NATIONAL BANK OF GREECE
Economic Analysis Department

SMEs:
Survey of Greek business trends

Special focus: Innovation

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In brief

❏ Innovation is a key driver for economic growth and a crucial factor for attaining competitive advantage. Greece appears to be well behind regarding R&D spending, as well as the legal and institutional framework for fostering innovation. For example, according to the Innovation Index constructed by NBG Economic Analysis Department, Greece comes 34th out of 44 European countries – that is, well below the EU average (i) in terms of inputs (i.e. quality of legal framework, human resources, infrastructure, alternative sources of financing and market sophistication) as well as (ii) in terms of outputs (i.e. academic, business, macroeconomic and digital production outcomes).

❏ By taking a closer look at innovative activity in Greek manufacturing — the sector producing the highest share of business innovation in Greece as well as in Europe (62 per cent and 64 per cent respectively) — we observe that, despite the unfavourable environment, 43 per cent of manufacturing SMEs present innovative activity (versus 50 per cent in the EU). These enterprises have managed to significantly increase their sales in the past 5 years (+11.2 per cent, on average), while also adopt more aggressive business plans and offer more jobs (versus the non-innovative SMEs).

❏ Innovative SMEs are divided into Leaders (enterprises which generate innovation) and Adopters (enterprises which adopt innovation):

    ✓ Leaders make up 5 per cent of SMEs in the Greek manufacturing sector (versus 6.4 per cent in the EU), and seek to develop innovative products, and establish R&D structures and synergies with the academia, thereby capturing a competitive edge in profitability and access to international markets.

    ✓ Adopters account for 38 per cent of SMEs in the Greek manufacturing sector (versus 44 per cent in the EU), and innovate in order to maintain their market position, mainly by adopting technologies from abroad.

❏ With 28 per cent of non-innovative SMEs (15 per cent of total SMEs) having already drawn up plans for innovation over the next 5 years (that being a percentage capable to close the gap between Greece and European average), what is needed is support for such activity by fostering an environment that favours enterprises in their innovation endeavours, so that business innovation can improve in terms of quality.

❏ By aiming to quantify the benefits of a relevant reform policy, our estimates indicate that if future innovative SMEs succeed in realizing their plans, the gains for the sector would be €0.7 bn over the next 5 years. But if these plans go hand in hand with an improvement in the innovation environment, the extra benefits could reach €4 bn over the 5-year horizon, while creating also substantial synergies between Leaders and Adopters and thereby improving the productivity of innovative enterprises overall.

❏ Improving innovation performance can also attract high value-added investments, further enhancing the positive footprint of innovation in the economy and the position of Greek entrepreneurship in the global value chain.
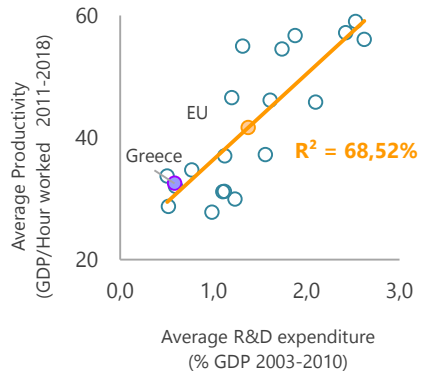
Innovation as a source of competitive advantage

R&D expenditure and labor productivity

Note: -
**Source**: Eurostate, NBG estimates

High competition due to the globalized business environment and the speed of technological advancement makes Research & Development (R&D) a key source of business diversification and competitive advantage.

Greece is lagging behind in terms of R&D investment both in comparison with total global spending on innovation, and compared with the EU relevant average (1.12 per cent of GDP versus 2.23 per cent and 2.03 per cent of GDP, respectively). It is noteworthy that the private sector shows the biggest lag versus the EU average, as its R&D spending represents only 0.55 per cent of GDP (versus 1.28 per cent in the EU), while the respective lag in public spending on innovation is a gap of just 0.18 pps (0.57 per cent versus 0.75 per cent).

In addition, recent IOBE survey data indicate that despite the growth in opportunity entrepreneurship, the growth model of new firms presents problems as it is marked by low innovation and the use of established technologies.
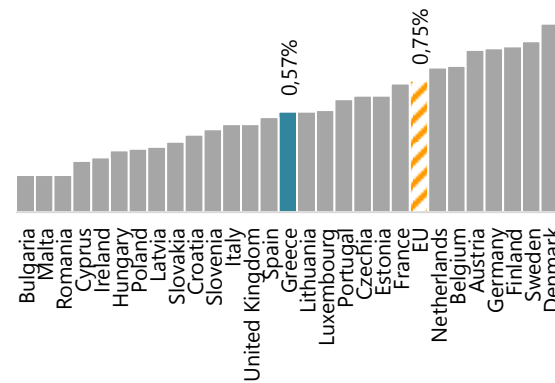
Total R&D spending
(per cent of GDP)
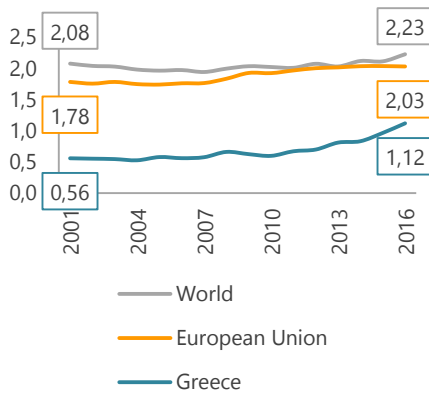
Note: -
Sources: Eurostat, World Bank
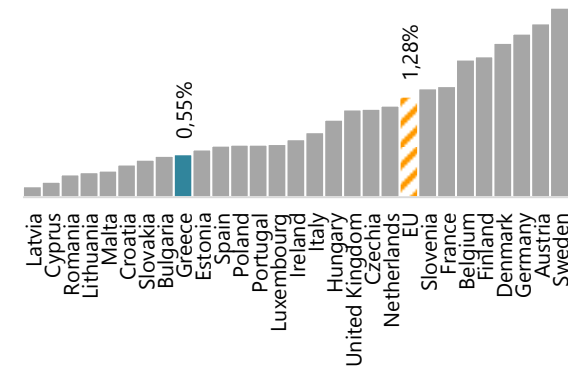
Public Sector R&D spending
(per cent of GDP)

Note: -
Source: Eurostat

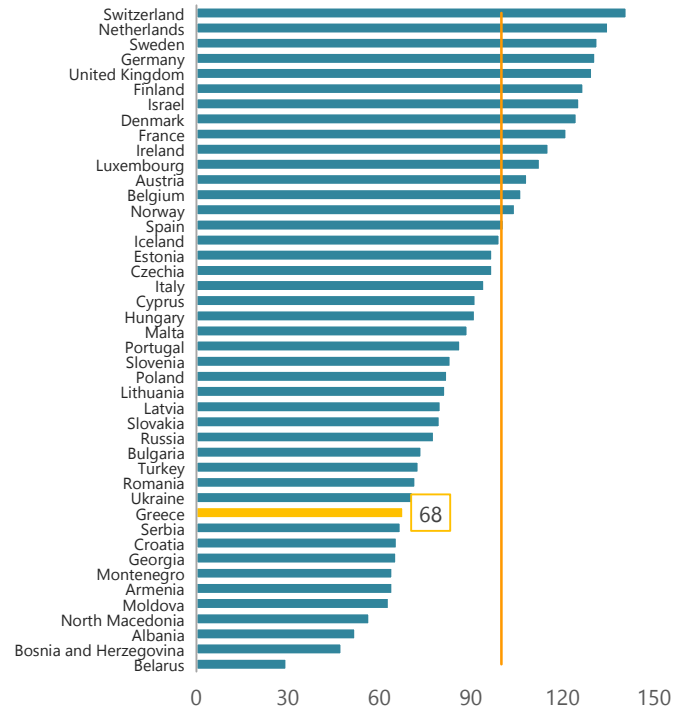## Private Sector R&D spending
(per cent of GDP)

Note: -
Source: Eurostat

Greece lags well behind in generating innovation
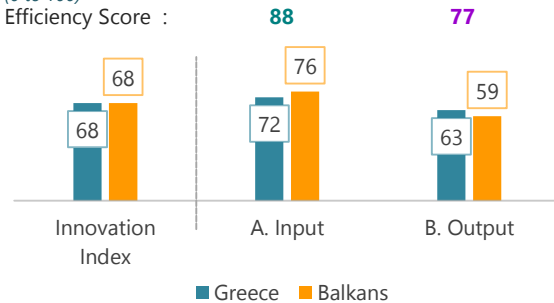
NBG Innovation Environment Index

To better understand and determine the conditions that foster innovation in European countries, NBG Economic Analysis Department constructed an **Innovation Environment Index** that takes into account the key parameters that define **Innovation Inputs*** (i.e. the factors that make up the environment that foster innovation activity) and **Innovation Outputs**** (i.e. the quantity and quality of the product generated as a result of innovation activity)***. Note that the separate estimation of the Inputs and Outputs sub-indices enables us to calculate the **Innovation Efficiency Score**.

