Ministry of Industry and Trade

United Nations Development Programme

INDUSTRY 4.0 READINESS

OF INDUSTRY ENTERPRISES IN VIET NAM

HA NOI 2/2019

SUMMARY REPORT

THE SURVEY

2,659 enterprises from 18 sub-sectors in industry and trade

26.8% of enterprises with less than 10 workers, 48.9% with 10-200 workers, 5.6% with 200-300 workers and 18.8% with more than 300 workers

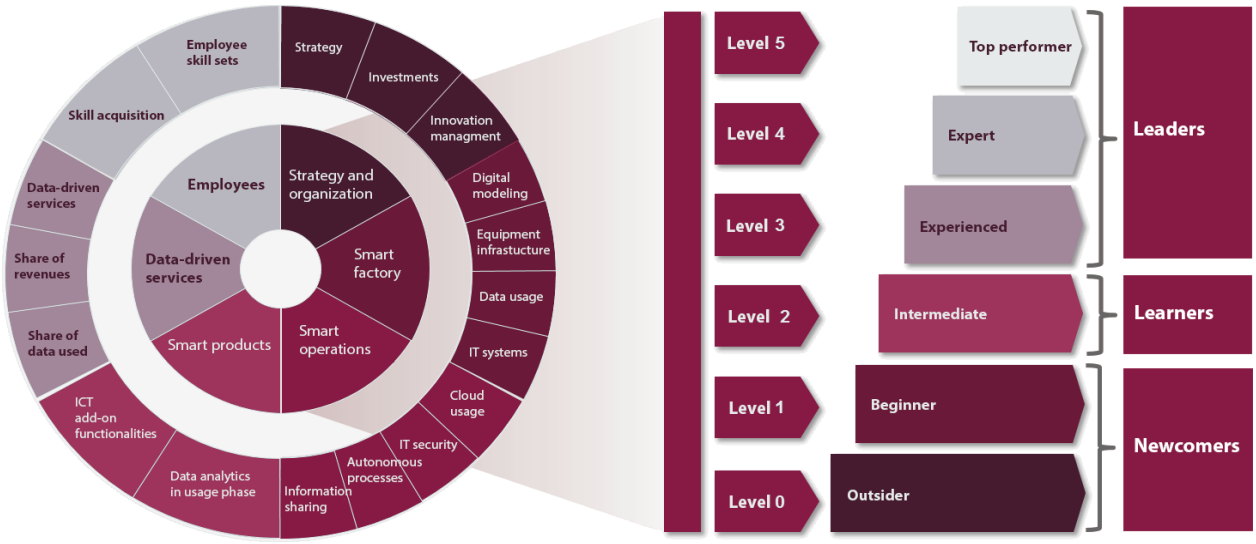
4.52% were State-owned enterprises (SOEs), 24.22% foreign direct investment (FDI) enterprises and 71.26% non-State enterprises

The survey was conducted in quarter 1 (questionnaire round) and quarter 2 (analysis and in-depth interview round) of 2018

United Nations Development Programme (UNDP) financed technical assistance for the survey's design, analysis of results and preparation of the survey report, while the Ministry of Industry and Trade (MOIT) financed all data collection, in-depth interview work and related policy dialogues.

ASSESSMENT METHOD

Measured Industry 4.0 readiness across **six dimensions** and ranked at **six levels (0-6)**: (i) Strategy and organization, (ii) Smart factory, (iii) Smart operations, (iv) Smart products, (v) Data-driven services and (vi) Employees.

