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Foreword

Despite challenging economic conditions over the past decade, Italy remains one of the largest economies in Europe and globally with fundamental strengths in the quality of its workforce and robust private domestic consumption. Italy’s recovery from the Global Financial Crisis of 2008-09 and the European Debt Crisis of 2012-13 has been slow and much work remains to be done to restore Italy’s economic health. However, in 2018, there have been some positive signs with unemployment falling to the lowest level since 2012, real wages beginning to rise, and government spending expected to boost short term growth. Going forward, Italy could seek to strengthen its external economic ties and capture the benefits of globalisation by growing exports and actively seeking to increase the levels of foreign investment in its economy.

The manufacturing sector is a critical part of the Italian economy with a strong global brand and reputation. As in many European countries, small and medium enterprises or SMEs (defined as those with <250 employees), play a central role in the manufacturing sector in Italy, although the high prevalence of micro-enterprises (companies with <10 employees) is fairly unique to Italy. Employment and value-added in the sector has recovered to pre-crisis levels and several recent developments have prompted increased optimism including the introduction of the Piano Nazionale Industria 4.0 or ‘Industria 4.0’ plan. This plan provides incentives and direct funding for companies, and especially SMEs, investing in Research and Development (R&D) and smart machinery.

In this report we have outlined two key themes that have the potential to further strengthen the Italian manufacturing sector going forward:

A. Leveraging the potential of Industry 4.0 to build Italy’s manufacturing capabilities:

Italy’s Piano Industria 4.0 must further build its technical foundation and give companies the confidence to invest in emerging technologies. The strategy needs to reach across the manufacturing sector and especially those industries where Italy is well positioned globally.

B. Enabling the scaling of Manufacturing SMEs through innovation and internationalisation:

As central actors in the Italian manufacturing sector, SMEs and micro-enterprises should develop active strategies to scale their businesses by collaborating on innovation and aligning their internal operations to support international growth and expansion.

Overall, the Italian manufacturing sector is well-positioned to take advantage of the technological transformations taking place globally. To achieve this, it must leverage its educated workforce, strategic geographic position in Europe and reputation for high-quality production and put in place the right enabling factors to secure its position in global value chains.

"Italy’s rich heritage in precision engineering and product design is world-renowned. The fourth industrial revolution is an opportunity to integrate smart solutions that would enhance these capabilities, marking the start of a new design revolution”

Badr Al-Olama
Head of GMIS Organising Committee
Italy is the 8th largest economy in the world and 4th largest in Europe\(^1\) with a population of 60.8 million\(^2\) and a GDP per capita of US$32,670 in 2017\(^3\). Italy faced significant challenges in the aftermath of the 2008 Global Financial Crisis and the 2012-13 Eurozone Debt Crisis with negative GDP growth in 2008 (-1.1%), 2009 (-5.5%), 2012 (-2.8%) and 2013 (-1.7%)\(^4\), however there has been a recovery since then, with Italy’s strongest economic performance in the past decade coming in 2017 with a Real GDP growth of 1.5%\(^5\) and a projected growth of 1.0% in 2018\(^6\). Nevertheless, sustaining this growth momentum remains a challenge, with low investment in infrastructure and productive capital remaining substantial concerns.

**Real GDP growth, 2010-22 (%)**

<table>
<thead>
<tr>
<th>Year</th>
<th>France</th>
<th>UK</th>
<th>Germany</th>
<th>Italy</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>0.2</td>
<td>1.5</td>
<td>0.7</td>
<td>-2.8</td>
</tr>
<tr>
<td>2017</td>
<td>1.8</td>
<td>1.8</td>
<td>2.5</td>
<td>1.5</td>
</tr>
<tr>
<td>2022</td>
<td>1.6</td>
<td>1.6</td>
<td>1.3</td>
<td>0.8</td>
</tr>
</tbody>
</table>

*Source: IMF*

**Slow recovery expected ahead**

- Short-to-medium term growth can expect a slight boost from the fiscal stimulus measures proposed by the newly elected government including tax cuts, reforms to the pension system and a guaranteed income for the unemployed and the least well off. However, these measures are expected to add €10.5 billion to Italy’s debt over the next decade\(^7\)
- Fundamental structural challenges including complexities in the operating environment, high public debt and low productivity are expected to impede longer term growth which is expected to stagnate to between 0.8 and 1.0%\(^8\) by 2022
- Private consumption remains an important driver of real GDP growth, supported by trends such as low oil prices and global macroeconomic expansion as well as domestic conditions such as higher wages and a reduction in unemployment
- However, export growth faces challenges ahead including slowing growth in important export destinations such as Spain and the UK and increasing global competition in some key sectors such as machinery and pharmaceuticals
Key exports from Italy, 2010-16 (%)

Note: Others include vegetable products, precious metals, plastics and rubbers, paper goods etc.  
Source: UN Comtrade

Some growth in exports with significant room for improvement

- Exports of goods and services constituted 31.3% of Italy’s GDP in 2017, increasing from 25.2% in 2010.
- The country is the 10th largest goods exporter globally, especially in the luxury goods segment where the ‘Made in Italy’ tag provides unique value-add in terms of branding and reputation.
- However, the health of the export sector going forward remains a key area of concern for the economy. Slowing growth in key European export markets such as France and the UK are driving these concerns. Competitiveness also remains a concern with unit labour costs outstripping productivity since 2011/12.
- 61% of Italy’s exports are directed towards other European countries, though Asia and North America are also important export destinations with a 19% and 13% share respectively. With China expected to contribute 35.2% to global growth in real GDP from 2017-2019, the United States to contribute 17.9% and India to contribute 8.6%, there is significant room for expansion of Italy’s global trade volumes and destinations.
**Economic and political conditions dampen external investment**

- Investors in Italy typically expect lower returns on investment compared to other OECD countries though many recognise the upside due to the strong fundamentals of the Italian economy such as the specialised workforce, inclusion in the Eurozone and the value of the “Made in Italy” brand.

- Operational challenges, such as high procedural costs and slow administrative processes as well as regulatory barriers to investment are areas of particular concern for foreign investors into Italy who will may potentially divert their investments into other markets.

