





EUROPEAN UNION



REGIONE AUTÒNOMA DE SARDIGNA REGIONE AUTONOMA DELLA SARDEGNA



Innovation & Patents (IPMED)



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This work does not aim to provide a full complete study, but rather highlighting main indicators some are presented by graphs such as infographic in order to be considered in future works in depth analyses.

Objectives:

1–Comparing Patents and Innovation **Index in Greece**, **Italy**, **Jordan and Tunisia** during the Period (2012–2022).

2-Highlighting improvement in **Innovation Index**, Focusing on **Patents** in the above countries (IPMED).

3- To come up with selected indicators (Patents) such as patent grants by technology in order to compare between the IPMED counters.

Methodology and Data Source:

Descriptive Analysis, Data Sources are from Official Sites, Local and Regional.

Expected Outcome: Constructing Indicators in order to provide conclusion's targeting

Researchers, Policies & Decision Makers.

Selected Economies Indicators

GDP per Capita – IPMED

Figure No. 1 indicates that the GDP per Capita of Italy, Greece respectively is more than quadrable that of Jordan and Tunisia during the period (2019–2021).



Source: https://data.worldbank.org/

Industrial Contribution (Including Construction) of the GDP

Figure No. 2 shows that manufacturing and construction industries percentage contribution to the GDP in Greece and Italy, respectively is less than Jordan and Tunisia during the period (2011–2021).

Figure No. 2 :



Source: World Bank / https://data.worldbank.org/

Global Innovation Index (GII)

Conceptual Framework of Global Innovation Index (GII)

Global Innovation Report 2011, (see Figure 3) had been made to explain the Global Innovation Index (GII) conceptual framework which consists of two sub-indices, Input Sub Index and Output Sub-Index, each of the separate sub- index built around pillars. Five inputs on one side hand pillars capture elements of component that enable innovative activities as follows: (1) Institutions, (2) Human capital and research, (3) Infrastructure, (4) Market sophistication (5) Business sophistication. Two elements' components pillar on the other side hand capture innovation outputs:(1) Scientific outputs (2) Creative outputs. Moreover, each pillar is consisted into sub-pillars and each sub-pillar is composed of individual indicators. "Sub-pillar scores are calculated as the weighted average of individual indicators; pillar scores are calculated as the simple average of the sub-pillar scores". The pillar on the top is the Innovation Efficiency Index which is the ratio of innovation outputs to innovation inputs (Shammout, a., et al,2021).





Innovation Index (GII) – IPMED

Figure No. 4 Indicates that (GII) score of Italy was the highest among the four countries during the period (2013–2022), followed by Greece in a steady behavior. Jordan & Tunisia however followed a rather flections decreasing trends below both Italy & Greek during the same period above.





Source: https://www.globalinnovationindex.org/analysis-indicator

Innovation Sub-Index (Inputs)

Figure No. 5 Indicate that analysis of Innovation Sub–Index (Inputs) resulted in that Italy remained stable in trend, while Greece, Jordan, Tunisia showed slightly fluctuations in a decreasing manner during the period (2013–2022).





Source: https://www.globalinnovationindex.org/analysis-indicator

Innovation Sub-Index (Outputs)

Figure No. 6 indicate that Innovation Sub–Index (Outputs) of Italy, Greece respectively is more than Tunisia and Jordan respectively during the period (2015–2019), while Jordan exceeded Tunisia in the 2022.





Source: https://www.globalinnovationindex.org/analysis-indicator

Innovation Efficiency Ratio – IPMED

The Innovation efficiency ratio is calculated by dividing the (Innovation Output sub-index) by the (Innovation Inputs sub-index).

Figure No. 7 indicates that the Innovation Efficiency Ratio of Italy, Tunisia respectively is more than Greece and Jordan respectively during the period (2020–2022).