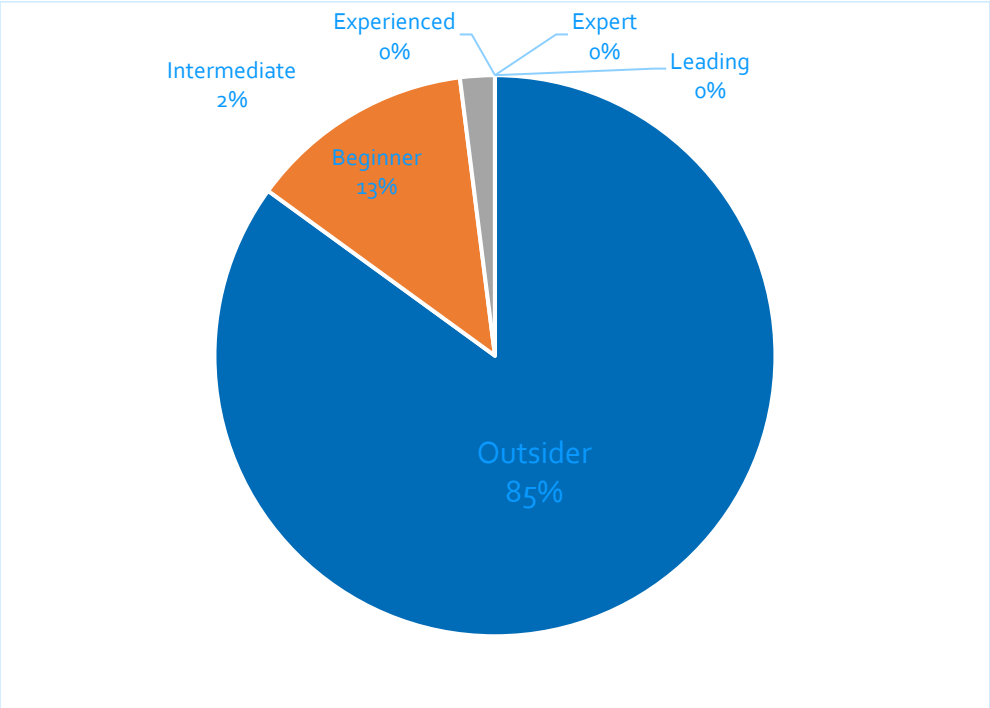


SOURCE: BASED ON THE METHOD USED BY THE GERMAN MECHANICAL ENGINEERING INDUSTRY ASSOCIATION (VERBAND DEUTSCHER MASCHINEN-UND ANLAGENBAU - VDMA).

KEY FINDINGS

The vast majority of enterprises were assessed at "outsider" level, while negligible shares of enterprises were assessed at "experienced" and "expert" levels out of the total number of surveyed firms. No enterprise was assessed at "leader" level.[1]

SHARE OF ENTERPRISES (%) BY READINESS LEVELS2



The situation was slightly better in the oil, electronics, chemicals, motor vehicles and electricity-gas-water sub-sectors, where the rates of "outsiders" were less than 85%. Notably in some sub-sectors, there were few enterprises at "intermediate", experienced" and "expert" levels.

