



Manufacturing 4.0 Readiness Assessment Survey

6 March 2023

Dear Stakeholder,

The Commonwealth Secretariat in collaboration with the Ministry of Industrial Development, SMEs and Cooperatives (Industrial Development Division) has secured the services of International Economics Consulting Ltd to assess the current state of Mauritius' manufacturing sector, the level of maturity of Mauritian manufacturing enterprises and its capacity to adopt high-end "Manufacturing 4.0" technologies. The output of this extensive study is expected to provide an effective foundation for a future capacity-building program to advise and upskill Mauritian manufacturers to adopt Manufacturing 4.0 technologies and processes.

We are thereby pleased to contact you to respond on the readiness assessment of your firm through a short survey. Filling out the survey gives your firm the opportunity of being selected for the capacity-building program. It normally should take between 10 and 15 minutes of your time. The deadline for completing the questionnaire is Monday 17 April 2023.

Concept

The online survey is broken down into 4 dimensions of Manufacturing 4.0, each containing a different set of questions:

Manufacturing and operations	To what extent does your company have digitally integrated and automated production and operations?
Smart products and processes	To what extent are the processes and products in your company digitally modelled and how is the collected data being used?
Strategy and organization	To what extent is Manufacturing 4.0 established and implemented in your company's strategy?
Supply chain	To what extent can advanced technologies be used to improve efficiency, transparency, and decision-making in supply chain management?

Terms of use, data privacy

We take the privacy of your personal information seriously. You are voluntarily providing your contact details and company name. The provided information will be securely kept confidential and will only be used for the purpose of this survey. The collected data will not be shared with any unauthorized third parties. You have the right to access, correct, or delete your personal information at any time by contacting us at info@tradeeconomics.com. Please review these terms carefully before participating in this survey. By submitting your responses, you acknowledge that you have read and understood these terms and consent to the use and protection of your personal information as described above.

For details on the survey please contact us at info@tradeeconomics.com.



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Company General Information

* 1. Respondent and Company Profile

i. Name of company:

ii. Name of respondent:

iii. Phone:

iv. Email address:

v. Office address:

* 2. In which District are your manufacturing operations located?

Please specify Town/Village.

* 3. In which sector do you operate?

* 4(i). How many local employees does your company have?

- Up to 19 employees
- 20 to 99 employees
- 100 to 249 employees
- 250 to 499 employees
- 500 or more employees

4(ii). How many foreign employees does your company have?

- 1 to 19
- 20 to 99
- 100 to 249
- 250 to 499
- 500 or more

5. When was the company established? [Year]

* 6. What is the percentage of local shareholding of your company?

- 100
- 99 to 75
- 74 to 50
- less than 50
- 0 (Operating under FDI)

* 7. What percentage of your customers is local?

- 100
- 99 to 75
- 74 to 50
- less than 50

8. What was your company's turnover last year?

- Less than Rs 1M
- Rs 1M to Rs 10M
- Rs 11M to Rs 30M
- Rs 31M to Rs 100M
- 101M to Rs 250M
- Above Rs 250M



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Section 2: Manufacturing 4.0 General Questions

Manufacturing 4.0 refers to the fourth industrial revolution, characterized by the integration of advanced technologies such as artificial intelligence, the Internet of Things, and robotics into the manufacturing process to create smart factories that are flexible, efficient, and capable of producing customized products.

* 13. Were you aware of Manufacturing 4.0 prior to this survey?

- Yes
 No

* 14. Do you see the implementation of Manufacturing 4.0 as a priority for your firm?

- Yes
 No

Please provide details.

* 15(i). Has your firm embarked on any initiatives around Manufacturing 4.0?

- Yes
 No

15(ii). If No, why is the company not implementing Manufacturing 4.0?

15(iii). If Yes, please elaborate on any challenges faced when implementing Manufacturing 4.0.

15(iv). Are there any other activities/initiatives being undertaken that would complement Manufacturing 4.0?

* 16(i). Do you require any support in implementing Manufacturing 4.0?

Yes

No

16(ii). If Yes, please specify the area(s) in which your company needs capacity-building support to achieve Manufacturing 4.0.

Cyber Security

Design and implementation of solutions

External expertise

Finance

Increase in awareness or training

In-house expertise

Strategy and leadership

Technology

Training

Other (please specify)

16(iii). If Yes, please also provide some details of the capacity-building support that is needed.

A few examples of details needed are:

In which technologies or skills do you need support?

Does the strategic and leadership team need awareness or training on Manufacturing 4.0?

