

# INNO PROVEMENT

## Regional Assessment

### COMPETE 2020 - Operational Programme for Competitiveness and Internationalisation

#### Portugal

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## 1. Introduction

The Managing Authority (MA) of Compete 2020 (Operational Programme for Competitiveness and internationalization) has the goal of improving the competitiveness of enterprises and their internationalization (in global competitive contexts), creating jobs and generating growth and added value, launching calls using public support incentives and grants to improve the Portuguese economy and our global situation.

The INNO PROVEMENT project has the aim of improving SME policy instruments to expand the support of innovation adaptation to the requirements defined by Industry 4.0.

While participating in INNO PROVEMENT, our focus will be the Definition of I4.0 public policy initiatives, and while we do have already launched some initiatives, our participation is poised to use the inputs of the partner institutions to improve these calls, while at the same time providing data to be used in a more pan-European approach to Industry 4.0.

Defining these public policies will have to account the differences in socio-demographic and economic situations of the different regional partners, while providing a template for a path to improve the implementation of I 4.0 policies.

The fact of the matter is, although I 4.0 is now seen as a standalone revolution and not only an evolution of the Third Industrial revolution, the concept may create a problem while communicating with the SME's.

Portugal ranked 16th in the Digital Economy and Society Index (DESI) of 2018, and is considered to be part of the medium performance cluster of countries, with improvements notably in the fixed and mobile broadband services, internet usage by citizens, while having room to improve that performance. It is also referred that “Although Portugal progressed faster than the EU average in all components of the Human Capital dimension, low digital skills levels, particularly among the elderly and those with low levels of education or on low income continue to entail risks of digital exclusion and hinder progress in most of the other dimensions of DESI.”

This is particularly important as low levels of education and digital exclusion may impair the understanding of what I4.0 represents for SME's and implementation of policies that promote I4.0 innovation.

The data present in the “Digital Picture of SME in Portugal” study (2017) shows that most of Portuguese SME's are not prepared for Industry 4.0 with a small fraction (11%) being able to acknowledge the possibilities of the Digital Economy at the highest level.

This problem as long been acknowledged by the Portuguese Government, which resulted in a I4.0 Strategy and a Strategic Committee, suggesting measures to improve our adoption and adaptation of I4.0.

In broad strokes, the Regional (Portuguese) context shows the need of improved I4.0 public policy initiatives, demonstrates that SMEs need to evolve and embrace The Digital Economy, but also all that the possibilities provided by Industry 4.0 concepts, are not yet broadly known. But mostly, within the Inno Provement project, we must find tools that enable the SME to integrate the I4.0 concepts in a strategic evolution and redefinition of their own nature as enterprises.

## 2. Used methodology

This Regional Assessment is based in a great deal of research already done by some stakeholders (IAPMEI, COTEC) and data available through the National Statistics Institute (INE), the Eurostat and The European Commission evaluating the situation of the SMEs, their appetite for new technologies, their capacity to develop a digital strategy, how they acknowledge the potential in digitisation and how Industry 4.0 is understood.

Most of this effort is (and will continue to be) based on desk research, i.e. using the available sources and analysing the results, comparing the evolution in the last years in the **Digital Economy and Society Index (DESI)** and using the **Small Business Act (2017)** data to support an evolution in formulating better calls, as a form of directing the SMEs' towards the introduction for I.4.0 systems.

Also used in this research is the data pertaining to Portugal present in the **Global Competitiveness Index 4.0 (2018 edition)**, and in the **European Innovation Scoreboard of 2018**.

Also consulted was the **Hays Global Skill Index of 2018 report**, a review that has some incidence in how the work market is structured and behaving on the matter of hiring and high technologies view of the Portuguese SME's.

The **2016 Global Manufacturing Competitiveness Index (Deloitte)**, was also used as a reference.

Also the first **Stakeholders Meeting/ Focus Group** took place in the 8<sup>th</sup> of February do 2019, and although this regional assessment was sent to Principal partner in the 30<sup>th</sup> of November do 2018, the main problems, questions and concept problems remain the same, in spite of continued efforts by the stakeholders.

The Stakeholders present at the meeting ranged from MA from the various regional Programs, to the National agencies in charge of innovation and Technological Centers focused in the development and implementation of low and high technological solutions adapted to SME different sectors.

The meeting involved almost all of the Stakeholders identified in **chapter 7** of this report, namely:

- Managing Authorities from the Regional Programs Norte, Centro, Lisboa and Algarve (MA Alentejo could not be present at that time);
- Intermediate Managing Bodies: Turismo de Portugal and ANI (AICEP and IAPMEI could not be present as they were engaged elsewhere);
- Business and Industrial Associations: APPICAPS and COTEC.
- Technological Centers: CEIIA and CITEVE.

The **Stakeholders Groups** is, simultaneously, the **Focus Group**, and being so, the meeting was used to exchange of knowledge. And as such should be seen as a shared effort between a reflexion on what is I 4.0, what is being done and what has already being achieved and what each Stakeholder can contribute to this effort.

During this meeting it was defined that some SME could be invited to these Stakeholders/Focus Groups meeting, and the Industrial Associations and Technological Centres will invite some SME's/case studies to join in next meeting.

Finally, an online survey was available through **Google Forms (from the 19th of November to the 3rd of December of 2018)**, based<sup>1</sup> on the questions suggested in Inno Provement Joint Methodology (September 2018) to which were invited to participate SME's that received ERDF/ESF support through the MA COMPETE 2020. Some of the questions asked were not defined in the document, but were necessary to better characterize the SME's that replied (the full on-line survey is present in Annex A of this regional Assessment).

From more than 6.630 inquiries made, we've received 322 complete responses (4,85% response ratio). Although this is a low number, considering the high count of invitees, the numbers and replies do somewhat reflect the SME's dimensions, type and sector and fall in the expected parameters in the aforementioned document.

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<sup>1</sup> There were small adaptations concerning questions 3 and 4 of the Methodology (6 and 7 of the survey). In question n.º 3 we considered a scale where the value of the most important factor is 4 instead of 1. In question n.º 4 we considered it as a multiple choice question, where one or more choices could be made, instead of attributing importance.

According to the Article 2<sup>nd</sup> of the Commission Regulation (EU) No 651/2014 of 17 June 2014, which defines Enterprise categories through Staff headcount and financial thresholds, SME's are defined in the following way (adapted):

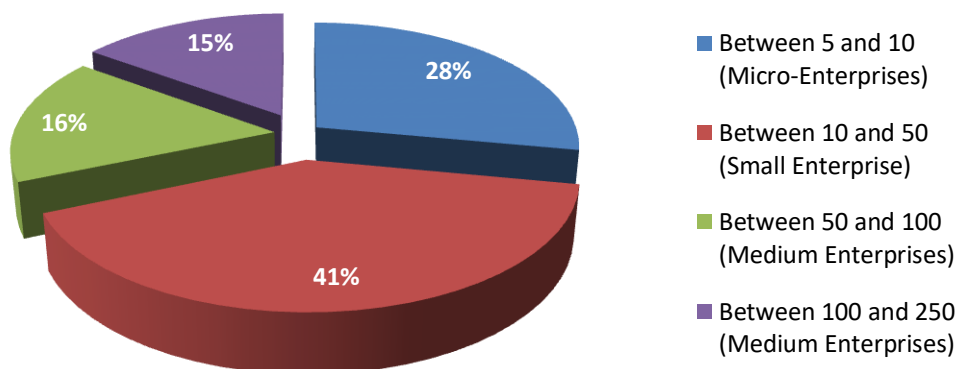
- **Micro Enterprise** - an enterprise which employs fewer than 10 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 2 million.
- **Small Enterprise** - an enterprise which employs fewer than 50 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 10 million.
- **Medium Enterprise** - an enterprise that employs fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million.

This classification assumes that enterprises need to fill only one of these criteria to be considered in those specific categories.

In order to define what type of enterprises replied, it was introduced in the survey's framework, a set of four questions that could help to understand the type of answers, namely defining the SME's either by workforce size or Annual Turnover, where are they located and in which business sector do they belong to, and by doing so helped define the statistical "Universe".

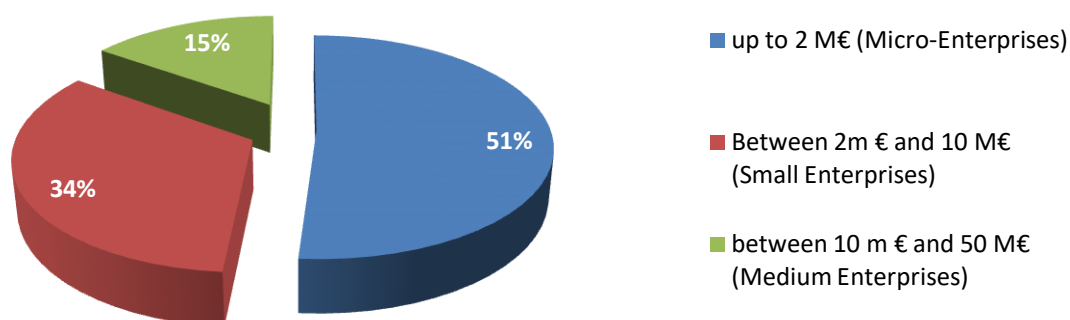
In terms of workforce size, 31% of the replies belong to Medium Sized Enterprises, meaning that the remaining 69% belong to Micro and Small Enterprises.

