



# ITU Workshop on Advancing Environmental Efficiency of Emerging Technologies

**Eco-friendly criteria for tech SMEs**

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- ▶ Until now, the prominent interest of researchers and policymakers has been focused almost exclusively on large manufacturing corporations
- ▶ belief that SMEs are supposed to be mainly followers rather than first adopters of innovations (Carafora 2021).
- ▶ But in many international areas, the role of SMEs is widely predominant.

# Criteria for tech SMEs



[Report D.WG1-04](#)



[Report D.WG 3-01](#)



?practise?





# Need to engage Small and mid-size enterprises (SMEs) on the issue of sustainability

- ▶ [D.WG1-04](#); [D.WG3-01](#) provide a list of key performance indicators (KPIs) metrics for SMEs to assess their sustainability and guidelines on the eco-friendly criteria for AI and other emerging fields of technology

## D.WG1-04 :

Key performance indicators (KPi) for small and medium enterprises to assess the achievement of sustainable development goals

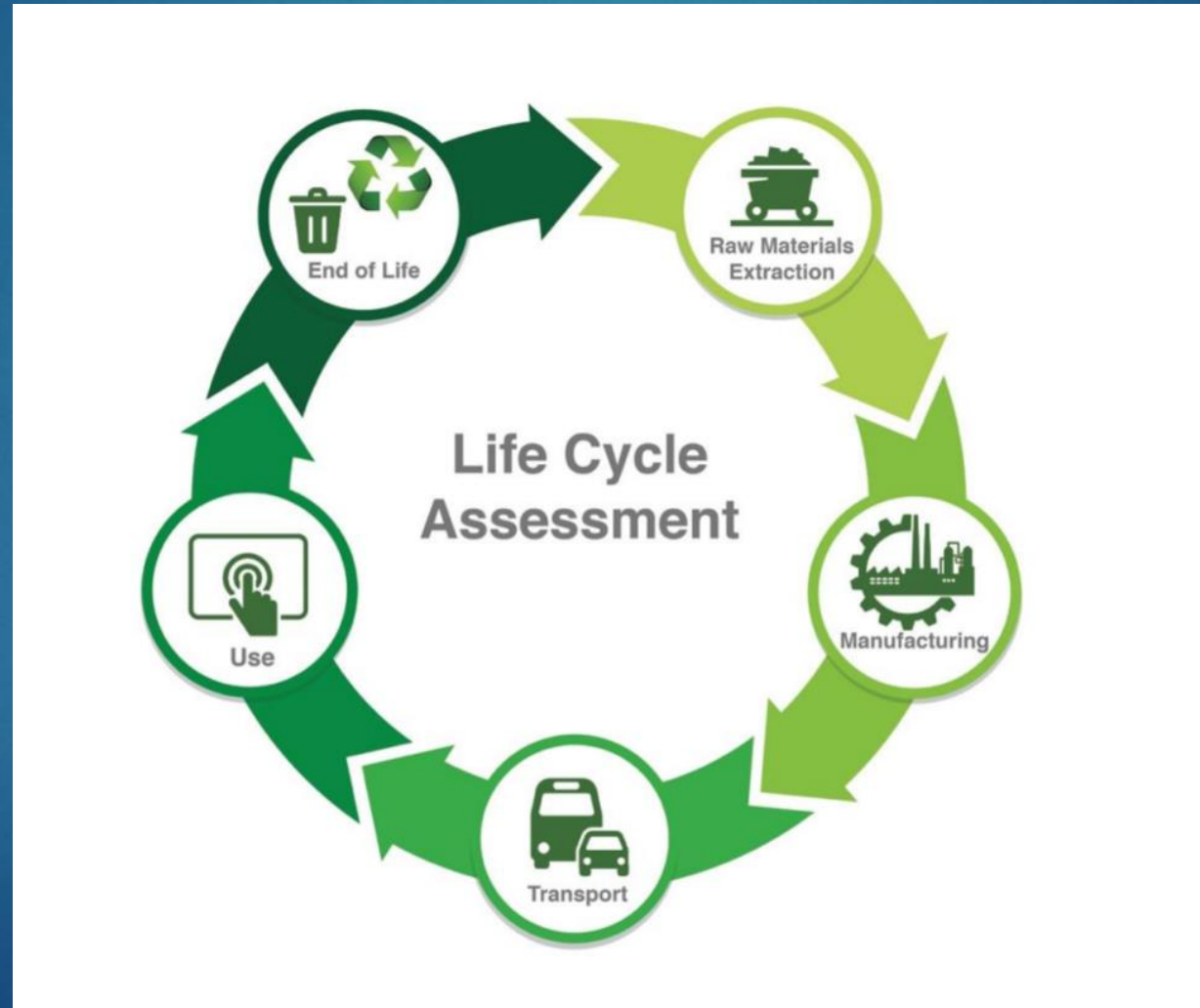
The sustainability of SMEs is based on various aspects:

- ▶ – **Work environment: taking into account the ability to ensure the welfare (safety, health, education, etc.) of the employees**
- ▶ – Transport: assessing the impact of transport of good and persons – Emissions: evaluating greenhouse gases and noxious gases
- ▶ – Procurement: measuring the effect of procuring resources deemed as unsustainable
- ▶ – Energy: measuring the proportion of renewables and identifying the usage categories
- ▶ – Waste: evaluating the enterprises' outputs.