To estimate the relative position of Greece, we set up two benchmarks: the EU average (which we set equal to 100), and the average for the Balkans. In this frame, **Greece** scores 68 points (thus reflecting a **lag of circa 32 per cent** versus the EU average) – thereby attaining a score that is very close to the Balkan average. In particular, the Innovation Inputs sub-index stands at 72 points, i.e. it presents a lag of around 28 per cent versus the EU. What is particularly worrying is the fact that these (in any case low) **inputs are not leveraged efficiently**, meaning that the Innovation Outputs sub-index stands at 63 points, i.e. a hefty 37 per cent behind the EU.

* Institutional environment, Human capital, Infrastructure, Financing, and Market sophistication.
** Business outcome, Academic outcome, Digital penetration, Macroeconomic impact
*** The selection of the individual variables was done on the criterion of the existence of a relationship of high statistical significance with economic variables. The total selected variables (along with their relative weights) are presented in the Annex.

NBG Innovation Environment Index: Main components

(0 to 100)

Sources: GII, GCI, Doing Business, NBG estimates

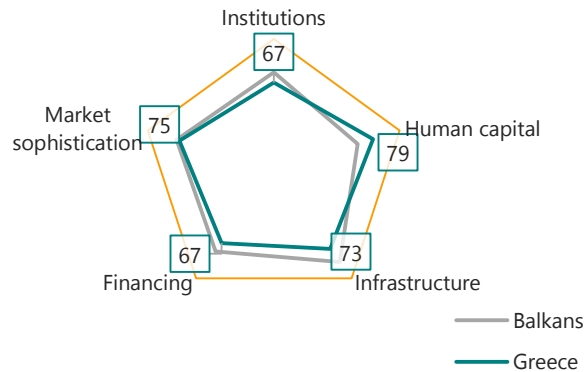# With regard to innovation inputs, there is a substantial lag in the institutional environment, infrastructure, and equity funding

Input sub-index
(EU benchmark=100)

- Balkans
- Greece

Institutions 67
Human capital 79
Infrastructure 73
Financing 67
Market sophistication 75

Components of the input sub-index
(EU benchmark=100)

Category	Component	Value
Institutions	Political environment	62
	Legal environment	72
Human Resources	Education	78
	Tertiary education	77
	Workforce	80
Infrastructure	General infrastructure	74
	ICT	72
Funding	Debt	82
	Equity	27
Market	Supply	65
	Demand	88
	Business	69
	International linkages	75

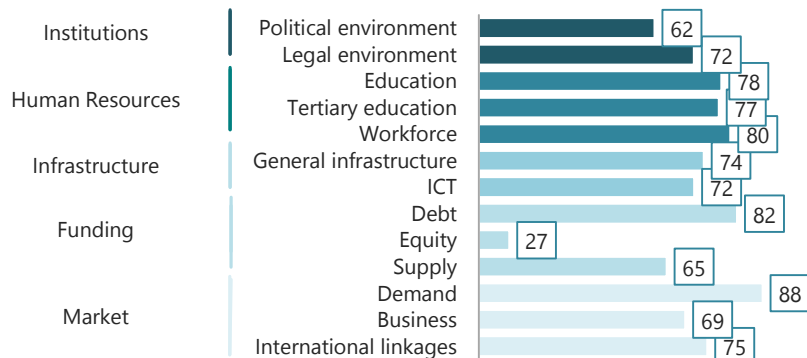*Sources: GII, GCI, Doing Business, NBG estimates*

When we look at innovation inputs, a first glance reveals that Greece **lags in all parameters vis-a-vis the EU** (from 20 per cent to 45 per cent) and, what is more, it lags behind the Balkan average in almost all parameters.

Looking closer, it becomes apparent that Human Capital is where **Greece has a comparative advantage**, scoring 79 points — a level well above the 67 points of the Balkan average.

On the other hand, the **Institutional environment** (in both its political and legal dimensions) and **Funding sources** (mainly due to the shallow stock market and low availability of VC) **appear to be the weak points of Greece**.

In addition, the areas of Infrastructure (digital or not) and Market sophistication also lag behind versus both the European and the Balkan averages.
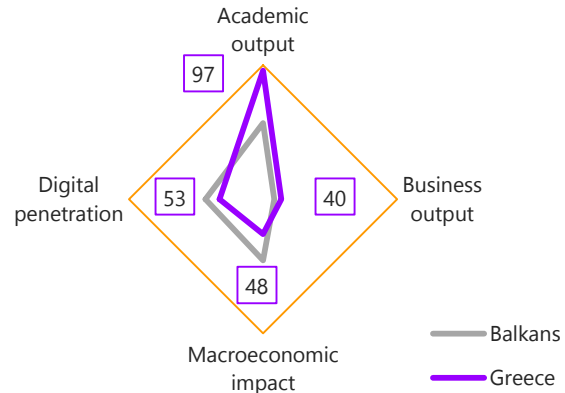
In the case of innovation outputs, only the academic sector stands out positively

Output sub-index
(EU benchmark=100)

Academic output: 97
Business output: 40
Macroeconomic impact: 48
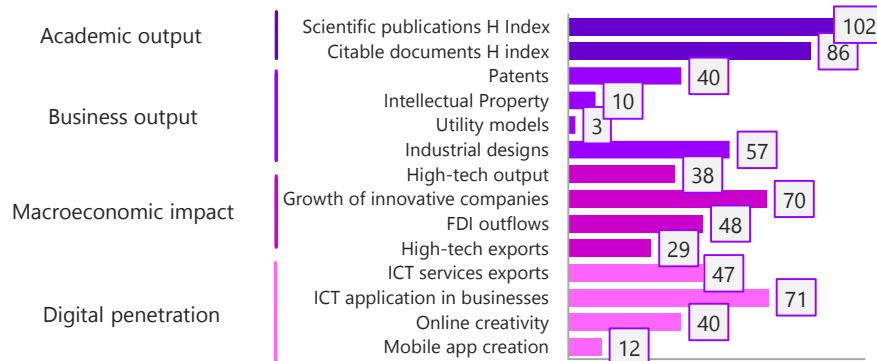Digital penetration: 53

Balkans
Greece

In the case of innovation outputs, we observe the markedly **dual nature** of the prevalent situation in Greece.

On the one hand, **academic innovation stands at levels very close to the European average** - creating an obvious advantage for Greece at around 40 per cent versus the Balkan average.

On the other hand, all **applied aspects of innovation appear to be substantially behind** the EU average (at circa 55 per cent) while in addition they lag behind the Balkan average. This is worrying because of its intensity and breadth, and touches on issues ranging from digital maturity to technology and patents' production.

Components of the output sub-index
(EU benchmark=100)

Category	Component	Value
Academic output	Scientific publications H Index	102
	Citable documents H index	86
Business output	Patents	40
	Intellectual Property	10
	Utility models	3
	Industrial designs	57
	High-tech output	38
Macroeconomic impact	Growth of innovative companies	70
	FDI outflows	48
	High-tech exports	29
Digital penetration	ICT services exports	47
	ICT application in businesses	71
	Online creativity	40
	Mobile app creation	12

*Sources: GII, GCI, Doing Business, NBG estimates*

Manufacturing SMEs can spearhead the effort to narrow the innovation gap...

As **manufacturing is the sector with the greatest participation** in innovation (covering more than 60 per cent of innovative enterprises in EU and Greece), exploring innovative activity in this particular sector presents particular interest. Moreover, due to the large significance of SMEs in the Greek manufacturing sector (½ of sales versus 35 per cent in the EU), NBG Economic Analysis Department has focused on this segment of Greek entrepreneurship by means of a field survey carried out in 460 enterprises, with a view to exploring **the actions and prospects for the growth of innovation in the sector**.