### SMEs per Workforce size (%)



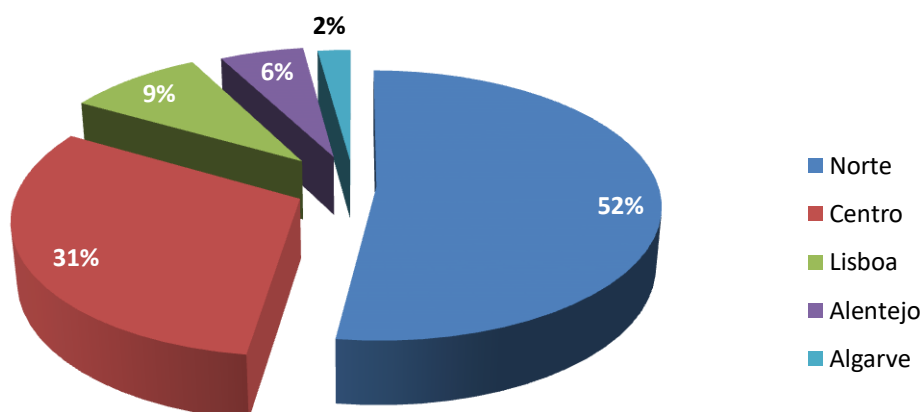
When considering Annual Turnover and accounting for the same reply base, only 15% can be considered Medium Enterprises. This also means that although in workforce size, 31% could be considered Medium, in fact 16% have Annual turnovers inferior to what the Regulation defines as criteria for medium sized enterprises (less than 10 million€).

### SME's size considering Annual Turnover (%)



Also, if only considering Annual Turnover, 51% of the replies came from micro enterprises, which, considering the SME's per Workforce Size represent only 28%.

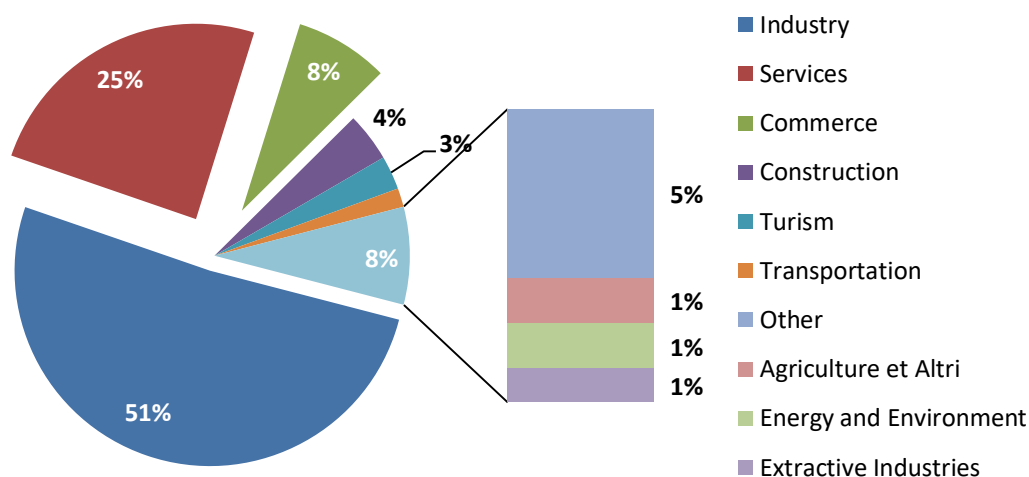
### SME's location (%) per region





Most of the replies came from the Norte and Centro Regions (83%) which concentrate most of the small businesses in Portugal, but also concentrate most of projects submitted do MA Compete2020, which is also factor to be considered, because all the invitees received ERDF/ESF support.

### Number (%) of SME's per business sector



Also confirming this statement, is also the segmentation in Business Sectors, with 51% of replies coming from industry related enterprises and in a far second, 25% accounting for the Services Industries and 8% representing Commerce.

From this data we can extrapolate that, while considering the workforce size, a third are medium sized enterprises and the other two thirds are in the micro and small scale, while their Annual Turnover is smaller than expected, and in fact suggest that replies came from less profitable enterprises or more labour intensive, which in turn are those who can profit the most from Industry 4.0.

As for the remainder of the Survey, It must be stated that the choice to follow the questions suggested in the Joint Methodology, considered that our partners would use the same ones, and there should be a basis for comparison, in spite of the diverse economic realities of each region or country.

### 3. Overview

According to the **Global Competitiveness Index 4.0 (2018)** Portugal ranks in 34th Place in a group of 140 countries.

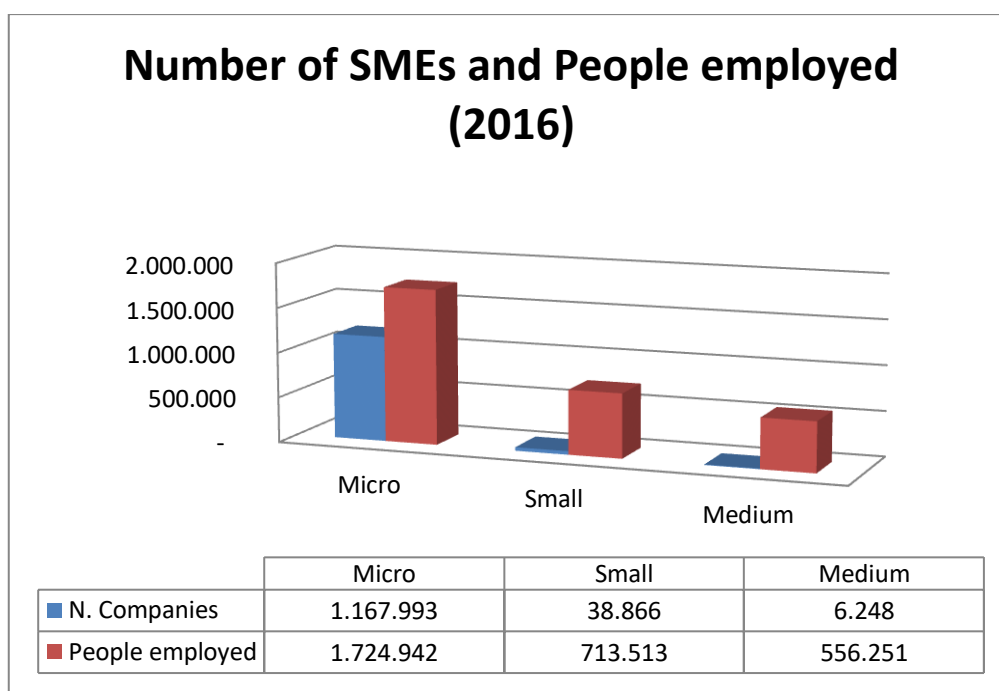
But this does not show the whole picture.

In spite of that 34th place, Portugal ranks 37th in Internet and Communication Technologies adoption, although it has a higher adoption of fixed broadband (17th) and fiber optic broadband (21st).

Almost 70% of the population is an Internet User (54th place) and the e-participation index is 0.9 (in a scale of 0 to 1). This particular scale measures the use of on-line services to facilitate the provision of information, interaction and engagement in e-decision processes with the government, being ranked at 30th.

The last statistic is more directly connected to Inno Provement: Digital Skills among the population with a score of 4.6 in a scale of 1 to 7 (rank 50).

What does this mean, in context, and how can we improve this situation at least taking in account the SME's?



**Source: INE - Pordata**

According to the **National Statistics Institute (INE)**, Portugal had more than 1,2 million SMEs' employing around 3 million people in 2016.

Lacking in the graph is the number of companies that no longer qualify as SMEs which represent almost 1.100, employing 805 thousand people.

If we consider that, according to Studies and Planning Office of Ministry of Work, Employment and Social Security, the active population throughout 2017 was 5,2 million, this means that around 57% of the active population was employed by SME's and 79% of all employees (accounting the big companies numbers) worked at SME's

Although Portugal is 32<sup>nd</sup> place in terms of innovation capability and it invests 1,3% of the GDP in R&D expenditure (rank 30) it also ranks 50<sup>th</sup> in terms of digital Skills (with a score of 4.6 in a scale from 1-7). And while it is in 27<sup>th</sup> place in business dynamism, it is the 74<sup>th</sup> in terms of SME financing.

What does this all mean?

The panorama of SME digitisation in Portugal is more homogeneous. All the numbers show that although we're favourably positioned in some areas, there is a lot to improve. The bet on R&D and innovation, as well in the high connectivity is not on par with the lower digital skills of the population.

In fact, the **Digital Portrait of Portuguese SME**, a survey done by IAPMEI and PSE show that 25% of SME'S lack a digital strategy (and may use only the e-mail as a digital Tool) and only 5% of them are considered top level (using the full spectrum of digital communication and productivity tools. Between those numbers rest 53% of SME within a Beginner level (using e-mail and possibly Facebook) with low digital maturity, which by itself, is worrisome.

This study also shows that most of the surveyed SME's have a desire to bet on digital marketing, identify new venues of business and eventually develop new products and services, and that 71% of Portuguese SMEs consider important to develop a digital strategy. But also that the main difficulty in the digital transformation of SMEs is the lack of human and technical resources, skills and capabilities, inefficient use of communication channels, and the lack of analytical culture.

For the digitisation development of these SMEs, the study clearly highlights the need to bet:

- On the development of digital marketing plans with the involvement of specialists (outsourcing);
- On training of human resources and in the creation of small internal structures dedicated to digital;
- In defining metrics and business indicators for the creation of an analytical culture.

According to the **Digital Economy and Society Index of 2018 (DESI)**, Portugal ranks 16 out of the 28 member states, losing one place to Index of 2017, in spite the score being higher almost 2 points.

THE DESI Index measures 5 Items (chapters):

1. Connectivity (Fixed broadband, mobile broadband and prices);
2. Human Capital (Internet use, basic and advanced digital skills);
3. Use of Internet Services (Citizens' use of content, communication and online transactions);
4. Integration of Digital Technology (Business digitisation and e-commerce);
5. Digital Public Services (eGovernment and eHealth).

For this assessment we will focus on two particular chapters:

- “Human Capital”  
and
- “Integration of Digital Technology”.

On the level of “Human Capital”, the report states that “Although Portugal progressed faster than the EU average in all components of the Human Capital dimension, low digital skills levels, particularly among the elderly and those with low levels of education or on low incomes, continue to continue to entail risks of digital exclusion and hinder progress in most of the other dimensions of DESI.

In fact Portugal ranks 24<sup>th</sup> in the percentage of Internet Users and ICT Specialists (with one of the lowest shares of specialized employment), and 20<sup>th</sup> in Digital Basic Skills.

The report also states that 50% of the population does not have the necessary skill to use effectively the Internet and 30% has no skills whatsoever. To put it in perspective, the EU Average for these items is 43% and 17% respectively.