## D.WG3-01 : Guidelines on the implementation of ecofriendly criteria for AI and other emerging technologies

- ▶ The Report provided guidelines to policymakers, technologists, innovators, environmentalists, and other stakeholders from the technology industry, environmental sciences, and policy arena, on the topic of eco-friendly criteria to assess the environmental impacts of artificial intelligence (AI) and other emerging technologies.

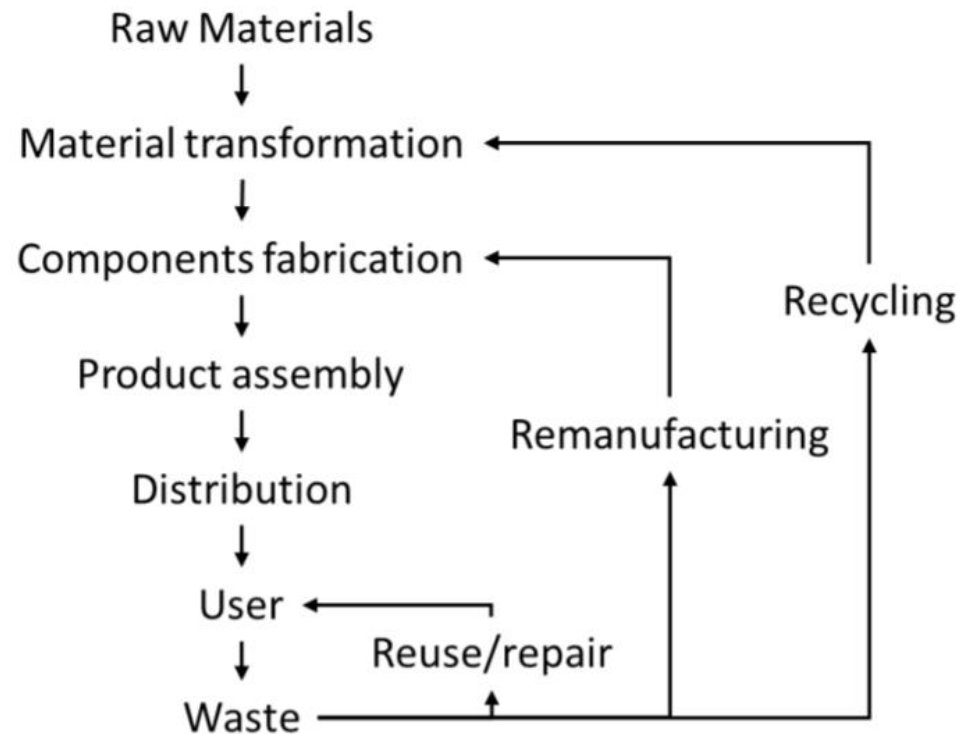
# Definition of stages for the analyses of the environmental impact





# Life-cycle of a product in Industry 4.0

Industry 4.0 can also help build a more circular economy. A circular economy is an alternative to a traditional linear economy (make, use, dispose) in which we keep resources in use for as long as possible, extract the maximum value from them whilst in use, then recover and regenerate products and materials at the end of each service life. Figure 7 is an illustration of the circular economy.





# Set of questions for policy makers

## Generic survey for technology industry

- 1) **What is the geographical focus of your company?**
  - national
  - broader region
  - international
  - truly global (all continents)
- 2) **Do you orient your company along national or international plans of environmental efficiency?**
  - national
  - international
  - both
  - don't know
  - other, such as (please fill in) .....
- 3) **What is the degree of importance when you think about concrete investments into environmental efficiency in the coming few years**  
*how important are investments into these areas for your company?*
  - top priority

# Important Issues



Small and mid-size enterprises (SMEs) show big differences in reality




Even in Europe there are huge gaps between theory and reality



We have to take into consideration the human factor





▶ Study results provide clear evidence that technological and organisational factors represent crucial inputs compared to environmental factors for green innovation, green HRM and green marketing when SMEs seek sustainable performance.

▶ Specifically, a positive strong relationship is shown between technological factors and green innovation, organisational factors and green HRM and environmental factors and green marketing (Alraja 2022).

