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MODULE 7

INNOVATION AND GREEN DESIGN	
Duration:	6 Hours
Learning objectives:	**a) Product Innovation: Developing New Products with Sustainable Practices** ● Understand and apply sustainable practices in the product development process. ● Utilize design thinking methodologies to create innovative and environmentally friendly products. ● Evaluate the environmental impact of new products throughout their life cycle. **b) Process Innovation: Improving Business Processes for Sustainability** ● Identify opportunities for improving business processes to enhance sustainability. ● Implement innovative solutions that increase efficiency and reduce waste in business operations. ● Analyze the effectiveness of process innovations in achieving sustainability goals. **c) Business Model Innovation: Creating Innovative and Sustainable Business Models** ● Develop innovative business models that incorporate sustainability as a core principle. ● Apply strategic thinking to assess market opportunities for sustainable business practices. ● Evaluate the feasibility and impact of new business models on environmental and social outcomes. **d) Green Design: Principles of Eco-design for Products and Services** ● Understand the principles of eco-design and their application in product and service development. ● Conduct environmental impact assessments to inform eco-design decisions. ● Develop strategies for implementing sustainable design practices in various contexts.

Sub-Modules:	1. Product Innovation: Developing New Products with Sustainable Practices 2. Process Innovation: Improving Business Processes for Sustainability 3. Business Model Innovation: Creating Innovative and Sustainable Business Models 4. Green Design: Principles of Eco-design for Products and Services
Resources and devices:	**Books** "Design for Sustainability: A Sourcebook of Integrated Eco-logical Solutions" by Janis Birkeland. This book provides a comprehensive overview of sustainable design practices and eco-design principles. "The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses" by Eric Ries. Focuses on innovative approaches to product development and business models, emphasizing sustainability. "Sustainable Product Design" by David A. H. McCulloch. Offers insights into sustainable practices in product design and development. "Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers" by Alexander Osterwalder and Yves Pigneur. **Articles and Journals** 1. Journal of Cleaner Production Publishes research on sustainable production and consumption, including articles on green design and innovation. 2. Sustainability An open-access journal that covers various aspects of sustainability, including sustainable business practices and eco-design. 3. International Journal of Sustainable Engineering Focuses on sustainable engineering practices, including innovations in product and process design.

	Online Resources **The Ellen MacArthur Foundation** Offers a wealth of resources on circular economy principles, including case studies and reports on sustainable design practices. Website: ellenmacarthurfoundation.org **Sustainable Design Toolkit** A practical resource providing tools and guidelines for implementing sustainable design practices. Website: sustainable-design-toolkit.com **GreenBiz** Provides articles, reports, and webinars focused on sustainable business practices and innovations in green design. Website: greenbiz.com **Coursera & edX** Online learning platforms offering courses related to sustainability, innovation, and eco-design from reputable universities. Websites: coursera.org | edx.org **ResearchGate** A platform where researchers share their publications; users can find articles related to innovation in green design. Website: researchgate.net **Devices for Learning** **Computers or Laptops** Essential for research, accessing online resources, and using design software. **Tablets** Useful for reading e-books, accessing online courses, and participating in discussions. **Design Software** Applications such as Adobe Creative Suite (Photoshop, Illustrator), AutoCAD, or SketchUp for product design and modeling. **Project Management Tools** Software like Trello, Asana, or Microsoft Project for managing group projects and timelines.

	Eco-design Assessment Tools Tools such as SimaPro or GaBi for conducting life cycle assessments and environmental impact evaluations. **Presentation Software** Tools like Microsoft PowerPoint or Google Slides for creating presentations on project findings and innovations. **Collaboration Platforms** Online tools such as Slack or Microsoft Teams to facilitate communication and collaboration among team members. **Multimedia Projectors** For presenting group projects and workshops in a classroom or seminar setting. **3D Printers** Useful for prototyping sustainable product designs during hands-on workshops. **Whiteboards/Smartboards** For brainstorming sessions, group discussions, and visualizing ideas during workshops. **Virtual Reality (VR) Headsets** For immersive experiences in eco-design simulations or virtual prototyping environments. **Online Learning Platforms** Access to platforms like Coursera or edX for supplementary courses related to sustainability and innovation. **Research Databases** Access to academic databases such as JSTOR or Google Scholar for finding relevant articles and journals. **Environmental Monitoring Tools** Devices for assessing environmental impacts (e.g., air quality monitors) during practical assessments. **Survey Tools** Online tools like SurveyMonkey or Google Forms for collecting feedback on designs or processes from stakeholders.
Assessment:	**Prototype Development** Description: Learners create a physical or digital prototype of a sustainable product based on eco-design principles.

	Assessment Method: Evaluate prototypes using a rubric that considers innovation, sustainability, functionality, and adherence to eco-design principles. **Case Study Analysis** Description: Assign learners to analyze a real-world case study of a company that successfully implemented green design or innovation practices. Assessment Method: Require a written report or presentation that discusses the strategies used, outcomes achieved, and lessons learned. Use a grading rubric to assess depth of analysis and clarity of presentation. **Group Project on Process Innovation** Description: Learners work in groups to identify an existing business process that can be improved for sustainability and propose an innovative solution. Assessment Method: Evaluate group presentations on their proposed solutions, considering feasibility, sustainability impact, and creativity. Peer evaluations can also be included. **Environmental Impact Assessment (EIA) Report** Description: Learners conduct an EIA for a product or service they design or analyze. Assessment Method: Assess the EIA report based on thoroughness, accuracy of data, and clarity in presenting potential environmental impacts and mitigation strategies. **Business Model Canvas Creation** Description: Have learners develop a business model canvas for a green enterprise. Assessment Method: Evaluate the canvas for completeness, innovation, and alignment with sustainability principles. Provide feedback on each section of the canvas. **Reflective Journals** Description: Throughout the module, learners maintain a reflective journal documenting their learning experiences, insights gained, and applications of concepts.

	Assessment Method: Assess journals based on depth of reflection, connections made between theory and practice, and personal growth in understanding sustainability. **Peer Review Sessions** Description: Organize sessions where learners present their projects or ideas to peers for feedback. Assessment Method: Use structured peer review forms that guide students in providing constructive feedback based on specific criteria related to innovation and sustainability. **Online Quizzes** Description: Use online platforms (e.g., Google Forms, Kahoot) to administer quizzes covering key concepts from the module. Assessment Method: Assess understanding through multiple-choice or short-answer questions related to innovation practices and green design principles. **Field Research Project** Description: Have learners conduct field research on local businesses implementing sustainable practices. Assessment Method: Require a report detailing findings, challenges faced by businesses, and recommendations for improvement. Assess based on research rigor and practical insights provided. **Sustainability Action Plan** Description: Learners develop an action plan for implementing green and sustainable practices within an organization or community. Assessment Method: Evaluate plans based on feasibility, clarity of objectives (especially those aligned to greening of their projects/ enterprises), measurable outcomes, innovation, green jobs created and alignment with sustainability goals.
Skills/abilities developed:	**Innovative and Green Products Development** Ability to design and develop new innovative products that incorporate sustainable practices and eco-design principles.