Additionally, 18% of the Portuguese active labour force (employed and unemployed individuals) has no digital skills, compared with an EU average of about 10 %.

On the aspect of the Integration of Digital Technology, there is a mixed picture. While there are some gains, most of the items considered, report losses or reduced growth.

While 25% of companies can be considered to have High or Very High levels of Digital intensity, we lost ground in on-line sales (e-commerce), Social Media, Electronic Information Sharing and RFID usage.

In fact, the report states that SME are faring a lot worse in e-commerce and Information sharing.

The **European Innovation Index 2018** reveals other, but similar, insights.

The manufacturing sector enterprises employ 17% of the population, above the EU Average (15,5%) whilst employing only 18 % in Medium to High Tech Employment versus some 37% in EU.

The Services sector is more in line with EU Average (41% in Portugal to 41,6% in the EU, whilst the employment in knowledge intensive services is and 31% versus 35% in the EU.

The **2016 Global Manufacturing Competitiveness Index (Deloitte)** shows a more worrisome perspective: Stagnation (at least in the purview of the interviewed CEOs). All metrics taken in account, Portugal places 35<sup>th</sup> (out of 40 countries) in this Index, and has been in this position since 2013, and is expected to maintain it in 2020.

While in the past, Portugal seemed to be on the fore front of the Digital integration, it has been losing ground, which is reflected by the worsening results.

Still, there is an effort to improve our technological standing, and improve and qualify our workforce with Public and European investment taking the brunt of the effort.

#### 4. Maturity of SMEs

Taking in consideration all the available data, most of it already referred in the Overview section of this report, namely the data present in the DESI Report of 2018, The Global Competitiveness report Index 4.0, the **Digital Portrait of Portuguese SME**, a survey done by IAPMEI and PSE, the Small Business Act Fact Sheet of 2017, and the COTEC/Deloitte Study over Industry 4.0.

The **Digital Portrait of the SMEs (2017)** was done inquiring more than 1.100 SME's, of which a little less than 48% have less than 10 workers (i.e. Micro enterprises).

Considering the digital awareness and maturity assessed in the inquest, only 11% of them are at a level that integrate Digital and Social technologies in business processes.

At this level the management of these companies encourages activities in the digital and social area and implemented internal and external processes to maintain contact with the market.

These companies encompass a large set of priorities, namely Digital Technology into the different functional areas, customization of products, advanced knowledge of final customer including profiling the customer needs and have.

The stark reality is that 89% of the inquired enterprises, whatever their level of adequacy to digital transformations are very far from the knowledge base needed to implement Industry 4.0 Solutions.

And in fact 78%, see themselves at a level that while being conscious of their limitations and that it is not enough to evolve, having a website and Facebook presence is a small victory.

And while considering that these 1.100 companies represent less than 0,1% of the established Portuguese SMEs, it is a reminder that the medium to big companies (numbering about 8.000) are better positioned to insert industry 4.0 concepts into their operations.

The main reason seems to be a lack of qualified manpower and of a future digital strategy.

THE DESI also reveals it seems to be easier (or less difficult) to hire ICT Experts and there is an increase in STEM Graduates.

On the other hand, according to the **Hays Global Skill Index of 2018** there is an excessive pressure on companies, because there are not enough high qualified IT workers which force the Wage pressure in high-skill industries (9.9 in a 10 scale). Considering this, SME's might not have the wage forming\creating capability to captivate workers (as the figure of only 2.4% overall employment - DESI Index 2018 shows), although the number of companies hiring ICT specialists is above the EU average at 20%.

The other reason resides in a lack of a defined digital strategy that influences how the incorporation of new production concepts is viewed.

These factors show that Portuguese SME's have a lower talent retention ability, due to the lack of qualified professionals and lack of sustainable financing of higher wages, which in turn reduces their ability to define, implement and adapt new production policies.

This interpretation seems to be in accordance with the Digital Portrait, where it is referred that bigger companies have higher maturity levels because they have the human resources needed for their strategy, are better prepared, and at the same time, when seen in conjunction with the Industry 4.0 concepts, have the knowledge to identify problems, suggest improved solutions, adapt the productive reality or in fact, change it.

Without going into great detail, as it was already done in the Overview Section, Portugal has a highly digitised access to government, and a 70% access rate to Internet, but with only 50% with few ICT skills (GCI 4.0 - 2018 Edition).

Taking in account **European Innovation Scoreboard (2018)** score of 85.2, and while losing 1,5 point in the Index between 2010 and 2017, Portugal's performance, while lagging in some aspects, is very dynamic in others relative to EU Average.

This mixed picture is a constant in every report quoted being the main reason the fact that most of the statistics come from the same international organisms (Eurostat, World Bank, World Economic Forum, and other institutions). Considering



this, and although the statistical analysis made by those various organisms is directed to particular theme or perspectives, a similar pattern emerges.

On the other hand, the on-line survey showed us other viewpoints and problems.

As already referred in this documented, the baseline questions, remain the same (although adapted to the Portuguese Reality), and as such, also the suggested answers.

In chapter **2.Used methodology** the identification of who responded to the on-line survey, was already established:

- Mostly Micro to medium enterprises of an industrial type (non specified), with small business turnovers relatively to their work force size, mainly concentrated in the Norte region Portugal.

But the main purpose was to know what they think about Industry 4.0. and public support for its integration.

In general terms the results are as follow:

- **Question 5<sup>2</sup> - Do you think public assistance is needed to help companies introduce Industry 4.0 solutions?**
  - 94% of replies consider that public assistance is important (6 or more points)
- **Question 6: If you think public assistance is needed to help companies introduce Industry 4.0 solutions? (types of support instruments)**
  - Almost 60% replies considered that non-refundable directed support instruments for I 4.0 were the most important, followed (about 54%) by general non-refundable support instruments where I 4.0 investments could be eligible.
  - Training and mentoring about I 4.0 was considered more important to 36%;

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<sup>2</sup> The question numbering utilized refers to the online survey question sequence (because there were 4 prior questions to these, as explained before) instead of the numbering utilized in the Annex 1 proposal of the Inno Provement Joint Methodology (September 2018)

- And almost 40% considered subsidised loan as an important tool for investing in I 4.0.
- **Question 7 - How do you think the central/regional government could better assist companies to introduce I4.0 solutions? ...**
  - 46% responded that any and all Public support would be welcome and 25% responded that they would prefer specific support for introducing I4.0 measures.
- **Question 8 - Do you know about public assistance to introduce I4.0 solutions in your company that was available in the past 2 years and/or is available now?**
  - 61,49% replied that they have or had knowledge of specific public funding directed to I 4.0, while 38,51% said that they did not have knowledge of such instruments.
- **Question 9 - Have you used public assistance to introduce I4.0 solutions in your company?**
  - A staggering 68,33% replied “No” with the remainder replying that they used once or more times that public funding.
- **Question 10 - What is your overall assessment about public assistance to introduce I4.0 solutions in your company?**
  - With almost a tie, most of the answers (38,82%) gave positive or somewhat positive feedback (6 to 10 points), while almost 37% replied “Don’t know/Can’t Say”.
  - The remainder gave a negative feedback.
- **Question 11 - Do you think there are competent and trustful organisations companies that can give you assistance?**
  - 64% of the replies indicated that there are professional consultants that can provide help.

- Only 10% feel that they are appropriately prepared.
- And 15% consider searching for help, but that there isn't any qualified

In general terms, the on-line survey displayed these signs:

- There will be a great reliance in professional consultants, mainly because there is a lack of internal "talent", i.e. qualified manpower.
- Public support initiatives are known, but not utilized, indicating that they should be better suited or target specific areas of I4.0.
- Non-refundable incentives and subsidized loans are considered to be the main desirable support instruments.
- Training and Mentoring incentives are considered important, but at a lower level of interest, indicating a lower level of commitment with retraining of the existing workforce, possibly due to the lower levels of education.

## 5. Public strategies and programmes

While in the Overview chapter of this report, the focus was in the broad situation of the Portuguese economy while targeting the necessary digital skills to implement a strategy to increase the interest in the I.4.0 Economy, this chapter intends to focus on the measures taken or to be implemented.

THE DESI Report from 2018, states as a landmark in changing perspectives the launch of the INCoDe.2030 (<http://www.incode2030.gov.pt/>) program, (April 2017), *a new national digital competences initiative with the aim of enhancing digital literacy and promote employability and professional training as well as R&D (including participation in international networks) in all areas associated with the digital transformation, which in effect means the ability to access digital media and ICTs, to understand and critically evaluate content as well as to communicate effectively), as well as the production of new knowledge through research activities, always taking in account the processing communication and interaction, and the development and production of digital content.*<sup>3</sup>

*There is great importance given to the Digital Competencies, a sector where Portugal is lacking sufficient development, which in turn is linked is also linked to the use of digital technologies for the design of new solutions to problems with different natures, the integration of interdisciplinary knowledge and data analysis, the intensive use of artificial intelligence, the use of advanced instrumentation and communication networks and mobile systems, and the development of cyber-physical systems as well as their programming.*

*This involves also developing hardware and software while extending the concept of IC technologies to electronics, automation and robotics.”*<sup>4</sup>

Taking in account the great disparities shown in the last chapter, where in terms of ranking and preparedness Portugal is overextended, while creating sufficient critical mass to overcome these difficulties, the chance to develop competences, while

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<sup>3</sup> <http://www.incode2030.gov.pt/iniciativa> - Translated and adapted

<sup>4</sup> <http://www.incode2030.gov.pt/iniciativa> - Translated and adapted

adapted to the immediate needs, but also anticipating future devolvement's, has one bigger role in creating a more digitally inclusive society.