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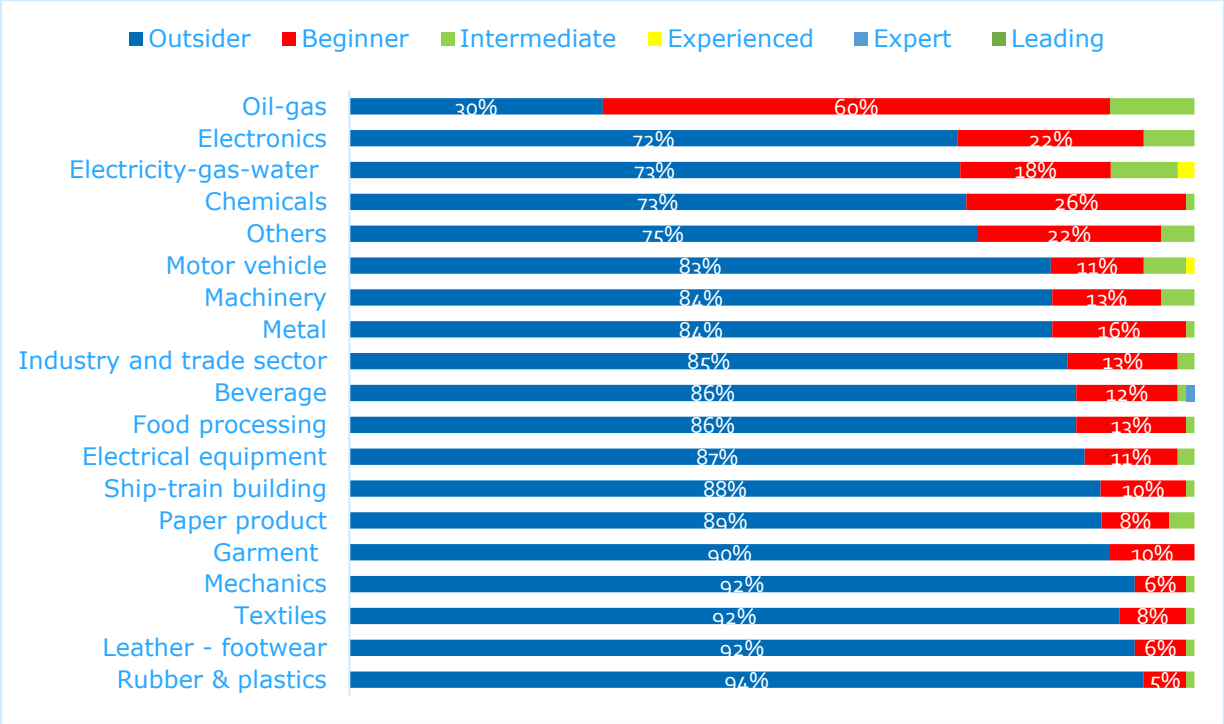
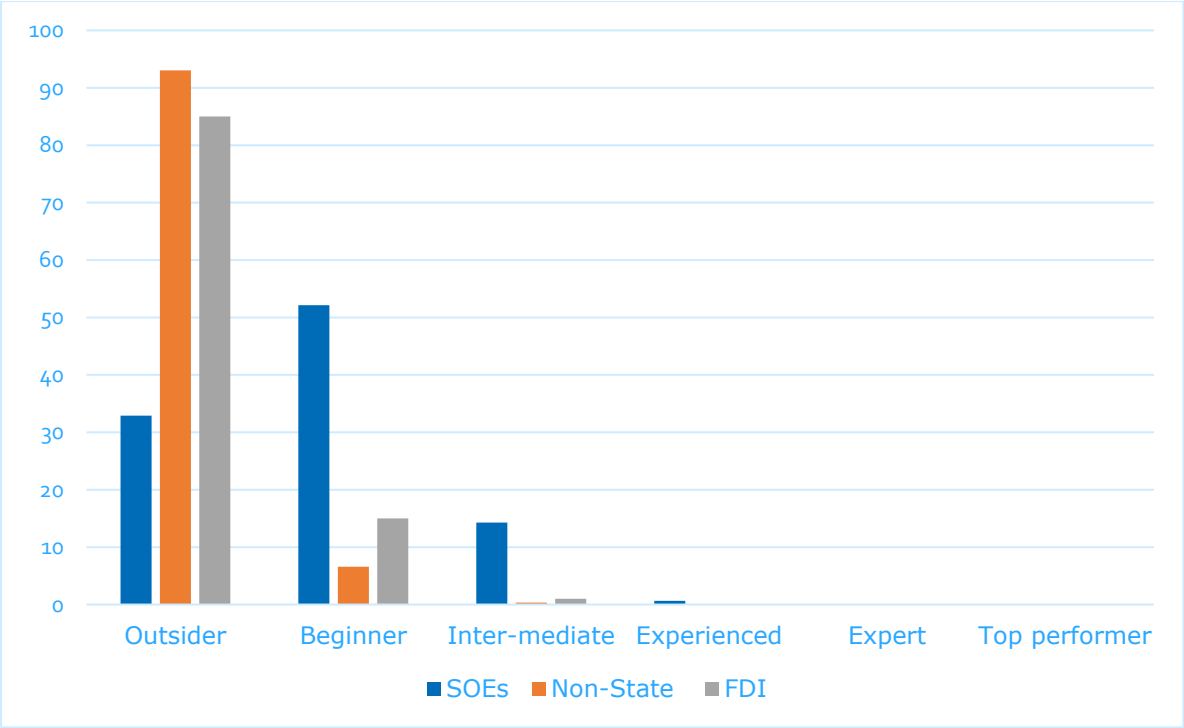
[1] It is noted that as the IR4.0 just started, the high proportion of enterprises that are not ready can also observded in Germany – the country with much higher development level compared to Viet Nam: the VDMA 2015 report of the survey on IR4.0 readiness shows that the share of enterprises that are at "outsider" level in engineering and manufacturing subsectors were at 38,9% and 58,2% respectively (VDMA 2015).