	Design Thinking Methodology Proficiency in applying design thinking techniques to innovate and solve sustainability-related challenges. **Process Innovation** Skills in analyzing and enhancing business processes to improve sustainability and operational efficiency. **Business Model Innovation** Capability to create and evaluate innovative business models that prioritize sustainability and address market needs. **Eco-design Principles** Knowledge of eco-design principles and the ability to apply them in product and service development. **Environmental Impact Assessment** Competence in conducting environmental impact assessments to evaluate the sustainability of products and processes. **Strategic Sustainability Planning** Ability to develop strategic plans that integrate sustainability into organizational practices and decision-making. **Collaboration and Teamwork** Skills in working effectively within diverse teams to foster innovation and implement sustainable solutions. **Critical Analysis** Proficiency in critically assessing existing practices, identifying areas for improvement, and proposing innovative solutions. **Research Skills** Ability to conduct research on sustainable materials, technologies, and practices, as well as analyze relevant data. **Effective Communication** Strong communication skills for articulating ideas, proposals, and findings related to innovation and green design. **Project Management** Skills in managing projects related to sustainable innovation, including planning, execution, monitoring, and evaluation.

Submodule 7.1

Developing new products with sustainable practices

→ **Skills:**

1. Systems thinking.
2. Sustainable design capabilities.
3. Environmental impact assessment.

DEVELOPING NEW PRODUCTS WITH SUSTAINABLE PRACTICES
Activity 1: Develop a model that uses sustainable product concepts that minimize environmental impact while meeting market needs.
Duration: 1.5 hours
Specific Learning Objectives 1. Understanding the principles of sustainable product development 2. Analyze life cycle assessment methodologies 3. Create innovative products with reduced ecological footprint
Methodology, Resources and Devices **Methodology**: Design thinking approach, collaborative problem-solving sessions, prototype development and sustainability evaluation. **Learning Devices:** Case study analysis, Sustainability simulation exercises, Computer-aided design (CAD) tools, Life Cycle assessment software **Resources**: Books, journals and online resources
Description of the activity and Key Concepts **Activity:** Develop a model that uses sustainable product concepts that minimize environmental impact while meeting market needs. **Key Concepts:** Circular economy principles, material selection for sustainability, eco-innovation strategies, cradle-to-cradle design
Assessment a. Sustainable product prototype presentation b. Lifecycle impact analysis report c. Peer review of design innovations d. Sustainability performance metrics evaluation
Skills/Abilities developed ● Systems thinking ● Sustainable design capabilities ● Environmental impact assessment

- Innovative problem-solving

Further readings, activities, materials, best practices:

Books

"Sustainable Design: The Science of Sustainability and Green Engineering" by Daniel Hoornweg
"Design for the Real World" by Victor Papanek
"Cradle to Cradle: Remaking the Way We Make Things" by William McDonough
"The Circular Economy: A Wealth of Flows" by Ken Webster

Academic Journals

Journal of Cleaner Production
Sustainable Design and Manufacturing International Journal
Research in Engineering Design
Technovation

Best Practices:

Design Strategies

Implement lifecycle assessment throughout product development
Integrate circular economy principles
Prioritize renewable and recyclable materials
Design for disassembly and reuse

Innovation Approaches

Utilize biomimicry as a design inspiration
Develop modular product architectures
Embrace open innovation and collaborative design
Conduct continuous sustainability performance tracking

Technology Integration

Use advanced simulation tools for environmental impact analysis
Leverage AI and machine learning for sustainable design optimization
Implement digital twin technologies for product prototype testing

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SOUTHERN AFRICA DEVELOPMENT, RESEARCH AND TRAINING INSTITUTE NPC
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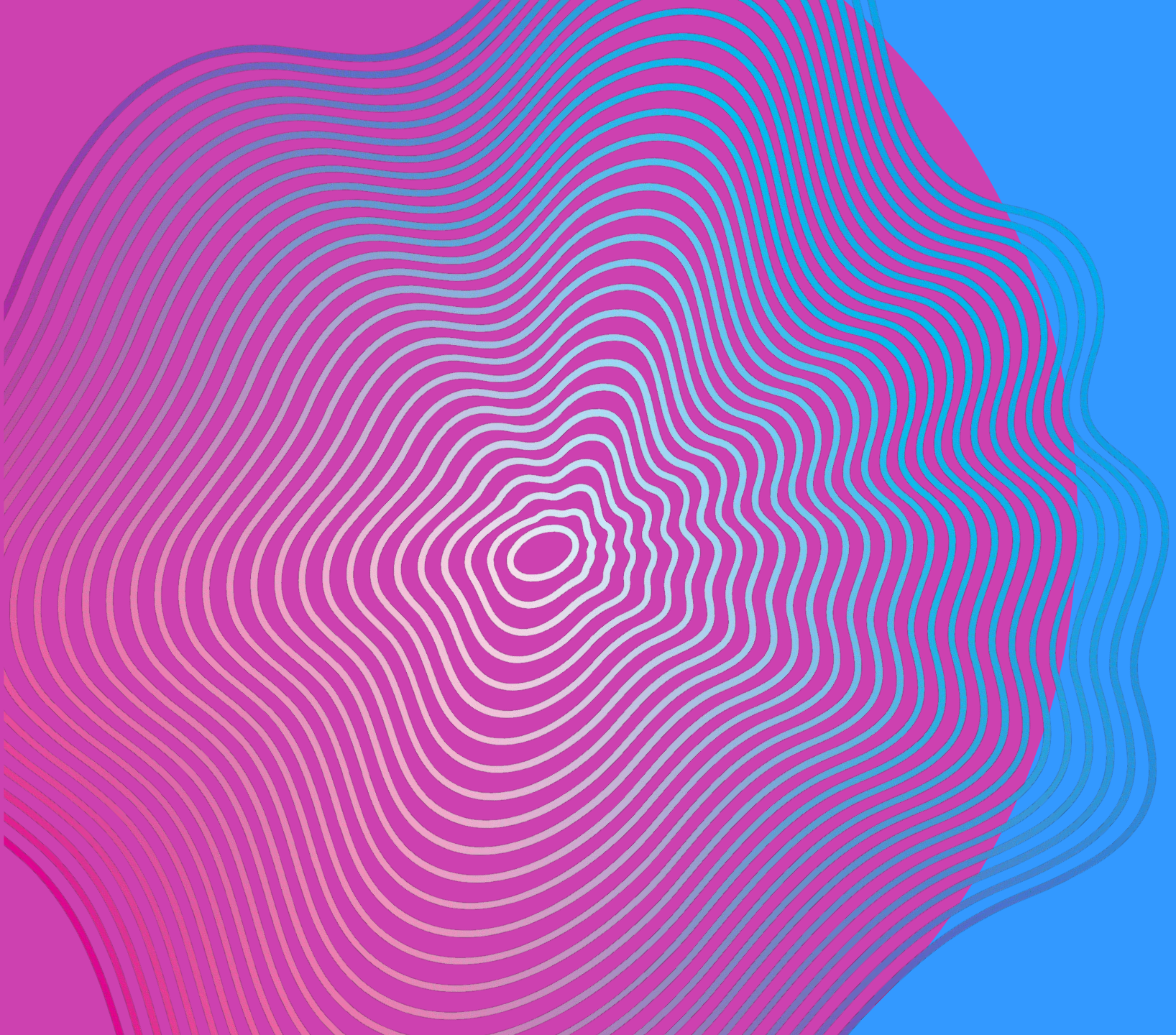

Learning Objectives

- Define the principles of sustainable product development.
- Explain how the circular economy drives product innovation.
- Identify and evaluate sustainable materials.
- Understand the role of life cycle assessment (LCA) in design.
- Apply design thinking for sustainable solutions.
- Prototype and test environmentally friendly products.
- Use of eco-innovation and best practices in product design.
- Design a sustainable product idea addressing a local need.