Figure No. 7:

Source: <u>https://www.globalinnovationindex.org/analysis-indicator</u>

Patents - IPMED

Total Patent Applications (Direct and PCT¹ National Phase Entries)

Table No.1 presented the total patent applications for the four countries during the period 2012–2021, we can see that Italy is increasing during this period, and Greece is increasing as well even though some slightly fluctuating, while Jordan and Tunisia are obviously fluctuating manner in the same period above.

| Year | Greece | Italy | Jordan | Tunisia |
|------|--------|-------|--------|---------|
| 2012 | 1107 | 28696 | 120 | 191 |
| 2013 | 1083 | 28970 | 213 | 218 |
| 2014 | 1254 | 29360 | 83 | 176 |
| 2015 | 1154 | 30306 | 184 | 218 |
| 2016 | 1234 | 31252 | 144 | 270 |
| 2017 | 1233 | 31393 | 88 | 188 |
| 2018 | 1137 | 32289 | 51 | 201 |
| 2019 | 1164 | 32028 | 49 | N/A |
| 2020 | 1129 | 32551 | 75 | N/A |

Table No.1:

¹ Patent Cooperation Treaty

| | IN | NOVATION & | PATENT (IPME | ED) | | | |
|--|----|------------|--------------|-----|--|--|--|
| 2021 1387 34206 53 N/A | | | | | | | |
| Source: https://www3.wipo.int/ipstats/keyindex.htm | | | | | | | |

Grant for Direct Applications – IPMED

Table No.2 presented the Grant for Direct Applications for the four countries during the period 2012–2021, we can see that Italy is increasing during this period even though some slightly fluctuating, we can see also that Greece slightly steady, while Jordan and Tunisia are obviously fluctuating manner in the same period above.

It is worth to mention that Tunisia data are not available to many years as is shown in Table No.1 and No.2.

| Year | Greece | Italy | Jordan | Tunisia |
|------|--------|-------|--------|---------|
| 2012 | 390 | 9643 | 14 | 143 |
| 2013 | 367 | 12077 | 18 | 104 |
| 2014 | 399 | 11658 | 63 | n/a |
| 2015 | 339 | 11103 | 33 | n/a |
| 2016 | 362 | 11158 | 9 | 1 |
| 2017 | 377 | 10245 | 27 | n/a |
| 2018 | 347 | 12441 | 48 | n/a |
| 2019 | 403 | 14426 | 26 | n/a |

Table No.2:

| 2020 | 391 | 14615 | 24 | n/a |
|------|-----|-------|----|-----|
| 2021 | 391 | 12209 | 19 | n/a |

Source: https://www3.wipo.int/ipstats/IpsStatsResultvalue

Resident Patent Application Percentage

Figure No. 8 Indicate that resident percentage to the total patent application

of Italy is slightly increasing, However Greece and Jordan are fluctuation during the period (2012-

2022), While Tunisia had improved by increasing during the period (2013-2022).

Figure No.8 :



Source: Calculated from Actual Data, https://www3.wipo.int/ipstats/keyindex.htm

Resident Applications per-million population (by origin)

Figure No.9 Indicate that the gap (Resident applications per million population) between Italy and other IPMED countries is increasing during the period 2012–2021, even though that Greece is less gap.

Figure No. 9



Patent grants by technology

Table No.3

| Sum of 2 | Column Labels | | | |
|---|---------------|--------|---------|----------|
| Row Labels | Greece* | Italy* | Jordan* | Tunisia* |
| 1 - Electrical machinery, apparatus, energy | 13.3 | 709.3 | 1.5 | |
| 10 - Measurement | 8.0 | 631.0 | 2.0 | |