As the country significantly lags behind the EU average regarding the number of innovative enterprises (with only 43 per cent of Greek SMEs being innovative versus 50 per cent in the EU), support for future innovation endeavours by SMEs could play a decisive role in **narrowing the innovation gap** and, by extension, reversing the brain drain. Specifically, quality innovation activity by SMEs can enhance their profitability, lead to the production of high value-added competitive products, and secure them a place in global value chains.
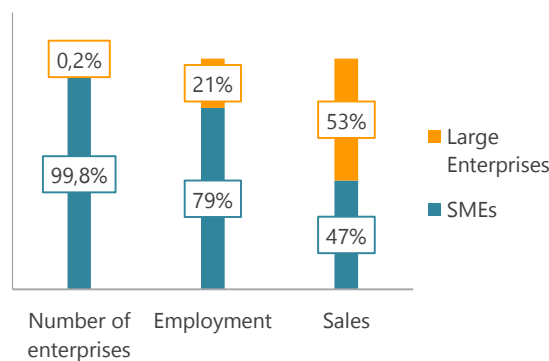
Share of innovative enterprises
(per cent of the sector for 2016)

	EU	Greece
Rest	8%	10%
ICT	15%	12%
Transportation	12%	16%
Industry	64%	62%
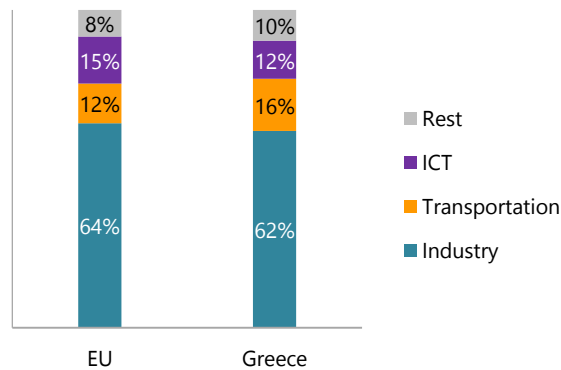
Share of SMEs in total manufacturing
(per cent sector)

	Number of enterprises	Employment	Sales
Large Enterprises	0,2%	21%	53%
SMEs	99,8%	79%	47%

Innovative SMEs in manufacturing
(per cent sector)

Greece	43%
EU	50%
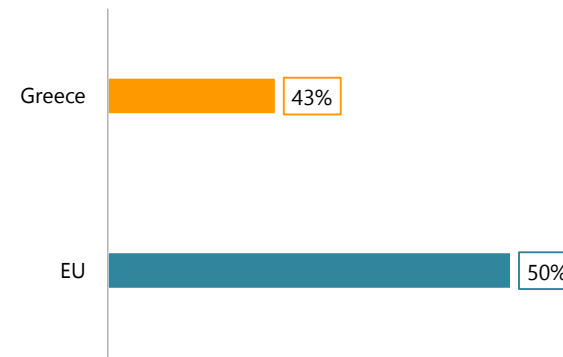
... as evidenced by the positive results achieved by SMEs already involved in innovation

When we focus on the performance of manufacturing SMEs that have implemented innovation plans over the past 5 years, it is evident how they stand out from non-innovative SMEs both regarding their current performance as well as their future prospects.

Specifically, innovative SMEs achieved a **significant increase in sales** over the past 5 years (11.2 per cent) – outperforming non-innovative SMEs in the sector (whose sales have stagnated).

The positive course of sales contributes to **increased optimism** for innovative SMEs, as reflected in:

✓ the business confidence index (35 points for innovative enterprises, 19 points for non-innovative ones),

✓ a more dynamic strategy for the future (with 69 per cent of innovative enterprises stating that their strategic goal is to achieve further growth, versus only 49 per cent for non-innovative ones), and

✓ significant improvement in employment prospects (with 36 per cent of innovative enterprises stating hiring plans versus only 25 per cent for non-innovative ones).

All the above can be regarded as the reward for those SMEs that **persisted in implementing their innovation strategy** despite the objective difficulties that arose because of the deep crisis (with half of them actually stepping up their innovation efforts).
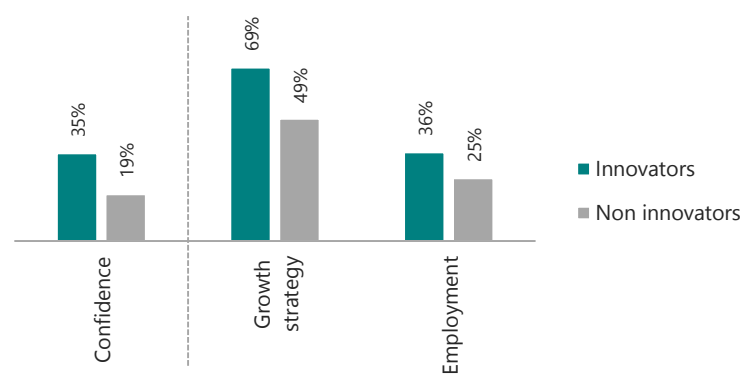
Difference in performance
(change in per cent)
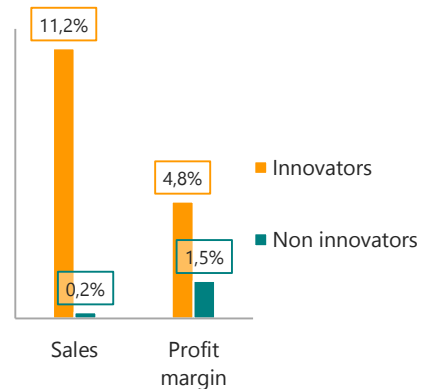
Difference in Sentiment
(index -100 through to 100 & sector per cent)

Crisis effect on innovative activity
(per cent of sector)

Note: -
Source*: NBG – Business Trends Survey*

Note: -
Source*: NBG – Business Trends Survey*
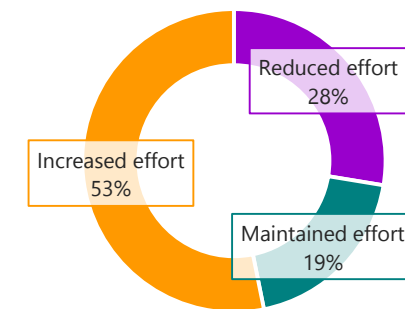
Note: -
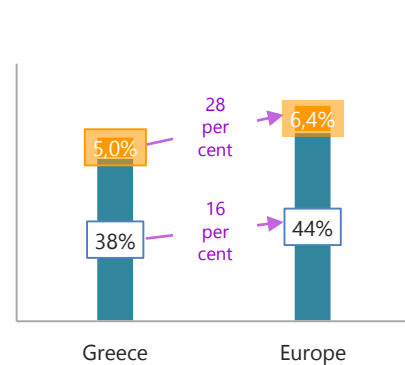***Source****: NBG – Business Trends Survey*

The quality of Greek SMEs' innovative activity is below the EU average

Having confirmed the practical significance of innovation, we take a closer look by focusing on the quality of Greek SMEs' innovative activity. Specifically, we shall make a distinction between **two types of innovating enterprises**: Leaders (who generate innovation) and Adopters (who adopt innovation).

This distinction among SMEs and the comparison with the EU average uncovers the **qualitative lag in the innovation strategy of Greek SMEs** (besides the aforementioned quantitative lag). Specifically, only 5 per cent of them can be classified as Leaders versus 6.4 per cent in EU (a gap of 28 per cent) with the corresponding figures for Adopters standing at 38 per cent and 44 per cent respectively (a gap of 16 per cent). This qualitative lag in innovation is reflected in the low performance at country level with regard to the number of patents registered, the performance of Greece being 36 per cent below the EU average.

Seen from this perspective, it is important to identify which **specific features distinguish the two types of innovative enterprises,** i.e. the Leaders from the Adopters. The first data indicate that they are enterprises with similar characteristics — i.e. of the same age and size (however, over the past five years innovative enterprises have gained in size).