Key Concepts

- Sustainable Product Design
- Circular Economy Principles
- Sustainable Materials
- Life Cycle Assessment (LCA)
- Eco-Innovation
- Design Thinking
- Green Prototyping
- Product Sustainability Best Practices

What is Sustainable Development?

Sustainable product development involves designing, prototyping, and delivering products that reduce negative environmental impact while responding to social and economic needs. It encourages innovation that balances resource use, profitability, and environmental responsibility.

- **Importance**: These products lower waste, reduce carbon footprints, and meet growing demand for green alternatives. They support environmental policy goals and contribute to the green economy.

Intro Activity
Ask: “Which everyday products in your community generate the most waste? How could they be redesigned sustainably?”
Use images of eco-products like solar lamps, reusable packaging, or upcycled items.

Principles of Sustainable Product Design

Sustainable Product Design includes guidelines that reduce environmental impact during the entire life cycle of a product — from sourcing materials to disposal.

- **Important to:**
  - Use fewer and renewable materials.
  - Design for durability, repair, and recycling.
  - Avoid harmful chemicals and excessive packaging.
- **Why It Matters**: Reduces environmental damage and waste while building customer trust.
- **Who Should Use It**: Product designers, innovators, startups, manufacturers.
- **Example**:
  A cosmetics start-up in Nairobi uses refillable glass jars and natural ingredients to reduce packaging waste.

Teaching Tip:
Bring two similar products (one eco-friendly, one not) and ask learners to compare features.

Circular Economy and Product Innovation

Circular Economy refers to a system that aims to eliminate waste by keeping products and materials in use for as long as possible.

- **When discussing circular economy it is important to consider aspects such as:**
  - Product life extension, reuse, recycling.
  - Innovative models like product-as-a-service or repair hubs.
  - Design for disassembly and modularity.
- **Why It Matters**: Promotes efficiency and reduces dependence on new raw materials.
- **Who Should Use It**: MSMEs, social enterprises, eco-entrepreneurs, youth ventures.
- **Example**: A youth group in Rwanda sells solar lamps with returnable battery packs, reducing e-waste.

Teaching Tip: Use a circular economy diagram and let learners locate products they use within the loop.

Sustainable Materials and Selection

Selection of sustainable materials involves choosing inputs that are renewable, recyclable, low impact, and safe for both people and the environment.

These include:

  - Renewable: bamboo, hemp, banana fiber.
  - Recycled: plastics, metals, paper.
  - Non-toxic, biodegradable materials.
- **Why It Matters**: Material choices greatly influence a product's environmental footprint.
- **Who Should Use It**: Artisans, manufacturers, fashion designers, innovators.
- **Example**:
  Youth in Meru produce eco-baskets using banana fibers instead of plastic twine.

Teaching Tip:
Show samples (or images) of alternative materials and discuss pros/cons.

Life Cycle Assessment (LCA)

LCA is a method to analyze the total environmental impact of a product — from raw materials to disposal.

- **It involves**
  - Defining stages of LCA: extraction, production, transport, use, disposal.
  - Basic LCA tools: spreadsheets, OpenLCA.
- **Why It Matters**: Helps product teams make smarter, lower-impact decisions.
- **Who Should Use It**: Business Start-ups, youth-led ventures, NGOs working in product design.
- **Example**:
  A soap manufacturer compares the footprint of plastic vs. kraft paper packaging.

Teaching Tip:
Use a simple worksheet to estimate the lifecycle impact of a local product e.g. cooking oil, solar battery

Eco-Innovation Strategies

These are strategies aimed at creating or improving products, services, or business models with environmental and economic value.

- **Content to Include in the design of a strategy**:
  - Upcycling, modularity, open-source/ peer to peer collaboration.
  - Digital tools for tracking impact.
  - Bio-inspired design (biomimicry).
- **Why It Matters**: Turns environmental challenges into business opportunities.
- **Who Should Use It**: Innovators, youth-led initiatives, makerspaces, accelerators.
- **Example**:
  A Kilifi-based youth group creates bowls and décor from coconut shells and sells them at local markets.

Teaching Tip:
Group brainstorm: What waste in your community could become a product? Why?

Design Thinking for Sustainability

A user-centered, problem-solving approach that considers environmental, economic, and social impact.

- **Content to consider**:
  - 5 stages: **Empathize** → **Define** → **Ideate** → **Prototype** → **Test**.
  - Focus on local relevance and usability.
- **Why It Matters**: Empowers learners to co-create real solutions with communities.
- **Who Should Use It**: Innovators, youth clubs, green hubs, trainers.
- **Example**:
  In Uganda, youth design a clay-based water filter using local materials for safe drinking water.

Teaching Tip:
Facilitate a 30-minute “design sprint” challenge: Redesign a market bag to reduce plastic use.

Best Practices in Sustainable Development

In sustainable product development it is important to:

  - Co-design with users.
  - Use lifecycle and sustainability criteria.
  - Ensure functionality, affordability, and sustainability of the end-product.
- **Why It Matters**:
  Promotes adoption, impact, and repeat customers.
- **Who Should Use It**:
  Startups, community enterprises, value chain actors, teachers at TVETs.
- **Example**:
  A textile group in Tanzania adopts zero-waste cutting and natural dyes to create eco-fashion lines.

Teaching Tip:
Have learners create a 5-point pledge or checklist for sustainable product design.

Practical Exercise - Design a Sustainable Product

Task

Design and present a prototype or concept for a sustainable product based on a real community need.

Steps

1. Identify a local problem or product that can be improved.
2. Propose a sustainable redesign.
3. Select eco-friendly materials.
4. Sketch or build a simple prototype.
5. Present the product’s features, impact, and value.

Output

A short group presentation or exhibit with visuals, sustainability justification, and target user description.

Teaching Tip

Encourage creative use of materials. Allow peer feedback and organize a “green product pitch showcase.”

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Submodule 7.2

Improving Business Processes for Sustainability

→ **Skills:**

1. Advanced process optimization capabilities.
2. Sustainability metrics analysis and presentation.
3. Strategic environmental planning.
4. Expertise in change management.
5. Systems thinking and holistic organizational design.

IMPROVING BUSINESS PROCESSES FOR SUSTAINABILITY
Activity 1: a. Conduct comprehensive organizational process mapping b. Develop sustainability performance diagnostic tools c. Design green process transformation strategies d. Create carbon footprint reduction frameworks e. Implement resource efficiency intervention plans
Duration: 1.5 hours
Specific Learning Objectives 1. To analyze existing business processes for sustainability gaps 2. To develop systematic approaches to process optimization 3. To understand environmental impact of organizational workflows 4. To create measurable sustainability intervention strategies 5. To develop skills in green process management
Methodology, Resources and Devices **Methodology**: Systems thinking approach, green management techniques, continuous improvement frameworks, data-driven process analysis, collaborative problem-solving workshops **Learning Devices**: Process simulation software, environmental impact tracking tools, industrial ecology case study platforms, carbon footprint calculation instruments, sustainability performance dashboards **Resources**: - Access to journals and publications, digital tools, professional networks, online learning platforms and practical research documents
Description of the Activity and Key Concepts: **Activity**: Conduct comprehensive organizational process mapping, develop sustainability performance diagnostic tools, Design green process transformation strategies, create carbon footprint reduction frameworks, implement resource efficiency intervention plans

Key Concepts: Resource efficiency principles, circular economy workflow design, green supply chain management, waste reduction strategies, techniques to minimize carbon footprint.

