944	3696	6029	5752
124	UK	4668	3247	3376	24504	29227	31174	29172	32474	34549
125	United States	6257	5499	5796	32851	36798	39424	39108	42297	45221
126	Uruguay	1241	1772	1999	7621	10883	12700	8862	12655	14699
127	Uzbekistan	147	362	NA	1485	2424	NA	1632	2786	NA
128	Venezuela. RB	1913	1536	NA	7651	9437	NA	9564	10973	NA
129	Vietnam	271	489	635	1326	2386	2999	1597	2875	3635
130	Yemen. Rep.	124	143	91	1940	2237	1307	2064	2380	1398
131	Zambia	113	126	138	916	1275	1412	1029	1401	1549
132	Zimbabwe	441	70	71	2318	430	575	2759	500	645

Sources: Elaborated by the author from World Bank statistics.

Note: the values of year 2015, at 2005 prices and Purchasing Power Parities where calculated multiplying the value of year 2010 of this table by the ratio of the variable in year 2015 to its value in year 2010 taken from the table of Annex 3.

Annex 3. Data of years 2010 and 2015 in Dollars at 2011 prices and PPPs

	WB132	QMH11 10	QMH11 15	QNMH11 10	QNMH11 15	PH11 10	PH11 15
1	Albania	623	676	9304	10349	9927	11025
2	Algeria	NA	NA	NA	NA	12870	13724
3	Angola	NA	NA	NA	NA	5895	6231
4	Argentina	3534	3295	15178	15806	18712	19101
5	Armenia	731	847	5971	7333	6703	8180
6	Australia	3570	2970	37815	40862	41385	43832
7	Austria	8062	8333	35113	35742	43175	44075
8	Azerbaijan	819	969	15131	15729	15950	16699
9	Bangladesh	413	552	2030	2581	2443	3133
10	Belarus	4164	4102	12071	13128	16235	17230
11	Belgium	6048	5954	35038	35769	41087	41723
12	Benin	286	273	1533	1714	1819	1987
13	Bolivia	754	861	4654	5671	5407	6532
14	Botswana	953	987	12381	14369	13334	15356
15	Brazil	2176	1725	12363	12941	14539	14666
16	Bulgaria	2059	2637	13225	14363	15283	17000
17	Burkina Faso	113	103	1312	1448	1425	1551
18	Burundi	77	72	686	677	764	749
19	Cambodia	399	568	2124	2723	2523	3291
20	Cameroon	430	419	2225	2572	2655	2991
21	Canada	4503	NA	36197	NA	40699	42983
22	Central Af R	60	45	828	581	888	626
23	Chad	19	59	1906	1989	1925	2048
24	Chile	2274	2817	17168	19720	19442	22537
25	China	3005	NA	6521	NA	9526	13570
26	China-Hong Kong	842	615	47266	52875	48108	53490
27	Colombia	1518	1621	9382	11365	10901	12985
28	Congo. DR	109	128	501	623	609	750
29	Congo. Rep.	196	406	4990	5137	5186	5543
30	Costa Rica	2052	1953	10948	12961	13000	14914
31	Cote d'Ivoire	NA	452	NA	2800	2690	3251
32	Croatia	2848	3034	17270	17602	20118	20636
33	Czech R	6634	8195	21656	22186	28290	30381
34	Denmark	5575	6655	38424	38829	43998	45484
35	Dominican R	1823	2040	9300	11332	11124	13372
36	Ecuador	1311	1692	8041	9084	9352	10777
37	Egypt. Arab R	1665	1671	8193	8425	9857	10096
38	El Salvador	1490	1628	5810	6217	7300	7845
39	Eritrea	NA	NA	NA	NA	1416	NA
40	Estonia	3568	4328	19173	23001	22741	27329
41	Ethiopia	46	73	1028	1460	1074	1533
42	Finland	7781	6614	32067	32380	39848	38994
43	France	4148	4242	32724	33524	36872	37766
44	Georgia	819	1139	5915	7886	6734	9025
45	Germany	8971	9987	31458	33797	40429	43784
46	Ghana	215	209	2845	3720	3059	3930
47	Greece	2353	2285	26373	21810	28726	24095
48	Guatemala	1295	1385	5419	5908	6714	7293