- However, domestic investments have been expanding supported by government measures such as tax incentives and an increasing willingness of banks to lend. The share of Italian companies planning expansions in 2018 is increasing\(^\text{12}\)

- The Industria 4.0 initiative has been a major factor in pushing companies to expand investment. It has generated significant interested and is prompting increased innovation amongst local companies through the provision of tax incentives and direct funding for investments in smart machinery and other tools that support the digitisation of the
The Evolution of Manufacturing in Italy

Italy is traditionally a manufacturing powerhouse with the second-largest manufacturing output in Europe. However, adverse economic and political conditions as well as the sector’s slow response to technological change have resulted in a challenging decade for the sector, with Manufacturing Value Added (MVA) contracting by a CAGR of -1.3% between 2010-2017\textsuperscript{13}. Most of these losses were made in the years 2012-2013, during the height of the downturn in Europe which significantly affected Italy due to its fiscal situation. The political and economic uncertainty in the aftermath of the crisis has dampened the investment climate and has led to a deterioration of gross capital formation in the country, which impacted the manufacturing sector particularly acutely. However, recent trends have been more positive with manufacturer confidence reaching record highs in 2017. Optimism about the Industria 4.0 Advanced Manufacturing plan is expected to propel growth in investments in machinery and equipment to 3.4% in 2018\textsuperscript{14}.

**Figure 1: Italian manufacturing is expected to recover its output**
Manufacturing Value Added, 2010-22 (US$ billion)

![Graph showing the recovery of manufacturing output](image)

**Source:** BMI

**Figure 2: Italy’s manufacturing’s share of Gross Value Added (GVA) has grown since 2010**
Contribution of Manufacturing to GVA (%)

![Graph showing the growth in manufacturing’s share of GVA](image)

**Source:** OECD

Note: Other refers to other segments in the industrial sector such as mining and construction. Total GVA is at basic prices (constant 2010 US$)
Manufacturing has retained its role as an important contributor to GVA and is one of the expected drivers of growth in the economy through initiatives such as Industria 4.0. The contribution of manufacturing to GVA increased from 15.8% in 2010 to 16.6% in 2017\textsuperscript{15}. The manufacturing sector is highly concentrated in the Northern and Central parts of the country with the benefits to the local economy and employment largely accruing in these areas. SMEs are central to the growth of the manufacturing sector and contributed 60% of turnover and represented 76.5% of jobs in the sector in 2015\textsuperscript{16}. Micro-enterprises (with under 10 employees) are also a feature particularly unique to Italy where they contributed to 9% of turnover of the manufacturing sector in 2015\textsuperscript{17}.

Figure 3: The manufacturing sector remains an important source of employment

The number of workers employed in manufacturing have recovered to their pre-crisis levels after 100,000 jobs in manufacturing were lost annually in 2011 and 2012\textsuperscript{18}. Manufacturing contributed to 15.4% of jobs in Italy in 2016, declining slightly from 15.7% in 2010\textsuperscript{19}, although it remains a meaningful contributor to overall employment. The decrease in employment in the sector, despite the increase in output suggests that automation is playing an increasingly important role in the industry. There is still significant slack in the labour market, as the unemployment rate was 11.2% and the youth unemployment rate 34.8% in 2017\textsuperscript{20}, resulting with Italy having the 3\textsuperscript{rd} highest unemployment rate in the EU behind Greece and Spain. These unemployed workers could be used to support the expansion of manufacturing sector but will need to be equipped with the right skills in order to do so. According to a 2018 study on the impact of industrial robots in six EU member countries including Italy, one additional robot per thousand workers reduces the employment rate by 0.16-0.20%\textsuperscript{21}. A PwC estimate found that 4% of jobs in the Italian manufacturing sector could be automated by the early 2020s, 26% by the late 2020s and 55% by the mid-2030s. These proportions are even higher for those without a high school or college degree.
The machinery and equipment industry in Italy plays a crucial role in supporting other manufacturing sub-sectors both domestically and globally. As a result, the machinery industry has a high degree of export orientation. In terms of exports, the largest categories are taps and valves, washing and bottling machines, pumps and turbines, heating machinery and transmissions. Italian products in this sector are considered to be of superior quality, especially direct end-consumer products, and command a premium price in the market. The turnover of the industry grew with a CAGR of 2.35% between 2010 and 2015 and exports grew with a CAGR of 0.45% between 2010 and 2016, suggesting that domestic consumption has been the main driver of growth since 2010. The sector is highly fragmented with SMEs dominating the production of machinery and equipment, especially in the supply chains of larger companies in areas such as food production equipment, packing equipment, construction equipment and metallurgical machinery.

Note: €1=US$1.1
Source: Italian National Institute of Statistics

The automotive sector is one of the fastest-growing within Italian manufacturing with turnover from the manufacture of motor vehicles growing at a CAGR of 5.2% between 2010-2015. Exports of cars grew with a CAGR of 9.4% between 2010-2016 and exports of car parts grew with a CAGR of 1.1% in the same time period. The high degree of export orientation in the automotive industry exposes it to some trade risks. ANFIA (Italian Association of the Automotive Industry) is the main trade association for the automotive industry which offers services to strengthen the competitiveness for the three industry segments: components, car coachbuilders and designers, and motor vehicles. Key companies include Alfa Romeo, Ferrari, Fiat and Maserati.
Pharmaceuticals

Figure 6: Italy Turnover from Manufacture of Pharmaceuticals, 2010-2015
(US$ billion)

The Italian pharmaceutical sector has significant competitive advantages, ranking second in Europe for pharmaceuticals production. Going forward, Italy is expected to overtake Germany to become the largest manufacturer in Europe within the next 5 years. Turnover from the manufacturing of pharmaceuticals contracted between 2010 and 2015 by a CAGR of -0.79%, however exports grew with a CAGR of 4.4% between 2010-2016. The industry has 130,000 employees in Italy and pays €6.1 billion in salaries annually with the workforce growing at an average of 1% annually. Key companies in the sector include Menarini, Chiese, Bracco and Recordati.

Source: Italian National Institute of Statistics

Textiles

Figure 7: Italy Turnover from Manufacture of Textiles, 2010-2015
(US$ billion)

The Italian textile production industry is one of the most advanced in the world with a high level of specialisation across all parts of the value chain. The turnover of the industry contracted with a CAGR of -1.47% between 2010-2015 due to increasing international competition and the rise of fast fashion however exports grew slightly with a CAGR of 0.35% between 2010 and 2016. The sector has faced significant competition and a number of player have exited. However, as a result the remaining players have consolidated and have a higher degree of export-orientation with exports accounting for 45% of turnover in the sector in 2017.

