



18th October, 2024 | São Paulo, Brazil

0930-1010 Session 8 | Impact of Climate Change, Environment Sustainability & Net-Zero

- **Chair: Dr. Paulo Gadelha, Coordinator of the Fiocruz Strategy for the 2030 Agenda/Fiocruz**
 - Dr. Jean-Pierre Amorij, Vaccine Technology Specialist-UNICEF-SD (virtual)
 - Dr. Ankur Mutreja, Director of Strategy, Partnerships and Communications, South Asia-PATH
 - Dr. Daniel Rodriguez, Director of Procurement-PAHO
 - Dr Carina Fichard de Miranda, Senior Investment Officer Health and Education Latin America and Caribbean Lead Upstream and PPPs-IFC
- Audience Q&A

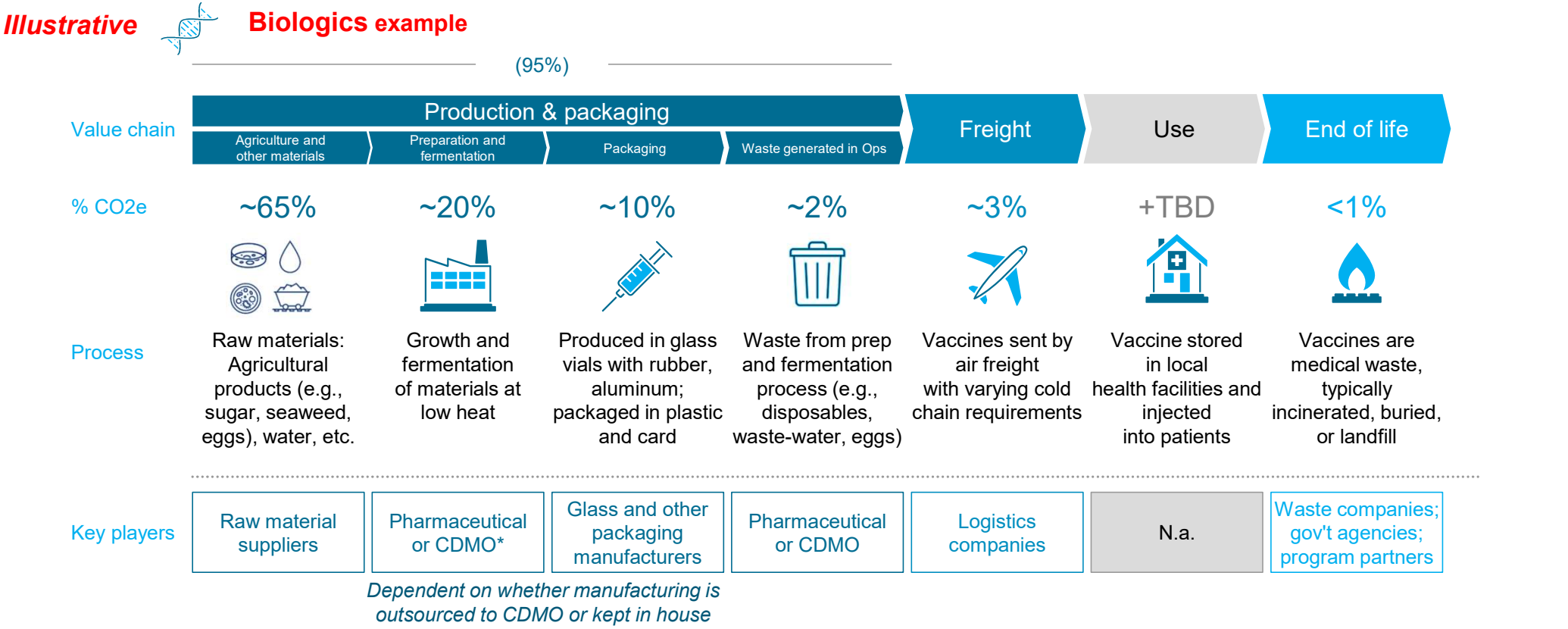
UNICEF & decarbonization of vaccines - Sustainable procurement of vaccines