How much financing is needed?

In which areas/departments financing is needed?

Are adequate training capabilities available locally or must be sourced from abroad?



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Section 3.1: Manufacturing and operations

17. What is your level of competency in manufacturing and operations, notably in the following areas? [Level 1: Beginner; Level 2: Intermediate; Level 3: Experienced; Level 4: Expert]

* (i). Automation

- Level 1: None or only a few machines can be controlled through automation.
- Level 2: Some machines and system infrastructures can be controlled through automation.
- Level 3: Most machines and system infrastructures can be controlled through automation.
- Level 4: Machines and systems can be controlled completely through automation.

* Please also indicate the level you expect your firm to be in 5 years with regard to automation.

Level 1

Level 2

Level 3

Level 4

* (ii). Connectivity

- Level 1: Equipment, machinery, and computer-based systems are not able to interact or exchange information.
- Level 2: Equipment, machinery, and computer-based systems are to some extent able to exchange and use each other's information.
- Level 3: Equipment, machinery, and computer-based systems are partially integrated.
- Level 4: Equipment, machinery, and computer-based systems are fully integrated.

* Please also indicate the level you expect your firm to be in 5 years with regard to connectivity.

Level 1

Level 2

Level 3

Level 4

*** (iii). Digital modelling**

A digital model is a computerised data model of a building, product or some other object that describes the form of an existing or proposed object.

- Level 1: No digital modelling.
- Level 2: Some processes use digital modelling.
- Level 3: Most processes use digital modelling.
- Level 4: All relevant processes use complete digital modelling.

*** Please also indicate the level you expect your firm to be in 5 years with regard to digital modelling.**

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** (iv). Equipment**

- Level 1: Significant overhaul is required to meet Manufacturing 4.0 model.
- Level 2: Some machines and systems can be upgraded.
- Level 3: Machines already meet some of the requirements and can be upgraded where required.
- Level 4: Machines and systems already meet all future requirements.

*** Please also indicate the level you expect your firm to be in 5 years with regard to equipment.**

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** (v). IT**

- Level 1: The core business is not supported by IT systems.
- Level 2: The core business process is supported by IT systems.
- Level 3: Some areas of the business are supported by IT systems and integrated with each other.
- Level 4: All areas of the business are supported by IT systems and are fully integrated with each other.

*** Please also indicate the level you expect your firm to be in 5 years with regard to IT.**

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* (vi). Maintenance

- Level 1: Equipment is manually maintained in line with the maintenance schedule.
- Level 2: Some machines alert operators of performance issues which enables them to manually schedule a maintenance task.
- Level 3: Some machines are self-diagnosing, automatically passing information to the maintenance scheduling system.
- Level 4: Machines are generally self-diagnosing, and the maintenance schedule adjusts itself based on real-time data inputs from the machine.

* Please also indicate the level you expect your firm to be in 5 years with regard to maintenance.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* (vii). Operations data usage in the cloud

- Level 1: Cloud solutions not in use.
- Level 2: Initial solutions planned for cloud-based software, data storage and data analysis.
- Level 3: Pilot cloud solutions implemented in some areas of the business.
- Level 4: Multiple cloud solutions implemented across the business.

* Please also indicate the level you expect your firm to be in 5 years with regard to operations data usage in the cloud.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* (viii). Process optimisation

- Level 1: Self-optimising or reacting processes are not in use.
- Level 2: Self-optimising or reacting processes are not in use, but there are pilots in more advanced areas of the business.
- Level 3: Self-optimising or reacting processes are used in selected areas.
- Level 4: Self-optimising processes or reacting processes are widely used.

* Please also indicate the level you expect your firm to be in 5 years with regard to process optimisation.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* (ix). Resource planning

- Level 1: Resource planning and technical production processes are managed through informal or ad-hoc methods.
- Level 2: Resource planning and technical production processes are managed and executed in silos using defined instructions.
- Level 3: Resource planning and technical production processes are formally connected. However, the exchange of data and information across different functions is predominantly managed by humans.
- Level 4: Resource planning and technical production processes are formally connected. The exchange of data and information across different functions is predominantly executed by equipment, machinery, and computer-based systems.

* Please also indicate the level you expect your firm to be in 5 years with regard to resource planning.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



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Section 3.2: Smart products and processes

18. What is your level of competency in smart products and processes, notably in the following areas? [Level 1: Beginner; Level 2: Intermediate; Level 3: Experienced; Level 4: Expert]

* (i). Data used for analytics

- Level 1: Data is not used.
- Level 2: 0-20% of collected data is used.
- Level 3: 20-50% of collected data is used.
- Level 4: More than 50% of collected data is used.

