

Computer Aided Strategic Planning for Manufacturing 4.0

A HANDS-ON WORKSHOP for Beginners

Syllabus and Course Outline

Overview

Simply stated, manufacturing is the production of finished goods through the use of labor, machines and tools. The inputs to the manufacturing process are typically “raw materials” that are transformed to “finished goods” through a sequence of activities. The primary activities in manufacturing, called the *manufacturing value chain*, contribute to the design, production, marketing, sales, delivery and support of a product (e.g., a spare part, a chair, a candy or a car) being sold to the customers. Each activity in the value chain must add some value towards the goal of producing a product. Support activities, such as accounting and finance, enable the primary activities. Manufacturers have always relied on industrial technologies over the years to grow their businesses and gain competitive advantages. Manufacturing 4.0, also known as M4.0, systems are heavily leveraging Industry 4.0 technologies, thus the digital technologies are of primary value. Several policies strengthen and or weaken the primary activities (e.g., quality assurance policies). This hands-on workshop will give you an opportunity to develop simple M4.0 solutions that consider policy considerations for your location by using a computer aided planning tool.

Workshop Highlights

- 6 Week Hands-On Workshop, one hour (or 90 minute) online session per week
- All attendees are encouraged to develop their own M4.0 solutions for their own locations
- The content will assume no prior knowledge of Manufacturing 4.0
- The course will follow a systematic methodology for launching M4.0 Initiatives
- Lectures are supported through gamifications and computer aided planning tools

General Information

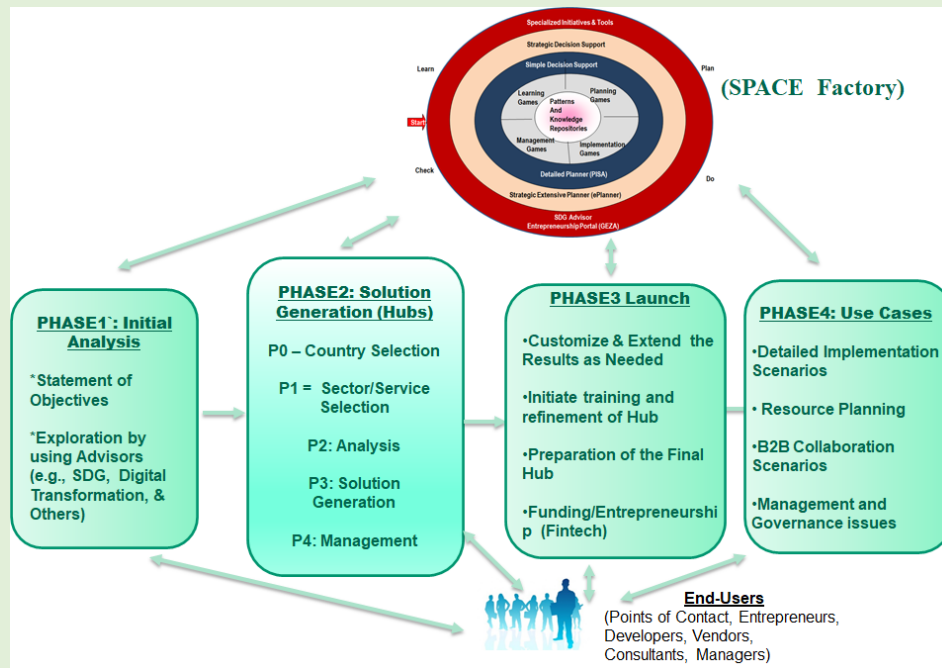
- This course has 6 online Sessions (S1, S2, S3, S4, etc., one session per week)
- Each session concentrates on one topic and has one hour of lecture (mixture of pre-recorded materials and in class discussion moderated by an instructor)
- There is 3-4 hour of homework (HW) for each session that consists of:
 - Reading text materials
 - Joining a discussion forum on a topic related to the session
 - Doing some hands-on experiments (e.g., Internet searches, gamifications, etc)

COURSE OUTLINE

- **S1: Overview** – What is M4.0 and Manufacturing Value Chain, quick real life examples of M4.0 variants around the globe, and sample policies. Introduction to the Course Project and overall Methodology shown in Exhibit1. Formation of teams and selection of team projects.
- **S2: M4.0 Methodology** –The concepts of strategic planning and stages of digital transformation for M4.0. How to initiate an M4.0 pilot project anywhere in the World. Analysis of the needs for M4.0 and explore few sample M4.0 solutions. Attendees focus on Phase1 of the Methodology (e.g., hands-on experiments with Digital Transformation Advisor) to develop a strategy..
- **S3: Planning for M4.0** -- How to develop a strategic plan to implement the transformation strategy by hand. Then learn about the SPACE platform – a computer aided planning tool – to implement the strategy. SPACE produce a strategic plan, feasibility study, funding proposal, an RFP, and project management artifacts that are needed to launch the company. Attendees focus on Phase2 of the Methodology (e.g., hands-on experiments with SPACE Planner to form a small company).
- **S4: Launching an M4.0 Initiative:** Use the SPACE Platform and analyze the results of the artifacts produced by SPACE. Discuss the results with other participants by using the discussion forum. Attendees focus on Phase3 of the Methodology that involve Policy analysis. .
- **S5: Develop Use Cases and Collaboration Scenarios:** Attendees Refine and extend the solutions produced by using local needs. The objective is to produce results that can be actually used in practice. Attendees focus on Phase4 of the Methodology that supports B2B Collaborations.
- **S6: COURSE WRAPUP:** Presentations by attendees and final discussions about results produced..

Exhibit1: Quick Overview of the Computer Aided Methodology

The following figure shows our methodology that rapidly produces SCCs by using an integrated planning environment, called SPACE (Strategic Planning, Architecture, Controls and Education). The integrated tools of the SPACE environment support the following stages of the Methodology.



Team Project (Rough Draft)

Overview:

Your team has been asked to develop a small company anywhere in the world that exemplifies the M4.0 concept and supports a population between 5,000 to 50,000 located anywhere in the world (preferably in your country/region). The main objective of this small initiative is to provide “smart” services that support the M4.0 Value Chain.

- This will be a team project (3-4 members per team).
- Project will consist of two deliverables.
- Deliverable A concentrates on a business vision and develop a: Digital Transformation Strategy. Deliverable B will implement the developed strategy by using a hands-on tool.

Deliverable A: Overall Vision and Solution Sketch (40 Points)

Objective is to develop digital transformation strategy for a small M4.0 initiative

8-10 annotated ppt slides that show the following:

- Overview of a small M4.0 Initiative in a developed or developing country
- Some basic statistics of the *selected initiative* (e.g., manufacturing subsector name, population to be served, main purpose, etc)
- What are the key challenges/barriers (technical, non technical, policy related) that will be addressed by this initiative
- What will be the Digital Shadow (eBusiness and Industry4.0) of this Initiative and what are its key components (i.e., which business and M4.0 services/processes will be automated and how much)
- What will be a good digital transformation strategy for this initiative (based on the Digital Transformation Game)

Deliverable B: Develop a Working Prototype of M4.0 (60 Points)

Objective is to implement the M4.0 strategy that was developed in Deliverable A.

8-10 annotated ppt slides that show the following:

- Use the SPACE ePlanner and Develop a Solution (portal) to support the M4.0 initiative
- Review the M4.0 produced and review its content
- Develop your own M4.0 hub by using SPACE
- Results from analyzing existing hubs (M4.0 and others) in the ICT4SIDS Global Village and SCC Lab
- Develop collaboration scenarios between your hub and other M4.0 and non-M4.0 hubs