49	Guinea	87	80	1108	1104	1194	1184
50	Haiti	NA	NA	NA	NA	1502	1651
51	Honduras	708	821	3263	3490	3971	4311
52	Hungary	4819	6106	17459	18725	22277	24831
53	India	769	954	3635	4800	4405	5754
54	Indonesia	1859	2174	6575	8193	8433	10368
55	Iran. Islamic	2090	2032	15353	13978	17444	16010
56	Ireland	9848	22505	35813	38439	45661	60944
57	Israel	NA	NA	NA	NA	29600	31971
58	Italy	5726	5450	30475	28794	36201	34245
59	Jamaica	721	794	7276	7312	7997	8105
60	Japan	7466	7771	28284	30047	35750	37818
61	Jordan	1815	1568	7657	6923	9473	8491
62	Kazakhstan	2404	2548	17693	20974	20097	23522
63	Kenya	312	293	2163	2543	2476	2836
64	Korea. Rep.	9324	10171	21028	24007	30352	34178
65	Kuwait	4154	4268	71050	65062	75204	69329
66	Kyrgyz R	524	516	2266	2722	2790	3238
67	Lao PDR	300	498	3684	4937	3984	5434
68	Latvia	2453	2836	15799	20222	18252	23057
69	Lebanon	1345	1203	14936	11884	16281	13087
70	Lesotho	317	298	2058	2478	2375	2777
71	Lithuania	3956	5216	17114	21754	21069	26971
72	Macedonia	1299	1669	10057	11091	11355	12760
73	Madagascar	NA	NA	NA	NA	1386	1376
74	Malawi	110	113	923	976	1033	1089
75	Malaysia	4946	5695	16161	19294	21107	24989
76	Mali	NA	NA	NA	NA	1872	1919
77	Mauritania	268	231	3049	3371	3317	3602
78	Mexico	2682	3126	12853	13542	15535	16668
79	Moldova	497	663	3414	4084	3911	4747
80	Mongolia	585	949	7123	10460	7709	11409
81	Morocco	1121	1313	5323	5972	6443	7286
82	Mozambique	104	112	814	1006	918	1118
83	Myanmar	739	1048	2982	4023	3721	5071
84	Namibia	1141	899	7319	9014	8461	9913
85	Nepal	130	145	1856	2156	1986	2301
86	Netherlands	5374	5423	40150	40930	45525	46354
87	New Zealand	3794	NA	28459	NA	32253	34646
88	Nicaragua	634	773	3395	4188	4029	4961
89	Niger	NA	NA	NA	NA	814	897
90	Nigeria	337	541	4813	5130	5150	5671
91	Norway	5032	5115	57236	58555	62268	63670
92	Pakistan	584	630	3699	4065	4284	4695
93	Panama	1159	1193	14261	19481	15419	20674
94	Papua NG	NA	NA	NA	NA	2087	NA
95	Paraguay	901	1033	6388	7606	7290	8639
96	Peru	1692	1706	8265	10061	9957	11768
97	Philippines	1200	1377	4397	5497	5597	6875
98	Poland	3850	5028	17921	20271	21771	25299
99	Portugal	3582	3654	23656	22894	27238	26548
100	Romania	4251	NA	13567	NA	17818	20538