Assessment

a. Comprehensive process improvement proposal development in groups
b. Sustainability performance dashboard creation
c. Quantitative efficiency analysis presentation
d. Implementation strategy evaluation
e. Process optimization simulation project

Specific Skills/Abilities developed

a. Advanced process optimization capabilities
b. Sustainability metrics analysis and presentation
c. Strategic environmental planning
d. Expertise in change management
e. Systems thinking and holistic organizational design

Further readings, activities, materials, best practices

Books

"Lean Thinking" by James P. Womack
"Green to Gold" by Daniel Esty
"The Sustainability Advantage" by Bob Willard
"Circular Economy: A Wealth of Flows" by Ken Webster

Journals

Journal of Cleaner Production
Corporate Social Responsibility and Environmental Management
Business Strategy and the Environment
International Journal of Sustainability in Higher Education

Publications

MIT Sloan Management Review
Harvard Business Review Sustainability Edition
World Economic Forum Sustainability Insights
United Nations Sustainable Development Reports

Best Practices:

Organizational Strategies

- Implement comprehensive sustainability audits
- Develop cross-functional green teams
- Create transparent sustainability reporting mechanisms
- Establish continuous improvement protocols

- Integrate sustainability metrics into performance evaluations

Technological Approaches

- Utilize advanced process simulation tools
- Adopt AI-driven efficiency optimization platforms
- Implement real-time sustainability tracking systems

Develop Digital Operational Techniques

- Design modular and adaptable business processes
- Prioritize renewable resource utilization
- Minimize waste through systematic workflow redesign
- Encourage collaborative innovation environments
- Develop agile sustainability intervention frameworks
- Carbon footprint management technologies

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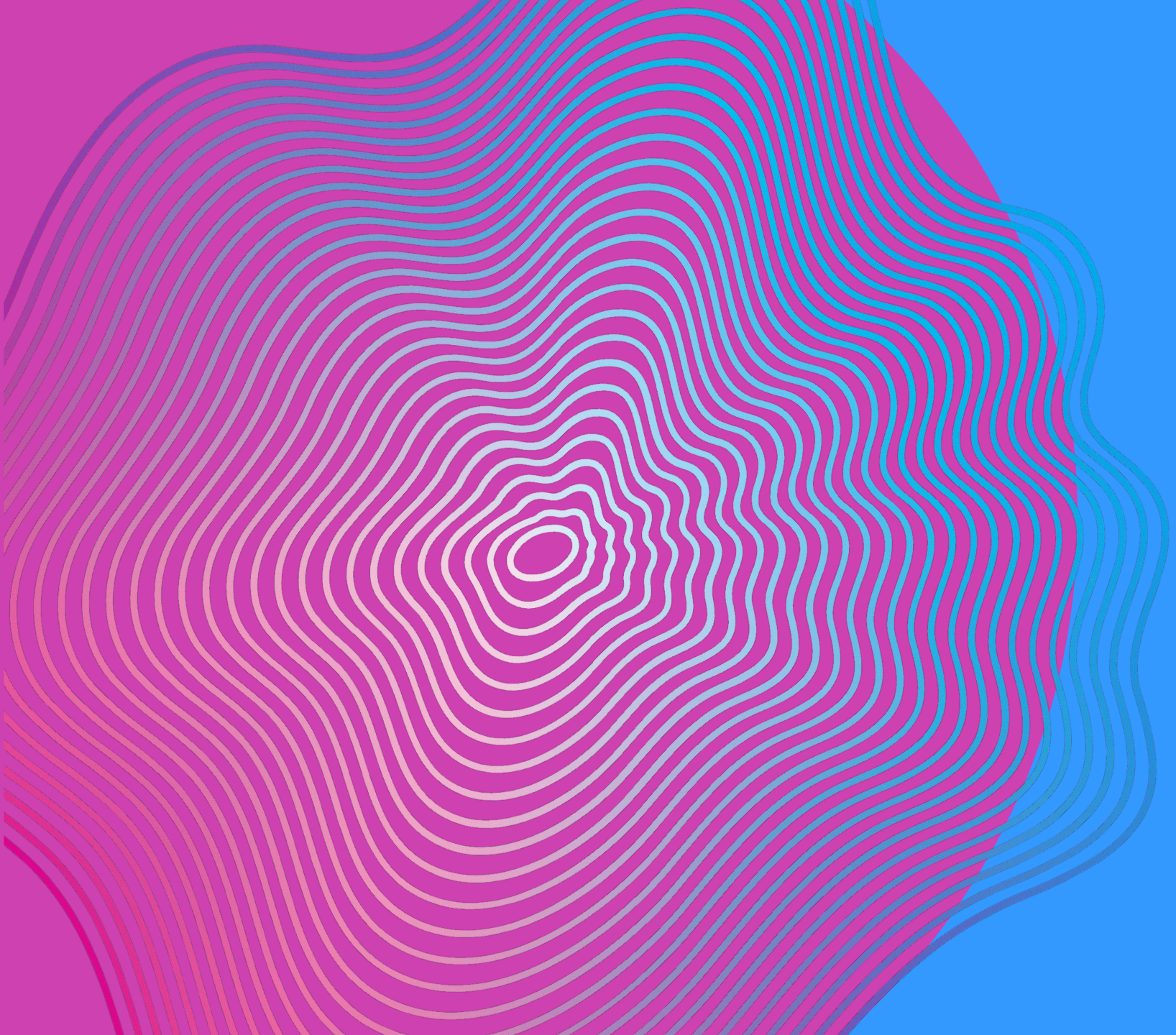

Learning Objectives

1. Define sustainable business processes and explain their benefits.
2. Identify key areas in a business for environmental and resource efficiency improvements.
3. Analyze energy, water, and material usage for sustainability gains.
4. Implement process improvements that reduce environmental impact.
5. Apply lean and green thinking principles in business operations.
6. Engage staff and stakeholders in sustainable process improvement.
7. Monitor sustainability indicators and performance outcomes.
8. Design a sustainability improvement plan for a business.

Key Concepts

- Sustainable Business Processes
- Resource and Energy Efficiency
- Lean and Green Thinking
- Continuous Process Improvement
- Waste Reduction
- Staff Engagement in Sustainability
- Monitoring and Evaluation for Impact
- Operational Eco-Efficiency

What are Sustainable Business Processes?

Sustainable business processes are operational routines or systems that are designed to minimize environmental impact, use fewer resources, and improve long-term efficiency without compromising quality.

- **Importance**:
  They help businesses cut costs, reduce emissions, comply with green standards, and appeal to environmentally aware consumers.
- **Target Audience**:
  Entrepreneurs, operations staff, MSMEs, production supervisors, sustainability leads.

Intro Activity:
Ask: “What routine processes in your business use the most energy or materials? Could they be improved?”

Understanding Sustainable Business Processes

What are they? - These are processes that minimize waste, pollution, and resource use while maintaining quality and profitability.

- **Content to Include**:
  - Examples: energy-efficient lighting, water reuse, digital systems, clean production.
  - Features: efficiency, traceability, low environmental footprint.
- **Why It Matters**:
  Helps enterprises reduce costs and meet sustainability standards.
- **Who Should Use It**:
  SMEs, youth entrepreneurs, trainers, CBOs.
- **Example**:
  A printing shop in Kisumu switches to digital receipts and solar power, cutting energy use by 35%.

Teaching Tip: Walk learners through a day in a business and highlight which processes could be greener.

Areas for Improvement in a Business

Interventions should target business areas that can be optimized for sustainability. These include Energy, water, transport, inventory, packaging, cleaning and should involve the use of technology, preventive maintenance, and bulk purchasing etc.