* Please also indicate the level you expect your firm to be in 5 years with regard to data used for analytics.

Level 1

Level 2

Level 3

Level 4

* (ii). Data used for operations

- Level 1: Data is only used for quality and regulatory purposes.
- Level 2: Some data is used to control processes.
- Level 3: Some data is used to control and optimise processes, e.g., predictive maintenance.
- Level 4: All data is used not only to optimise processes but also for decision making.

* Please also indicate the level you expect your firm to be in 5 years with regard to data used for operations.

Level 1

Level 2

Level 3

Level 4

* (iii). Data protection

- Level 1: No data protection policies or procedures are followed.
- Level 2: Have internal policies but do not ensure compliance in engagement with suppliers/customers.
- Level 3: Good understanding of robust policies and procedures but haven't updated for General Data Protection Regulation.
- Level 4: Conducted a recent General Data Protection Regulation audit and are confident of compliance including in light of Manufacturing 4.0.

* Please also indicate the level you expect your firm to be in 5 years with regard to data protection.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* (iv). Data-driven decisions

- Level 1: Data is not widely analysed.
- Level 2: Some data is analysed and featured in key business reports to review performance.
- Level 3: Most data is analysed, and the results are considered when making business decisions.
- Level 4: All relevant data is analysed and informs business decisions.

* Please also indicate the level you expect your firm to be in 5 years with regard to data-driven decisions.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* (v). Intelligence

- Level 1: No electronic or digital devices are used.
- Level 2: Equipment, machinery, and computer-based systems can be pre-programmed.
- Level 3: Equipment, machinery, and computer-based systems can notify operators of deviations from predefined parameters.
- Level 4: Equipment, machinery, and computer-based systems can predict and notify operators of possible causes of deviations.

* Please also indicate the level you expect your firm to be in 5 years with regard to intelligence.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** (vi). Product customisation**

- Level 1: The nature of the product does not allow for individualisation or standardised mass production.
- Level 2: The majority of products are made in large batch sizes with limited late differentiation. [Late differentiation is the practice of postponing changes to a base product until the end of the manufacturing process]
- Level 3: Products can be largely customised but still have a standardised base.
- Level 4: Late differentiation is available for most make-to-order products.

* Please also indicate the level you expect your firm to be in 5 years with regard to product customisation.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** (vii). Product lifecycle management**

- Level 1: Processes along the product lifecycle are not managed.
- Level 2: Processes along the product lifecycle are managed and executed in silos.
- Level 3: Digital tools and systems that manage product lifecycles are linked with each other. However, the exchange of information along the product lifecycle is predominantly managed by humans.
- Level 4): Digital tools and systems that manage the product lifecycle are formally linked with each other, and the exchange of information along the product lifecycle is mainly executed by computer-based systems.

* Please also indicate the level you expect your firm to be in 5 years with regard to product lifecycle management.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



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Section 3.3: Strategy and organization

19. What is your level of competency in strategy and organisation, notably in the following areas? [Level 1: Beginner; Level 2: Intermediate; Level 3: Experienced; Level 4: Expert]

* (i). Degree of strategy implementation

- Level 1: Manufacturing 4.0 is not part of the strategic process.
- Level 2: Manufacturing 4.0 is an issue at the departmental level but is not integrated into the strategy.
- Level 3: A Manufacturing 4.0 strategy has been defined.
- Level 4: A Manufacturing 4.0 strategy is being implemented.

* Please also indicate the level you expect your firm to be in 5 years with regard to the degree of strategy implementation.

Level 1

Level 2

Level 3

Level 4

* (ii). Employee skills

- Level 1: Employees have little or no experience with digital technologies.
- Level 2: Employees in technology-focused areas of the business have some digital skills.
- Level 3: Employees across most areas of the business have intermediate level digital and data analysis skills.
- Level 4: Employees across the business have advanced digital and data analysis skills.

* Please also indicate the level you expect your firm to be in 5 years with regard to employee skills.

Level 1

Level 2

Level 3

Level 4

*** (iii). Employee training**

- Level 1: There is no formal learning and development program to onboard and train the workforce.
- Level 2: There is a formal learning and development program with clear commencement and conclusion points. The scope is limited to skills acquisition.
- Level 3: There is a continuous learning and development program that is integrated with organisational objectives, talent attraction, and career development.
- Level 4: Formal feedback channels are in place to allow integrated learning and development programs to be jointly curated and updated by employees, HR, and management.