Source: Italian National Institute of Statistics
Italy’s Approach to Sustainability in Manufacturing

Italy developed the National Sustainable Development Strategy (NSDS) 2017/2030 in response to the global challenges set forth by the UN Sustainable Development Goals (SDGs). The NSDS is Italy’s strategic framework for achieving the targets set out in the UN SDGs; it is a holistic strategy focusing beyond an income-oriented approach, addressing issues such as inequality, poverty, unemployment, and climate change and promoting topics such as environmentally sustainable economic growth and innovation.

The NSDS is likely to have profound implications for the future of the Italian manufacturing sector and how Italy approaches the challenges ahead.

There are five main areas of interest in the National Sustainable Development Strategy: People, Planet, Prosperity, Peace, and Partnership.

Each area has a number of associated Strategic Choices within which there are multiple National Strategic Goals. These National Strategic Goals then tie back to 1 of the 17 UN Sustainable Development Goals. Under the ‘prosperity’ area, there are particular subjects that will deeply impact the outcomes in the manufacturing and industrial sector. One such National Strategic Choice is to ‘financially support and promote research and innovation in sustainability’ which has three associated strategic goals:

1) Increase investment in research and development
2) Implement the digital agenda and enhance the diffusion of smart grids
3) Innovate processes and products and promote technological transfer

National Strategic Choice III to ‘Promote sustainable production and consumption patterns’ tie back closely to UN SDG 12 (Responsible Consumption and Production) and includes goals such as “Dematerialise the economy, improving the efficient use of resources and the circular economy” and “Promote social and environmental responsibility in companies and institutions”. In addition, the NSDS also seeks to promote innovation through financial instruments by increasing access to credit by SMEs in partner countries and by increasing cooperation between the private and public sectors and the not-for-profit sector in areas such as entrepreneurship.

Another area where Italian organisations are taking the lead is the ‘Efficient and Sustainable Manufacturing’ efforts within the European Commission’s Smart Specialisation Platform. The industrial region of Lombardy in Northern Italy is a leading area for this project. The objective for the ‘Efficient and Smart Manufacturing’ effort is to “provide industry with innovative solutions from research and exploiting the potential of smart specialisation to promote new efficient supply chains with added high value”. The pilots conducted in Lombardy in the areas of De-Manufacturing and remanufacturing, Smart and adaptive manufacturing as well as Digital and virtual factory have the potential to be scaled and could offer a ‘one-stop-shop’ solution to European companies to drive uptake of new business models.

These initiatives by the Italian government and the broader international effort to achieve these goals will likely spur action by Italian manufacturing companies across the board and lead them to adopt a holistic view of sustainability and their role in supporting Italy to achieve these goals.

Source: European Commission, National Sustainable Development Strategy 2017/2030

Key supporting initiatives

**Industria 4.0 plan:** National program that provides support to companies that invest in smart manufacturing technologies and R&D

**National Operative Program for Entreprises and Competitiveness:** European Regional Development Fund Program to achieve investment and jobs growth in the less developed regions of Italy through (1) strengthening research, technological development and innovation, (2) enhancing access to, use and quality of ICT, (3) enhancing competitiveness of SMEs, and (4) supporting shift towards a low carbon economy.

**National Operative Program for Research and Competitiveness:** provides financial assistance for research and innovation of the entrepreneurial fabric in the “convergence” regions of Italy (Calabria, Campania, Puglia and Sicily)

**Strategy for Digital Growth:** A strategy for Italy’s digital sector focusing on building digital infrastructure, sector transformation plans and investments in skill building that will allow digital technology to become a lever to drive economic and social transformation.
In order for Italy to prosper, the manufacturing sector must expand its contribution to the economy and create well-paid jobs that can support an expansion in employment, particularly amongst youth. Technological change and increased global competition are changing the demands on the Italian manufacturing sector. Italian companies will have to work to restore their competitiveness in order to achieve these goals.

**Figure 8: Italian manufacturing is expected to continue its recovery**

Key milestones for Italian manufacturing in its development:

### 1960s-2000s
- **Creation of the EU**: Italy was a founder member of the European Economic Community in 1957 and signed the treaty of Maastricht in 1992 which established the European Union. This led to the introduction of Euro in 1999.
- **The goal of the EU** being to enhance the economic, social, and political cohesion among member nations.
- **From 1999 to the peak in 2007**, Italian exports almost doubled (current price) increasing the share of exports to GDP to 27% in 2007.

### 2008-09
- **Global recession**: Italy’s GDP fell over 8% from 2008 to 2009, largely due to falling industrial activities (Manufacturing GVA declined 18% from 2008-09). The recession in Italy’s trading partners also led to a decline in exports.
- **The recession**, coupled with structural problems, including low productivity, loss of competitiveness, and a deterioration in public finance led to a deep and prolonged crisis.

### 2012-13
- **EU Economic Crisis**: slow growth and Greece’s debt crisis expanded into an EU-wide crisis. Italy’s GDP fell over 9% between 2011 and 2012.
- **The crisis still has an ongoing effect**: Italian public debt increased from 117% in 2011 to over 130% in 2017, making Italy the country in the EU with the highest government debt after Greece.

### 2016
- **Industria 4.0 plan** was launched by The Italian Ministry of Economic Development to support industrial change by promoting investment in innovation, technology, and skill development for 2017-2020 and beyond.
- As a result, Italy’s tax scheme is one of the most attractive in the world, according to the PwC Digital Tax Index 2017, ranking 2nd globally. Alongside this, several supportive measures have been put in place to boost investment and output in manufacturing in the long run.

#### A. Leveraging the potential of Industry 4.0 to build Italy’s manufacturing capabilities:
- Italy’s Piano Industria 4.0 must build its technical foundation to give companies the confidence to invest in Industry 4.0 and bring along companies from all across the manufacturing sector especially those industries where Italy has global strengths on the Industry 4.0 transformation.

#### B. Enable the scaling of Manufacturing SMEs through innovation and internationalization:
- As central actors in the Italian manufacturing sector, SMEs and micro-enterprises should develop active strategies to scale their businesses by collaborating on innovation activities and aligning their internal operations and strategy to support internationalisation.
Industry 4.0 offers a potential source of differentiation and competitive advantage for Italy’s manufacturing sector. It has the ability to stem the tide of offshoring that has caused deindustrialisation in Europe and other developed countries. Italy’s Industry 4.0 national plan - the “Piano Nazionale Industria 4.0” or “Industria 4.0” was launched in February 2017. It aims to encourage investment in and adoption of Industry 4.0 technologies by Italian companies. The plan’s primary tools are tax and financial incentives and funding to encourage investment in physical and human capital.