[2] In this figure, the share (percentages) of the firms at "experienced" and "expert" levels in the total number of surveyed firms was too small and rounded as "zero". At the same time, the percentages of these firms at the "experienced' and "expert" levels in the number of surveyed firms *within few sub-sectors, due to smaller numbers of surveyed firms in the sub-sectors*, became more significant as shown in the next figure.



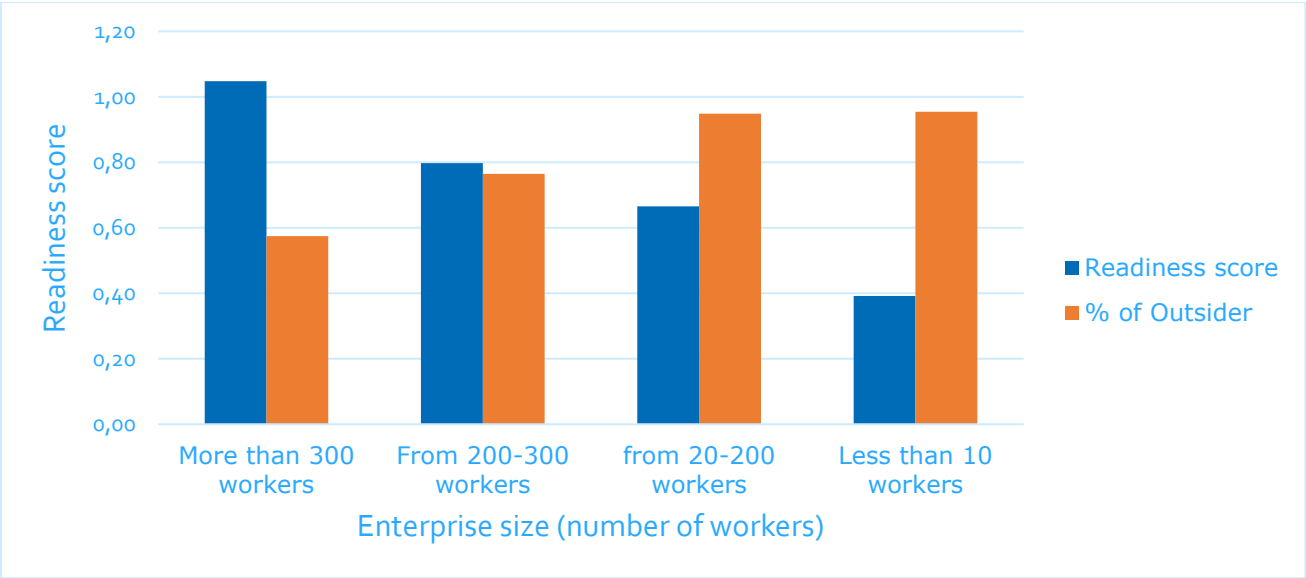
SOEs outperformed non-State and FDI enterprises thanks to their larger size, higher capital concentration, sub-sector concentration and hi-tech production nature.