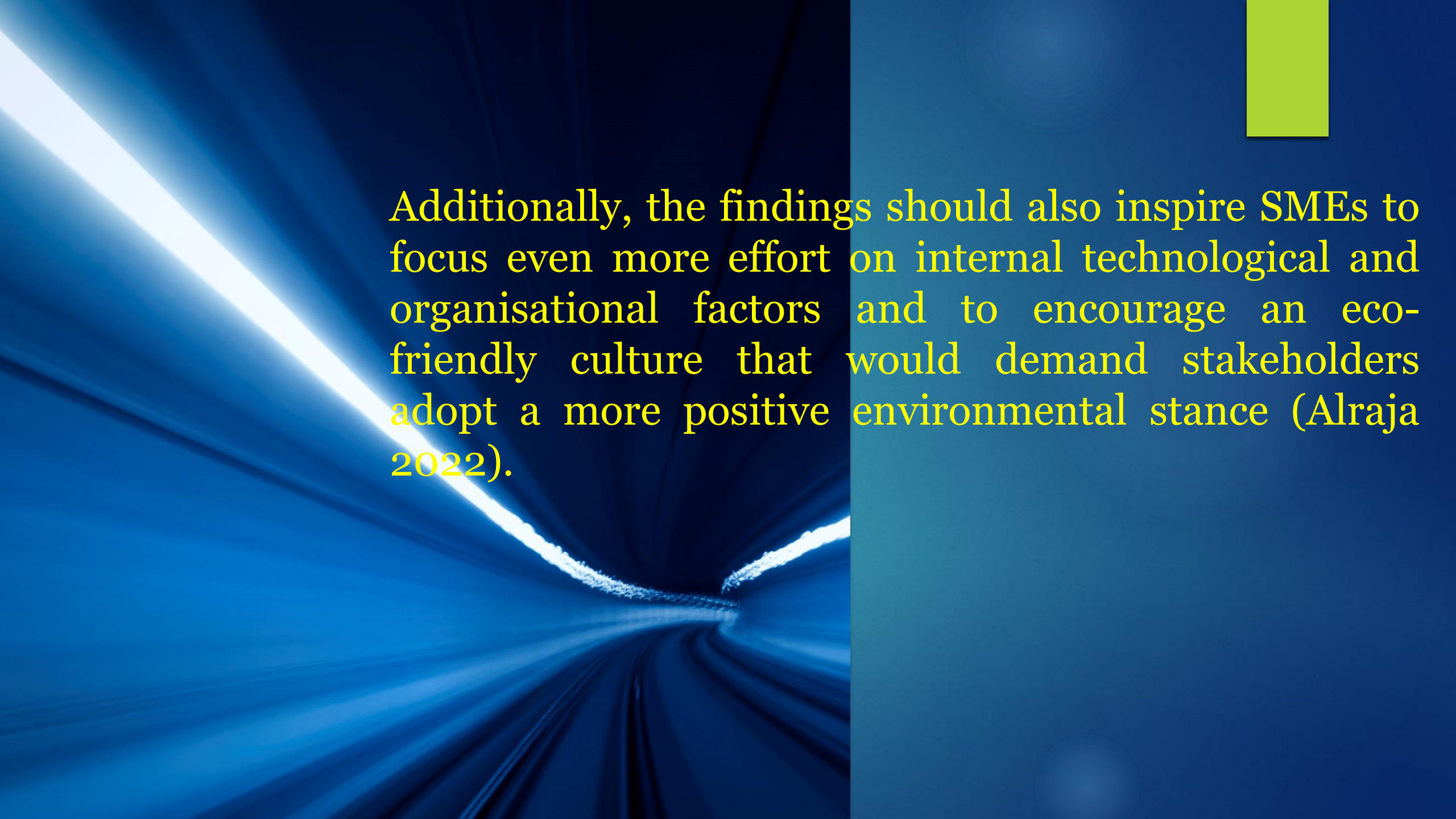
# Therefore, for the transition to a circular economy we need

- ▶ campaigns to increase awareness and understanding and mainstream discussions about circularity
- ▶ Tax breaks & subsidies for operating closed-loop models, and penalties for generating excess waste
- ▶ Pledges, voluntary or legally binding, to encourage circularity practices in the private sector
- ▶ Access to technology and infrastructure required to process waste, and encourage knowledge transfers with international experts
- ▶ cultural influencers can drive understanding about circularity and generate consumer demand for closed-loop products that would open new markets for eco-inclusive SMEs



# SUPPORTING SMEs IN THE TRANSITION TO A CIRCULAR ECONOMY

- ▶ Improving Information and Education
- ▶ Encouraging Regulation and Policy
- ▶ Improving Access to Technology and Infrastructure
- ▶ Taking into account the real possibilities of small enterprises
- ▶ Taking into account the human factor



Additionally, the findings should also inspire SMEs to focus even more effort on internal technological and organisational factors and to encourage an eco-friendly culture that would demand stakeholders adopt a more positive environmental stance (Alraja 2022).