Quality of innovation
(per cent of sector)

Greece: Adopters 38%, Leaders 5,0%
Europe: Adopters 44%, Leaders 6,4%
28 per cent
16 per cent

■ Adopters   ■ Leaders

Note: -
Source: NBG – Business Trends Survey

Patent index
(index from 0 through100)

Greece 43
Europe 67
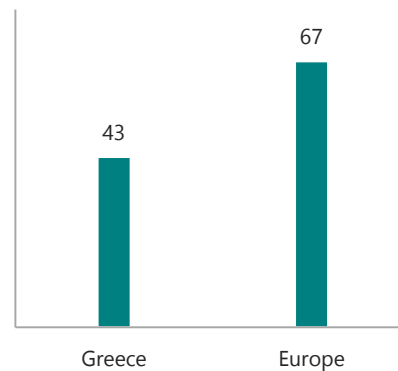
Note: -
Source: NBG - Business Trends Survey

Age
(years)

Adopters 23
Leaders 21
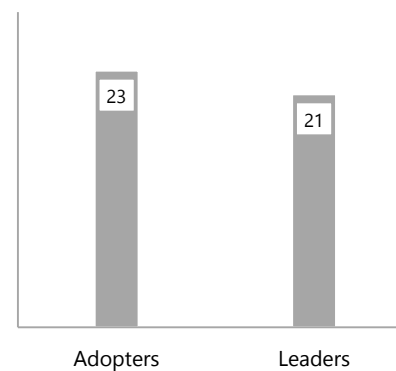
Note: -
Source: NBG – Business Trends Survey

Size
(€ million)

Adopters: 3,1 (2013), 3,4 (2018)
Leaders: 3,3 (2013), 4,0 (2018)

▨ 2013
■ 2018
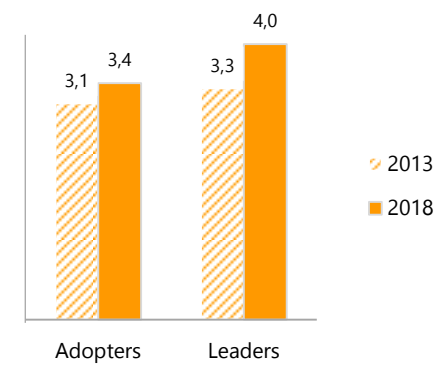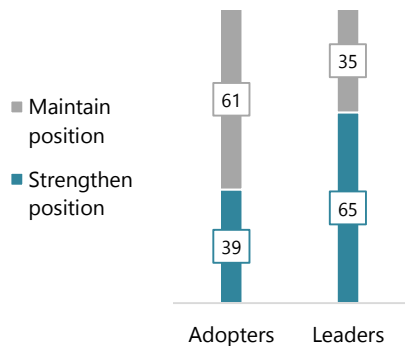
Note: -
Source: NBG – Business Trends Survey

Strategy is the key factor distinguishing Leaders from Adopters ...

So, what is it that actually distinguishes the Leaders from the Adopters[1]? The answer lies in more strategic dimensions of business approach. Specifically:

✓ Differentiation in terms of **motives**: Leaders appear to be more dynamic, aiming to strengthen their position through innovation, while Adopters appear more conservative aiming to sustain their position through innovation. In addition, the majority of Leaders (¾) stepped up their innovation efforts as a reaction to the crisis (versus 50 per cent in the case of Adopters).

✓ Differentiation in terms of **strategy**: The majority of Leaders places emphasis on the **development of innovative products** (versus second-level innovation, e.g. in terms of procedures or organizational structure). Furthermore, Leaders tend to focus on the qualitative aspect of their innovation endeavours – that is, strengthening their R&D departments (54 per cent versus 8 per cent for Adopters) and developing synergies with the academic (47 per cent versus 3 per cent) and research community (35 per cent versus 3 per cent).

[1] the figures refer to Greek SMEs of the manufacturing sector

Innovation motive
(per cent of sector)

- Maintain position
- Strengthen position

Adopters: Maintain 61, Strengthen 39
Leaders: Maintain 35, Strengthen 65

Note: (-
Source: NBG – Business Trends Survey

Strengthening of innovative efforts during the crisis
(per cent of sector)

Adopters 50%
Leaders 74%
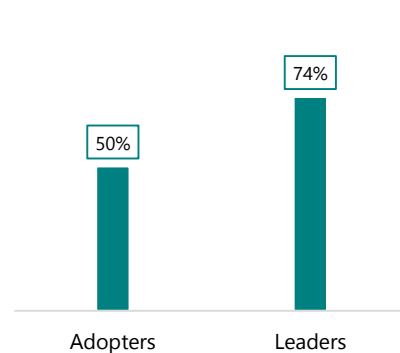
Note: -
Source: NBG – Business Trends Survey

Product strategy
(per cent of sector)

Adopters 65%
Leaders 92%
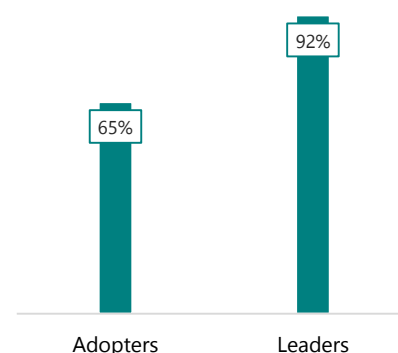
Note: -
Source: NBG – Business Trends Survey

Strategic actions
(per cent of sector)

Strategic action	Leaders	Adopters
Invest in R&D division	54%	8%
Collaborate with university	47%	3%
Collaborate with research institute	35%	3%
Purchase technology from abroad	15%	22%
Existing infrastructure	18%	70%

- Leaders
- Adopters
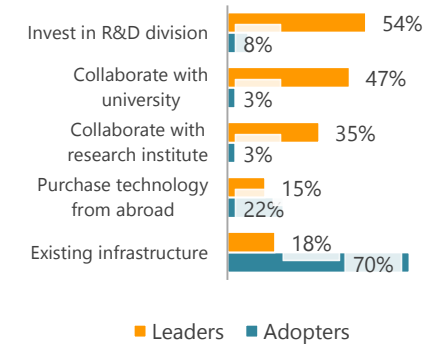
Note: -
Source: NBG – Business Trends Survey

... which translates into a competitive edge in profitability and access to international markets

Despite the high satisfaction rates that all SMEs record regarding the implementation of their innovation strategy (over 70 per cent), the differentiation of the Leaders' strategy offers stronger advantages.

Specifically, over the past 5 years, Leaders achieved a 19 per cent increase in sales versus only 9 per cent by Adopters. This superiority reflects the greater innovation booster in exports, with ⅔ of the Leaders stating that **their export orientation was enhanced as a result of innovation** (versus only 16 per cent of Adopters). The more dynamic progress of sales and the growth in export orientation by Leaders is also reflected in their higher expectations relating to growth targets and employment growth.

In addition, the more marked improvement in profit margin by Leaders (8.6 pps versus 3.6 pps) is mainly the outcome of their ability to achieve higher prices and not so much due to improvements in production cost, as the impact of innovation on such costs is roughly equivalent across all innovators (circa ¼ of the enterprises state a positive impact).

Sales
(sales expressed as percentage change for the period of 2013–2018, domestic market & exports as per cent of the SMEs sector)

- Adopters
- Leaders

	Sales	Domestic market	Exports
Adopters	9%	55%	16%
Leaders	19%	63%	66%
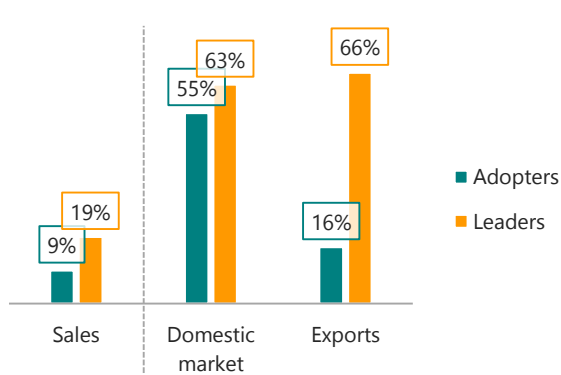
Note: -
Source: NBG – Business Trends Survey

Future perspectives
(per cent of the SMEs sector)

- Leaders
- Adopters

	Growth strategy	Employment
Leaders	81	51
Adopters	67	32

Note: -
Source: NBG – Business Trends Survey

Profit margin
(change 2013–2018 in pps)
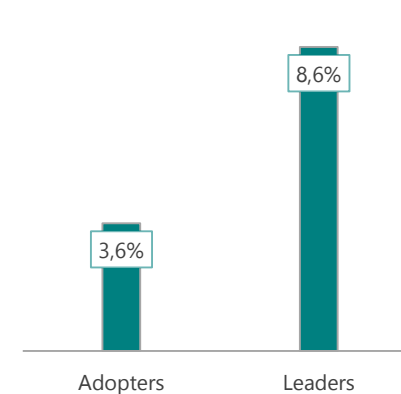
Adopters	Leaders
3,6%	8,6%

Note: -
Source: NBG – Business Trends Survey

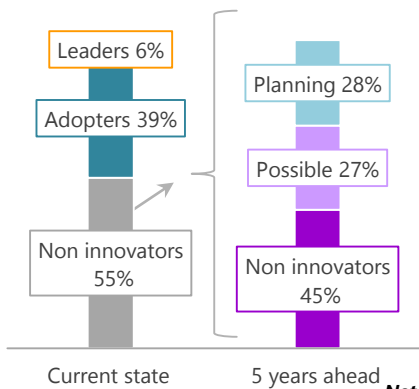# 15 per cent of manufacturing SMEs are planning to start innovating...