* Please also indicate the level you expect your firm to be in 5 years with regard to employee training.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** (iv). Factory-of-the-Future (FoF)**

FoF is a concept that describes the next generation of manufacturing facilities. It is a vision of a highly digitized and interconnected manufacturing environment that leverages advanced technologies to create a more efficient and flexible production system.

- Level 1: Intentions to establish a Factory-of-the-Future are not identified as a strategic focus in the company's plans.
- Level 2: Intentions to establish a Factory-of-the-Future have been identified as a strategic focus in the company's plans.
- Level 3: A long-term strategy and governance model to establish a Factory-of-the-Future exists or is under construction.
- Level 4: The long-term strategy and governance model to establish a Factory-of-the-Future has been put into place.

* Please also indicate the level you expect your firm to be in 5 years with regard to Factory-of-the-Future.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** (v). Investment**

- Level 1: No sizeable Manufacturing 4.0 investment.
- Level 2: No ongoing review of cost/benefit analysis for Manufacturing 4.0 investment.
- Level 3: Annual cost/benefit analysis of Manufacturing 4.0 investment.
- Level 4: Quarterly cost/benefit analysis of Manufacturing 4.0 investment.

* Please also indicate the level you expect your firm to be in 5 years with regard to investment.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** (vi). Leadership competency**

- Level 1: Management is unacquainted with the latest concepts of Manufacturing 4.0 that can enable the next phase of advancement.
- Level 2: Management is partially familiar with the latest concepts of Manufacturing 4.0 that can enable the next phase of advancement.
- Level 3: Management is fully familiar with the latest concepts of Manufacturing 4.0 that can enable the next phase of advancement.
- Level 4: Management (internally or through external support) can apply the latest concepts of Manufacturing 4.0 to enable improvements in at least one area.

* Please also indicate the level you expect your firm to be in 5 years with regard to leadership competency.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** (vii). Measurement of Manufacturing 4.0**

- Level 1: No indicators exist to determine the status of the Manufacturing 4.0 implementation.
- Level 2: A structured set of business metrics exists, with some measurement of Manufacturing 4.0 drivers.
- Level 3: Manufacturing 4.0 metrics are widely understood in the business and used in monthly reporting.
- Level 4: Business metrics and personal development plans are focused on Manufacturing 4.0 objectives.

* Please also indicate the level you expect your firm to be in 5 years with regard to the measurement of Manufacturing 4.0.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



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Section 3.4: Supply chain

**20. What is your level of competency in supply chain, notably in the following areas?
[Level 1: Beginner; Level 2: Intermediate; Level 3: Experienced; Level 4: Expert]**

* (i). Integration

- Level 1: Ad-hoc reactive communication with suppliers and customers.
- Level 2: Basic communication and data sharing where required with suppliers and customers.
- Level 3: Data transfer between key strategic suppliers/customers (e.g., customer inventory levels).
- Level 4: Fully integrated systems with suppliers/customers for appropriate processes (e.g., real-time integrated planning).

* Please also indicate the level you expect your firm to be in 5 years with regard to integration.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* (ii). Inventory control

- Level 1: Inventory levels are understood but not recorded in a computer database.
- Level 2: A computer database, which is manually updated with inventory levels, is used.
- Level 3: A computer database, which is updated by smart devices, is used.
- Level 4: A real-time database, which is updated by smart devices, is used.

* Please also indicate the level you expect your firm to be in 5 years with regard to inventory control.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* (iii). Tracking

- Level 1: There is limited or no product tracking.
- Level 2: Products can be tracked as it moves between manufacturing and internal distribution sites.
- Level 3: Products can be tracked through manufacturing and distribution until it reaches the customer's distribution centre.
- Level 4: Products can be tracked along the complete lifecycle.

* Please also indicate the level you expect your firm to be in 5 years with regard to tracking.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* (iv). Visibility

- Level 1: There is no integration with suppliers or customers.
- Level 2: Site location, capacity, inventory, and operations are visible between first-tier (highest level) suppliers and customers.
- Level 3: Site location, capacity, inventory, and operations are visible throughout the supply chain.
- Level 4: Site location, capacity, inventory, and operations are visible in real-time throughout the supply chain and used for monitoring and optimisation.

* Please also indicate the level you expect your firm to be in 5 years with regard to visibility.

Level 1	Level 2	Level 3	Level 4
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>