Supply Chain Dynamics (SCD)

Summer term 2017, version: 10/04/2017

Technicalities

One semester course, taught every second semester in the summer term.

Six credit points; on average, four contact hours per week. Taught in English.

Course coordinator and lecturer: Prof Dr Andreas Größler; tutorials: Ivan Đula and Manuel Brauch

Part of the MSc study programme in (technically oriented) business administration.

Time and location

Classes: Mondays, 15:45–17:15 in KII M 17.12 and Thursdays, 17:30–19:00 in KII M 17.73

First class: Monday, 10 April, 15:45, then every week on Monday and Thursday until term ends (details see time table)

Requirements

Introductory bachelor level course in operations management and/or logistics

Short description and learning goals

The course starts with discussing the nature of supply chains, in particular their dynamic aspects. Students acquire first-hand experience on effects of dynamic behaviour. A major part of the course is devoted to learning a methodology for better understanding and controlling supply chains, system dynamics. It is used to analyse some real world cases of dynamic supply chain issues.

After successfully finishing the course, students can:

- name and discuss sources and effects of dynamics in supply chains
- analyse simple supply chain structures with the help of dynamic models
- understand and evaluate complex dynamic supply chain models

Course design

Although officially split into lectures and tutorial sessions, all classes consist of theoretical and practical parts. Thus, the content will run over the two sessions per week with teacher presentations, case study work, modelling exercises, and experiential learning elements. Assessment will be carried out by means of a written exam (90%) and a multiple-choice mid-term assessment during a regular class (for date see time table).

Course element	Quantity	Time required	Total [h]
Contact hours			
Interactive lectures	23	2 h	46
Self-study			
Reading assignments	430 pp.	98.5 h	98.5
Preparation of modelling cases	7	2 h	14
Exam preparation	1	20 h	20
			132.5
Examination			
Written exam	1	1.5 h	1.5
Total			**180**

Time table

Week		Date	Topic	Teacher(s)	(Reading) assignment
15	C1	Mon, 10/04	Introduction to and motivation for course	AG	Akkermans, ch. 1
16	C2	Thu, 20/04	Experience dynamics: The Beer Game	AG/ID/MB	
17	C3	Mon, 24/04	Beer Game debriefing	AG	Senge, ch. 3
	C4	Thu, 27/04	Dynamic decision making and its shortcomings	AG	Akkermans, ch. 3
18	C5	Thu, 04/05	An introduction to system dynamics	AG	Akkermans, ch. 2
19	C6	Mon, 08/05	Hands on session: getting to know Vensim	AG	Sterman, ch. 3; Vensim tutorial
	C7	Thu, 11/05	Practice session: identifying stocks and flows, feedback loops	ID/MB	
20	C8	Mon, 15/05	Business cycles and oscillations; Managing cyclical industries: Modelling the Philipps case	AG	Akkermans, ch. 4; prepare Model
	C9	Thu, 18/05	Practice session: modelling exercises I	ID/MB	

21	C10	Mon, 22/05	Aging chain models and their behaviour; Information sharing in the supply chain: Modelling the ASML case	AG	Akkermans, ch. 5; prepare model
22	C11	Mon, 29/05	Mid-term assessment; student evaluation Miscellaneous modelling issues (initialization, lookup graphs, co-flows, GMB)	AG	
	C12	Thu, 01/06	Practice session: modelling exercises II	ID/MB	
23	No classes: Pentecost holidays				
24	C13	Mon, 12/06	Growth dynamics; Managing market growth dynamics: Modelling the Interpolis case	AG	Akkermans, ch. 6; Prepare model
25	C14	Mon, 19/06	Archetypal dynamic behaviour and modelling modules; Decision traps in projects: Modelling the TechCo case	AG	Akkermans, ch. 7; Prepare model
	C15	Thu, 22/06	*Guest lecture: Alexander Zock, PhD -- Irrelevance, irrationality and irresponsibility, the three curses of the organizational use of System Dynamics*		
26	C16	Mon, 26/06	Validity of system dynamics models; Capacity building and quality issues: Modelling the first KPN case	AG	Akkermans, ch. 9; Prepare model
	C17	Thu, 29/06	Practice session: modelling exercises III	ID/MB	
27	C18	Mon, 03/07	Implementation issues; Managing buyer-supplier collaboration: Modelling the second KPN case	ID	Akkermans, ch. 12; Prepare model
	C19	Thu, 06/07	Practice session: modelling exercises IV	ID/MB	
28	C20	Mon, 10/07	Synopsis of the remaining models in the textbook	AG	Akkermans, chs. 8, 10, 11
	C21	Thu, 13/07	Practice session: modelling exercises V	ID/MB	
29	C22	Mon, 17/07	Course summary	AG	Akkermans, ch. 13
	C23	Thu, 20/07	Q&A	ID/MB	

Structure

Classes C1–C7 set the scene by making clear that dynamic complexity is tricky to understand for humans. Modelling and simulation is advocated as a way to better deal with dynamic issues in supply chain management. This part also addresses the basics of Vensim and makes use of an experiential learning exercise (the Beer Game).

Classes C8–C21 deal with specific topics of supply chain dynamics. General information about the issues is provided; then, a specific case is modelled with system dynamics and analysed regarding its general insights.

C22 concludes the course with a summary.

References to readings

Akkermans, H.: Supply Chain Dynamics – Mastering Disruptive Change in Innovation-Driven Industries, 2014, Uitgeversgroep [ISBN 978-94-002-1608-2], pp. 1–378.

Senge, P.M.: The Fifth Discipline – The Art and Practice of the Learning Organization, 1990, Currency Doubleday, pp. 27–54.

Sterman, J.D.: Business Dynamics – System Thinking and Modeling for a Complex World, 2000, Irwin McGraw-Hill, pp. 83–105.

Software

Download and install Vensim PLE on your computer: http://vensim.com/free-download/.

A tutorial for Vensim PLE by Craig Kirkwood is available at http://www.public.asu.edu/~kirkwood/sysdyn/SDRes.htm.