With a view to reduce the gap between Greece and EU and as the number of non-innovative SMEs remains high (55 per cent of the sector), it is important to examine potential plans for the adoption of an innovation strategy in the future by these enterprises.

At a first glance, the survey data present an encouraging picture of the future, with **28 per cent of non-innovative enterprises** (representing 15 per cent of all enterprises) **reporting that they have already designed an innovation strategy** and they intend to implement it within the next 5 years. In addition, the similarity of these enterprises to the already innovative ones (in terms of both age and size) give rise to positive expectations that it is actually likely (and feasible) to innovate to the same extent as the companies that are already innovating.

At this point, note that an additional significant share of non-innovative SMEs (approximately ¼) states that they would like to develop an innovation strategy provided that the conditions in the general environment would be improved.

Structure of manufacturing SMEs sector
(per cent of sector)

Leaders 6%
Adopters 39%
Non innovators 55%

Planning 28%
Possible 27%
Non innovators 45%

Current state   5 years ahead

Note: -
Source: NBG – SMEs Survey

Age
(in years)

Innovators	Planning	Non-innovators
22	21	24
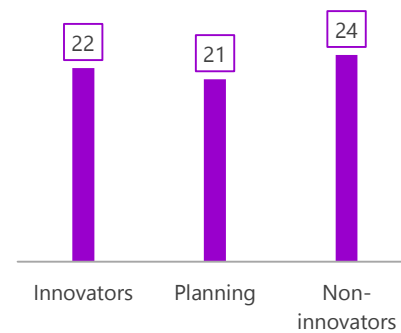
Note: -
Source: NBG – SMEs Survey

Size
(in € million)

Innovators	Planning	Non-innovators
3,2	3,3	2,2
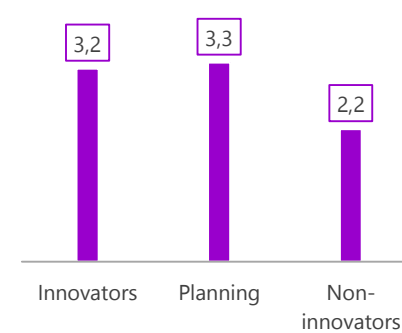
Note: -
Source: NBG – SMEs Survey

... however, there is a tendency to adopt the Adopters' strategy

The aforementioned observation is directly linked to the planned actions of SMEs intending to start to innovate. In order to **evaluate the quality aspect of these plans**, we focused on the factors that differentiated Leaders from Adopters over the past 5 years, and then compared these conclusions with the actions planned by the SMEs.

In this context, we have unveiled that **Future Innovators are similar to the Adopters' profile**, as they state that:

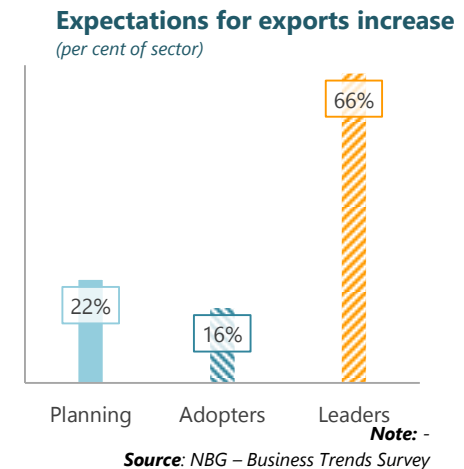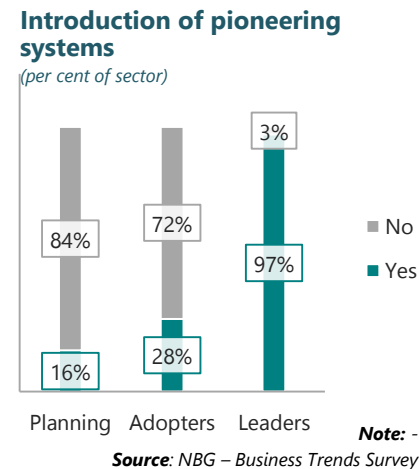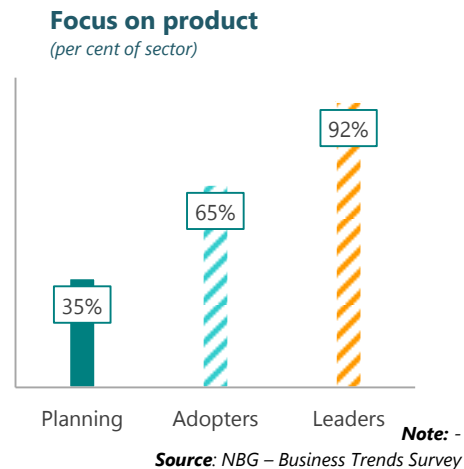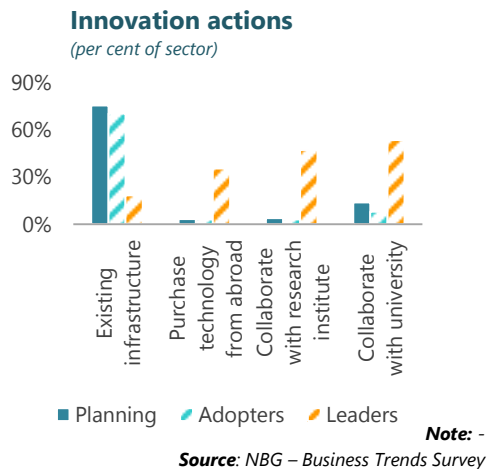✓ They will leverage their existing business structures (76 per cent versus 70 per cent for Adopters and 18 per cent for Leaders), while only a few of them plan to hire skilled R&D staff (14 per cent versus 8 per cent for Adopters and 54 per cent for Leaders), and a small number plans to collaborate with a research centre (3 per cent versus 3 per cent for Adopters and 35 per cent for Leaders) or university (4 per cent versus 3 per cent for Adopters and 47 per cent for Leaders).

✓ They give low priority to product innovation (only 35 per cent of the sector mention it as an objective target of the planned innovation strategy, versus 65 per cent for Adopters and 92 per cent for Leaders), and accordingly most of them do not plan to introduce new products in the Greek market.

✓ They have low expectations of boosting export activity as a result of their innovation (limited to 22 per cent of the sector versus 16 per cent for Adopters and 66 per cent for Leaders).

Innovation actions
(per cent of sector)

■ Planning ▮ Adopters ▮ Leaders

Note: -
Source: NBG – Business Trends Survey

Focus on product
(per cent of sector)

Planning	Adopters	Leaders
35%	65%	92%

Note: -
Source: NBG – Business Trends Survey

Introduction of pioneering systems
(per cent of sector)

■ No ▮ Yes

	Planning	Adopters	Leaders
No	84%	72%	3%
Yes	16%	28%	97%

Note: -
Source: NBG – Business Trends Survey

Expectations for exports increase
(per cent of sector)

Planning	Adopters	Leaders
22%	16%	66%

Note: -
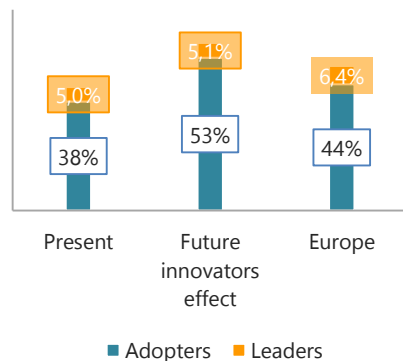**Source**: NBG – Business Trends Survey