SHARE (%) OF ENTERPRISES BY READINESS LEVEL AND OWNERSHIP



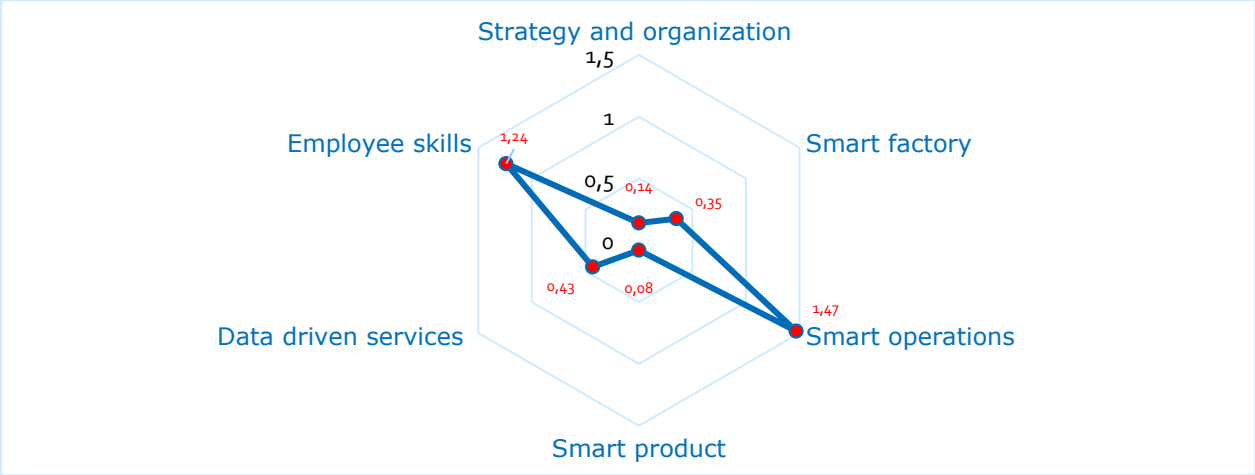
Enterprise size matters: the bigger size (keeping other characteristics equal) the higher the score (higher readiness level).

READINESS SCORE BY SIZES OF ENTERPRISES



Readiness varied across dimensions: better in "Smart Operations" and "Employee (skills)"

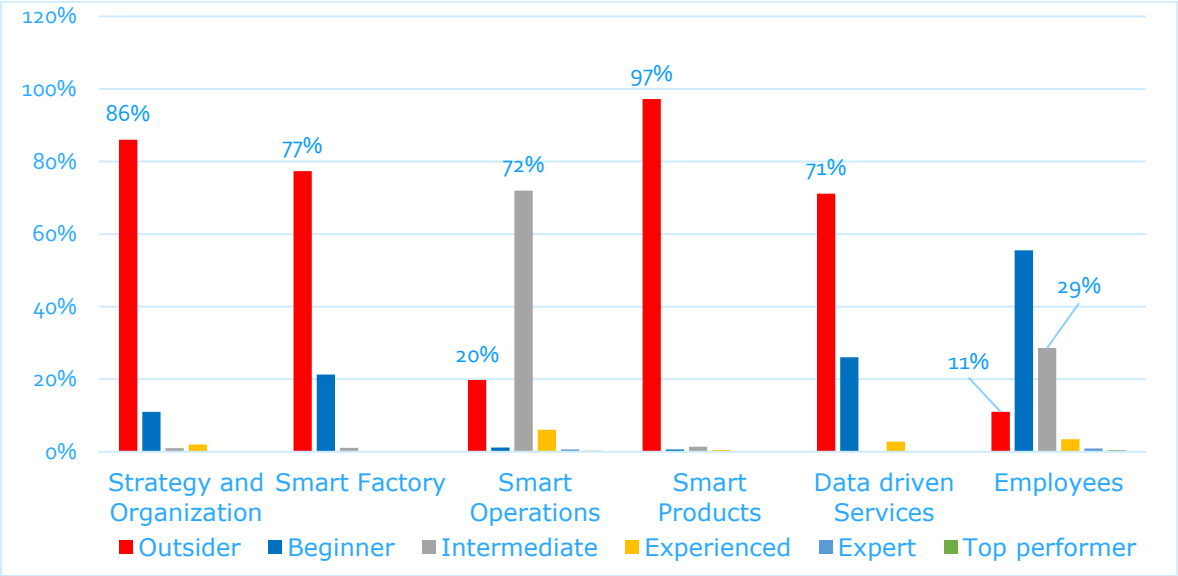
READINESS SCORE BY DIMENSIONS



Smart Operations: Relatively better readiness with an "outsider" rate of only 13% and 61% of enterprises were at "intermediate" and higher levels