Jean-Pierre Amorij, Technical Specialist
Vaccine Centre, UNICEF Supply Division

DCVMN Annual Meeting, October 2024

GHG Emissions for vaccines in the value chain

largely driven through upstream production and raw materials



Note: Process for typical biologic, production processes vary significantly within biologics and across small molecule. This does not tie to UNICEF 2019 baseline given no activity teardown possible with public emission factors and data available.
Source: IVL, SMI, BCG Analysis
* Contract Development and Manufacturing Organizations

GHG Emissions of vaccines

– abatement levers

~15% at low cost

More expensive abatement levers

Cost neutral (or savings) from efficiency gains and power switch

Higher cost for high temp. heat and process change
Difficult to abate raw materials

- 1 Recycling in packaging products (aluminum, rubber)
- 2 **Power efficiency** changes in production & fermentation process (e.g., optimize air flow exchange, reduce leaks)
- 3 **Heat efficiency** changes in production & fermentation process (e.g., optimize low temp requirements, reduce leaks)
- 4 Increase recycling and reduce waste in glass vial production
- 5 **Electrification** in production (e.g., use heatpumps and direct electric heating to substitute for lower heats)
- 6 Regenerative agricultural products used in **raw materials** (sugar, etc.)
Difficult to abate raw materials required in vaccines due to specific regulation and requirements (i.e. substitutions not feasible); focus on encouraging **sustainable practices upstream** with those raw ingredients
- 7 Use of **low-carbon heat sources** in production (e.g. biomass)
- 8 Use of **CCUS** on production and incineration for rubber
- 9 Use of **sustainable fuels** in freight

GHG Emissions

Energy Consumption


Packaging

Upstream Supply Chain Suppliers

Waste management & circularity


Transport & International freight

Supply Chain efficiencies



Traceability and Verification System (TRVST)
Enable barcode encoded data use to

- Verify products (counter falsification & diversion)
- Improve **stock management**, supply efficiencies (incl recalls), **reduce waste**,
- Enable **e-leaflets**



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<https://www.unicef.org/supply/documents/unicef-supply-scope-3-greenhouse-gas-emissions-baseline>

Moving Vaccine Manufacturing and Supply Chain towards Net Zero

Dr Ankur Mutreja

Director – Strategy, Partnerships and Communications



DCVMN, 18th Oct'24, Sao Paulo



‘Net Zero Energy’ (NZE) is a concept to raise energy efficiency of buildings and processes by reducing energy consumption and waste to the minimum and by generating sufficient renewable energy on-site to offset the consumption of grid electricity (grid-linked).

Why apply Net Zero?

Vaccine Manufacturing

- Taking India as an example, **our bio-economy has grown from \$10 billion in 2014 to \$151 billion by the end of 2023**. Indian manufacturers supplied 25% of the vaccines purchased by WHO during COVID-19. ¹
- Energy transition is a must and **the biofuels and circular economy are essential for sustainability of the bio-economy** in the long run
- The scope of **biotechnological advancements is crucial to achieving a carbon-neutral future** for a sustainable and greener planet.

Vaccine Supply Chain

- **Countries suffer from chronic vaccine distribution failures due to irregular and unreliable shipments:**
 - Access to transport is uncertain and poorly planned
 - Vaccine storage conditions are not continuously monitored. ²
- The **number, volume and value of vaccines and temperature-sensitive medicines is steadily increasing globally.**

What is being done?