Creating Leaders requires institutional reforms

The innovation appetite of non-innovative SMEs over the next 5 years is expected to **narrow the quantity gap** between Greece and the EU, with the estimated number of innovative SMEs amounting to 58 per cent (versus 50 per cent of the EU average). However, **no significant improvement in quality is expected**, as only 1 per cent of future innovative SMEs will follow a Leaders' strategy (as evidenced by their planned actions).
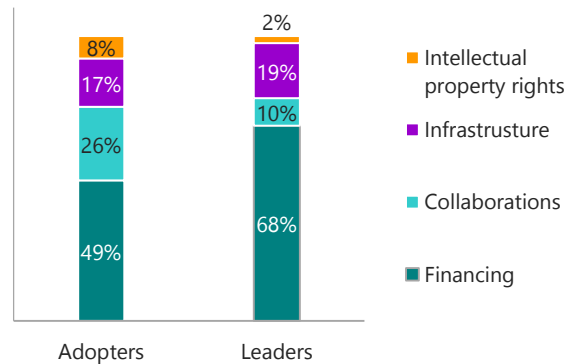
To narrow the quality gap with the EU (i.e. Leaders amounting to 6.4 per cent of SMEs), **there needs to be an improvement in the innovation environment**, with actions focused on eliminating the key barriers to innovation, as identified by SMEs: venture financing, infrastructure quality , and the framework for collaboration between enterprises and the research/academic community. Note that the key importance of the above mentioned obstacles is also confirmed by our analysis of the innovation environment, as Greece's poorer performance in the Innovation Inputs Index is observed in Financing and Infrastructure (where Greece ranks lowest versus the Balkan average).

Structure of innovative SMEs
(per cent of sector)

Present: 38%, 5,0%
Future innovators effect: 53%, 5,1%
Europe: 44%, 6,4%

■ Adopters ■ Leaders

Most important problems
(per cent of sector)

Adopters: Financing 49%, Collaborations 26%, Infrastructure 17%, Intellectual property rights 8%
Leaders: Financing 68%, Collaborations 10%, Infrastructure 19%, Intellectual property rights 2%

■ Intellectual property rights
■ Infrastructure
■ Collaborations
■ Financing

Components of input index
(EU index=100)

Human capital: Greece 77, Balkans 63
Market sophistication: Greece 72, Balkans 75
Institutions: Greece 64, Balkans 75
Infrastructure: Greece 62, Balkans 81
Financing: Greece 55, Balkans 60

■ Greece ■ Balkans

Note: -
Source: *NBG – Business Trends Survey*

Note: -
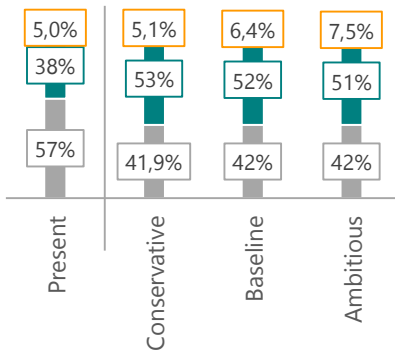***Source***: *NBG – Business Trends Survey*
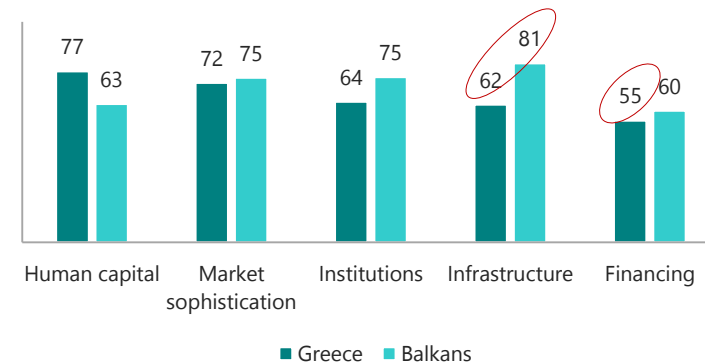
Note: -
Source: *NBG – Business Trends Survey*

Significant synergies between Leaders and Adopters

According to our estimates, an increase in the Innovation Input Index to the EU average should lead to an increase in the share of Innovation Leaders from 5.0 per cent today to 6.4 per cent of total enterprises (baseline scenario). Additional benefits can be generated through a more aggressive improvement in Greece's environment to the level of the top 3 countries, thereby boosting the Leaders' share by another percentage point to 7.5 per cent of the total (ambitious scenario).

At the same time, the positive impact of higher quality innovation (due to the increased presence of Leaders) should **spread among Adopters**, which will now operate in a higher quality innovation environment, with more options available (and more appropriate for the needs of the Greek market). This improvement will in practice be reflected in an increase in the efficiency of the innovative strategy of Adopters.

Sector structure on the basis of innovation activity
(per cent of sector)

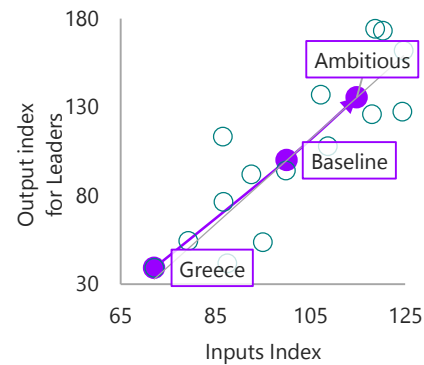■ Basic   ■ Adopters   ■ Leaders

Note: -
Source: NBG – Business Trends Survey

Input index & innovation leaders
(EU benchmark=100)
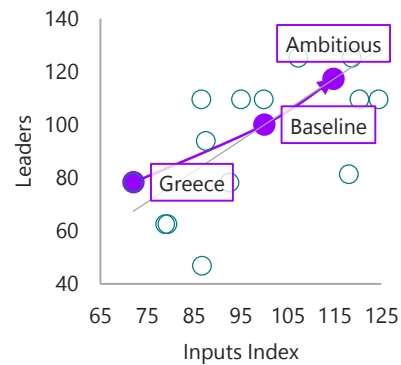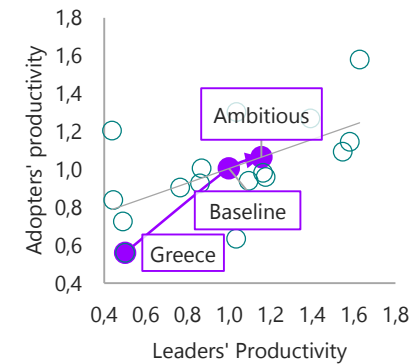

Note: -
Source: NBG – Business Trends Survey

Innovation inputs & outputs
(EU benchmark=100)

Note: -
Source: NBG – Business Trends Survey

Impact of innovation on productivity
(index)

Note: -
Source: NBG – Business Trends Survey

The economic impact of increased innovative activity by manufacturing SMEs is estimated to reach around €0.7bn under the conservative scenario over the next five years...

Conservative scenario

On the basis of the expected recovery of the Greek economy (+14 per cent of nominal GDP over the next five years), manufacturing SMEs activity is likely to grow by €2.2 bn through to 2024 (from circa €14.2 bn in 2019).

If the **innovation environment in Greece remains in its current state** (conservative scenario), then we estimate that SMEs will go ahead with their plans both on the quantitative and qualitative aspect. In this case, the improvement will likely be only in terms of a quantitative increase in innovative activity (without improving efficiency), and accordingly the **additional positive impact will be €0.7 bn**.
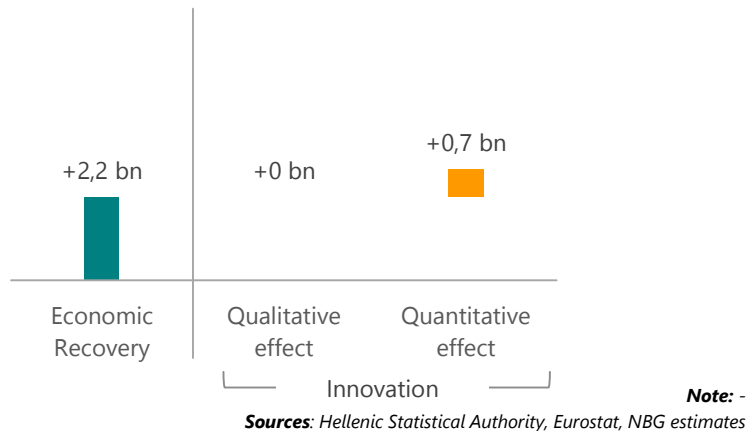
Baseline scenario

When looking at the baseline scenario, we maintain the assumption that all SMEs which have drawn up such plans will develop innovation, while at the same time **we assume an improvement of the input index** to EU levels.