There are four key components to the Industria 4.0 Plan:

1. Financial Incentives – tax incentives and access to finance
2. Digital Innovation Hubs - regional technology hubs which serve as a contact points between companies, investors and research institutions
3. Competence Centers - technical labs which serve as a venue for training, demonstrations, sharing of best practices as well as providing technical advisory services and technology transfer for SMEs
4. Training - Modernisation of education across secondary, tertiary and vocational training through educational programmes such as Scuola Digitale (a programme to modernise and digitise the Italian school system), Alternanza Scuola Lavorno (a practical experience and training program for high school students), vocational training through the Instituti Tecnici Superiori as well as increased funding of Industrial PhDs

**Focus Area A1**

**Build the technical foundation of “Industria 4.0” plan**

The Industria 4.0 plan will allow Italy to be considered an active participant in preparing the economy and the population for the changes brought on by Industry 4.0. The strength of the plan is that it is a series of well-designed financial incentives to prompt investment in the physical and human capital that is required to increase the productive capacity of the manufacturing sector. This approach has significant merits in tackling the main stumbling block of the implementation of Industry 4.0, which is financing. 75% of 178 Italian manufacturing and engineering companies surveyed in 2016 stated that Industria 4.0 is “too expensive and not affordable by everyone”. Italy has the second largest share, among EU member countries, of SMEs reporting that access to financing has been their dominant concern. According to a 2018 survey, Italian SMEs reported significant barriers to obtaining a loan including being discouraged to apply, the high cost of loans and high likelihood of rejection. Obtaining financing during the post-crisis era has been increasingly challenging for Italian SMEs. In the past small businesses used to rely on relationship-based borrowing and most banks would rely on collateral, typically real estate, until the 2012-13 recession during which the value of assets plummeted, bankrupting thousands of firms and increasing the Non-Performing Loan ratios of most banks. This resulted in a credit crunch which lasted until 2014 and have made banks’ requirement on lending stricter.
Italy ranks 25th out of the 28 countries on the Digital Economy and Society Index (DESI). DESI measures the progress made on digitisation by the 28 Digital Single Market Member States on five measures including connectivity, human capital, use of internet services, integration of digital technology, and digital public services. The main reason to Italy’s mediocre performance among the 28 countries is the low level of digital skills. For instance, in 2018, the percentage of internet users in Italy is 69% compared to 81% in EU. Moreover, the number of STEM graduates per 1,000 individuals aged 20-29 in Italy is 13.5, lower than that of EU which is 19.42. The ranking suggests that new opportunities in digital are much more likely to be realised in the other markets that are more digitally advanced than in Italy. Additionally, there are fewer pioneering digital technology companies in Italy that are able to drive Industry 4.0 technologies similar to a Siemens in Germany or Dassault in France.

The lack of investment in digital skills and education in addition to a challenging economic, regulatory and political environment has deterred Italian digital technology companies from emerging. With many more technologically-ready economies in neighboring countries, Italy has been deprived of talent and investment in digital technologies.

The government is putting in place initiatives to better equip the sector through an Italian Bill of Internet Rights and a strategy for ultra-fast internet connection. However, the benefits of these investments will need time to materialize and home-grown Italian digital technology companies can only emerge if economic and political conditions stabilize.

Italy has also been slow to embrace the potential of international trade and globalisation in allowing it to access and adopt market-leading technologies. The uncompetitive tax structure, regulatory burden, high cost and effort of setting up or expanding a business, operational challenges, and cost of labour still remain the major barriers for the expansion of international and domestic companies in Italy. As a result the ICT services exports are only 1.8% of trade (ranking 59th globally43) and high-tech net imports are only 7.9% of trade (ranking 65th globally 44). Conversely, Italy performs much better in terms of high tech net exports (5.8%, ranking 29th globally45) and for intellectual property receipts (0.6%, ranking 24th globally46) which it can leverage to position itself for success in the information technology sphere.

Source: Siemens Survey

Figure 9: Italian companies recognise the key advantages and barriers to Industry 4.0

<table>
<thead>
<tr>
<th>Perceived Advantages</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>More efficiency</td>
<td>47</td>
</tr>
<tr>
<td>More productivity</td>
<td>28</td>
</tr>
<tr>
<td>Speed of innovation to market</td>
<td>28</td>
</tr>
<tr>
<td>Lower costs</td>
<td>26</td>
</tr>
<tr>
<td>Control and confidence in production, pricing, and distribution</td>
<td>17</td>
</tr>
<tr>
<td>More flexibility</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Perceived Critical Aspects</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expensive/Not everyone will be able to afford it</td>
<td>75</td>
</tr>
<tr>
<td>Lack of internal competencies</td>
<td>35</td>
</tr>
<tr>
<td>Not everything can rely on machines</td>
<td>1</td>
</tr>
<tr>
<td>Decrease in employment</td>
<td>1</td>
</tr>
<tr>
<td>Useless for small companies</td>
<td>1</td>
</tr>
</tbody>
</table>

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In addition, the current structure of Industria 4.0 plan also incentivises the piecemeal upgrading of machinery into "smart" machinery rather than transformation of the system. The full benefits of Industry 4.0 can be realized by reimagining the use of data and IT as a key input in the manufacturing industry. Therefore, it will be important to leverage the Digital Innovation Hubs and competence centers as a platform to drive the process of developing a common understanding of Industry 4.0 as a system-wide transformation. This will allow companies to realize the full benefits across all parts of their business—from demand generation and marketing, to production processes and operations. Having established this mindset, the competence centers can then help companies assess their existing digital maturity (based on various measures developed by the European Commission) and develop a potential roadmap that considers the possibilities from an end-to-end value chain perspective. It will also be important to increase the involvement of international technology companies in driving the desired transformation. Italy should be actively looking to bring in cutting-edge global companies in the key technology areas, to act as partners for innovative Italian manufacturers. This will allow Italian companies to have awareness of, and access to industry-leading technologies that will allow them to make and implement investment decisions that can support a broader industrial transformation strategy.

Finally, Industry 4.0 and digitisation will prompt the need for standardisation to allow for interoperability, openness and scalability among Italian businesses. The transformation will also bring to the forefront concerns surrounding the use of data, including security and privacy, as well as highlight the need to balance between flexibility and structure in the development of IT services and structures. To tackle these challenges, government and industry stakeholders should look to partner to develop a common approach with clear standards and a robust governance structure.