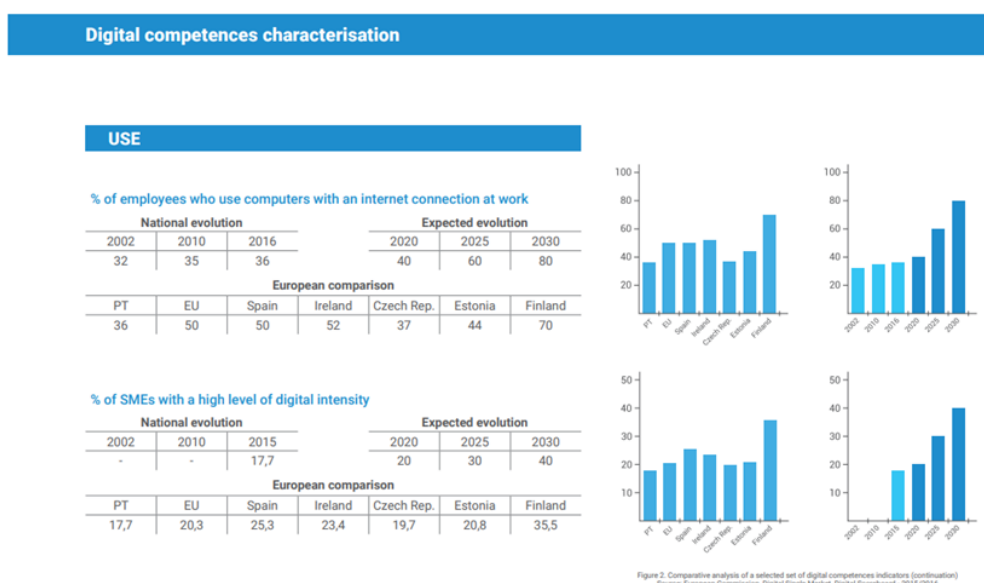
*The fact is that INCoDe.2030 acts as part of a coalition in the context of the Digital Skills and Jobs Coalition with flagship projects focusing in five main action lines:*

- *Inclusion,*
- *Education,*
- *Qualification,*
- *Specialisation,*
- *Research)*

*“These include, among others, the setting-up of internet access points, an interactive platform to gather and disseminate examples of promising measures to fight digital exclusion, and a range of training measures to promote ‘digital citizenship’ (cidadania digital) by using online public services as well as tools such as Qualifica+, which seeks to address skills deficits among social groups at high risk of social exclusion.” (Source DISE 2018)*

But how does this correlate to Industry 4.0 initiative?

The following graphic was extracted from the InCoDe presentation, from one of the 5 chapters of the initiative, namely directed to the Digital competences characterisation. Taking that data into account, Portugal is lagging and lacking in terms of use and Technological Know-how, which in turn shows the need to make an effort to catch-up and exceed the EU Average, at least.



Also, a permanent **Forum for Digital Competences** has also been nominated as the governance body in charge of monitoring and evaluating INCoDe.2030 initiatives, with the purpose of promoting and articulating a group of social actors and ensure widespread mobilisation for the initiative.

Also referred in the DESI Report of 2018 there is the indication that something should be done to rebound the statistics.

In line with need the Portuguese government presented the “Indústria 4.0” (Industry 4.0) Initiative which was publicly presented in January do 2017, aiming not only to increase the number of companies using e-commerce by 55 % by 2020 (baseline 2011) but also to increase to increase SME participation in the digital economy.

The need to identify the best practices for the industrial sector in terms of its digital and oriented (public and private) transformations, the awareness adoption and massification of new technologies is the principal motive for this national strategy for the digitisation of the economy, which encompasses 64 measures involving both public and private sector players focusing strongly the development of the national

The “Indústria 4.0” report by COTEC Portugal - Associação Empresarial para a Inovação, (Entrepreneurial Association for Innovation) and Deloitte reflects a set of measures, which result from a great deal of effort spent in interviews, workshops and meetings with the main stakeholders of different sectors of the Portuguese economy from all of this resulted a set of needs and recommendations for the definition of a strategy to adopt the short and medium term to implement an I 4.0 strategy, focused in 6 areas:

1. Human Resources Training;
2. Technological cooperation;
3. StartUp i4.0;
4. Financing and investment support;
5. Internationalization;
6. Legal and regulatory adaptation;

A 7<sup>th</sup> measure is an action by itself. The creation of a 4.0 Platform intended to be used as an articulation, dissemination, mobilization and advisory to all involved parties in order to promote cooperation, coherence and synergies between involved parties, operating as tool to monitor the results, storage and sharing.

The measures presented by the COTEC/Deloitte Study were the result of broad contributions from the different public and private entities (numbering more than 120) identifying the best way to implement Industry 4.0 concepts, providing the best method to provide a technical basis for defining the scope of a national strategy for the digitization of the economy.

The main fact is, and considered as such by the Portuguese Government, that Industry 4.0 can be the driving force to develop national competitiveness, and the measures indicated in that report, of which only some will be indicated, are the Building blocks of this the strategy.

The COTEC report also considers the Industry 4.0 concept, in line with a growing international tendency, as an industrial revolution, in the sense that it represents the integration of production methods and the latest developments in information and communication technology.

This “new” evolution is based on the tendency and need of digitization present in our society, and the development of Human-Machine interfaces both intelligent and interconnected that will enable that people, machines, logistical systems, and production systems to coordinate and cooperate till the final product.

Based on the DESI report of 2018, its indicated that these measures are expected to mobilise EUR 4.5 billion, including EUR 2.26 billion from the European structural and investment funds over a 4-year period.

It is also stated that half of Portuguese companies will initiate some sort of Digital Transformation until 2020, and that 67% of CEOs will center their strategies on that new dynamic, with the purpose of building an intelligent and connected industry.

The COTEC Study also supports itself in the DESI Report, but the one from 2016. While comparing the two, it becomes obvious that our position has been degrading itself (going from 15<sup>th</sup> in 2016 to 16<sup>th</sup> in 2017) and that urgent measures are needed.

Other Studies (UBS1 and The Deloitte Manufacturing Global Competitiveness of 2016) also show that Portugal is in a less than favourable position in the group of analysed economies, mostly in the bottom half of the ranks.

The Portuguese Ministry of Economy defined three essential goals, to invert this path:

- To accelerate the adoption of technologies and concepts of Industry 4.0 into the Portuguese business fabric;
- To promote Portuguese technological companies at an international level;
- To make Portugal an attractive location for investment in the industry 4.0 context.

With these goals in mind, the Government, within the COTEC I 4.0 initiative identified the needs of the industry via interviews with the involved enterprises, the study of other EU initiatives and stakeholders meetings, to create a set of proposals and possible solutions to attain the aforementioned goals.

Accounting for dozens of initiatives, which by themselves would merit a study on their definition and effectiveness, we've selected a few items that may be considered as more representative, identifying them by area:

1. Human Resources Training;
  - a. Digital literacy and competences;
  - b. Technical I 4.0 Courses;
2. Technological cooperation;
  - a. Adira Industry 4.0 (an integrated fabrication lab for additive manufacturing);
3. StartUp i4.0;
  - a. Promotion of Innovation strategies;
4. Financing and investment support;



- a. Specific Call directed at Industry 4.0, namely, I4.0 Vouchers, Innovation and qualifications Call, ID&T Programs;
- b. Credit Line for I 4.0 Exporters;
- 5. Internationalization;
  - a. Promoting the participation in Tech Fairs through organized presence (government).
  - b. Enterprising presence in foreign markets,
- 6. Legal and regulatory adaptation;
  - a. Participation in standardizations efforts around I 4.0 efforts.

Not as a result of the aforementioned measures, but of the continued effort made to improve our Industry, we must highlight the **“PME Digital” program**, co-financed by the COMPETE2020 program which aims to train, provide information and increase business skills of SMEs for digital transformation, fostering the acceleration of the Portuguese Economy for a Digital Economy in the Automotive, Materials, Raw Materials and Commerce.

## 6. Non-governmental strategies and programmes

In this chapter we would like to highlight two particular initiatives, and although they're directed to two different target groups (General population and ICT technologies Companies), they contribute to the effort of the societal digitisation.

Identified in the DISE report of 2018, the **MUDA movement (Movimento pela Utilização Digital Ativa)** can be translated as “Change” - Active Digital Utilization Movement. (<https://www.muda.pt/>). This Movement has a large participation of private enterprises, universities, associations and, also, the Portuguese Government.

And change is what is intended.

The main purpose of this Movement is to help and divulge all the possibilities a digital society has, and show how citizens can improve their real lives using the spectrum of possibilities present in the Public Administration, but also in the private sector, and civil society. This movement also aims to help reduce the number of people who have never used the internet while promoting the acquisition of digital competences, which according to most indexes are lacking.

We face two types of challenges here: On one side we must improve the digital knowledge and skills among more vulnerable groups (like the elderly, immigrants or low income groups where Digital technologies are not a priority).

On the other we need to educate and instil the importance of digital skills to reap the benefits of digitisation either in society as a whole, and in the enterprises.

Another relevant project is TICE.pt - Information Technology, Communication and Electronics which was set up in 2008, with its headquarters in Aveiro.

This project involves and mobilizes relevant actors throughout the country, particularly in the regions of Braga, Porto, Coimbra and Lisbon, covering the entire value chain in the TICE area.

The TICE.PT coordination platform guarantees and promotes the interfaces between the academic world, represented by universities and R & D institutes, and the business world, represented by members and also through networks, especially SMEs, represented by their associations.

## 7. Stakeholders

The **Management Authority - Compete 2020** participation in the INNO Provement project supports itself in the articulation with a group of stakeholders, most of them regular contributors to the management of EU Funds, mainly defining calls, the objectives and evaluation sets. This group is the **Incentive Systems Network** which encompasses, all the regional managing authorities (North, Centro, Lisboa, Alentejo, Algarve, and COMPETE2020), the Intermediate Organisms (AICEP, ANI, IAPMEI and TP), the Agência de Desenvolvimento e Coesão (Development and Cohesion Agency) and when applicable Secretaries of State directly connected to planning.

In this project, except for the AD&C and the Secretaries of State, all others participate in this project, namely:

### A. Public Bodies:

**MA Regional OP Norte, MA Regional OP Centro, MA Regional OP Lisboa, MA Regional OP Alentejo and MA Regional OP Algarve.**

These are Regional Management Authorities with the direct responsibility for the definition of priorities, evaluating all the needs and providing contributions for organizing multi-layered calls, with the purpose of supporting the development of SME all over the Portuguese mainland.