Regulations

- Taskforce on Climate related Financial Disclosures (TCFD).¹
- Health Sector Climate Pledge in the US²

Global Health x Sustainability Political Momentum:

- Both, the G7 and G20 are integrating Climate and Health in their Health and Finance agenda.
- Unprecedented focus on global health and climate change at UNGA 2023. ³

Investors and Employers

- *Investors:* Life Sciences companies scoring highly in ESG enjoyed a 0.35% lower cost of capital compared to those with lower scores.⁴
- *Employers:* Life Sciences companies are increasingly engaging employees on sustainability agendas and ensuring environmental considerations are part of the decision-making process. ⁵

Healthcare Providers

- Increasingly, pharmaceutical tenders have environmental considerations built in ⁶

What can be done?

Vaccine Manufacturing



Support research into new manufacturing techniques that may produce vaccines with a smaller carbon footprint.

Work alongside regulators to establish and adhere to sustainability standards in vaccine manufacturing.

Transition to bio-based and renewable materials for vaccine production and opt for biodegradable or recyclable packaging solutions to minimize environmental impact.

Shift manufacturing facilities to use solar, wind, or other renewable energy sources to power operation

Adopt zero-waste strategies by recycling materials and finding ways to repurpose by-products from the manufacturing process.

Vaccine Supply Chain



High energy efficiency in storing and delivering vaccines to reduce the recurrent costs of distribution.

Adopting a system of planned vaccine deliveries by dedicated electric vehicle

Solar modules on the roofs of stores linked to the electrical grid could generate enough 'green' energy for storage and transport.

'Green' distribution systems for vaccines and medicines could meet an increasing need for cooling in public health programs.

PATH for Net Zero



Solarized active-cooling vaccine-carriers (Emvolio) to ensure climate-resilient & sustainable immunization



Learnings from Solarisation of Oxygen Generating Plants (OGPs)



In partnership with WHO and Ministry of Health, Tunisia implemented “Project Optimize” to demonstrate innovative health supply chain solutions