One step in the right direction has already been taken with the trilateral cooperation among the Industry 4.0 plans of the three major European industrial countries—Alliance Industrie du Futur (France), Plattforme Industrie 4.0 (Germany), and Piano Industria 4.0 (Italy). The cooperation aims to bring together the key digitizing manufacturing incentives of the three countries and focuses on three areas:

1) **Standardisation and Reference Architectures**: A working group will ensure common standards and interoperable interfaces among different manufacturers in the three countries to achieve a digitalized manufacturing ecosystem. Standardisation reduces compliance, integration, and verification costs, increases transparency in the market, and eases market access for innovative products.

2) **SME engagement and testbeds**: A second working group will map use cases from the three countries and interlink them to promote an international network of test infrastructures.

3) **Policy support**: A working group will exchange best practices on policies to strengthen the Digitalization processes of their manufacturing sectors, sharing the recommendations at the European level and in international forums.

This cooperation has allowed Italy to benefit from best practices in Europe, establish itself as a leader in the future Digital Single Market, and give it a voice in setting pan-European standards. There have been three main outputs to this exercise:

1) **Reference Architecture Model Industry 4.0 (RAMI 4.0)**: A unified model for all industrial 4.0 components or the Internet of Things for manufacturing. The RAMI 4.0 will ensure that participants involved in Industry 4.0 discussions will be able to understand each other by breaking down complex processes into easy-to-grasp packages in areas such as data privacy and IT Security.

2) **Smart Manufacturing Standards Landscape**: A common standards map showing all the standards that apply to a particular aspect of Smart Manufacturing.

3) **Structure of the Administration Shell**: An outline of the necessary harmonised concepts.

The technical requirements laid out by this initiative are fairly high in terms of requiring specialised skills and expertise by the companies implementing these technologies. Therefore, it will be important to use the Digital Innovation Hubs and I4.0 Competence Centers to drive adoption of these standards and simplify their application to allow for all companies to benefit.
Focus Area A2

Leverage Industry 4.0 to enhance the success of “Made in Italy” industries

Many of Italy’s manufacturing industries are renowned for their craftsmanship and quality. The “Made in Italy” brand is powerful capital for companies manufacturing in the country, and Italy ranks 7th globally when evaluating perception of “Made in...” brand (with an index score of 84 out of 100[48]). Italy has particular reputational and branding strengths in direct end-consumer facing industries such as textile and fashion (Gucci, Valentino, and Ferragamo), food (Nutella and Lavazza), automotive (Ferragamo and Lamborghini) as well as furnishings and home appliances (DeLonghi and Smeg). There is tremendous market potential for Italy in being able to produce these “Made in Italy” products more efficiently and in being able to introduce and expand the reach of these products to new demographics and markets especially emerging markets in Asia and Africa.

However, the applications of Industry 4.0 in industries such as fashion and food manufacturing are somewhat untested, and there are fewer existing models for companies to adopt. For example, in the pharmaceutical sector, the application of Industry 4.0 is underexploited despite Italy having the second largest output in Europe. Similarly, the food and beverage manufacturing sector in Italy’s expenditure on in-house and external R&D activities amounted to €380 million in 2015[49], representing only 0.3% of industry turnover, which is likely to impede further innovation and efficiency in the sector. By focusing on certain industries that are a source of competitive advantage, Italy will also be able attract technology companies that are developing solutions for these applications and spur further innovation.

Going forward, these ‘Made in Italy’ industries should look to leverage Industry 4.0 to find new sources of revenue and increase the appeal of their products to customers. One of the relevant concepts that can likely be leveraged is mass customisation, which refers to the concept of producing fully customised outputs by using industry 4.0 to program and automate machinery to produce ‘batch sizes of 1’. There will be significant benefits to having an early-mover advantage in such areas especially as other transformations in the retail and consumer and healthcare space (such as customised medicine, e-commerce and wearables) come to fruition. BMW, for instance, offers “virtually unlimited individualisation” for their orders. The company’s mobile application provides choices for paint finishes, interior trim, equipment, and other options for both the interior and exterior of the car. Moreover, the customer can even include their signatures to the car. The customisation is powered by augmented reality technology, extending the role of the customer to a co-designer rather than a typical consumer. Moreover, the healthcare industry is also moving towards a ‘customised medicine’ model where customers demand products with different dosages and unique features. To cope with these changes, the pharmaceutical industry in Italy will need to transition from a batch manufacturing process to an integrated, continuous manufacturing process that is highly flexible and precise, thereby positioning themselves at the cutting edge of this transformation. To date, the Industria 4.0 plan has shown some positive results in driving the adoption of digital tools by Italian companies but there is still significant room for growth.
Case Example: Adidas launched the Adidas Speedfactory in Ansbach during 2017

The traditional value chain of the conventional sneaker making process can take up to 60 days. Different components of a sneaker are often created in different factories, sometimes, in different parts of the world. For Adidas, this conventional model is inefficient and too slow to respond to the increasing complex customer demands. As a result, Adidas launched the ‘Speedfactory,’ a manufacturing innovation platform that compresses the sneaker production value chain in one place. Though the targeted annual production of 500,000 shoes is a small proportion of their global sales, the main aim of the new plant is to shorten the entire supply chain cycle so that customers can access new designs almost immediately. With the entire process from design to production being manned by robots, the new plant is highly flexible and efficient with a lead time of less than a week, between product design and placement in stores.

Finally, Digital Innovation Hubs should also broaden their focus beyond traditionally “hard” industry sectors, in particularly by targeting SMEs from the food, fashion, appliance and pharmaceutical industries to participate and derive operational benefits and address current challenges. The Industry 4.0 application model for these industries will possibly need to be developed from scratch, providing Italian companies with the opportunity to be pioneers in the space, solving some of the major problems being faced—including lack of skilled professionals, high error rate, and need for high level of human oversight and interaction in operations. Other areas such as predictive analytics will also help manage costs, quality and maintain profitability given the tight margins in the industry. Overall, a systematic and collaborative approach could be valuable, involving industry associations and companies coming together to develop a list of pain points in their respective areas, and then considering a wide range of technology tools and solutions, leveraging upon the Industry 4.0 competence centresto solve these problems.
Case Study:
Leading industry 4.0 countries have taken steps to bring technology to an operational level within companies

**Plattform Industrie 4.0**

Plattform Industrie 4.0’s focus is on the digitisation of industrial production, in particular through cyber physical systems. The German approach to Industry 4.0 has centred on creating working relationships between the main stakeholders, industrial companies and the government, to establish a common understanding of Industry 4.0 and providing joint recommendations on how to create a reliance and consistent framework.