There are also MA for the Autonomous Insular regions (Azores and Madeira), but they are not involved in this project or the **Incentive Systems Network**, mainly due to their specific nature.

### B. Public Concerned/oriented Business Support Organizations

- IAPMEI - Agência para a Competitividade e Inovação I.P. - (Agency for Competitiveness and Innovation - <https://www.iapmei.pt/>) formerly know as “The Institute of Support to Small and Medium Enterprises and Innovation (IAPMEI)” is one of the Intermediate bodies that support and enable the application of European Funds, but also to help determinate which are the best a characteristics for the diverse calls enacted in the past years.

Although they focus mainly in the Innovation and entrepreneurship part of the programs they contribute to the definition of various types of calls, and to the definition of the public strategies.

- **AICEP Portugal Global - Trade & Investment Agency** (<http://www.portugalglobal.pt/EN/Pages/Index.aspx>) is a government agency focused not only in encouraging the investment of foreign companies in Portugal, but also to contribute to the success of Portuguese companies abroad in their internationalization processes or export activities. It is also one of the Intermediate bodies that support and enable the application of European Funds, but also to help determinate which are the best characteristics for the diverse calls enacted in the past years.

Although they focus mainly in the Internationalization part of the programs they contribute to the definition of various types of calls, and to the definition of the public strategies.

- **ANI - National Innovation Agency** (<https://ani.pt/en/>) has the mission to promote knowledge transfer through greater and better collaboration and cooperation between enterprises and the research & knowledge production institutions, assuming the role of “THE INNOVATION HUB” that emphasises in the growing alignment of R&D, Innovation and technology-based entrepreneurship policies in the areas of science and economy.

This agency is another of the Intermediate bodies that supports and enables the application of European Funds, but also to help determinate which are the best characteristics for the diverse calls enacted in the past years, mostly those regarding promoting innovation through research funding.

- **TP - Tourism of Portugal** (<http://www.turismodeportugal.pt>) is the national Tourism Authority, with responsibility for promoting and the valorisation and sustainability of tourism in a broad spectrum of activities. The TP encompasses the competences needed to regulate all the industries linked to tourism, from supply to demand.

Although TP focus mainly on Tourism oriented projects they also contribute to the definition of various types of calls, and to the definition of the public strategies.

### C. Other Stakeholders (Non-Government Business Support Organizations and SME's)

- **Strategic Committee of the Industry 4.0 Platform Initiative** (private companies and public and private agencies, industry associations, MA Compete 2020).

This committee has the mission of advising on how to consolidate and integrate I 4.0 concepts defined in the platform activities and present them to policy makers and other stakeholders in order to contribute for an organized plan of action.

- **APPICAPS - Portuguese Footwear, Components, Leather Goods Manufacturers' Association** is a national association based in Porto. Founded in 1975 it represents companies in a diverse set of sectors namely - Footwear and Footwear components, Leather goods industry (bags, wallets, gloves, belts, etc.), and manufacturing equipment. Companies with related activities to the above mentioned are also members of the association.

This association is one of many that collaborate in the development of joint projects EU Funded directed support and develop qualifications and internationalization projects. (<https://www.apiccaps.pt/apiccaps/about-us/123.html>)

- **CEFAMOL - National Association of the Mould Industry** was founded in 1969, and is a non-profit and public utility.

Its mission is to represent its members, consolidating its identity and its intervention space through action that allows unifying and synthesizing interests of the Portuguese mould industry, while being considered a reference and a space for discussion and reflection for companies in the sector, which in turn allows for the definition and implementation of a

concerted strategy that promotes the recognition of sector (nationally and internationally), its promotion and sustainable development.

(<https://www.cefamol.pt/index.php?id=13>)

- **CEiIA - Center for innovation and Excellence in the Automotive Industry.**

CEiIA was created in 1999 with the goal of supporting the competitiveness of the Portuguese automotive industry. Since then the scope of its activities included, besides the automotive industries, aeronautics, urban mobility, ocean and space industries. The work of CEiIA in sustainable mobility is an international reference and recognized by the United Nations as a Case Study. Also in the aerospace industry, CEiIA is recognized as a highly qualified center for structural engineering (as the collaboration with Embraer and with the Leonardo Finmeccanica group, shows).

(<https://www.ceiia.com/history>)

- **CITEVE - Têxtil Technologies** is a Technological Center, a private non-profit organization, based in Vila Nova de Famalicão and with commercial delegations in Brazil, Tunisia, Argentina, Pakistan, Chile and Mexico. It provides companies in the Textile and Clothing Sector, mainly SMEs (90 %), with a portfolio of services that include laboratory testing, product certification, technical and technological consulting, R & D + innovation, training, and fashion and design.

It's mission is to support the development of the technical and technological capabilities of the textile and clothing industries through the promotion and diffusion of innovation, promotion of quality improvement and instrumental support to the definition of industrial policies for the sector.

([https://www.citeve.pt/sobre\\_nos](https://www.citeve.pt/sobre_nos) )

- **COTEC Portugal** (<http://www.cotecportugal.pt/pt/>) is one of the main business associations for innovation and technological cooperation. COTEC involves multinational companies, large national groups and SMEs in various sectors of activity, representing, in aggregate terms, more than 16% of GDP in value added and 8% of private time.

Not only COTEC is responsible for monitoring the implementation of these measures, but also for updating them when needed, suggesting and aggregating the best practices and recommendations.  
(<https://www.industria4-0.cotec.pt/sobre/>).

- **ISQ - Institute for Welding and Quality, S.A.** is an organization, created in 1965, which provides scientific and technological support and promotes ongoing improvement, innovation and the safety of people and property in Industry and Services, namely construction, aerospace, automotive, oil and gas, civil engineering, and intervening nationally and internationally in the certification process.  
(<https://www.isq.pt/EN/>)



## 8. Addressed policy instrument

The MA Compete 2020 has since its inception been directly involved in support of not only SME's (but mostly) always providing incentive tools/scheme support for growth and introducing new subjects for development, economic and management improvement and internationalizations of these enterprises. The program is mainly directed to support Medium SME's, but Micro and Small enterprises are also supported via the collaboration of the Regional Programs.

The program enforces, in this framework, the objectives defined in the **Priority Axis 2: "Reinforcement of SME competitiveness and context costs reduction"** **Thematic Objective 3: "Reinforcement of SME competitiveness"**, **Investment Priority 3.3: "SME innovation and qualification"**, through the ERDF.

**Schemes:** Grants with the objective of strengthening SME's competitiveness through the support of technological (product and process), organisational and marketing innovation projects.

**Main characteristics:** support to projects aiming technological, organisational and marketing innovation, applying new methods and processes, as well as raising flexibility and competitiveness in the global market; specifically regarding I4.0, the mentioned schemes intend to promote cooperation between higher education institutions, companies and other entities of the national innovation system, aiming at the valorisation and transfer of technology, the qualification of human resources and the development of new areas of competence (such as I4.0), where digital transformation will enable disruptive changes in business models, products, and production processes, aiming to respond to the challenges posed by the rapid technological evolution, flexibility and integration of SMEs in international value chains.

With the INNOPROVEMENT project, the MA of COMPETE 2020 intends to improve the calls for proposals for the mentioned schemes, with the overall objective of targeting innovation activities which are based on or can be adapted to the requirements set by Industry 4.0.

These schemes could be better focused to support:

- product innovation (through connected or intelligent products/services, from faster product development (less time-to-market), greater customization to customer needs, and support of information flows between the customer and production),
- process innovation (increased productivity and flexibility through the use of autonomous, modular and connected systems, supported in advanced data processing/analysis and predictive algorithms) and
- organizational or marketing innovation (through the adoption of new business models supported in the sharing of knowledge/practices and economic models supported in user communities).

The schemes could also be improved to support I4.0 in other sectors than manufacturing industry.

For example, in the particular case of Tourism, they could be focused to support digitalization, encompassing services integrated with emotional intelligence, virtual reality and augmented reality (in communication and marketing), development of engagement applications with tourists and IoT.

The improvement of the policy instrument can be assessed if the supported projects have a greater focus on the priorities of I4.0.

Our final goal is to have 30% or more of the SMEs benefiting from these instruments, with projects aiming at implementing Industry 4.0 concepts.

At the moment there is only one specific scheme for I.4.0, namely, the vouchers for very small business to start Industry 4.0 theme. We've had a Call in 2017 (already closed), and have another open at the moment.

In the other available schemes it was defined that they must have I.4.0 in the priorities of the calls. This means that the SMEs can have higher grant rates and better selection conditions, if they include relevant investments in Industry 4.0.

## 9. Conclusions

The main conclusion of this Regional Assessment is an obvious one: There is, still, a long road ahead.

While Portugal compares favourably in large set of metrics like infrastructures and digital culture, the fact is it ill prepared to embrace the Industry 4.0 notions and implement them, and by all assessments is a middle tier country in terms of digitisation and digitalization of its society and economic fabric.

The main problem is not that it can't adapt its economy to use Industry 4.0 concepts, using monitoring productivity in real time, or enabling real time verifications of procedures. The problem is what to do with all that information.

And there lies main frailty of Portugal: the lack prepared and qualified manpower, with high tech knowledge and the ability to interpret all the inputs (data) the monitoring I4.0 systems provide.

As stated before, in this assessment, the data present in the “Digital Picture of SME in Portugal” study (2017) shows that most of Portuguese SME's are not prepared for Industry 4.0 with a small fraction (11%) being able to acknowledge the possibilities of the Digital Economy at the highest level.

And although in terms of higher education and R&D, Portugal Ranks 32<sup>nd</sup> in 140 countries in the Global Competitiveness Index 4.0, the with a 1,3% GDP expenditure, the fact is there a great need of qualified manpower, and mainly, the capability to support the higher cost in wages that these qualifications demand.