- **Why It Matters**:
  These areas are often responsible for a business's largest costs and carbon impact.
- **Who Should Use It**:
  Operational staff, business owners, technical advisors.
- **Example**:
  A poultry farm installs water-efficient drinkers and reorganizes waste handling.
- **Teaching Tip**:
  Group exercise: Map a local business and identify its "waste hotspots."

Analyzing Resource Use

Involves tracking how much water, energy, materials, and time go into each step of a business process.

- **How to:**:
  - Use utility bills, observation, metering, or process mapping.
  - Identify inefficiencies and leaks.
- **Why It Matters**:
  Provides a baseline for improvement and accountability.
- **Who Should Use It**:
  M&E officers, business owners, trainers.
- **Example**:
  A metal workshop discovers it can save 20% electricity by staggering machine use.

Teaching Tip: Analyze sample energy bills or data and calculate simple improvements.

Implementing Sustainable Process Improvements

Process involves making small or large changes to daily business operations to improve sustainability such as switching to efficient lighting, fixing leaks, using shared transport, using Eco-cleaning products, waste separation, scheduling to avoid idle time.

- **Why It Matters**:
  Can cut costs and attract green funding or customers.
- **Who Should Use It**:
  Any enterprise or project with repeatable processes.
- **Example**:
  A tailoring business introduces fabric pattern cutting software, reducing offcuts by 40%.

Teaching Tip:
Have learners propose 3 “quick wins” for green improvements.

Lean and Green Thinking

This is a combined approach that seeks to eliminate waste and improve value while caring for the environment such as value stream mapping, continuous improvement and green enhancements such as reducing emissions, paper use, transport fuel. Processes should involve engaging team members and external actors in green process improvements such as awareness creation, training, recognition of ideas, joint initiatives, green champions, suggestion schemes.

- **Why It Matters**:
  Encourages efficiency and aligns with green enterprise practices.
- **Who Should Use It**:
  Manufacturing businesses, food processors, service providers, business managers and community based enterprises.
- **Example**:
  A small hotel uses occupancy forecasts to avoid over-ordering perishables.

Teaching Tip:
Use a “before and after” visual to compare lean-green changes.

Monitoring and Evaluating Impact

Tracking key indicators to measure if process improvements are working.

- **Should Include**:
  - Key metrics: energy saved, downtime reduced, volume of waste diverted.
  - Use of tracking tools, logbooks, Excel, dashboards.
- **Why It Matters**:
  Keeps improvements on track and provides data for reports or funders.
- **Who Should Use It**:
  Enterprise teams, trainers, M&E staff.
- **Example**:
  A youth group records its compost volume and sells 30% more fertilizer each month.

Teaching Tip: Let learners develop 2–3 sustainability indicators for a mock business.

Best Practices for Sustainable Business Processes

Tried-and-tested techniques that reduce resource use and increase sustainability and include regular maintenance, automation, policy alignment underpinned by continuous review, benchmarking, feedback loops.

- **Why It Matters**:
  Builds long-term improvement and supports environmental certification.
- **Who Should Use It**:
  Process owners, trainers, field officers.
- **Example**:
  A digital print shop upgrades machines, eliminates single-use paper samples, and gets ISO 14001 ready.

Teaching Tip:
Group brainstorm: create a 5-step checklist for process sustainability.

Practical Exercise

Task

Develop a sustainability improvement plan for one business process in a real or hypothetical enterprise.

Steps

1. Select a process (e.g., packaging, delivery, cleaning).
2. Describe current practices.
3. Identify inefficiencies or environmental issues.
4. Propose improvements and KPIs.
5. Share how staff will be engaged.

Output

Group plan presentation using flip charts or slides with visual process maps and targets.

Teaching Tip

Create peer review groups for feedback, and award best practical ideas with certificates or small incentives.

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Submodule 7.3

Creating Innovative and Sustainable Business Models

→ **Skills:**

1. Strategic sustainable innovation capabilities
2. Sustainable entrepreneurship expertise
3. Holistic business ecosystem thinking
4. Stakeholder collaboration techniques
5. Regenerative design implementation

CREATING INNOVATIVE AND SUSTAINABLE BUSINESS MODELS
Activity 1: Design transformative business models that integrate sustainability as a core strategic element.
Duration: 1.5 hours
Learning Objectives a. Understand sustainable business model archetypes b. Develop innovative value propositions c. Create economically viable sustainable strategies d. Analyze systemic business transformation approaches e. Design regenerative business ecosystem models
Methodology, Learning Devices, and Resources **Methodology**: Business model canvas adaptation, stakeholder engagement workshops, sustainable innovation frameworks, design thinking approaches, systems thinking methodology **Learning Devices**: Business model simulation platforms, sustainability scenario planning tools, collaborative design digital platforms, interactive innovation workshops, virtual sustainability strategy laboratories **Resources**: Circular business models, shared value creation, sustainable value propositions, stakeholder ecosystem design
Activity and Key Concepts **Activity**: Develop transformative sustainable business model prototypes, design value propositions integrating environmental and social impact, create stakeholder engagement frameworks, develop sustainable innovation strategies, analyze existing business models for sustainability potential **Key Concepts**: Circular business models, shared value creation principles, sustainable value propositions, stakeholder ecosystem design, regenerative economic frameworks

Assessment

a. Comprehensive business model presentation
b. Sustainability impact assessment report
c. Innovative concept pitch competition
d. Peer/ group evaluation of sustainable strategies
e. Stakeholder value creation analysis

Specific Skills/ Abilities Developed

a. Strategic sustainable innovation capabilities
b. Sustainable entrepreneurship expertise
c. Holistic business ecosystem thinking
d. Stakeholder collaboration techniques
e. Regenerative design implementation

Further Readings, activities, materials and best practices

Academic Books

"Business Model Generation" by Alexander Osterwalder
"Blue Ocean Strategy" by W. Chan Kim
"Sustainable Business Models" by Florian Lüdeke-Freund
"Reinventing Business Models" by Mark W. Johnson

Professional Journals

MIT Sloan Management Review
Harvard Business Review - Sustainability Edition
Stanford Social Innovation Review
Journal of Business Strategy and the Environment

Recommended Publications

World Economic Forum Sustainability Reports
United Nations Global Compact Publications
Ellen MacArthur Foundation Circular Economy Insights

Online Resources

Sustainability Innovation Platform
Green Business Network Publications
Circular Economy Research Repositories

Research Platforms

International Sustainable Business Research Center
Global Innovation for Sustainable Development Network
Sustainable Enterprise Academy Publications

Best practices:

Organizational Strategies

a. Integrate sustainability into core business strategy
b. Develop transparent impact measurement systems
c. Create cross-functional innovation teams
d. Establish continuous learning environments
e. Prioritize stakeholder value creation

Technological Approaches

a. Utilize advanced sustainability modeling tools
b. Implement digital platforms for collaborative innovation
c. Develop AI-driven sustainability strategy frameworks
d. Create real-time impact tracking mechanisms

Operational Techniques

a. Design flexible and adaptive business models
b. Encourage experimental and iterative approach
c. Develop multi-stakeholder collaboration frameworks
d. Prioritize regenerative economic principles
e. Create scalable sustainable innovation processes

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Strengthening Capacity for Sustainability Management

Learning Objectives

1. Understand what sustainability management involves and why it is critical.
2. Identify key sustainability competencies and skills.
3. Describe tools and systems for managing sustainability within organizations.
4. Develop roles and responsibilities for sustainability in an enterprise.
5. Design simple sustainability policies and codes of conduct.
6. Promote sustainability leadership and culture in the workplace.
7. Strengthen internal and external partnerships for sustainability.
8. Plan capacity-building initiatives for long-term impact.