The realisation of the vision is supported by three main initiatives:

1. Use cases that help companies understand possible benefits of Industry 4.0 and implementation efforts required
2. Create testbeds that allow companies to test ideas and make developments ready-for-use
3. Establish information centres that provide advisory services on coping with the newly emerged business contexts

**Industrial Internet Consortium**

The Industrial Internet Consortium (IIC) is an industry-led initiative, focused on driving the use of Industrial Internet of Things (IIoT). The founding members and initial driving force for the initiative came from American technology and manufacturing companies - GE, IBM, AT&T, Cisco and Intel. However, the vision of the IIC is as a global organization with membership from foreign and domestic institutions including small and large companies, industry associations, universities and even government organisations.

The IIC Testbed working group plays a crucial role in the process of synthesising ideas into implementation-ready propositions. Proposals for testbeds are generally created by member companies, academia and government agencies may support industry players with funding support. The IIC will provide guidance on implementation of the testbed. All testbed proposals are required to demonstrate that they involve multiple technologies and can scale outside a single company. The testbed model also creates opportunities for spin-off applications based on the knowledge gathered through the testbed.

**Catapult High Value Manufacturing**

High Value Manufacturing Catapult (HVMC) is a UK government-led initiative that aims to support high value manufacturing businesses with innovation projects that require new manufacturing solutions. The purpose of this initiative is to spread economic success across sectors in order to generate broad-based growth. HVMC bridges the gap between innovation in academia and the application of innovation within companies. HVMC works with high value manufacturing businesses that have potential ideas about innovative practices but do not have the capabilities needed to implement. HVMC is able to fill the gap for companies by providing support on missing capabilities, facilities to test and scale high-value manufacturing processes and identify potential suppliers. HVMC supports companies with capabilities such as automation and digital manufacturing. However, the focus is not purely on Industry 4.0 technologies, as the initiative also supports innovation in ‘traditional’ engineering. The HVMC has been one of the UK’s most successful business support programs generating US$17 of net benefits for each US$1 of public funding.

Source: Plattform Industrie 4.0, Industrial Internet Consortium, Catapult HVM, Digital Transformation Monitor
B. Enabling the scaling of Manufacturing SMEs through innovation and internationalisation

The nature and structure of the Italian manufacturing sector is heavily influenced by the role played by SMEs and start-ups. In Italy, SMEs are highly clustered and around 60% of medium-sized manufacturing firms are located in industrial districts, creating supply chains around them by attracting specialised, small producers. As in other European countries, these SMEs typically occupy a market niche, with the most successful organisations competing through product differentiation (excelling at producing a highly specialised component) and continuous innovation. Given the high proportion of jobs (73%) and turnover (60%) that SMEs contribute to the manufacturing industry, helping them achieve scale will be key to driving the growth of the sector as a whole. In addition, the role of these SMEs is especially crucial as the country has few large “flagship” or “anchor” businesses around which industries and manufacturing value chains are structured; and spurring innovation and internationalisation by Italian SMEs will be critical for driving productivity and growth in the industry.

Focus Area B1

Fostering opportunities for innovation

The barriers to SMEs investing in innovation are clear—a lack of resources in terms of human, physical and financial capital as well as the inability to scale the applications of these innovations beyond their product or process niche due to lack of network with other firms in the value chain. One of the barriers that is particular to the Italian manufacturing sector is that many of the SMEs are micro-enterprises or family-run businesses that have somewhat different challenges with achieving scale including an unwillingness or inability to bear financial risk and lack of management capability.

A plan to drive innovation amongst SMEs should hone in on the factors that provide these companies with a relative advantage. For example, SMEs are capable of being highly innovative due to the agility provided by their size and scale, therefore ideas can be approved more quickly and the culture is more adaptable to timely implementation. In this context, Italy has significant structural advantages as it looks to build greater innovative capacity amongst its SMEs.
The country has a strong culture of cluster development (ranking 4th globally in the World Economic Forum measure of ‘cluster development’[^53]) that can be leveraged to enable the scaling of new innovations and ideas across the sector. Cluster development is considered an important driver of innovation and is often used as a metric to judge the maturity of a market in this regard. Encouraging the development of clusters is a common policy tool deployed by governments looking to spur innovation as the inter-linkages between firms in overlapping value chains allows SMEs to better anticipate customer needs and facilitates a more rapid development and feedback cycle. The concentration of companies within the cluster also allows for the rapid permeation of government initiatives, investment and knowledge within the industry and the supply chain thereby deepening their impact.

In addition, collaborative manufacturing across sectors as well as different parts of the value chain will be a key enabler of innovation. SMEs can pool resources and reduce financial burdens allowing them to achieve the economies of scale that can support them in competing with larger market players. This will also enable them to recognise new market opportunities and innovate by sharing ideas and best practices as well as combining expertise from different functional areas.

The Italian government can help spur these changes by putting in place the right incentive structures such as tax credits for innovative companies, innovation hubs located in strategic areas and reducing the transactional costs of forming partnerships between companies. It is also important to recognise that while governments can help put in place the right enabling factors, it will be up to the companies themselves to seize the opportunities and realise their potential. More Italian SMEs need to have active innovation strategy and innovation champions internally, to make the business case for implementing and scaling these innovations. These champions should look to maximise value across various dimensions and examine how they can adopt best practices from other leading companies within their sectors and outside.

Finally, while independent, self-driven innovation by SMEs is the eventual goal, enabling Italian companies to adopt technological standards being set in other companies and countries would be a first step in the right direction. Even if companies are unable to innovate independently, encouraging SMEs to pursue an active innovation strategy will give them the agility required to successfully adapt to technological changes and evolving market conditions.
Case Example: Friuli-Venezia Giulia’s Manufacturing Innovation Success

Friuli–Venezia Giulia (FVG) is an autonomous region in North-Eastern Italy which is well known for its advancements in industry. FVG ranks as the best performing region in Italy in terms of the degree of innovation, performing 70% higher than the lowest performing region, and 10% higher than the second best performing one. FVG’s five key industries are agribusiness, metalworking, furniture and home systems, medical, and maritime technology. Some successful industrial companies based in FVG include Electrolux Spa, Brovedani Group Spa, Fincantieri, and Monte Carlo Yachts.