And so, we must adapt the financing instruments to have a two pronged approach to this problem:

- Support the industry 4.0 concepts and their introduction, adapted to the industries where we're intervening, possibly having incentives for hiring highly prepared and skilled workers;
- Support and develop IT abilities, reinforce the Digital Skills, retrain, where possible, existing workers to adopt and implement the IT concepts needed to implement Industry 4.0.

These steps are not, by themselves, a solution, but only the foundations of the needed work to overcome these difficulties, which by all accounts will be based on the exchange of knowledge with other regions and the context of their best practices, with the more immediate goal of creating the right tools to implement the right concepts.

## ANNEX I - Online Survey and Results

In this Annex, we will show the translated questions (images) of the online survey, the raw data (translated to English) and graphics that support the analysis made in Chapters 2 and 4 of this report.

The original Survey is available on Google Forms, [here](#) with the title (translated) “Industry 4.0: SME’s Support Instruments“

### Annex I.A - Online Survey images

#### Indústria 4.0: Instrumentos de Apoio às PME’s

Este questionário deverá apenas ser respondido por empresas, se a entidade que representa não tiver a classificação de empresa, agradecemos o seu tempo mas não se enquadra no âmbito deste inquérito

\*Obrigatório

Endereço de email \*

1. Classifique a sua empresa quanto ao número de trabalhadores \*

- Entre 5 a 10
- Entre 10 a 50
- Entre 50 a 100
- Entre 100 a 250

2. Classifique a sua empresa quanto ao Volume de Negócios \*

- Até 2 M€
- Entre 2m € a 10 M€
- Entre 10 m € a 50 M€

3. A que sector de Atividade se dedica a empresa que representa? \*

- Indústria Extrativa
- Indústria Transformadora
- Serviços
- Turismo
- Comércio
- Energia e Ambiente
- Transportes
- Construção
- Agricultura, Silvicultura e Pescas
- n.a./n.d

4. Em que localização se situa a empresa? \*

- Norte
- Centro
- Lisboa
- Alentejo
- Algarve

5. Considera importante para as empresas a existência de instrumentos de apoio público à introdução de soluções no âmbito da Indústria 4.0? \*

Indique a sua resposta considerando uma escala de 1 a 10 em que 1 corresponde a Discordo totalmente e 10 a Concordo Totalmente

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

6. Caso considere que os apoios públicos são importantes para apoiar as empresas a introduzir soluções no âmbito da Indústria 4.0 (I4.0), classifique as seguintes opções por ordem de importância? \*

Indique a sua resposta considerando uma escala de 1 a 4 em que 4 corresponde à opção que considera mais relevante

	1	2	3	4
Instrumento de apoio específico para I4.0 com incentivo não reembolsável	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instrumentos de apoio não reembolsáveis em que os custos para soluções I4.0 são elegíveis	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Apoios à Formação, mentoring, coaching no âmbito I4.0	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Acesso a empréstimos em condições favoráveis (bonificados)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Qual ou quais a(s) forma(s) de apoio público às empresas que considera ser(em) mais adequada(s) para a introdução de soluções no âmbito da Indústria 4.0? \*

- Programas de formação gratuitos
- Programas de formação em condições favoráveis
- Apoios financeiros específicos
- Todos os apoios financeiros ao desenvolvimento económico e à inovação que permitam o desenvolvimento da Indústria 4.0 nas empresas
- Outra: \_\_\_\_\_

8. Tem ou teve conhecimento de iniciativas de apoio público à introdução de soluções no âmbito da Indústria 4.0, ainda disponíveis ou que estiveram disponíveis nos últimos dois anos? \*

- Sim
- Não

9. Alguma vez utilizou apoios públicos na sua empresa para a introdução de soluções no âmbito da Indústria 4.0? \*

- Não
- Sim, uma vez.
- Sim, mais do que uma vez

10. Que avaliação faz dos apoios públicos existentes para a introdução de soluções no âmbito da Indústria 4.0 nas empresas? \*

Indique a sua resposta considerando uma escala de 1 a 10 em que 1 corresponde a Insatisfeito e 10 a Muito Satisfeito

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- Não sei\Não conheço

11. Considera existirem organizações / empresas idóneas, capacitadas para ajudar as empresas no âmbito da introdução de soluções no âmbito da Indústria 4.0? \*

Assinale a resposta mais adequada

- Não temos necessidade de apoio externo especializado nesta questão
- É possível encontrar consultores profissionais no mercado que nos podem ajudar
- Consideramos que os atuais programas de apoio público estão capacitados para nos apoiar
- Consideramos recorrer de ajuda especializada, mas não cremos ser possível encontrar organizações competentes e idóneas nesta área.

Enviar-me uma cópia das minhas respostas.

**SUBMITER**

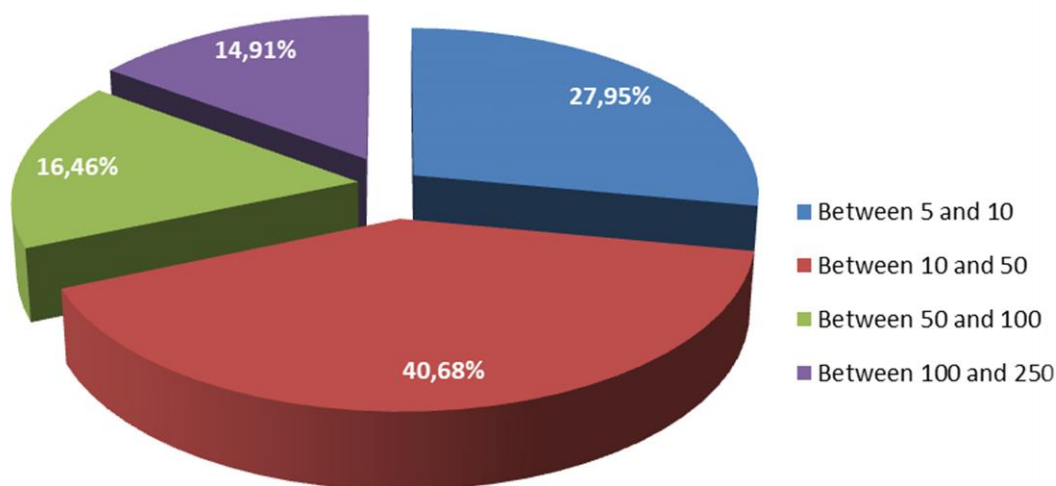
Nunca envie palavras-passe através dos Formulários do Google.



## Annex II.A - Online Survey Results (Raw Data and Graphics)

1. Rate your company in terms of number of employees		
Number of Workers	% of Replies	N.º of Replies
Between 5 and 10	27,95%	90
Between 10 and 50	40,68%	131
Between 50 and 100	16,46%	53
Between 100 and 250	14,91%	48
<b>Total</b>	<b>100%</b>	<b>322</b>

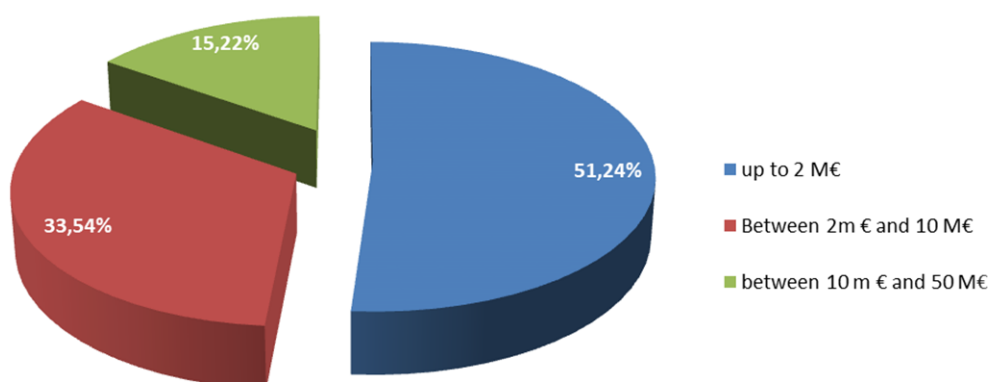
### 1. Rate your company in terms of number of employees



**2. Rate your company in terms of Annual Turnover**

Business Turnover	% of Replies	N.º of Replies
up to 2 M€	51,24%	165
Between 2m € and 10 M€	33,54%	108
between 10 m € and 50 M€	15,22%	49
<b>Total</b>	<b>100%</b>	<b>322</b>

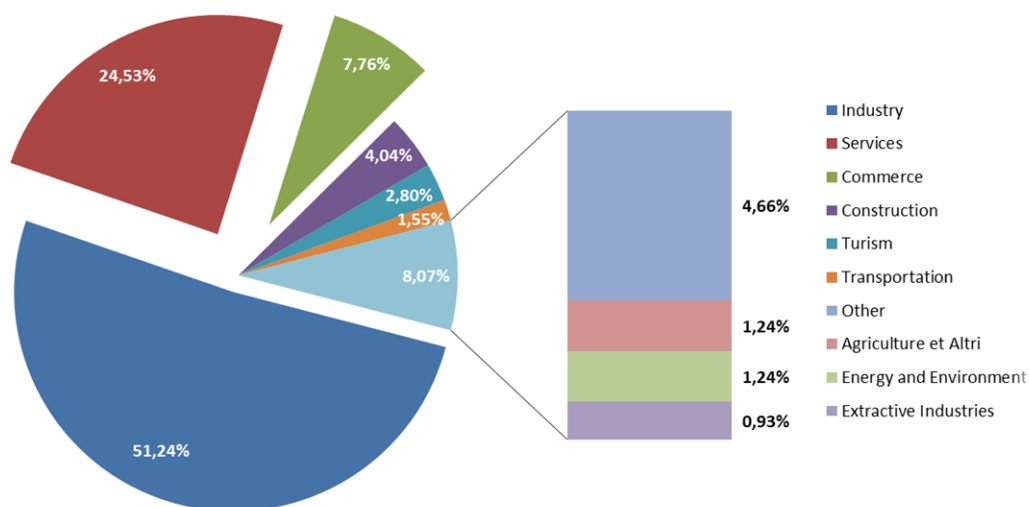
**2. Rate your company in terms of Annual Turnover**