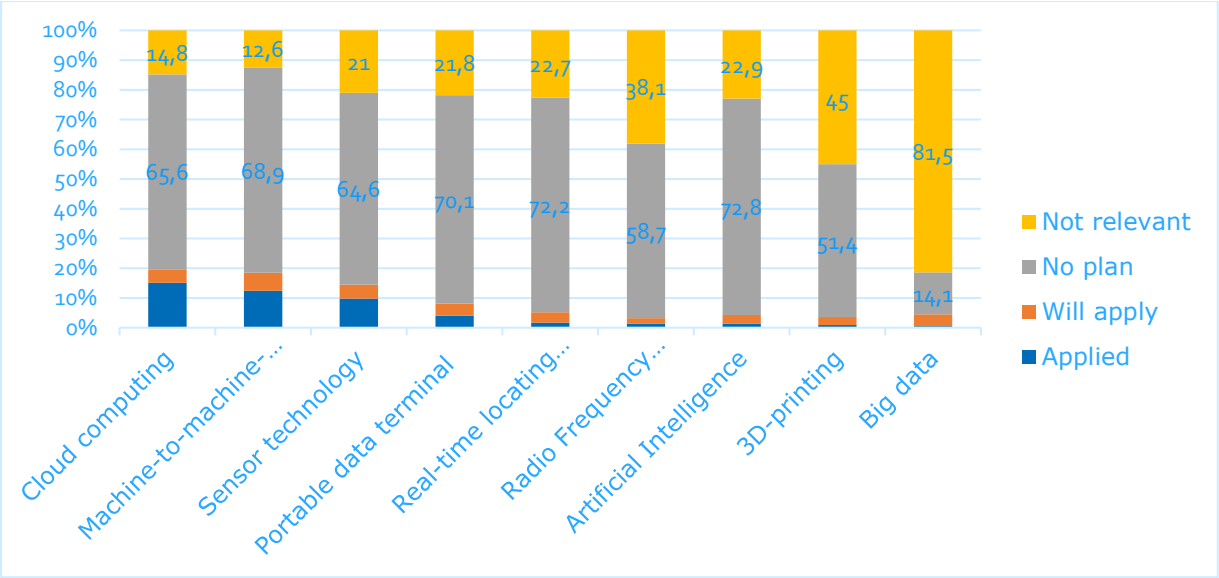
Employee (skills): Relatively better readiness with an "outsider" rate of only 11% and 43% of enterprises were at "intermediate" and higher levels

Smart Products, Strategy and Organization, Smart Factory and Data-driven Services: Low readiness with 93%, 83%, 65% and 67% of enterprises with "outsider" ratings, respectively.[3]