PAHO & decarbonization

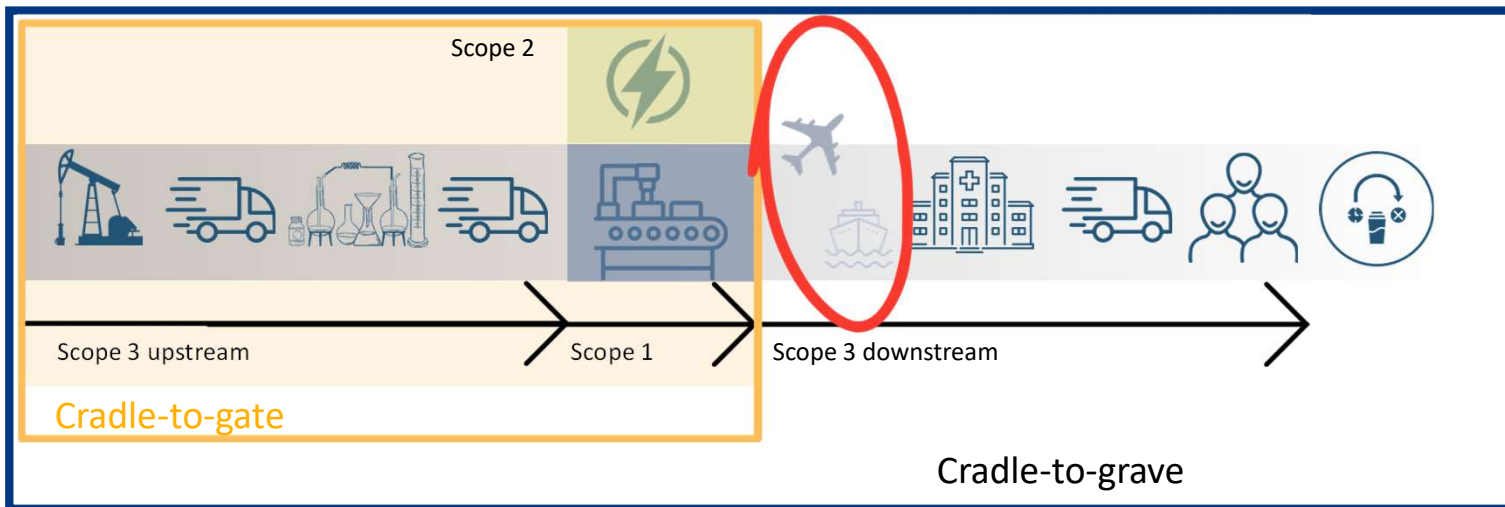
Dr. Daniel Rodriguez

Director of Procurement-PAHO



SETTING INVENTORY BOUNDARIES: CRADLE-TO-GATE VS CRADLE-TO-GRAVE

- The cradle-to-gate or partial Product Carbon Footprint (PCF) is the sum of GHG emissions, expressed as CO2 equivalents, from the extraction of the resources up to production of the final product.
- It includes all product-related direct GHG emissions from production processes that are owned or controlled by the reporting company (Scope 1) as well as emissions from the generation of purchased energy such as electricity and steam (Scope 2) and use of raw materials consumed by the product-processing plants (upstream Scope 3).



Source: Based on ISO 14067:2018 setting system boundary



Goal: Reduce by 50% GHG Intensity Factor by 2030

PAHO Scope 3.4 Supply Chain Emission Reduction Strategy (2024-2030)



Encourage supplier sustainability action:

- Sustainability policy and/or strategy
- Supplier emissions reduction targets
- Annual reporting against targets



Promote modal shift to low-emission transportation options:

- Awareness & capacity building on low-emission solutions
- Low-emission transport of non-temperature-controlled products
- Innovative low-emission transport of temperature-controlled products



Reduce packaging and promote sustainable material use:

- Minimizing material use in packaging
- Promote sustainable and reusable packaging
- Advocate digital solutions for product instructions



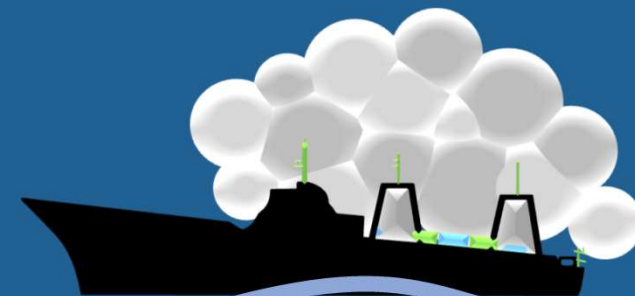
Enhance shipping consolidation in PAHO supply chain operations:

- Further strengthening shipping consolidation
- Leveraging pre-positioning opportunities
- Showcase industry pilot business cases



Leverage low-emission transportation solutions:

- Sustainable in-land transport solutions
- Usage of sustainable air (SAF) and maritime fuels
- Usage of Green Shipping Corridors



Fostering sustainable vaccine manufacturing

Carina Fichard de Miranda,
Senior Investment Officer & Program Leader for
the Services upstream advisory work for LAC

DCVMN 25th AGM, October 18, 2024, São Paulo, Brazil

Fostering Sustainable Vaccine Manufacturing – Technical Assistance

IFC can support vaccine manufacturers optimize both new and existing facilities. From initial designs and preliminary diagnostics to actionable improvement plans with clear KPIs, we aim to create resource-efficient, green-certified facilities.

1



RESOURCE EFFICIENCY

Assess and improve **vaccine manufacturers' performance in energy, water use, renewable generation and material use efficiency:**

- Comparing them against **global industry benchmarks.**
- **Evaluating production processes** and utilities to identify gaps and propose improvements.
- **Including operational and production-based KPIs.**
- **Developing action plans** with specific investment needs.
- **Implementing a systemic approach to resource efficiency measurement,** target setting, reporting, and improvement.