101	Russian F	3425	3322	19683	20803	23108	24124
102	Rwanda	91	109	1263	1607	1353	1716
103	Saudi Arabia	5003	6434	40418	44290	45421	50724
104	Senegal	302	NA	1879	NA	2181	2297
105	Sierra Leone	28	24	1190	1292	1217	1316
106	Singapore	15405	15753	56700	65139	72105	80892
107	Slovak R	5235	6344	19924	21910	25159	28254
108	Slovenia	5782	6759	22897	22338	28678	29097
109	South Africa	1729	1664	10299	10761	12029	12425
110	Spain	4316	4586	28190	27630	32506	32216
111	Sri Lanka	1722	1959	6841	9102	8563	11062
112	Sweden	7982	7734	34960	37755	42943	45488
113	Switzerland	10660	10149	44882	46362	55542	56511
114	Syrian Arab R	NA	NA	NA	NA	NA	NA
115	Tajikistan	314	NA	1793	NA	2106	2641
116	Tanzania	154	140	1937	2351	2091	2491
117	Thailand	4191	4209	9296	11027	13487	15237
118	Togo	94	67	1114	1284	1208	1351
119	Tunisia	1877	1812	8559	8938	10436	10750
120	Turkey	3085	4435	14875	18948	17959	23382
121	Turkmenistan	NA	NA	NA	NA	9942	14992
122	Uganda	141	153	1399	1539	1540	1693
123	Ukraine	1170	1046	6655	6419	7824	7465
124	UK	3615	3759	32580	34750	36196	38509
125	United States	6145	6477	43228	46313	49373	52790
126	Uruguay	2644	2983	14439	16849	17082	19831
127	Uzbekistan	NA	NA	NA	NA	4240	5700
128	Venezuela. RB	2121	NA	14424	NA	16545	NA
129	Vietnam	664	863	3822	4805	4486	5667
130	Yemen. Rep.	452	289	4027	2352	4479	2641
131	Zambia	263	288	3016	3340	3279	3627
132	Zimbabwe	186	187	1275	1704	1460	1891

Source. Elaborated by the author from WB(2017). World Development Indicators.

Annex 4. Mixed dynamic model relating QNMH and QMH

Here we include the results of the model summarized in table 4. They include besides the main variables (QMH and QNHM some dummy variables with a value equal to unity for special countries and equal to zero in other cases. The estimations of Africa, America, Asia-Pacific and the group of Europe and Eurasia are based on previous studies, indicated as source, and the estimations with the World sample of 132 countries are presented here.

Africa

Dependent Variable: QNMH10PP05. Method: Least Squares Included observations: 38				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
QNMH00PP05	1.203963	0.015889	75.77503	0.0000
QMH10PP05-QMH00PP05	3.582825	0.349117	10.26253	0.0000
D3 Angola	1231.040	169.0106	7.283805	0.0000
D17+D23+D37 Burkina Faso, Chad, Egypt	449.0880	96.23817	4.666423	0.0001
D77 Mauritania	872.6339	166.1947	5.250671	0.0000
D109 South Africa	2062.708	237.7603	8.675578	0.0000
D132 Zimbabwe	-1031.559	221.1065	-4.665439	0.0001
R-squared	0.996992	Mean dependent var		2275.816
Adjusted R-squared	0.996410	S.D. dependent var		2590.288
S.E. of regression	155.1960	Akaike info criterion		13.09208
Sum squared resid	746659.6	Schwarz criterion		13.39374
Log likelihood	-241.7495	Hannan-Quinn criter.		13.19941
Durbin-Watson stat	1.079364			

Source. Guisan(2017 a).

America

Dependent Variable: QNMH10PP05. Method: Least Squares. Included obs.: 22				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
QNMH00PP05	1.201132	0.021279	56.44785	0.0000
QMH10PP05-QMH00PP05	2.351296	0.540135	4.353162	0.0004
D21	-4290.998	1074.685	-3.992797	0.0009
D24	2327.479	856.7207	2.716731	0.0147
D93	2860.057	844.0319	3.388565	0.0035
R-squared	0.991983	Mean dependent var		9279.227
Adjusted R-squared	0.990097	S.D. dependent var		8342.729
S.E. of regression	830.2260	Akaike info criterion		16.47799
Sum squared resid	11717679	Schwarz criterion		16.72595
Log likelihood	-176.2579	Hannan-Quinn criter.		16.53640
Durbin-Watson stat	1.439397			

Source Guisan and Aguayo (2015)