FVG’s innovative ecosystem has been driven by three main factors:

First, the regional landscape of FVG consists of groups of firms or “clusters.” Firms in the same sectors group in the same region come together to promote collaborations with research centres, institutes and enterprises which bring in benefits and new opportunities to the region. These clusters include:

- The District of Thermo-Electro Mechanical and Components (COMET)
- The Furniture and Home System Cluster
- Maritime Technology Cluster FVG

Clustering enables firms to benefit from greater scale without sacrificing flexibility. Firms that cluster benefit from rich labour pools—making it easier for firms to hire workers, knowledge spill over which often occur when firms are in close proximity, and lower cost of transporting goods as suppliers are often in the cluster area.

Second, FVG supports businesses in the region through financial, fiscal, and other incentives. For instance, SMEs can receive financing for the purchase or lease of new equipment and can receive grants for business development initiatives such as creation of new factories and capital expenditures. Moreover, some SME’s not currently operating in FVG are encouraged to move their operations to FVG through the offering of tax incentives.

Third, FVG plays a significant role in helping firms stay productive and advancing their technologies. The two most important initiatives in the advanced manufacturing field are the Lean Experience Factory (LEF) and the Digital Experience (DiEX). Together LEF and DiEx serve firms in the FVG region and guide them in topics such as digitalisation of manufacturing processes, factory of the future, and other technological aspects such as smart manufacturing, machine learning, man-machine cooperation, IoT, cyber security, and big data. FVG and its neighboring area also host a wide range of academic and research institutions. This includes the AREA Science Park and various universities which carry out research in life sciences, physics, electronics, ICT, mathematics, physics, and in new cutting-edge disciplines, such as cognitive neuroscience and neurobiology.

Ultimately, the strategic location of the city of Trieste, where FVG is located, allows for great internationalisation. Located at the end of the proposed ‘21st Century Maritime Silk Road’ as part of China’s Belt and Road (B&R) initiative, Trieste has received significant interest from Chinese investors and will likely become one of the ports on this route. Trieste is currently preparing itself to host the 2020 Euro Science Open Forum (ESOF). This event will promote the city as a hub for science and technology in Central Europe and in turn increase investment. Similar developmental efforts should be carried out not only in FVG, but also in other Italian regions to foster innovative ecosystems throughout the country. Strengthening Italy’s productivity will require significant efforts which cannot be achieved by a single entity but will require the collaborative effort of all stakeholders from manufacturers, technology experts, educators, investors, workers, and the government. For example, the government has a role to play by supporting programs that include financial and fiscal incentives. Academic and research institutions must ramp up research & development efforts to produce cutting-edge technologies like those in FVG and local firms should look to form clusters with fellow firms and stakeholders to achieve maximum benefit.

Source: European Commission, Investing in FVG, Lean Experience Factory, Area Science Park
**Focus Area B2**

**Support internationalisation of SMEs**

While the domestic Italian market is facing a drop in demand due to challenging macroeconomic conditions, global sales for products, such as luxury goods, are on the rise in emerging markets such as China and Indonesia. Such export markets therefore present lucrative opportunities for Italian companies to internationalise and gain access to new customer segments for their products. However, the Italian manufacturing sector has not been well-positioned to seize the opportunities presented by globalisation and currently have a lower export orientation as Italian companies have a lower level of innovation caused by various factors such as the nature of the Italian business sector which is made up of SMEs; the SMEs usually face challenges with achieving scale including an unwillingness or inability to bear financial risk and lack of management capability. As a result, Italy has weaker links to global value chains as compared to other industrialised countries such as Germany or the United States. It has also struggled particularly in terms of high-tech exports which represent only 5.8% of total trade of Italy (ranking 29th in the world) which is low for a highly developed economy in Europe. Another challenge in terms of internationalisation is that there are fewer foreign companies and less foreign capital for investing in projects in Italy. External investors can potentially bring in financial resources, know-how and contacts needed to facilitate international trade, and this is currently an area of improvement. Italy ranks 111th in the world in terms of FDI net inflow, which accounts for only 0.8% of GDP.

In particular, Italian SMEs also face additional and significant challenges in selling to foreign markets. Despite the increase in the share of exporting SMEs from 13.2% to 14.8% between 2008-2014, currently, only 25% of SMEs in the industrial sector export their products, as compared to 90% of large Italian companies. They often lack economies of scale resulting in higher trading costs, making them less likely to export as compared to large companies.

There are currently some support structures for internationalisation such as Servizi Assicurativi del Commercio Estero (SACE) and the ‘Plan for the extraordinary promotion of the Made in Italy’. SACE is an Italian credit export agency that offers a wide range of financial tools including credit insurance and guarantees on loan plans to support the growth plans of Italian SMEs abroad. The ‘Plan for the extraordinary promotion of the Made in Italy’ is a mix of initiatives both in Italy and abroad to attract investment.

To further drive internationalisation, Italian export promoting agencies will have to capitalize on what they are already doing well but at the same time also identify the market failures which are currently hampering Italian SMEs from expanding their export capabilities abroad and target its service offering to specifically address these issues. According to a 2017 survey by SBA on internationalisation, Italian SMEs are lacking behind their EU peers on the following topics: information availability (lack of information on exporting strategies and how to identify international business opportunities), involvement of trade community, automation (electronic exchange of data and use of risk management, and automated border procedures), cooperation between various border agencies of the country, extra-EU online exports, and extra-EU imports of goods. Furthermore, the top challenges cited by Italian SMEs on selling to foreign markets were finding business partners (66%), customs regulations (38%) and different regulations in different countries (34%) in 2017.
In particular, there is a need to address the factors in which Italian SMEs are behind as well as the top concerns of these SMEs. For instance, the export promoting agencies responses to the lack of trade information could be to provide more publications of trade information both online and offline and more accessible counseling and training for SMEs, to organise exhibitions and roadshows educating local SMEs, and to ensure that the resources are readily available for SMEs online. Moreover, the export promoting agencies should assist SMEs in finding the appropriate partners in the exporting country—by facilitating outreach, helping to provide the right contacts and connections, and marketing the value proposition and benefits of partnering with an Italian SME to foreign investors.

To fully internationalise, there need to be efforts from both the export promoting agencies as well as SMEs. SMEs interested in foreign expansion could also seek investment from international sources that could provide them with both the know-how and capital required to support an international expansion. SMEs could seek partnerships with foreign investors that would provide them with local contacts, market insights and access to technology that would allow them to tailor their offerings to the target market. For instance, Chinese companies have already invested in Italian companies such as power engineering company Ansaldo Energia and fashion company Krizia. Italian SMEs must also seek to further develop their own capabilities to facilitate internationalisation, especially in areas such as human resources (hiring employees with experience working or studying abroad, rewarding employees that speak foreign languages) and product development and selection (identifying and innovating products and services that would appeal to international consumers).