Key Concepts

- Sustainability Management
- Environmental and Social Governance (ESG) Systems
- Sustainability Skills and Competencies
- Internal Capacity Building
- Codes of Conduct and Policy Design
- Stakeholder Engagement
- Leadership for Sustainability
- Organizational Culture Change

What is Sustainability Management

Sustainability management is the structured approach organizations use to integrate environmental, social, and governance (ESG) goals into their operations, strategy, and culture.

- **Importance**:
  Strengthens long-term business resilience, regulatory compliance, and social license to operate.
- **Target Audience**:
  MSME leaders, HR and training officers, NGO teams, youth-led businesses.

Intro Activity:
Ask: “What does it take for a business to remain responsible and green beyond one person or project?”

What is Sustainability Management

Involves coordinated efforts to integrate sustainability into an organization’s strategy, systems, and daily actions.

- **Need to Focus on**:
  - Strategic alignment with SDGs, ESG, or national goals.
  - Operational mechanisms: policies, indicators, training.
- **Why It Matters**:
  Embeds sustainability into the core — not just as a one-time project.
- **Who Should Use It**:
  Business owners, NGO managers, HR, project leads.
- **Example**:
  A manufacturing SME in Nairobi includes sustainability KPIs in all departmental targets.

Teaching Tip:
Let learners analyze what makes a company’s “green program” succeed or fail. Include a matrix on successes and failures and reasons for both

Key Sustainability Competencies

These are skills and knowledge required to design, lead, and implement sustainability strategies.

Competencies include:

- Systems thinking, stakeholder engagement, resource literacy.
- Technical: waste audits, emissions tracking, ESG reporting.

Why It Matters:
Builds capacity for staff to take ownership of sustainability tasks.

Who Should Use It:Team leaders, TVETs, youth organizations.

Example: A water company trains 4 staff as a “green officers” to monitor water use.

Teaching Tip: Group work: Match sustainability tasks to key competencies.

Tools and Systems for Managing Sustainability

Can include software, dashboards, or methods used to plan, track, and report sustainability progress.Involves the use of:

  - ESG scorecards, reporting templates, checklists.
  - Free tools: GRI, Excel dashboards, Trello for green planning.
- **Why It Matters**:
  Makes sustainability measurable and visible.
- **Who Should Use It**: Admin staff, field coordinators, business planners.
- **Example**:
  A social enterprise tracks monthly fuel, plastic use, and social training hours in a shared dashboard.

Teaching Tip: Demo a simple tracking sheet and have learners adapt it to their context.

Assigning Roles and Responsibilities

Involves delegating sustainability tasks and ensuring everyone has a part to play such as role examples: sustainability lead, green ambassador, ESG reporter. Roles and responsibilities of officers should be integrated into job descriptions and team charters.

- **Why It Matters**:
  Prevents sustainability from becoming “no one’s job.”
- **Who Should Use It**:
  HR, team leaders, project managers.
- **Example**:
  A CBO appoints one person in each unit to track eco-impact and report monthly.

Teaching Tip: Learners develop a sustainability organogram for a sample enterprise.

Policies and Codes of Conduct

These are written documents that guide actions and expectations around sustainability such as environmental policy, code of ethics, responsible sourcing guidelines. THey should be written in clear, simple language and adapted to the enterprise's context.

- **Why It Matters**:
  Institutionalizes sustainability and provides reference points.
- **Who Should Use It**:
  Formal businesses, NGOs, cooperatives.
- **Example**:
  A youth group signs a shared code to minimize plastic, report unethical behavior, and support diversity.
- **Teaching Tip**:
  Each group drafts a mini sustainability commitment for their team.

Building a Sustainability Culture

Involves creating shared values, attitudes, and behaviors that support sustainability across an organization such as celebrating green wins, telling impact stories, visible leadership support. Should engsage staff engagement, encourage peer recognition and adapt friendly competitions.

- **Why It Matters**:
  Culture sustains action beyond rules or leadership changes.
- **Who Should Use It**:
  Leaders, communications staff, youth club heads.
- **Example**:
  A business holds monthly “eco-awards” for the department with best resource savings.

Teaching Tip:
Brainstorm: “What traditions or practices support a green culture?”

Strengthening Partnerships and Networks

Partnerships involve collaborating with external actors to expand sustainability learning, influence, and resources such as NGOs, Government institutions, private sector, suppliers, community leaders, funders based on shared goals, co-investment opportunities, capacity exchange.

- **Why It Matters**:
  Spreads influence, scales ideas, and fills capacity gaps.
- **Who Should Use It**:
  Network builders, program designers, business liaisons.
- **Example**:
  A Nairobi eco-enterprise co-trains with a local university and hosts interns for research.

Teaching Tip: Learners map their top 3 sustainability allies or knowledge partners.

Best Practices in Capacity Building for Sustainability

Should include structured, inclusive methods that build knowledge and skills over time such as mentoring, coaching, e-learning, experiential learning (learning by doing). Can include training-of-trainers sessions, reflective practices.

- **Why It Matters**:
  Builds depth and succession for sustainability leadership.
- **Who Should Use It**:
  Training coordinators, youth leaders, HR teams.
- **Example**:
  A green jobs program trains youth as trainers and mentors for new cohorts.

Teaching Tip: **“Peer Learning Circles” Simulation**

- Organize learners into small groups and assign each a sustainability skill (e.g., energy tracking, stakeholder engagement).
- Each group discusses how to teach that skill to others using low-cost methods (e.g., peer coaching, WhatsApp groups, on-the-job demos), then shares their plan.

Practical Exercise - Build a Sustainability Capacity Plan

Task

Create a sustainability management and training plan for a small enterprise or organization.

Steps

1. Define sustainability goals and skill gaps.
2. Identify roles and systems needed.
3. Draft a policy or code.
4. Suggest partnerships and culture-building steps.

Output

Group presentation or poster with visuals of systems, roles, and action plans.

Teaching Tip

Encourage use of real enterprise examples or adapt to learners' community organizations.

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Submodule 7.4

Principles of Eco-Design for Products and Services

→ **Skills:**

1. Ecological design thinking capabilities
2. Environmental systems understanding
3. Sustainable innovation design expertise
4. Critical design analysis
5. Regenerative design implementation

PRINCIPLES OF ECO-DESIGN FOR PRODUCTS AND SERVICES
Activity 1: Apply eco-design principles to create environmentally responsible products and services.
Duration: 1.5 hours
Learning Objectives: a. To master eco-design methodologies b. To understand comprehensive environmental design principles c. To develop products with minimal environmental impact d. To analyze sustainable material selection techniques e. To create design solutions that support circular economy principles
Methodology, Learning Devices and Resources **Methodology**: Design for Environment (DfE) approach, biomimicry design principles, sustainable design thinking, systems-based design analysis, holistic ecological design frameworks. **Learning Devices**: Environmental design simulation software, material selection and impact assessment tools, laptops/ computer, 3D ecological design modeling platforms, virtual prototyping environments, sustainability impact visualization technologies **Resources:** Academic journals, digital tools, online platforms, professional journals, research repositories.
Activity and Key concepts **Activity**: Develop environmentally responsible product design concepts, create ecological design prototypes, analyze lifecycle environmental impacts, design products with minimal carbon footprint, implement regenerative design strategies **Key Concepts**: Design for disassembly principles, sustainable material selection strategies, energy efficiency in design, regenerative design principles, circular economy product development

Specific skills/ abilities developed

a. Ecological design thinking capabilities
b. Environmental systems understanding
c. Sustainable innovation design expertise
d. Critical design analysis
e. Regenerative design implementation