2



SUSTAINABLE COOLING

Implement **business models for both new and existing facilities that prioritize efficient HVAC systems:**

- **Perform data measurement and analysis,** providing insights into **the performance of critical systems** such as furnaces, chillers, compressors, condensers, piping, etc
- **Provide tailored recommendations to reduce the carbon footprint of cooling systems.**
- Develop a decarbonization plan **setting GHG reduction targets for sustainable cooling systems.**

3



GREEN BUILDING CERTIFICATION

IFC' **EDGE toolkit** for green buildings

- Helps achieve a **lighter carbon footprint and optimize water and energy use.**
- Provides a metrics-driven approach to sustainability strategy **for both new and existing plants, focusing on savings in water, energy, and materials.**
- **Certifies with three ambition levels: EDGE, EDGE Advanced, and EDGE Net Zero.**
- **Globally, EDGE has certified over 60 million square meters,** significantly contributing to the transformation of the green building certification market.

Fostering Sustainable Vaccine Manufacturing – Financing

In addition to technical assistance, IFC can finance the identified investments through sustainability-linked financings



SUSTAINABILITY-LINKED FINANCING (SLF)

SLF is designed to incentivize borrowers to achieve ambitious, predetermined sustainability performance targets (SPTs). These loans/bonds can be structured in two categories:

1. **“Use of Proceeds”** – Green/Blue/ESG/ Social, which is **priced in the same way as any conventional debt instrument**.
2. **“Target-Driven”** – SLL/SLBs, which is **priced with interest rates indexed to sustainability performance targets (SPTs) with step up/ step down pricing mechanism, validated and implemented within a sustainability-linked financing framework (SLFF)**.

Description

- **Material, Relevant and Core to the business** and/or its ESG strategy, and **ambitious** compared to “business as usual” and peers.
- **SPTs rationale, ambitiousness and validation** methodology laid out in a SLFF validated by an independent SPO

KPIs

- Strong **historical track record** (at least 3 years).
- Small quantity of KPIs (**2 or 3 typically**).
- **Externally verifiable and/or able to be benchmarked**.

Pricing

- **Step up / step down** pricing mechanism indexed to performance on SPTs.

Verification

- **Second Party Opinion (SPO)** needed
- **Annual verification of achievement of targets needed**



1

IFC can help structure the **KPIs**, calibration of **SPTs**, drafting of the **framework** and review the **implementation plan**.

2

IFC can **facilitate procurement and verification endorsement**; but validation report needs to be written by SPO.

3

IFC can **structure and coordinate the SLL/SLB launch** included the issuance and the preparation for disclosure.

4

IFC can facilitate **contacts for target verification**; but the report must be written by SPO / audit company.

Thank you!