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Asia-Pacific

Dependent Variable: QNMH10PP05. Method: Least Squares. Included obs. 30				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
QNMH00PP05	1.253758	0.023238	53.95198	0.0000
QMH10PP05-QMH00PP05	0.930252	0.242107	3.842324	0.0008
D26 Hong-Kong China	6011.968	1176.750	5.108960	0.0000
D60 Japan	-2799.247	1098.451	-2.548359	0.0180
D65 Kuwait	7113.923	1207.836	5.889806	0.0000
D103 Saudi Arabia	-3970.155	1032.205	-3.846285	0.0008
D106 Singapore	7946.677	1135.367	6.999214	0.0000
R-squared	0.996193	Mean dependent var		11614.40
Adjusted R-squared	0.995200	S.D. dependent var		13670.28
S.E. of regression	947.1274	Akaike info criterion		16.74571
Sum squared resid	20632157	Schwarz criterion		17.07265
Log likelihood	-244.1856	Hannan-Quinn criter.		16.85030
Durbin-Watson stat	0.398475			

Source Guisan and Exposito(2015)

Europe and Eurasia

Dependent Variable: QNMH10PP05. Method: Least Squares. Included obs.: 42				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
QNMH00PP05	1.222405	0.017015	71.84160	0.0000
QMH10PP05-QMH00PP05	2.541376	0.337150	7.537831	0.0000
D8 Azerbaijan	5165.743	1545.780	3.341835	0.0020
D42 Finland	8066.021	1721.638	4.685084	0.0000
D45 Germany	-4692.401	1627.662	-2.882909	0.0066
D113 Switzerland	-6657.508	1675.400	-3.973682	0.0003
R-squared	0.980595	Mean dependent var		16353.40
Adjusted R-squared	0.977900	S.D. dependent var		10379.56
S.E. of regression	1543.032	Akaike info criterion		17.65245
Sum squared resid	85714147	Schwarz criterion		17.90069
Log likelihood	-364.7015	Hannan-Quinn criter.		17.74344
Durbin-Watson stat	1.408399			

Source. Guisan(2017 b).

In these results we find an estimated coefficient for the lagged variable very alike in all the regressions, with little differences among the geographical areas, but there are more differences in the case of the coefficient of the increase of QMH.

World Model 1: with country dummies and without a dummy for Asia-Pacific (DAS)

Dependent Variable: QNMH10PP05. Method: Least Squares. Sample: 1 132				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
QNMH00PP05	1.214179	0.009994	121.4884	0.0000
QMH10PP05-QMH00PP05	1.919638	0.177592	10.80927	0.0000
R-squared	0.990093	Mean dependent var		10044.69
Adjusted R-squared	0.989185	S.D. dependent var		10911.99
S.E. of regression	1134.806	Akaike info criterion		16.99282
Sum squared resid	1.55E+08	Schwarz criterion		17.25489
Log likelihood	-1109.526	Hannan-Quinn criter.		17.09931
Durbin-Watson stat	1.722778			

Source: Elaborated by author for this study.

Coefficients of country dummies for special cases in World Model 1.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D8 Azerbaijan	5314.323	1135.820	4.678843	0.0000
D21 Canada	-4409.315	1173.210	-3.758335	0.0003
D26 China Hong-Kong	7779.965	1168.964	6.655435	0.0000
D42 Finland	6731.094	1214.039	5.544379	0.0000
D45 Germany	-4112.360	1169.834	-3.515336	0.0006
D62 Kazakhstan	3576.628	1137.772	3.143537	0.0021
D65 Kuwait	7919.225	1189.220	6.659177	0.0000
D103 Saudi Arabia	-3332.162	1149.038	-2.899957	0.0044
D106 Singapore	9061.197	1165.681	7.773310	0.0000
D113 Switzerland	-5875.147	1188.940	-4.941500	0.0000

World Model 2: with country dummies and with a dummy for Asia-Pacific (DAS)