**3. To which sector of activity is the company you represent dedicated to?**

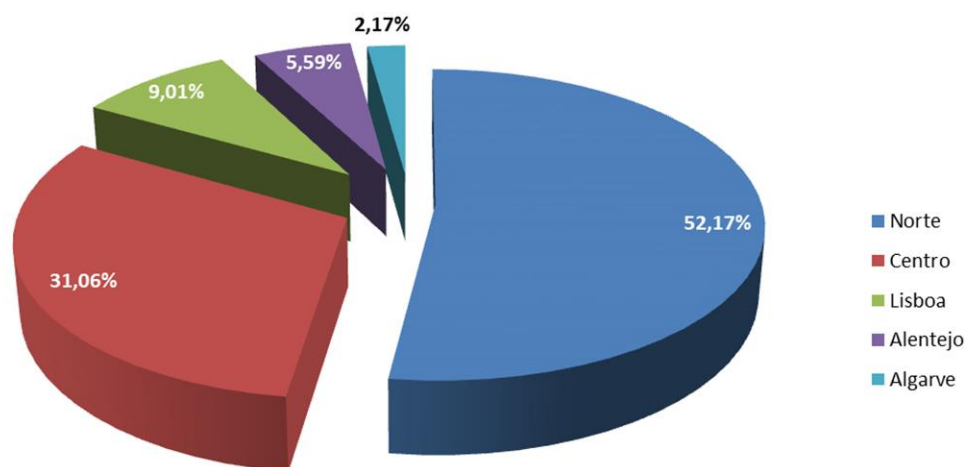
Sectors	% of Replies	N.º of Replies
Industry	51,24%	165
Services	24,53%	79
Commerce	7,76%	25
Construction	4,04%	13
Turism	2,80%	9
Transportation	1,55%	5
Other	4,66%	15
Agriculture et Altri	1,24%	4
Energy and Environment	1,24%	4
Extractive Industries	0,93%	3
<b>Total</b>	<b>100%</b>	<b>322</b>

**3. To which sector of activity is the company you represent, dedicated to?**



4. Where is your company located?		
Regions	% of Replies	N.º of Replies
Norte	52,17%	168
Centro	31,06%	100
Lisboa	9,01%	29
Alentejo	5,59%	18
Algarve	2,17%	7
<b>Total</b>	<b>100%</b>	<b>322</b>

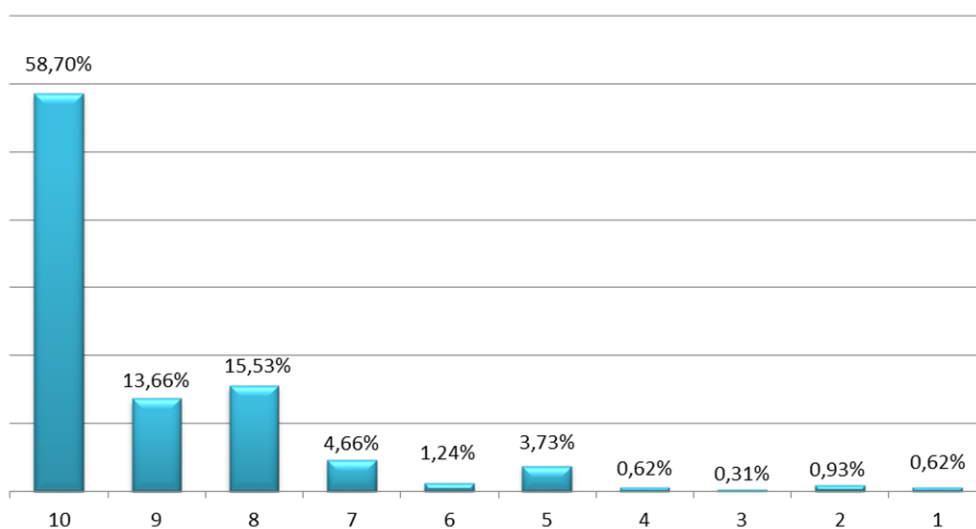
#### 4. Where is your company located?



**5. Do you think public assistance is needed to help companies introduce Industry 4.0 solutions?**

Importance	% of Replies	N.º of Replies
10	58,70%	189
9	13,66%	44
8	15,53%	50
7	4,66%	15
6	1,24%	4
5	3,73%	12
4	0,62%	2
3	0,31%	1
2	0,93%	3
1	0,62%	2
<b>Total</b>	<b>100%</b>	<b>322</b>

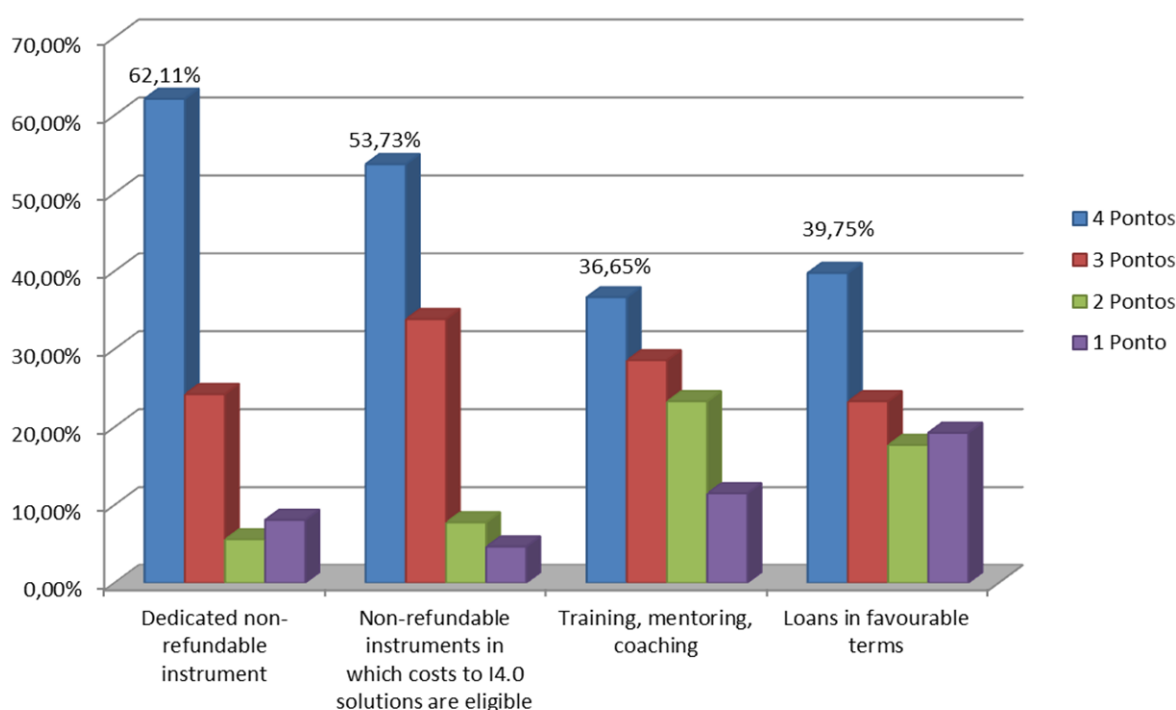
**5. Do you think public assistance is needed to help companies introduce Industry 4.0 solutions?**



6. If you think public assistance is needed to help companies introduce Industry 4.0 solutions, then please rank the below options in order of importance (4 is most important\*)

Importance (4-1)	4 Points		3 points		2 Point		1 Point	
	% of Replies	N.º of Replies	% of Replies	N.º of Replies	% of Replies	N.º of Replies	% of Replies	N.º of R
Dedicated non-refundable instrument	62,11%	200	24,22%	78	5,59%	18	8,07%	26
Non-refundable instruments in which costs to I4.0 solutions are eligible	53,73%	173	33,85%	109	7,76%	25	4,66%	15
Training, mentoring, coaching	36,65%	118	28,57%	92	23,29%	75	11,49%	37
Loans in favourable terms	39,75%	128	23,29%	75	17,70%	57	19,25%	62

**6. If you think public assistance is needed to help companies introduce Industry 4.0 solutions, then please rank the below options in order of importance (4 is most important\*)**

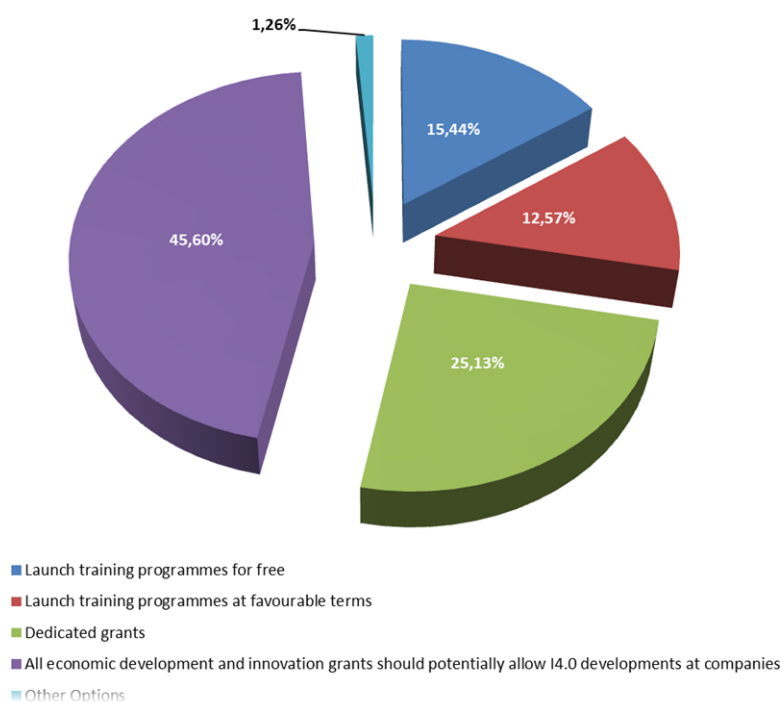


Note: In the Annex 1 Survey proposal of the Inno Provment Joint Methodology (September 2018), this question was proposed with a classification of 1 to 4 points, being that 1 one was the most important. In our survey we inverted this classification, being 4 the most important.