Panel Discussion & Audience Q & A



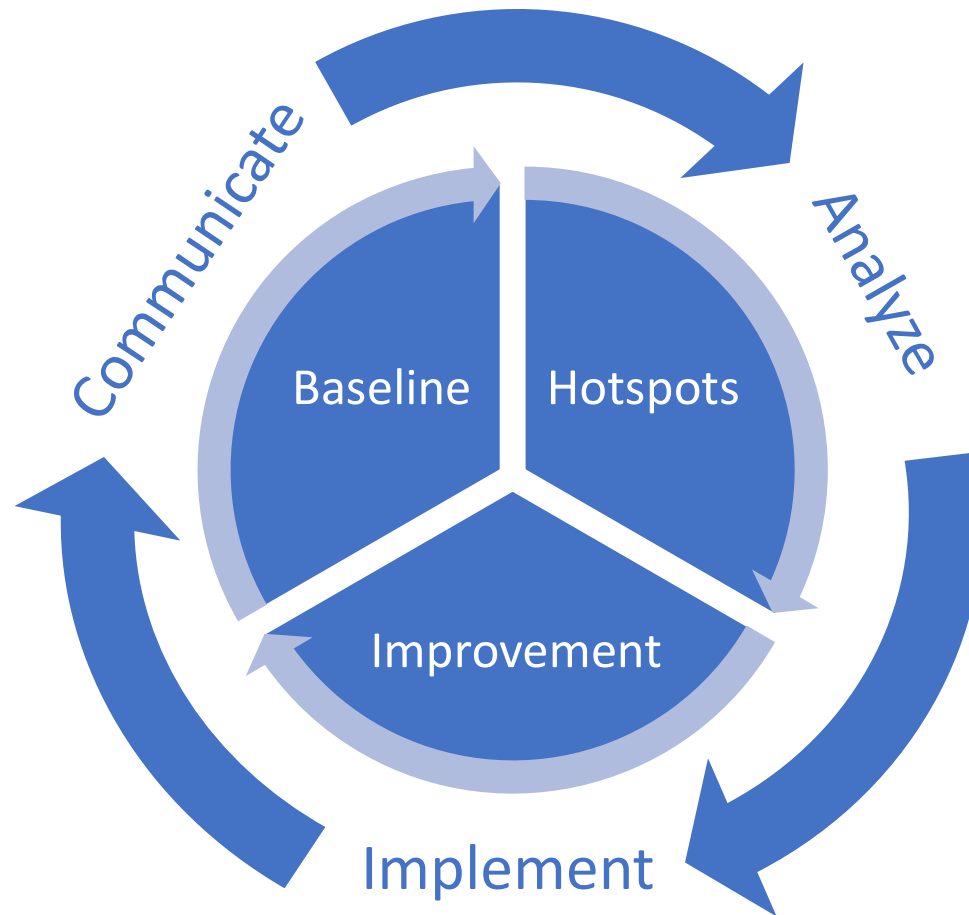
Concluding remarks

Decarbonization in the vaccine supply chain

Dr. Paulo Gadelha,
Coordinator of the Fiocruz Strategy for the 2030 Agenda/Fiocruz

How to make your business more environmentally sustainable

One step at a time



High-level indicative roadmap towards carbon reduction & net-zero

Hotspot Analysis, Baseline & GHG Inventory	Use of renewable, low-carbon energy and international transport optimization	Implement relative simple / mature interventions in production & circularity	Deep-dive assessments	Feasibility assessment of intervention based on LCA-PCF assessment	Feasibility of use more cost-intensive/complex abatement levers
<ul style="list-style-type: none"> •Scope 1 – data •Scope 2 – data •Scope 3 – data connected to your suppliers’ goods/services •Baseline & annual inventory, based on assumptions and/or (your suppliers) reported data 	<ul style="list-style-type: none"> •Purchase agreements for renewable energy (pooled if feasible) •Optimize own energy sources •International transport optimization – (partial) modal shift to sea freight (if feasible) 	<ul style="list-style-type: none"> •Power efficiency •Heat efficiency •Electrification •Increasing circularity (reduce, reuse, repurpose, etc.) in packaging products •Increase recycling/reuse of material input in production (e.g. recycling water, raw materials) 	<ul style="list-style-type: none"> •Life cycle assessment (product/product family specific) •Product Carbon Foot (PCF) assessment – •Identify hotspots in production process as well as upstream (excipients / upstream suppliers) and down-stream (transport, waste management / down-stream suppliers) 	<ul style="list-style-type: none"> •Upstream sustainability in the supply chain (production of raw materials by your suppliers) •Reduction of emissions due to use of materials (reduce weight/volume used) •Regenerative agriculture products substitution or optimization of their production 	<ul style="list-style-type: none"> •Use of low-carbon heat sources in production (e.g. biomass) •Use of sustainable fuels in freight •Regional/local manufacturing (set-up allowing carbon reduction) •Use of CCUS on production and incineration for rubber (and plastics)
Drive awareness and commitment of manufacturers to decarbonization (commitment → declaration)					
Peer to peer learning, knowledge sharing, use of standardized methodologies					
Advance ESG reporting and GHG Emissions disclosures (evidence → verification and audit)					
Set GHG Emission targets (e.g. SBTi)					
Other enablers: communication, collaboration and knowledge sharing					