Module: OPM 582 Case Studies in Service Operations Management

Contents:

Sustainability or sustainable development is one of the most critical topics of the 21st century. It incorporates many different topics, such as climate change, social justice and inequality, pollution and waste management, resource availability and many more topics. Managing in a sustainable way is becoming a topic of increasing importance across industries. It requires integration between operations, strategy, technology, and other issues from an integrated viewpoint.

This course reviews managerial concepts and selected analytical tools for effectively and efficiently managing the transitions towards sustainable operations. In particular, the goal is to apply the theory to various cases studies of firms covering a broad range of industries as well as functions.

Case topics will be allocated at the beginning of the course based on student preferences. Students will work in teams of two on the assigned case.

Learning outcomes:

Students will intensify their understanding of operations and sustainability topics by applying concepts and analytical tools in a broader, interdisciplinary and strategic context to practical case studies.

The course should be useful for anyone with an intention of going into professional services such as consulting; into industry (service or manufacturing), where the importance of managing operations in a sustainable way is increasing every day; or with a desire to set up their own business.

Prerequisites:

Formal:

Recommended: Participants should be familiar with the fundamentals of operations management. Furthermore, students need a basic knowledge in mathematics (including linear programming) and in statistics (probability distributions).

Obligatory registration: yes	Further Information	Further Information on the registration:	
Max. 20 participants	See below		
Courses	Hours per week	Self-study	ECTS
Lecture	2	6	4
Exercise	2	2	2
ECTS in total			6
Form of assessment	Assignment(s)/work on case studies:		
	final team rep	ort (60%)	
	final presenta	tion (30%)	
	individual class	ss participation (10	%)
Preliminary course work			
Lecturer/Person in charge	Prof. Dr. Cornelia Sch	ön, David Topchish	nvili

Duration of module	1 semester
Offering	Fall term
Language	English
Program-specific educational goals	LG 2, LG 4, LG 5
Range of application	Mannheim Master in Management, MMBR, M.Sc.
	Business Education, M.Sc. Business Informatics,
	M.Sc. Business Mathematics, Diploma Bus. Adm.,
	M.Sc. Econ.

Session Schedule

Date	Course type	Time	Room
26.08.2019-	Registration period	-	Portal
05.09.2019			
06.09.2019	Admission to course	-	Portal
06.09.2019	Kick-off & theory	B3 – B4	SO 318
13.09.2019	Theory & Preference statement	B3 – B4	SO 318
20.09.2019	Theory & Case distribution	B3 – B4	SO 318
27.09.2019	Help session	B3 – B5	SO 318
01.10.2019-	Online Lecture on Sustainability and OR	anytime	Online @ILIAS
31.10.2019	in Practice (see description below)		
04.10.2019	Help session	B3 – B4 / B5	SO 318 / O 048
11.10.2019	Help session	B3 – B5	SO 318
18.10.2019	Help session	B3 – B5	SO 318
25.10.2019	Help session	B3 – B5	O 226/28
25.10.2019-	Hack for Good challenge	Full day	Camp Kronberg
27.10.2019	(only for the team working on Topic 15)		
31.10.2019	Help session	B3 – B4	O 048
01.11.2019	Submission deadline (Topics 1-14)	-	ILIAS
08.11.2019	Final presentations	B2 – B5	SO 318
06.12.2019	Submission deadline (Topic 15)	-	ILIAS

Student Deliverables

Each team has to submit a written report on the assigned case of 10-12 pages (templates available on ILIAS).

In addition, each team has to present the main findings in the "Final presentations" session. Attendance for the final presentations is mandatory for all participants. For your presentation, your team will take on the role of consultants presenting to a management board. The management board consists of another team which should critically review the analysis and the recommendations of the consulting team. The duration of the presentation shall be 10 minutes per team member, with additional 5 minutes of review and discussion time per team member. The assignment of topics to management boards will be done by the instructor. Furthermore, please note that we may ask questions about the "Online Lecture on Sustainability and OR in Practice" of your choice during the Q&A session of your presentation (see below for more details of the lecture).

Submission deadline for report, presentation, and ALL calculations / files:

- 01. November 2019 for teams with topics 1-14
- 06. December 2019 for team with topic 15

Please upload your submissions (report, presentation, calculations/software output) to ILIAS under "Upload of final Report, Presentation & all Calculations" task.

Registration & Case Allocation

Since this course is limited to maximum 20 participants, registration for this course is obligatory and binding. In order to register, please do the following:

- (1) As an individual, register for the course OPM582 through Portal2 (Modul "Anmeldep-flichtige Veranstaltungen MMM") during the official registration period running from **26. August 2019** to **05. September 2019**. Please note that this registration is binding.
- (2) If you are admitted to the course, you are asked to state your preferences for the cases by distributing 100 points among all cases (using the provided template). Note that each case is typically selected by 2 or 3 participants who will then work together in a team. If you already have a team of 2 or 3, you can state a preference as a team. Otherwise, you can state individual preferences and you will be matched with other team-members based on your preferences. To state your preferences, you have to assign points to at least 5 different cases. You may only assign integer values. Based on you preferences, we will allocate the cases in a way that maximizes overall preferences