Assessment

a. Comprehensive eco-design portfolio development and presentation
b. Environmental impact simulation project based on current work scenario (where applicable)
c. Sustainable design critique and evaluation (through peer groups)
d. Prototype development and performance assessment
e. Life Cycle analysis report

Further Readings and Best Practices

Books

"Cradle to Cradle" by William McDonough
"Sustainable Design: The Science of Sustainability and Green Engineering" by Daniel Hoornweg
"Design for the Real World" by Victor Papanek

Journals

Journal of Cleaner Production
Sustainable Design and Manufacturing International Journal

Design Studies

Environmental Design Research Journal
Professional Publications
UNEP Sustainable Design Guidelines
World Economic Forum Sustainability Reports
Ellen MacArthur Foundation Circular Design Insights

Best Practices:

a. Integrating life cycle thinking in design processes
b. Prioritizing renewable and recyclable materials
c. Develop modular and adaptable product architectures
d. Create transparent environmental impact documentation

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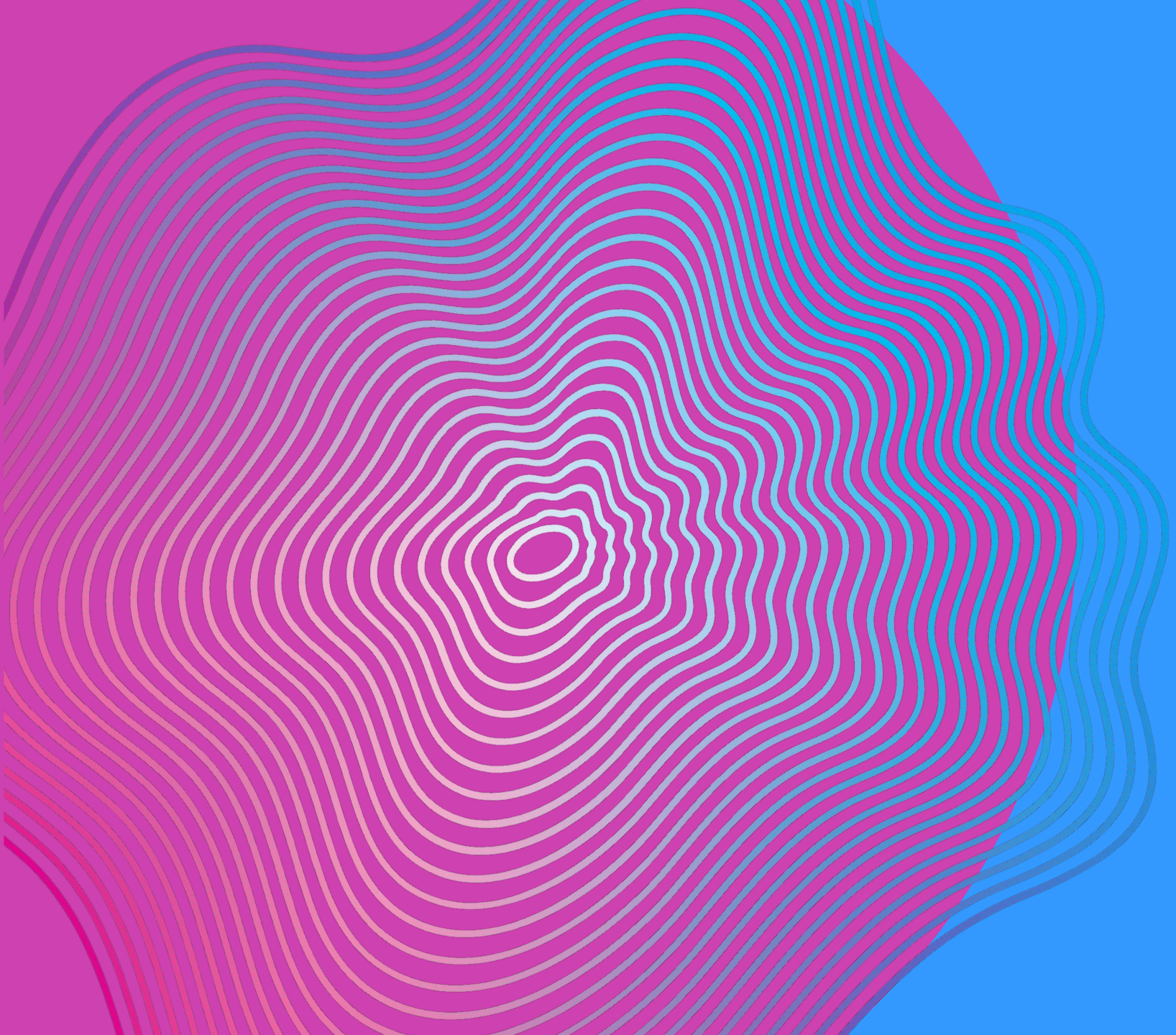
Adopting Sustainable Business Models



Learning Objectives

- Define sustainable business models and understand key features.
- Identify different types of green and circular business models.
- Apply tools like the Business Model Canvas with a sustainability lens.
- Integrate sustainability into value propositions and customer relationships.
- Understand revenue streams and cost structures in sustainable models.
- Use innovation to enhance environmental and social impact.
- Analyze case studies of successful sustainable enterprises.
- Design a sustainable business model for a product or service.

Key Concepts

- Sustainable Business Models
- Triple Bottom Line (People, Planet, Profit)
- Business Model Canvas
- Green Revenue Streams
- Value Propositions for Impact
- Circular Economy Models
- Inclusive Business
- Mission-Driven Entrepreneurship

What are Sustainable Business Models?

A sustainable business model creates economic value while delivering environmental and social benefits. It aligns purpose with profit.

- **Importance**:
  These models build trust, attract conscious consumers and investors, and support long-term viability.
- **Target Audience**: Entrepreneurs, incubators, youth ventures, MSME developers.

Intro Activity:
Ask: “Can a business make money, save the environment, and empower people at the same time?” Show 1–2 African examples that do.

Display or distribute **3 short case examples** of local or well-known businesses (real or fictional). Include a mix of sustainable and non-sustainable models. Ask learners to **work in pairs or small groups** to:

1. Identify whether each business is sustainable or not.
2. Justify their answer using the “Triple Bottom Line” (People, Planet, Profit).

Example Case Snippets:

- *EcoBags Kenya*: Uses waste fabric to make reusable shopping bags and employs women from informal settlements.
- *Fast Plastics Ltd*: Produces cheap single-use plastics for fast food outlets, has no waste recovery system.
- *Solar Connect Africa*: Sells pay-as-you-go solar lamps and offers after-sales repair services.

Understanding Sustainable Business Models

SBMs are business approaches that serve people and the planet while remaining profitable. They focus on value creation across financial, environmental, and social dimensions and require additional emphasis on long-term orientation, circularity, inclusivity.

- **Why It Matters**:
  Helps businesses thrive in future markets.
- **Who Should Use It**:
  Startups, NGOs with enterprise arms, SMEs.
- **Example**:
  EcoPost in Kenya turns plastic waste into building poles, creating jobs and cleaning communities.

Teaching Tip: Ask learners to name one green or ethical brand they know and why.

Types of Sustainable Business Models

These are business archetypes that drive sustainability.

- **They Include**:
  - Circular models, product-as-a-service, inclusive business, social enterprise.
  - Hybrid models (non-profit with revenue).
- **Why It Matters**: Shows learners they can choose and adapt models that suit their impact goals.
- **Who Should Use SBMs**: Youth entrepreneurs, accelerators, CBOs.
- **Example**:
  Sanergy in Nairobi collects waste and turns it into fertilizer and energy.