# Facts

- ▶ Small enterprises are an important backbone of our industry and economical well being
- ▶ Small enterprises do not have the financial possibilities as medium enterprises
- ▶ The need of well trained personal is getting bigger
- ▶ There is a big lack of IT-trained and competent staff
- ▶ Environmental factors deal always with human beings
- ▶ IT competence will maybe start now in some schools by 2023
- ▶ Daily use of IT is starting not regularly at any elementary school in Europe

# The Human Factor (Global SME Mindset)

- ▶ In a technology-dependent global economy, human factors remain critical to success for SMEs.
- ▶ Access to talent and an affordable supply of skilled workers are prerequisites for growth, as is a healthy company culture that focuses on innovation, prepares employees to master the latest digital tools, and fosters confidence in management's ability to navigate change.

2,100

SMEs surveyed

46%

Are hiring actively to  
support growth strategy

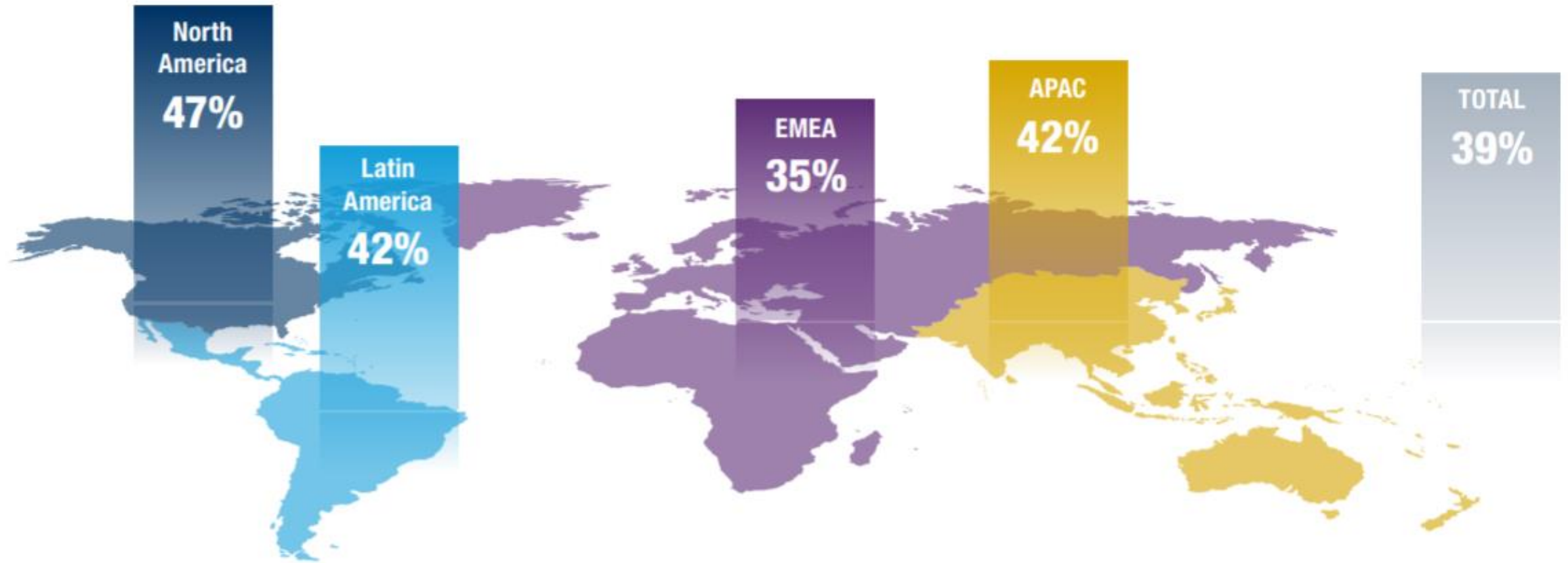
39%

Find it increasingly hard to  
hire skilled workers to  
match business needs



# SMEs see a huge gap of skilled workers

Firms that find it increasingly difficult to recruit people with the right skills for their business



# Summary

- ▶ Carfora (2021) found that the stakeholders with not-contractual ties with SMEs affect Green innovations.
- ▶ Among stakeholders with not-contractual ties only workforce represents a strong stimulus to eco-innovate.
- ▶ Anyway, contrary to expectations, public administrations exert a negative influence; that is, they appear to hinder SMEs approach towards GIs

# Summary



- ▶ Technology has changed many things for SMEs, including the way they address human factors such as personnel needs, management focus, and company culture.
- ▶ The reality facing SMEs is that the degree to which they can effectively manage human factors and weave technology into their cultures will go a long way toward determining how successful their businesses can be—and how well a global economy that depends on SMEs for growth will perform.
- ▶ Business culture has an important role in the company's success





Thank you for your  
attention

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