The combination of these two effects should boost the recovery by (i) enhancing the profitability of SMEs (yielding an additional €1.9 bn), and (ii) increasing the number of Leaders from 5 per cent to 6.4 per cent of SMEs (adding €0.7 bn). Consequently, the assumptions of the baseline scenario add €2.6 bn to the conservative impact (€0.7 bn), **thus raising the overall innovation impact to €3.3 bn.**

Conservative scenario
(in € bn)

+2,2 bn — Economic Recovery

+0 bn — Qualitative effect

+0,7 bn — Quantitative effect

Innovation

Note: -

Sources: *Hellenic Statistical Authority, Eurostat, NBG estimates*

Baseline scenario
(in € bn)

+2,2 bn — Economic Recovery

+1,9 bn — Qualitative effect

+1,4 bn — Quantitative effect

Innovation

Note: -

Sources: *Hellenic Statistical Authority, Eurostat, NBG estimates*
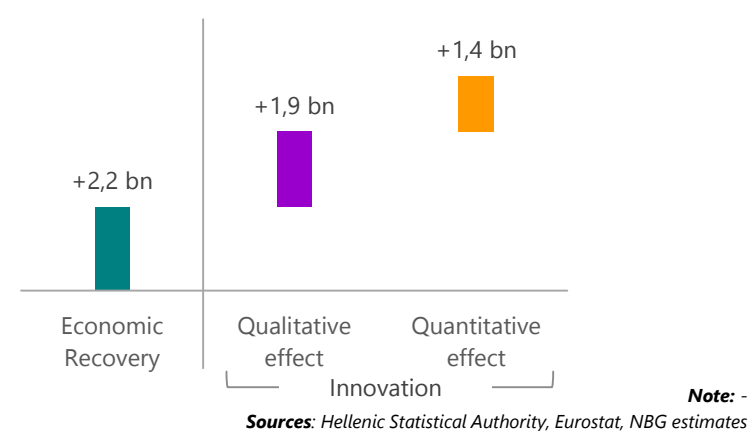
… and reaching €4 bn under an ambitious reform agenda

Ambitious scenario

**Finally, we consider an ambitious scenario in which we assume an improvement in the input index to the levels of the 3 top-performing countries.**

The implementation of such a bold reform should boost the recovery trend by (i) enhancing the profitability of SMEs (yielding an additional €2.3 bn), and (ii) increasing the number of Leaders from 5 per cent to 7.5 per cent of SMEs (adding €1 bn). Consequently, the assumptions of the ambitious scenario add €3.3 bn to the conservative impact (€0.7 bn), **thereby raising the total innovation impact to €4 bn.**

Ambitious scenario
(in € bn)

+1,7 bn

+2,3 bn

+2,2 bn

| Economic Recovery | Qualitative effect | Quantitative effect |
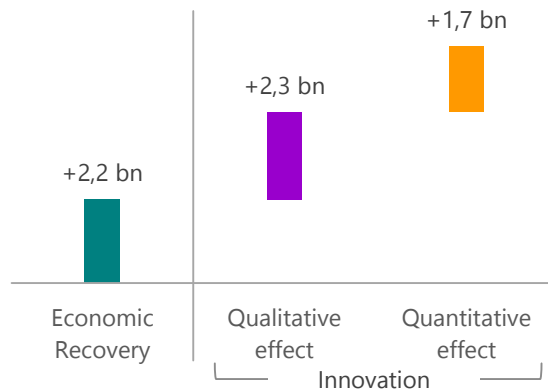
Innovation

Note: -

Sources: *Hellenic Statistical Authority, Eurostat, NBG estimates*

Summary of scenarios and other benefits from innovation

In conclusion, it emerges that improvement in the performance of the Innovation Input Index is the key to achieving higher level innovation (in terms of quality and quantity). The potential benefit could be as high as €4 bn through the increase in the number of innovative SMEs, the qualitative upgrade of innovative activity, and the higher efficiency that innovation will bring to manufacturing SMEs.

However, achieving better innovation performance will not only benefit the manufacturing sector, but will also help the country as a whole. If Greece is not to become the laggard of the Balkans, it is essential that the innovation environment is improved (given that countries in the region are already ahead in several areas of the Innovation Index).

In addition, better performance in innovation can also lead to better ability to attract high value-added investments, further enhancing the positive footprint of innovation in the economy and the position of Greek business in the global value chain.

Methodology of our model

According to the reasoning behind the scenarios' estimation, an improvement of the innovation environment will increase the number and productivity of Leaders. This increase will attract existing and prospective Adopters because of the new innovation available, thereby increasing their productivity, numbers, and the benefit to the economy.

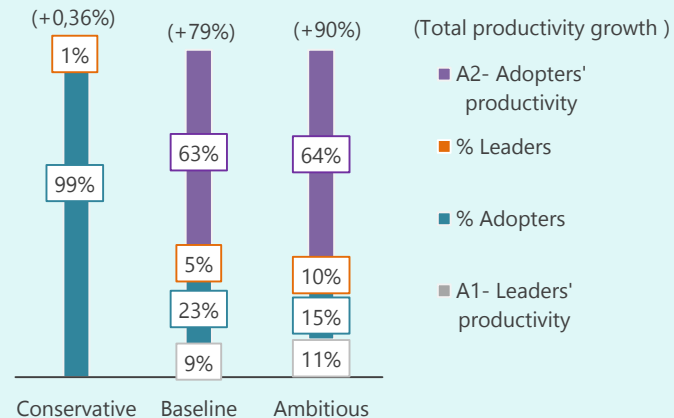Having estimated a function of the form:

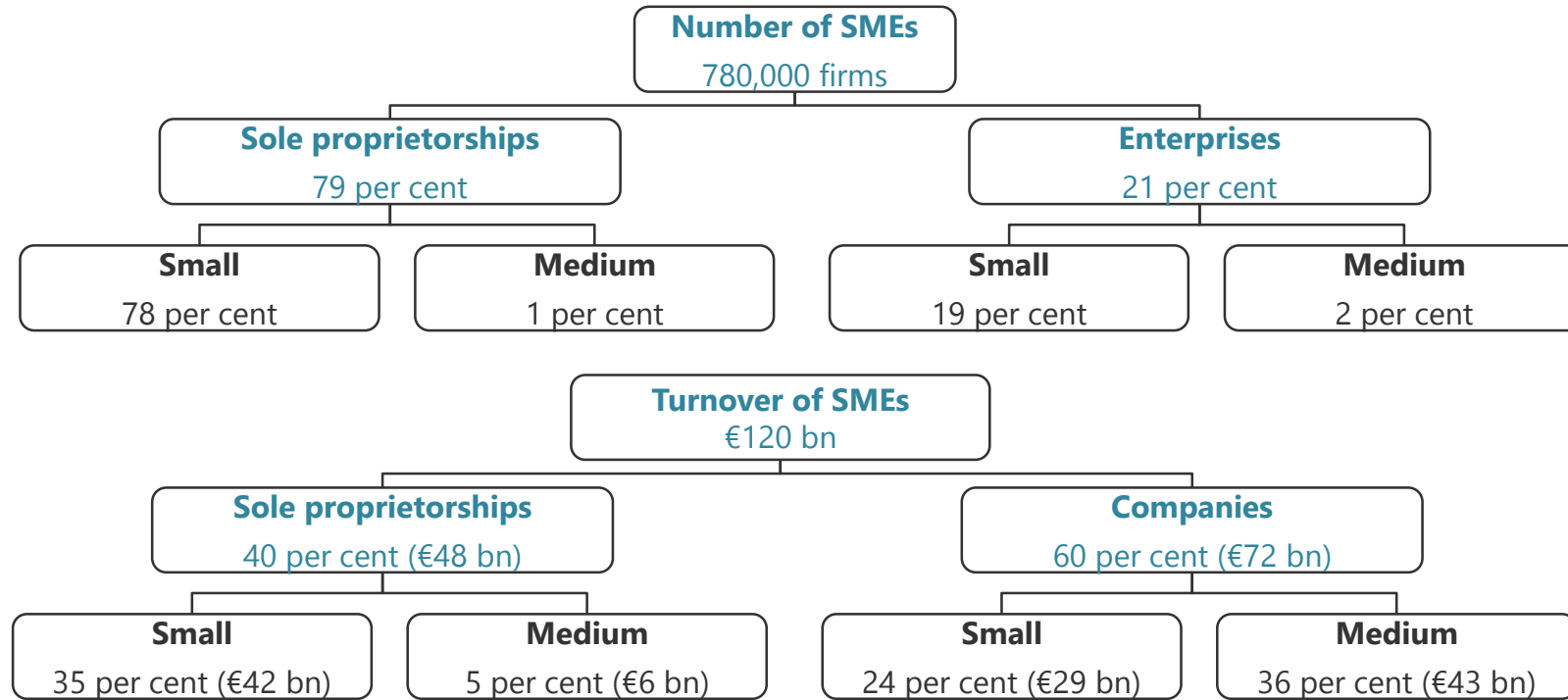$$\mathbf{Y = A_1 * \% \, Leaders + A_2 * \% \, Adopters}$$

where Y is total productivity, and A1, A2 is the productivity of Leaders and Adopters respectively. It is observed that under the conservative scenario, (i.e. without improving the innovation environment), business growth improves the total productivity of innovative SMEs by just 0.36 per cent. However, in the baseline and ambitious scenarios the benefits from an increase in the number of innovative enterprises combined with the increase of their productivity – through the improvement of the input index – are much greater (79 per cent and 90 per cent growth in total productivity, respectively).