Another approach for SMEs, particularly those in the supply chain of larger internationalised companies, could be to leverage these existing relationships for their own efforts at internationalisation. This could be the case for both Italian and non-Italian companies using their strategic geographic location and economic ties with Europe. SMEs, which are relatively numerous in the Italian aerospace sector, rely on their relationship with national OEM manufacturer Leonardo to support their internationalization efforts.

Case Study: Hong Kong Trade Development Council (HKTDC) tackles SME internationalisation pain points

Italian export promoting agencies could leverage on success stories of other overseas agencies such as the Hong Kong Trade Development Council (HKTDC). HKTDC identified that local SMEs lacked trade information and the knowledge needed to expand their businesses overseas. They were also having difficulty contacting or networking with potential overseas customers. As a result, HKTDC launched a range of initiatives including the HKTDC SME Centre, business matching services and trade fairs. The HKTDC SME Centre launched an online research portal and hosted over 35 workshops in 2012-13, focusing on topics such as China business, SME management, intellectual property, and entrepreneurship. The HKTDC business matching services has a vast database of international buyers and with their matching specialists to help match suppliers to buyers, acting as a third party to facilitate communication among SMEs and their potential overseas customers. Lastly, HKTDC organises more than 30 international trade fairs annually. These include buyer forums, where traders from abroad share their sourcing needs and market trends with exhibitors.
The ‘ICT Innovation for Manufacturing SMEs’ (I4MS) initiative was launched by the European Commission in 2016, under the “Digital Industrial Leadership”, an EU-wide strategy for digitizing the European manufacturing industry. The I4MS initiative aims to enable and foster the collaboration of manufacturing mid-caps, SMEs and start-ups across their value chains with the support of European innovation centres, such as European Digital Innovation Hubs (DIH), universities, application-oriented research organisations in cross-border experiments.

The I4MS Initiative supports mid-caps and SMEs in the manufacturing sector along three dimensions, including: 1) providing access to competencies that can help in assessing, planning and mastering digital transformation, 2) providing access to innovation networks of a broad spectrum of competencies and best practice examples, and 3) providing financial support to mid-caps and SMEs on the demand and supply side to master digital transformation.

The I4MS initiative aims to nurture the manufacturing ecosystem and provide benefits to all stakeholders. For example, DIH provides companies with universal access to digital competencies and all other necessary resources that support the development of regional ecosystems to turn excellent technical solutions into innovative products and services. The initiative also supports SMEs financially to adopt advanced technologies so that SMEs can develop innovative and competitive products and services. The initiative provides a platform for companies to experiment, test and mature existing technologies while broadening its applications.

Increasing collaboration across Europe has proven to be important in strengthening the European manufacturing industry. About 29 EU member states and associated countries were involved in Phase 1 and Phase 2 of the I4MS. Also, more than 70% of experiments conducted until 2016 have a relevant European dimension and are executed in collaboration with partners from different EU member states combining existing regional strengths and know-how. In Phase 1 alone, 195 experiments have been initiated and are either completed and have achieved the intended technological and economic impact or in a final state of implementation. Meanwhile, for Phase 2, 25 experiments have been launched at the outset and 60 additional experiments that focus on establishing new user-supplier collaborations have been put up for selection.

**Case Study:**
Digitising the European manufacturing sector through I4MS

**Key Phases of 'I4MS'**

**Phase 1 : Start-up the I4MS Ecosystem**
2013-2017

**Phase 2 : Organically grow the I4MS system**
2015-2019

**Phase 3: Nurture ecosystem to focus on EU added-value**
2018-2021

**Key technologies**
1. HPC cloud-based simulation services
2. Advanced laser-based equipment assessment
3. Industrial robotics systems
4. Intelligent fixtures

**Key actions**
1. Technological focus - CPS and IoT targeting SMEs
2. ‘New Coordination and Support Actions’ for multiplying effects of the Innovation Actions
3. Mentoring programmes for DIHs

**Key technologies**
1. Integration of CPS and IoT for smart production
2. Robotics systems
3. HPC cloud-based modelling and simulation
4. Digital design for additive manufacturing

**Source:** European Commission
Conclusion

Despite challenging economic conditions in the aftermath of two economic crises and political instability, the Italian economy has shown some signs of recovery especially in light of the new government’s fiscal expansion plans. Going forward, the fundamental macroeconomic challenge will be to restore the competitiveness of Italian businesses through measures such as investments in increasing the productive capacity of key sectors, an increase in the ease of doing business as well as reforms to encourage foreign investment. The manufacturing sector in Italy has been heavily influenced by the prevailing macroeconomic conditions in the country. Output and employment in the sector are only beginning to return to pre-crisis levels and remain a core part of the economy. The impact of slowing growth has been felt unevenly across different manufacturing subsectors but most retain strengths in terms of their global reputation and specialised workforce.

In this context, Industry 4.0 presents significant opportunities for the sector. As a highly developed economy, Italy is better positioned than many others to take advantage of these opportunities but it will also need to contend with gaps in the digital maturity of its economy. The Italian government has already taken several positive steps through its Industria 4.0 plan which will successfully deal with financing challenges.

The collaboration with Germany and France will also position the technical aspects of Italy’s digital transformation. However, there is much to be done to operationalise the transformation on-the-ground by building a nuanced understanding of Industry 4.0 as a journey. It will also be important to spur adoption in key manufacturing sectors such as pharmaceutical and textiles through the application of concepts such as Industry 4.0.

In order for these initiatives be operationalised, it will be important to recognise that SMEs are a critical part of the Italian manufacturing landscape and responsible for the majority of jobs and turnover within the sector. Therefore, a strategy to spur the growth of the sector must recognise their unique role and the challenges they face. Innovation and internationalisation represent two key strategies to support the scaling of SMEs. SMEs must adopt an active innovation strategy and engage in collaborative innovation to realise opportunities across sectors. Italian policymakers must put in place the right support structures by facilitating closer links between SMEs and foreign companies to allow them to recognize trade opportunities while SMEs must actively seek to further enhance their internal operations, growth strategy and collaboration efforts in order to reap the benefits. There are ample opportunities and avenues for growth for the Italian manufacturing sector, and realising these opportunities will require political will and active engagement from companies of all sizes.
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