Universität Stuttgart

Supply Chain Dynamics (SCD)

Summer term 2018, version: 09/04/2018

Please note: This document reflects our planning before the term started; it will **not** be updated regularly. For short-term changes regarding rooms or times, see Campus. Changes regarding the content will be discussed in class and, if appropriate, communicated via Ilias.

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

Recommended 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 (10%; see timetable for date). The mid-term assessment cannot be retaken or be written at another time.

Depending on the total number of students not being too big, 20% of points (from the written exam) can be substituted by a classroom presentation of one of the cases from Ackermann's book (dates see timetable) in groups of two or three students. This includes that groups submit a presentation file before class, update it based on feedback received in class, and upload it to Ilias.

In total, 50% of all points are necessary to pass the course with 6 credit points. The content of the exam comprises all topics discussed in class plus all required reading assignments (see timetable).

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**
16	C1	Mon, 16/04	Introduction to and motivation for course	AG	Akkermans, ch. 1
	C2	Thu, 19/04	Experience dynamics: The Beer Game	AG/ID/MB	
17	C3	Mon, 23/04	Beer Game debriefing	AG	Senge, ch. 3
	C4	Thu, 26/04	Dynamic decision making and its shortcomings	AG	Akkermans, ch. 3

18	C5	Thu, 03/05	An introduction to system dynamics	AG	Akkermans, ch. 2
19	C6	Mon, 07/05	Hands on session: getting to know Vensim	AG	Sterman, ch. 3; Vensim tutorial
20	C7	Mon, 14/05	Business cycles and oscillations Managing cyclical industries: Modelling the Philipps case	AG	Akkermans, ch. 4; prepare Model
	C8	Thu, 17/05	Practice session: identifying stocks and flows, feedback loops	ID/MB	
21	No classes: Pentecost holidays				
22	C9	Mon, 28/05	Aging chain models and their behaviour Information sharing in the supply chain: Modelling the ASML case	AG	Akkermans, ch. 5; prepare model
23	C10	Mon, 04/06	Mid-term assessment; student evaluation Miscellaneous modelling issues (initialization, lookup graphs, co-flows, GMB)	AG	
	C11	Thu, 07/06	Practice session: modelling exercises I	ID/MB	
24	C12	Mon, 11/06	Growth dynamics Managing market growth dynamics: Modelling the Interpolis case	AG	Akkermans, ch. 6; Prepare model
	C13	Thu, 14/06	Practice session: modelling exercises II	ID/MB	
25	C14	Mon, 18/06	Archetypal dynamic behaviour and modelling modules Decision traps in projects: Modelling the TechCo case	AG	Akkermans, ch. 7; Prepare model
	C15	Thu, 21/06	Practice session: modelling exercises III	ID/MB	
26	C16	Mon, 25/06	Validity of system dynamics models Capacity building and quality issues: Modelling the first KPN case	ID	Akkermans, ch. 9; Prepare model
	C17	Thu, 28/06	*Guest lecture: Alexander Zock, PhD* *-- Irrelevance, irrationality and irresponsibility, the three curses of the organizational use of System Dynamics*		

27	C18	Mon, 02/07	Implementation issues Managing buyer-supplier collaboration: Modelling the second KPN case	AG	Akkermans, ch. 12; Prepare model
	C19	Thu, 05/07	Practice session: modelling exercises IV	ID/MB	
28	C20	Mon, 09/07	Synopsis of the remaining models in the textbook	AG	Akkermans, chs. 8, 10, 11
	C21	Thu, 12/07	Practice session: modelling exercises V	ID/MB	
29	C22	Mon, 16/07	Course summary	AG	Akkermans, ch. 13
	C23	Thu, 19/07	Q&A	ID/MB	

Structure

Classes C1–C6 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 C7–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. Furthermore, students' modelling skills are enhanced by practice tutorials.

C22 and C23 conclude the course with a summary and Q&A session.

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.