In both scenarios, the importance of spreading innovation in the economy becomes apparent, as Adopters' productivity, which is the main driver of total productivity growth (as shown in the graph below), can only be increased as a result of the improvements in both the input index and Leaders' productivity.

Innovation drivers of productivity
(% contribution)

| | (+0,36%) | (+79%) | (+90%) | (Total productivity growth) |

Legend:
- A2- Adopters' productivity
- % Leaders
- % Adopters
- A1- Leaders' productivity

Conservative: 1%, 99%
Baseline: 63%, 5%, 23%, 9%
Ambitious: 64%, 10%, 15%, 11%

Mapping the SME sector in Greece

```
                          Number of SMEs
                          780,000 firms

        Sole proprietorships                        Enterprises
           79 per cent                              21 per cent

    Small              Medium              Small              Medium
  78 per cent         1 per cent        19 per cent         2 per cent


                          Turnover of SMEs
                             €120 bn

        Sole proprietorships                        Companies
       40 per cent (€48 bn)                     60 per cent (€72 bn)

    Small              Medium              Small              Medium
35 per cent (€42 bn)  5 per cent (€6 bn)  24 per cent (€29 bn)  36 per cent (€43 bn)
```

** For the purposes of the survey, **small** enterprises are those reporting turnover of less than €1 million and **medium-sized** enterprises are those reporting turnover of between €1 million and €10 million. * In this mapping, the features of each category were approached based on a European Commission classification that distinguishes enterprises by number of employees (**small**: up to 10 employees and **medium**: 10-50 employees).*

Source: European Commission (SBA Factsheet 2015), Eurostat, Hellenic Statistical Authority. (2015 Structural Survey of Enterprises), NBG Estimates

❑ The circa 780.000 SMEs in Greece generate turnover of around €120 bn.

❑ 4/5 of SMEs are sole proprietorships, which account for a corresponding share of the total domestic business sector (compared with just ½ of the business sector in Europe).

❑ Although sole proprietorships comprise the majority of SMEs, the greater share of turnover (of 60 per cent) is generated by companies of various legal status (SA, limited partnership, limited liability, etc.).

Sample Description

Distribution of number of companies of sample*				
Turnover (in millions €)	Manufacturing	Services	Trade	Construction	Total SMEs
1: (0 - 0,1]	73	45	45	30	193
2: (0.1 - 0.5]	73	45	45	30	193
3: (0.5 - 1]	74	45	45	30	194
4: (1 - 2,5]	74	45	45	30	194
5: (2.5 - 5]	73	45	45	30	193
6: (5 - 10]	73	45	45	30	193
Total SMEs	440	270	270	180	1160

* Depending on data availability, there is possible deviation of 10 per cent

Percentage mix of SMEs by sector* (based on turnover)				
Turnover (in millions €)	Manufacturing	Services	Trade	Construction	Total SMEs
1: (0 - 0,1]	1 per cent	5 per cent	2 per cent	1 per cent	9 per cent
2: (0.1 - 0.5]	3 per cent	6 per cent	12 per cent	1 per cent	22 per cent
3: (0.5 - 1]	2 per cent	3 per cent	9 per cent	1 per cent	15 per cent
4: (1 - 2,5]	3 per cent	3 per cent	11 per cent	1 per cent	18 per cent
5: (2.5 - 5]	4 per cent	4 per cent	8 per cent	1 per cent	17 per cent
6: (5 - 10]	4 per cent	4 per cent	9 per cent	2 per cent	19 per cent
Total SMEs	17 per cent	25 per cent	51 per cent	7 per cent	100 per cent

* Weighted average of the last decade

Source: EL.STAT. Company Register (2007), ICAP Data, Eurostat, NBG Estimates

❑ Our survey examines a sample of enterprises with a turnover of below medium-size enterprises (SMEs).

❑ Enterprises were selected using a stratified sampling method, in line with the standards of similar surveys carried out by international organizations. Specifically, a total of 1.160 enterprises were selected in such a way as to enable even distribution of the sample on the basis of two key factors: scale of turnover (6 scales) and sector of activity (Manufacturing, Trade, Services, Construction).

❑ In order to draw conclusions that are representative of the SME segment, answers were weighted according to the participation of each sub-set in the total turnover of the segment. Thus, findings were arranged (i) by size, (ii) by sector, and (iii) for the entire SME business sector. In line with the methodology, the segments are weighted, in principle, on the basis of their contribution shares in total turnover and not the number of enterprises.

Constructing a business confidence index

❑ In order to construct a confidence index for SMEs, we included a number of basic questions regarding the level of business activity in the previous and in the coming half year. The model for the questions is based on the harmonized questionnaire recommended by the OECD and the European Commission, thereby enhancing the comparability of the index.

❑ The Index questions offer 3 alternative answers: increase (+), no change (=), decrease (-), or above normal (+), normal (=), below normal (-). To begin with, we convert the number of answers per category (+, =, -) to percentages and then we calculate the net result by subtracting the (-) from the (+) percentage. Last, the confidence index for each sector is the average of the net results for the following questions:

  ✓ For **manufacturing**: The level of orders, inventories, and future production trend.
  ✓ For **services**: The business situation of the firm in the previous half year, past and future demand trend.
  ✓ For **trade**: Level of inventories, past and future demand.
  ✓ For **construction**: Level of backlog, and future employment trend.

❑ For the SME sector, the business confidence index has been estimated as a weighted average of its subsectors (the weights being the shares of the sectors' turnover in the economy).

❑ By carrying out the survey on a regular 6-month basis we should be able to form a picture of SMEs' course over time, as reflected in the index. To draw reliable conclusions, comparison will be made between the current index level and its long-term average (so as to correct possible over-optimism or over-pessimism bias).

❑ The evolution of the confidence index (and any other reviews over the course of time) does not take into account the closing of companies, just the developments regarding enterprises operating during the period this survey is carried out.

Survey ID

❑ Company: TNS

❑ Methodology: Quantitative research in the form of Computer Aided Telephone Interviewing - C.A.T.I., using a 20-minute structured questionnaire.

❑ Sample: A total of 1,160 interviews were conducted (960 within the context of the current assessment plus 200 booster interviews with manufacturing SMEs):

   ✓ 580 enterprises with annual turnover up to EUR 1 million (freelancers, sole proprietorships, unlimited partnerships, limited partnerships, limited liability companies, SAs) - 100 of which are food industries

   ✓ 580 enterprises with annual turnover between EUR 1 million and 10 million (unlimited partnerships, limited partnerships, SAs, limited liability companies) - 100 of which are food industries

❑ Geographical coverage:

   ✓ Athens, Thessaloniki, Heraklion, Ioannina, Kavala, Larissa, Patras

❑ Sampling: multi-stage, stratified, non-proportional sampling for sector, turnover size & geographical area in each of the two sets of samples. Quotas relating to turnover and for the booster sample.

❑ Statistical error: in each of the two sets of samples of 580 enterprises the maximum statistical error is estimated at +/- 4.15 per cent at a 95 per cent confidence level.

❑ Period of survey: 03/10/2018 - 09/11/2018

❑ Survey framework: The survey was carried out in line with ESOMAR and SEDEA (Association of Greek Market and Opinion Research Companies) codes of conduct and the quality control requirements set by PESS (Quality Control in Data Collection). A total of 39 researchers and 2 reviewers with experience and know-how in business surveys participated in the field research.

Survey of Greek SMEs
Special focus:

Special focus: Innovation

January 2020