Dependent Variable: QNMH10PP05. Method: Least Squares. Sample: 1 132				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
QNMH00PP05	1.222653	0.009581	127.6182	0.0000
QMH10PP05-QMH00PP05	2.486762	0.214303	11.60396	0.0000
(QMH10PP05-QMH00PP05)*DAS	-1.443629	0.343679	-4.200514	0.0001
R-squared	0.991372	Mean dependent var		10044.69
Adjusted R-squared	0.990502	S.D. dependent var		10911.99
S.E. of regression	1063.449	Akaike info criterion		16.86971
Sum squared resid	1.35E+08	Schwarz criterion		17.15363
Log likelihood	-1100.401	Hannan-Quinn criter.		16.98508
Durbin-Watson stat	1.786643			

DAS is a dummy which is equal to 1 for countries of Asia-Pacific and zero in other cases. The coefficient is significant and negative showing that the impact of manufacturing on non manufacturing activities is, on average, lower in Asia-Pacific (2.486762-1.443629=1.043133) than in other areas of the World (2.486762).

Coefficients of country dummies for special cases in World Model 2.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D8 Azerbaijan	5176.524	1064.904	4.861024	0.0000
D21 Canada	-4927.700	1106.342	-4.454048	0.0000
D26 China Hong-Kong	6966.076	1112.462	6.261854	0.0000
D42 Finland	7929.049	1172.900	6.760208	0.0000
D45 Germany	-4664.606	1104.129	-4.224692	0.0000
D62 Kazakhstan	3347.943	1067.617	3.135903	0.0022
D65 Kuwait	8072.506	1115.038	7.239670	0.0000
D103 Saudi Arabia	-3425.550	1077.015	-3.180595	0.0019
D106 Singapore	8788.019	1094.316	8.030605	0.0000
D113 Switzerland	-6616.441	1128.068	-5.865284	0.0000

We have tested the homogeneity of this coefficient in the World regression with 132 countries and find that we can reject the homogeneity in the case of Asia, being the estimated coefficient lower in that case. This may due to different causes as for example to the effect of missing relevant variables. As seen in Guisan(1997) the effects of missing variables affect to the estimation of the coefficients of included variables that have high degree of correlation with the missing ones. The important question is that in all the cases the effect of QMH is highly positive.

Annex 5. Suggested news and readings on the evolution of some countries and the UN Sustainable Development Goals.

https://en.wikipedia.org/wiki/Economy_of_Botswana
Botswana's impressive economic record has been built on a foundation of diamond mining, prudent fiscal policies, international financial and technical assistance, and a cautious foreign policy. It is rated the least corrupt country in Africa, according to international corruption watchdog, Transparency International. By one estimate, it has the fourth highest gross national income at purchasing power parity in Africa, giving it a standard of living around that of Mexico and Turkey.[10]

https://en.wikipedia.org/wiki/Energy_in_Australia

Annex. Special increase of GDP of Ireland in year 2015
http://www.abc.es/economia/abci-irlanda-crecio-263-por-ciento-2015-201607122102_noticia.html

http://www.cso.ie/en/releasesandpublications/er/iips/irishindustrialproductionbysector2015/

Value of Products manufactured and sold by Irish based enterprises rose 12.9% to €115.6 billion in 2015

The total value of products manufactured in Ireland in 2015 was €115.6 billion. This was an increase of 12.9% on 2014 figures. *See Table 1.*

Significant growth in Ireland's top industries

The Chemical and Pharmaceutical sectors recorded the biggest percentage increase in NSV in Ireland between the years 2013 - 2015. The Chemical sector experienced 51.8% growth while the Pharmaceutical sector had 46.9% growth.

The value of Food products manufactured in the same time period rose 8.2% while the Computer, optical and electrical equipment sector grew by 37.5% in NSV terms. Elements of these percentage changes are attributable to NACE changes as a result of some enterprises being reclassified from the Services sector to the Industrial sector. *See Figure 4 and Table 1.*

http://www.elglobal.net/hemeroteca/irlanda-se-revela-como-refugio-fiscal-y-productivo-entre-las-big-pharma-AUEG_953542

United Nations. Sustainable development goals.
https://sustainabledevelopment.un.org/?menu=1300

Blog of the author related with World Development in English:
https://euroamericanassociation.blogspot.com.es