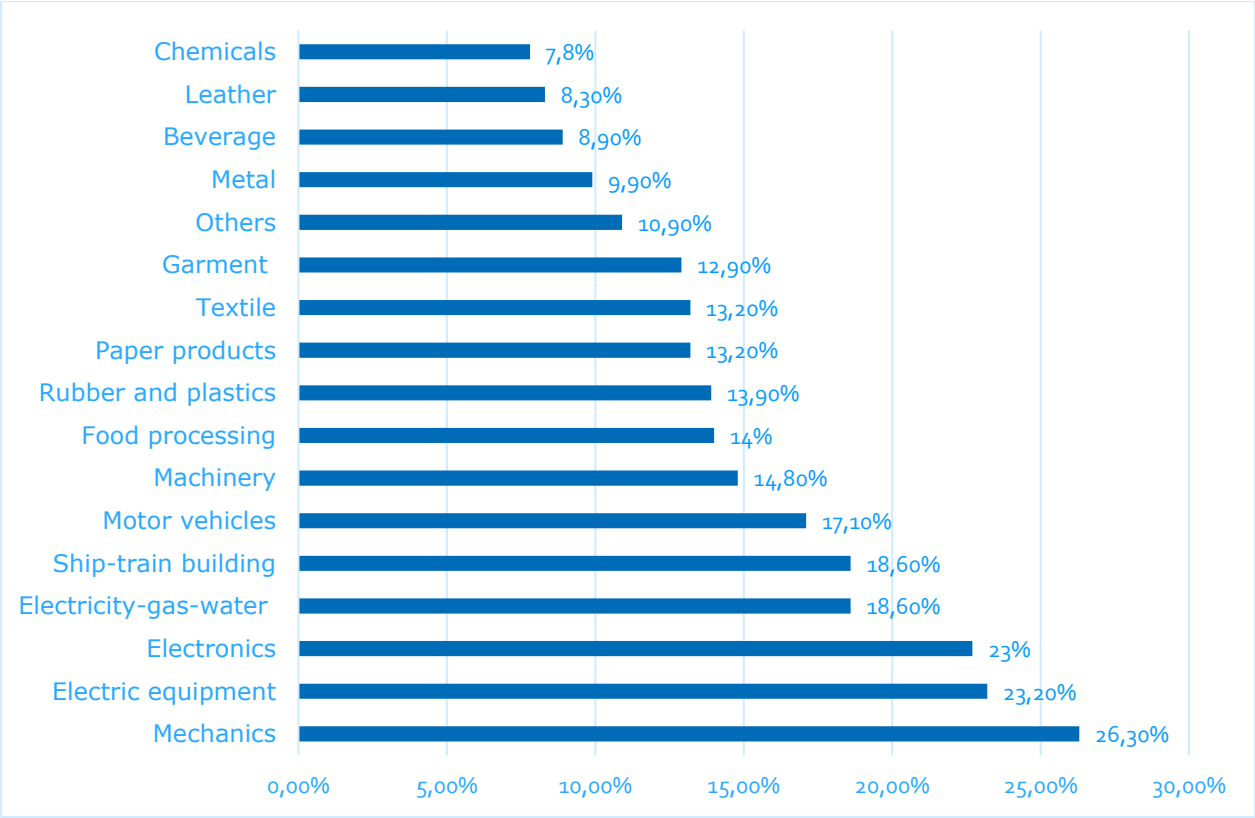
[3] The high proportion of enterprises at "outsider" level in some pillars was also observed in Germany: though 60% enterprises were aware of IR4.0, 75% enterprises (most of them are SMEs) did not have IR4.0 Strategy in 2015 (VDMA 2015).

The level of enterprises applying Industry 4.0 technologies is low.[4]