Teaching Tip:
Use flashcards of model types and ask learners to match to real-world examples.

Create a set of flashcards or slides — half showing **descriptions of different sustainable business models** (e.g., “recycles waste into products,” “rents rather than sells,” “offers eco-friendly alternatives”), and the other half showing **business types or logos** (real or fictional).

Instructions for Learners:

In pairs or groups, match each model description to the correct business type, then briefly explain why.

Business Model Canvas for Sustainability

A business model canvas is a visual tool that outlines how a business creates, delivers, and captures value. We now add green elements (sustainability aspects).

- **The canvas should include**:
  - Adapted sections: customer value, partners, costs, revenue, impact.
  - Eco-friendly channels and key activities.
- **Why It Matters**:
  Makes green business planning clear and structured.
- **Who Should Use It**: Business clubs, trainers, mentors, small businesses/ enterprises.
- **Example**: A youth soap business uses local herbs, sells via eco-markets, and trains women.
- **Teaching Tip**: Complete a canvas together using a case study or fictional product.

Value Proposition with a Sustainability Lens

Value proposition refers to the unique benefit or solution your business offers — now integrated with environmental or social value.

- **Compelling value propositions emphasize**:
  - Eco-efficiency, ethical sourcing, inclusive employment.
  - Emphasis on solving real problems (e.g., waste, pollution, access).
- **Why It Matters**:
  Helps businesses stand out and build loyalty among conscious consumers.
- **Who Should Use It**:
  Entrepreneurs, brand strategists, product teams.
- **Example**:
  A refill station for household cleaners offers safe, low-waste products to low-income families.

Teaching Tip:

Ask learners to think of a local environmental or social problem (e.g., plastic pollution, food waste, youth unemployment). Then, guide them to:

1. Describe the **problem** in one sentence.
2. Craft a **value proposition** that offers a green or inclusive solution — e.g., “We help schools reduce plastic by supplying reusable, washable lunch bags made by local youth.”

Instructions:

- Give them 10 minutes to work individually or in pairs.
- Ask a few to present their “problem + solution” pitch.
- Give positive, constructive feedback using a basic checklist: Is it clear? Sustainable? Practical?

https://www.strategyzer.com/books/value-proposition-design

https://www.designkit.org/resources/1

Revenue and Cost Structures in Green Models

Revenue and cost structures in sustainable business models refer to the financial logic of how a green or inclusive enterprise **generates income (revenue streams)** and **manages its expenses (cost structure)** in a way that supports both profitability and sustainability goals.

These structures are designed to:

A. Capture value from delivering environmental or social benefits (e.g., selling eco-products, charging service fees, accessing carbon credits, or receiving green subsidies).
B. Minimize operating costs through resource efficiency (e.g., saving energy/water), reuse of materials, digital tools, and local sourcing.
C. Reflect the business's commitment to ethical and circular practices, ensuring that every shilling spent or earned aligns with its sustainability mission.

Why It Matters: Sustainability must also be financially viable.

Who Should Use It: Finance teams, founders, grant seekers.

Example: A briquette-making cooperative in Kisii generates revenue from selling clean cooking fuel to schools and households, while reducing costs by using free agricultural waste and training youth interns instead of hiring full-time staff initially.

Teaching Tip: Case study: Match revenue streams to sustainable value propositions.

Using Innovation for Impact

Innovation for impact in sustainable business models refers to the **creative application of ideas, tools, technologies, or partnerships** that enhance the **environmental and social outcomes** of an enterprise while still delivering economic value.

This kind of innovation is not only about new products or technology, it's about **rethinking how value is created and delivered** in a way that solves pressing issues like pollution, resource scarcity, inequality, or climate change.

Types of innovation might include:

- **Process innovation** – e.g., using solar drying instead of charcoal.
- **Business model innovation** – e.g., renting reusable containers instead of selling single-use ones.
- **Technology innovation** – e.g., mobile apps for waste collection, or blockchain for fair trade.
- **Community-based innovation** – e.g., co-creating services with farmers or youth groups.

The aim is to **maximize positive impact** and differentiate the enterprise through sustainability, inclusiveness, and ingenuity.

- **Why It Matters**:
  Innovation creates competitive advantages and tackles urgent challenges.
- **Who Should Use It**:
  Incubators, youth innovators, digital enterprises.
- **Example**:
  In Tanzania, an app connects households with waste collectors using e-vouchers and GPS.
- **Teaching Tip**: Ask groups to describe one low-tech innovation for an environmental challenge in their area.

Successful Green Business Study Cases

Green business case studies are **real-life examples of enterprises** that have successfully integrated sustainability principles — such as environmental care, social inclusion, and ethical operations — into profitable business models.

These cases demonstrate how diverse business types (startups, cooperatives, manufacturers, service providers) can **align mission and money**, while dealing with real-world challenges such as limited financing, regulation, or behavior change.

Effective case studies illustrate:

- The **business model type** used (e.g., circular, inclusive, social enterprise).
- The **problem being solved** (e.g., plastic pollution, lack of clean energy, unemployment).
- The **innovation applied** and how impact was measured.
- The **lessons and challenges** that others can learn from.

They provide relatable, practical inspiration for learners and show that sustainable business is **doable, adaptable, and scalable** — even in resource-constrained settings.

Teaching Tips

Let learners **analyze one or two case studies** using a simple framework:

- What was the problem?
- What solution was offered?
- How did it generate income?
- What impact did it create?

Best Practices in Adopting Sustainable Business Models

Best practices in adopting sustainable business models refer to the **proven approaches, habits, and strategies** that help enterprises successfully integrate environmental, social, and economic sustainability into their operations and decision-making — **consistently, profitably, and with long-term resilience**.

These practices reflect lessons from successful green businesses and help guide entrepreneurs to **avoid greenwashing, reduce risk**, and **build truly purpose-driven models**.

They include:

1. Starting lean and validating early – Begin with small pilots to test both market demand and sustainability benefits before scaling.
2. Embedding sustainability into the business model canvas – Not just as a CSR activity, but in value creation, delivery, and capture.
3. Tracking and communicating impact – Using simple, transparent methods (e.g., “X kg of plastic saved,” “Y youth trained”).
4. Listening to customers and communities – Co-designing products or services that are usable, affordable, and solve real problems.
5. Partnering for scale and influence – Collaborating with government, NGOs, peers, or academia to grow responsibly.
6. Reinvesting in innovation and people – Committing part of profits to process upgrades, staff capacity, or R&D.
7. Maintaining authenticity and values alignment – Making decisions that reflect the enterprise’s mission, even when faced with pressure for short-term gain.

Why It Matters:
Helps avoid greenwashing and supports scale.

Who Should Use It:
Early-stage entrepreneurs, changemakers, ecosystem actors.

Example:
A youth cooperative in Kakamega grows its green product line slowly, testing each with local markets.

Teaching Tip: Learners create a top 5 “green business commandments” poster.

Practical Exercise - Build a Sustainable Business Model

Task

Develop a sustainable business model for a real or hypothetical product/service.

Steps

1. Define the product or service.
2. Complete a Business Model Canvas (with environmental/social elements).
3. Describe your value proposition and revenue plan.
4. Show how you will reduce impact and engage stakeholders.

Output

Team or individual presentation with visual BMC and impact statement.

Teaching Tip

Hold a “green pitch fest” where groups present ideas and get feedback from peers or mock investors.

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