7. How do you think the central/regional government could better assist companies to introduce I4.0 solutions? Please rank the below options in order of importance:

Options	% of Replies	N.º of Replies
Launch training programmes for free	15,44%	86
Launch training programmes at favourable terms	12,57%	70
Dedicated grants	25,13%	140
All economic development and innovation grants should potentially allow I4.0 developments at companies	45,60%	254
Other Options	1,26%	7

7. How do you think the central/regional government could better assist companies to introduce I4.0 solutions? Please rank the below options in order of importance(\*):

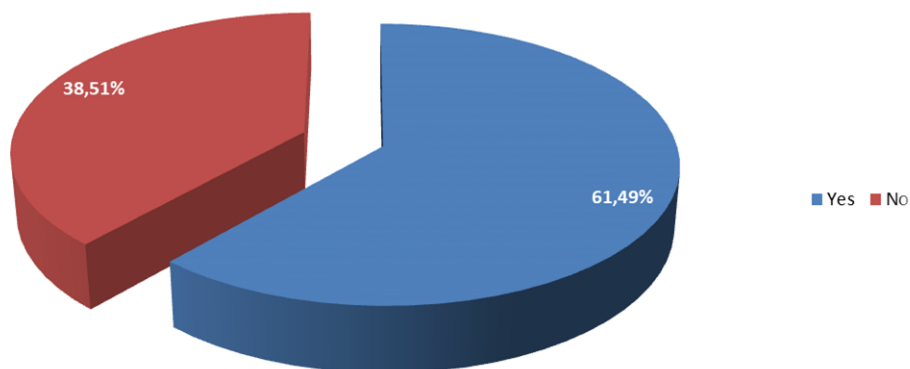


Note: In the Annex 1 Survey proposal of the Inno Provement Joint Methodology (September 2018), question n.º 7 (number 3 in that document) was to be ranked in terms of importance (1 to 4). We opted to change that approach and permit multiple choices, ranking them by the number of selections made.

**8. Do you know about public assistance to introduce I4.0 solutions in your company that was available in the past 2 years and/or is available now?**

Replies	% of Replies	N.º of Replies
Yes	61,49%	198
No	38,51%	124
<b>Total</b>	<b>100%</b>	<b>322</b>

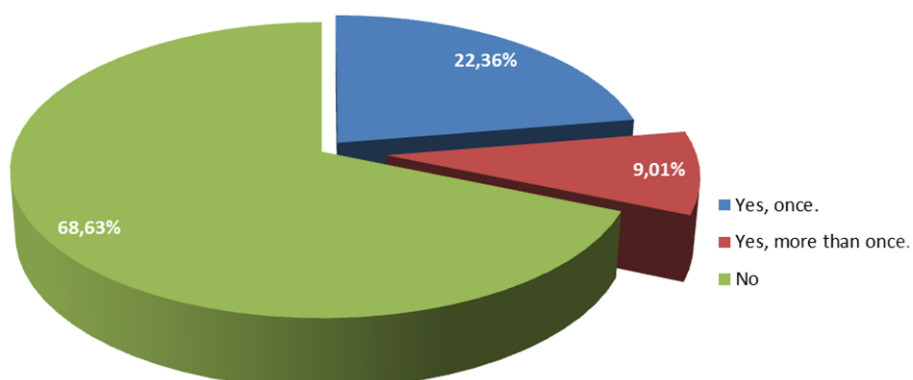
**8. Do you know about public assistance to introduce I4.0 solutions in your company that was available in the past 2 years and/or is available now?**





9. Have you used public assistance to introduce I4.0 solutions in your company?		
Replies	% of Replies	N.º of Replies
Yes, once.	22,36%	72
Yes, more than once.	9,01%	29
No	68,63%	221
<b>Total</b>	<b>100%</b>	<b>322</b>

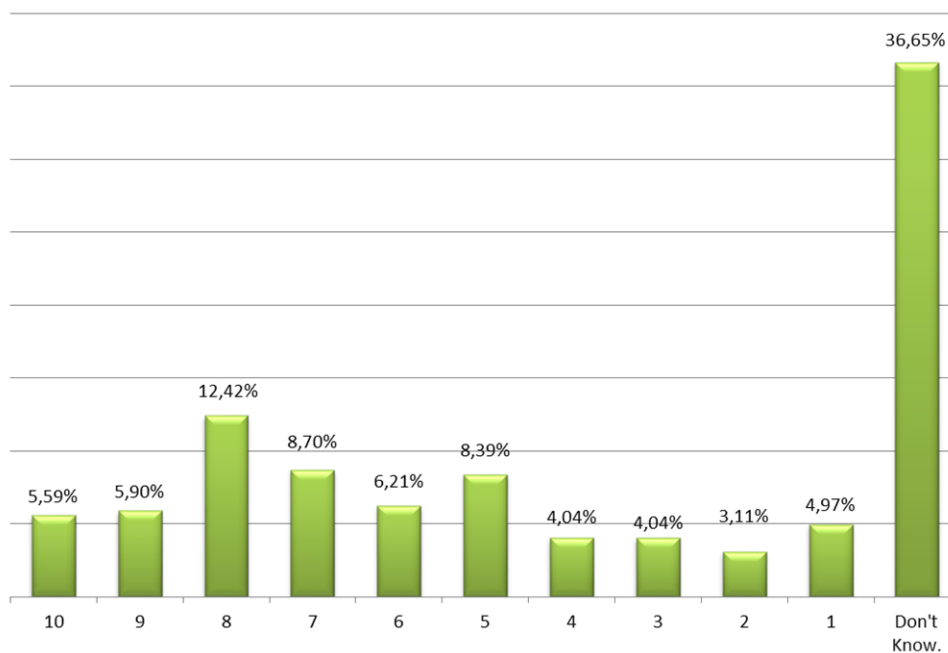
**9. Have you used public assistance to introduce I4.0 solutions in your company?**



**10. What is your overall assessment about public assistance to introduce I4.0 solutions in your company?**

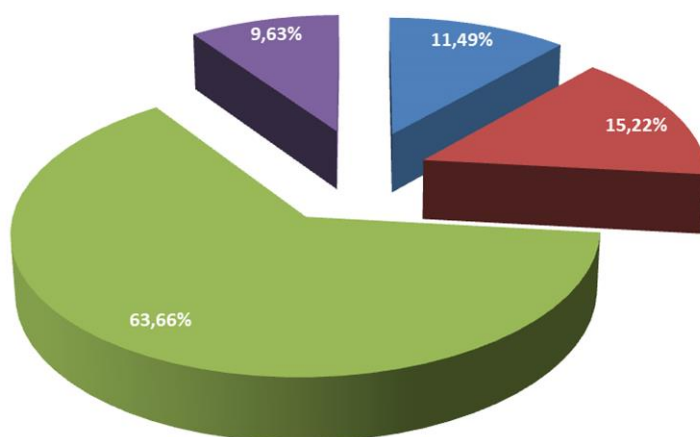
Importance	% of Replies	N.º of Replies
10	5,59%	18
9	5,90%	19
8	12,42%	40
7	8,70%	28
6	6,21%	20
5	8,39%	27
4	4,04%	13
3	4,04%	13
2	3,11%	10
1	4,97%	16
Don't Know.	36,65%	118
<b>Total</b>	<b>100%</b>	<b>322</b>

**10. What is your overall assessment about public assistance to introduce I4.0 solutions in your company?**



11. Do you think there are competent and trustful organisations companies that can give you assistance?		
Importância	% of Replies	N.º of Replies
We think that current public programmes of central/regional government are helpful	11,49%	37
We would need professional assistance on this but we don't think we can find competent and trustful organisations.	15,22%	49
We can find professional consultants on the market that can help us	63,66%	205
We don't need external expertise on this issue	9,63%	31
<b>Total Geral</b>	<b>100%</b>	<b>322</b>

**11. Do you think there are competent and trustful organisations companies that can give you assistance?**



- We think that current public programmes of central/regional government are helpful
- We would need professional assistance on this but we don't think we can find competent and trustful organisations.
- We can find professional consultants on the market that can help us
- We don't need external expertise on this issue

## ANNEX II - Sources:

### Annex II.1 - International Sources:

- **Commission Regulation (EU) No 651/2014 of 17 June 2014**  
<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014R0651>
- **The Global Competitiveness Index 4.0 - 2018 Edition**  
<https://www.weforum.org/reports/the-global-competitiveness-report-2018>
- **Digital Economy and Society Index (DESI) 2018**  
<https://ec.europa.eu/digital-single-market/en/scoreboard/portugal>
- **“Digital Picture of SME in Portugal”, 2017 survey PSE/IAPMEI,**  
<http://www.pse.pt/wp-content/uploads/2017/07/Retrato-Digital-PME-principais-conclusoes.pdf>
- **European Innovation Scoreboard (2018)**  
[https://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards\\_en](https://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_en)  
<https://ec.europa.eu/docsroom/documents/30696/attachments/1/translations/en/renditions/native>
- **Deloitte “Manufacturing Global Competitiveness” of 2016**  
<https://www2.deloitte.com/global/en/pages/manufacturing/articles/global-manufacturing-competitiveness-index.html>
- **Hays Global Skill Index of 2018**  
<http://www.hays-index.com/full-index/>

### Annex II.2 - National (Portuguese) Sources:

- **Anacom - National Authority for Communications (Autoridade Nacional de Comunicações) -Reports**  
<https://www.anacom.pt/render.jsp?contentId=1434129>
- **COTEC - I 4.0 Initiative**

<https://www.industria4-0.cotec.pt/>

- **InCoDe.2030**

[http://www.incode2030.gov.pt/sites/default/files/incode2030\\_en.pdf](http://www.incode2030.gov.pt/sites/default/files/incode2030_en.pdf)

- **Office of Strategy and studies of the Portuguese Ministry of Economy -  
Gabinete de Estratégia e Estudos do Ministério da Economia**

<http://www.gee.gov.pt/>

- **PORDATA – Portuguese private database, sourced in the National Statistics Institute  
database.**

<https://www.pordata.pt/en/Home>