| 11 - Analysis of biological materials | 1.5 | 69.0 | | |
|---|-------|--------|-----|-----|
| 12 - Control | 8.7 | 195.3 | 2.0 | |
| 13 - Medical technology | 31.0 | 766.7 | 1.7 | 1.0 |
| 14 - Organic fine chemistry | 15.0 | 353.3 | | |
| 15 - Biotechnology | 15.3 | 210.7 | 1.0 | |
| 16 - Pharmaceuticals | 67.0 | 664.0 | 2.0 | 2.5 |
| 17 - Macromolecular chemistry, polymers | 3.3 | 374.7 | | |
| 18 - Food chemistry | 26.3 | 196.0 | 1.0 | 1.0 |
| 19 - Basic materials chemistry | 9.0 | 204.7 | 2.7 | |
| 2 - Audio-visual technology | 4.7 | 131.7 | | 1.0 |
| 20 - Materials, metallurgy | 3.7 | 198.3 | 1.0 | |
| 21 - Surface technology, coating | 23.0 | 218.0 | 1.0 | |
| 22 - Micro-structural and nano-technology | | 36.3 | | |
| 23 - Chemical engineering | 10.7 | 436.0 | 3.7 | 1.0 |
| 24 - Environmental technology | 12.7 | 172.3 | 1.0 | |
| 25 - Handling | 24.3 | 1084.3 | 1.5 | 1.0 |
| 26 - Machine tools | 107.3 | 576.3 | 1.5 | |
| 27 - Engines, pumps, turbines | 15.0 | 631.7 | 2.3 | |
| 28 - Textile and paper machines | 7.3 | 415.3 | | |
| 29 - Other special machines | 41.3 | 890.0 | 1.0 | |
| 3 - Telecommunications | 7.0 | 101.3 | | |
| 30 - Thermal processes and apparatus | 9.0 | 443.7 | 1.0 | |
| 31 - Mechanical elements | 10.0 | 787.3 | | |
| 32 - Transport | 17.7 | 1189.3 | 2.0 | 1.0 |
| 33 - Furniture, games | 14.3 | 644.0 | | |
| 34 - Other consumer goods | 13.3 | 439.3 | 1.0 | |
| 35 - Civil engineering | 37.7 | 791.7 | 2.0 | |
| 4 - Digital communication | 4.3 | 191.0 | | 1.0 |
| 5 - Basic communication processes | 1.3 | 72.3 | | |
| 6 - Computer technology | 12.0 | 233.7 | | 1.5 |
| 7 - IT methods for management | 4.0 | 25.0 | | 1.0 |
| 8 - Semiconductors | 3.0 | 123.3 | | |
| 9 - Optics | 2.0 | 169.7 | | |
| Unknown | | 3.0 | | |
| Grand Total | 584 | 14380 | 33 | 12 |

*Available years average (2019,2021,2022)

Conclusions

- Innovation Index (GII) score of Italy was the highest among the four countries during the period (2013–2022), followed by Greece in a steady behavior. Jordan & Tunisia however followed a rather flections trends below both Italy & Greek during the same period above.
- Innovation Sub–Index (Inputs) resulted in that Italy remained stable in trend, while Greece, Jordan, Tunisia showed slightly fluctuations in a decreasing manner during the period (2017– 2022).
- 3. Manufacturing percentage contribution including Construction of the GDP in (Greece and Italy), respectively are less than percentage contribution (Jordan and Tunisia) during the period (2011-2021) ; Therefore this indicate that there is an opportunities for nonmanufacturing countries to improve technology in other sectors in addition of Manufacturing.
- Resident percentage to the total patent application of Italy is slightly increasing, while Greece, and Jordan are fluctuation during the period (2012–2022). While Tunisia had improved by increasing during the period (2013–2022).
- 5. The gap (Resident applications per million population) between Italy and other IPMED countries is increasing during the period 2012–2021, while Greece gap is less.

References:

Cornell University, INSEAD, & WIPO; The Global Innovation Index;

https://www.globalinnovationindex.org/analysis-indicator https://www.wipo.int/portal/en/index.html

https://www3.wipo.int/ipstats/keyindex.htm

Shammout, A., Al-Satel. R., and Al-Zu'bi, B (2021).Exploring Analysis of the Global Innovation Index Considering Manufacturing Industry in Jordan (2011-2020). Journal of al-Quds Open University for Administrative & Economic Research and Studies Vol-No (16).

World Bank – Open Data /: https://data.worldbank.org/

World Intellectual Property Indicators 2022

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