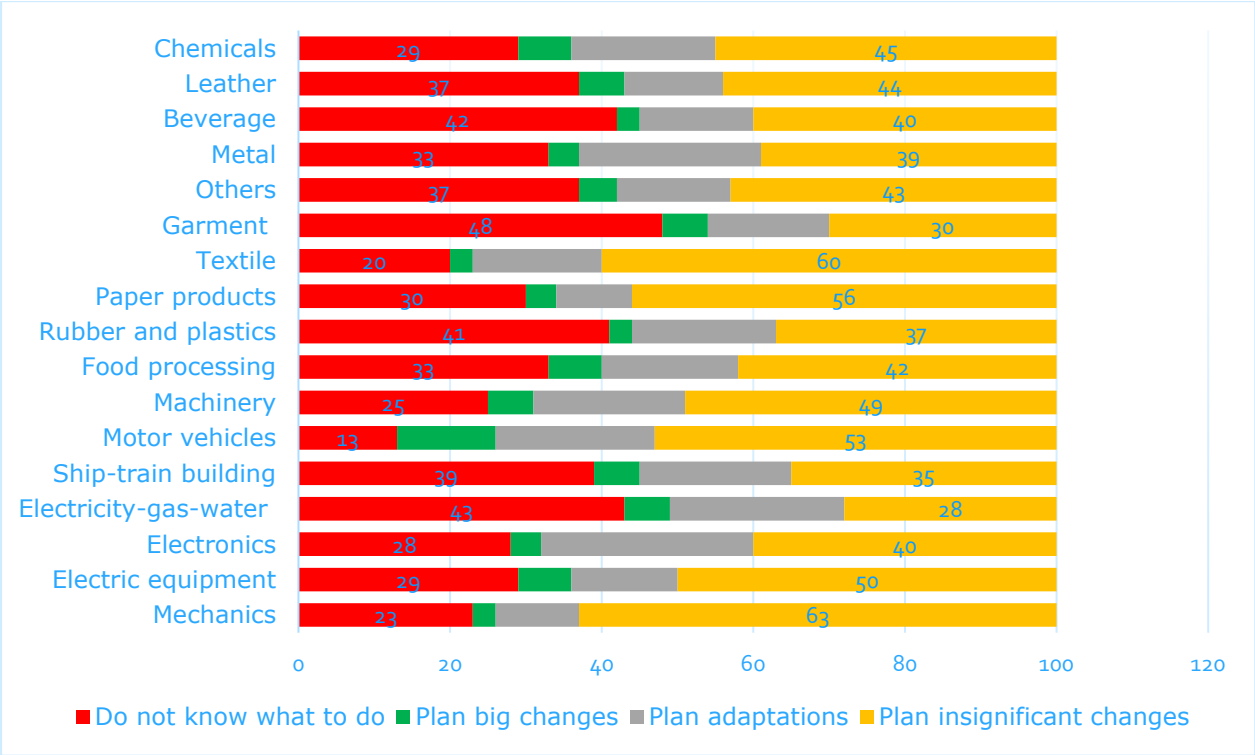


This includes application of cloud computing.

[4] It is noted that even in developed countries, the application of advanced digital technologies is still limited. The *World Bank Report "World Development Report 2016: Digital Dividends"* shows that earlier this decade, on the average only 19.2% of enterprises used cloud computing, while the application of radio frequency identification technology was much lower at 4.2% of enterprises.



The level of awareness and responses to I4.0 is low: high proportions of enterprises remain unprepared with no or limited planning.



KEY AREAS FOR IMPROVEMENTS TO ENHANCE I4.0 READINESS RECOMMENDED BY INTERVIEWED ENTERPRISES:

- Telecom infrastructure
- Access to improved utilities (water, electricity)
- Network and data security
- National/sectoral databases
- Access to capital
- Incentives for investment in Industry 4.0 technologies
- Human resources development, 21st Century skills
- Linkages to global value chains
- Enhancement of e-commerce
- E-government: e-payment of taxes, Customs services
- Application of international standards.

KEY POLICY IMPLICATIONS:

- Efforts to enhance the I4.0 readiness of enterprises should be integral to actions in industrial policies, domestic enterprise development, reform of SOEs and FDI attraction.
- Efforts are needed to support domestic enterprises to grow in size, capital concentration, capacity for R&D and provide skills training to workers.
- Innovative, cross-sectoral solutions are important for developing innovation networks to accelerate the application of I4.0 technologies to help domestic enterprises improve productivity and competitiveness, connect to domestic and global value chains.
- SOE reforms must enhance linkages between SOEs and domestic private enterprises to maximize SOEs' advanced I4.0 readiness.
- FDI attraction must shift to higher quality FDI, especially in terms of technology transfers and connecting domestic enterprises to global value chains.
- Enterprises should, based on on-going efforts, develop and implement their own I4.0 strategies and increase investment (with government support) to renovate technologies (especially those with relatively high spillovers and low costs, such as cloud computing and digitalization).
- Enterprises, depending on identified relevance, should also focus on: (i) applying IT technologies for production processes and products (improving I4.0 readiness in *Smart Product* dimension), (ii) improving data collection and utilization, and applying IT infrastructure that connects machines to optimize and automize production processes (in *Smart Factory* dimension), (iii) applying *data-driven services*, (iv) connecting with systems outside enterprises (in *Smart Operations*) and (v) continuing enhancement of workers' I4.0 skills.
- International experiences in applying relatively low cost, but high spillover I4.0 technologies should be further explored for application.
- Measurements and methods to assess I4.0 readiness must be further tailored to better fit the context and specificities of Viet Nam's enterprises and sectors.