Online Lecture on Sustainability and OR in Practice (during October)

During October, there is an ILIAS online lecture from the Franz Edelman Competition (IN-FORMS Video Learning Center) demonstrating outstanding applications of OR (here in particular on sustainability) in the real world. The Franz Edelman Award rewards the use of operations research, analytics and mathematics in practice. It is a competition that attests to the contributions of operations research and analytics in both the profit and non-profit sectors. Since its inception, cumulative benefits from Edelman finalist projects have topped the \$292 billion mark. Edelman finalist teams have improved organizational efficiency, increased profits, brought better products to consumers, helped foster peace negotiations, and saved lives. The purpose of the Franz Edelman competition is to bring forward, recognize and reward outstanding examples of operations research, management science and advanced analytics in practice in the world.

Of the following three topics, please select the one that is most interesting to you and watch it. The corresponding videos will be accessible through the ILIAS group of this course during October. All videos are 30-40 minutes, and explain the business problem, the modeling and solution approach, as well as results and impact. Please note that we may ask questions about the online lecture of your choice during the Q&A session of your presentation. For example, you should be prepared for the following questions:

- Briefly describe purpose and impact of the project.
- Briefly describe the modeling approach(es) used in the project.
- What were your personal key lessons learned from the video?
- Etc.

Choice #1: Calibrated Route Finder- Social, Environmental and Cost-effective Truck Routing

Finding the best route with many conflicting objectives is very difficult. The online system Calibrated Route Finder has been developed in collaboration among many companies and organizations and successfully addresses the problem. A key component is an inverse optimization process that establishes more than 100 weights to balance social values, environmental impacts, traffic safety, stress, fuel consumption, CO2 emissions, and costs. In addition, methodological and analytic developments now enable measurement and inclusion of perceived hilliness and curviness as well as strict rules where to drive. The system has been in operations since 2009 and is today used by about 100 companies.

Choice #2: IBM Cognitive Technology Helps Aqualia Reduce Costs and Save Resources in Wastewater Treatment

This work takes a deep dive into operational management optimization problems in wastewater treatment plants. We used a constrained Markov Decision Process as the key optimization framework. Our technology was tested in a one-year pilot at a plant in Lleida, Spain, operated by Aqualia, the world's 3rd-largest water company. The results showed a

dramatic 13.5 percent general reduction in the plant's electricity consumption, a 14 percent reduction in the amount of chemicals needed to remove phosphorus from the water, and a 17 percent reduction in sludge production.

Choice #3: The Off-Hours Delivery Project in New York City

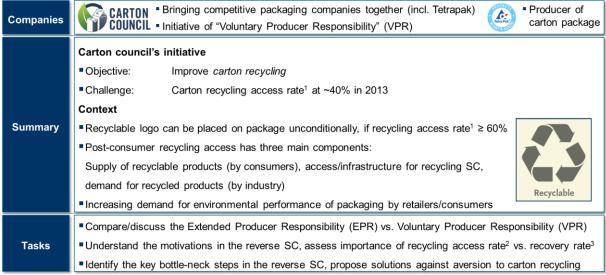
As part of the off-hours delivery (OHD) project, the team designed and implemented incentives to induce receivers to accept deliveries in the off-hours (7PM to 6AM). The ensuing change of the delivery times enable supply chains to switch to the off-hours to benefit from increased productivity and lower costs; while enhancing safety, sustainability, and fostering livability and quality of life. Operations Research and Management Science (OR/MS) played a central role in the design of the incentives and the implementation; leading to its acceptance as official policy of the City of New York and the New York City Department of Transportation (NYCDOT).

Case studies

Topic 1: Upcycling Ocean Plastics Through Supply Chain Innovation

Companies	Computer and technology product manufacturer and services provider US-based, founded in 1984	
	Dell's Ocean Plastics initiative ■ Objectives: Cost saving for packaging, diversion of waste from the oceans ■ Approach: Reuse of ocean plastics waste for packaging of new products ■ Challenges: Develop supply chain for waste reuse at scale in "build-to-order" and uncertainty context,	
Summary	develop more <i>use cases</i> of plastic waste, develop <i>consortium</i> with other companies Dell's context	
	 "Build-to-order" and "configure-to-order" model Commitment to sustainability ("2020 legacy of Good" plan, "3 Cs" strategy in packaging), incl. a goal source 100% of packaging from sustainable materials 	
Tasks	■ Develop a strategic plan on how to proceed with the Ocean Plastics initiatives — Internally (3P impact), to get buy-in from all stakeholders — Externally, to develop a consortium with other companies that want to follow suit	

Topic 2: Voluntary Producer Responsibility: Carton Packaging Recycling in U.S.



Topic 3: Patagonia

tagonia Manufacturer of high-end outdoor apparel		
■ Mission to "save our home planet"		
Product Lifecycle Initiative		
bjective: Lengthen the lifecycle of each product, thereby reduce landfill waste		
pproach: Expand practices of repairing, recycling and reusing old garments, "Most radically, the		
initiative would include telling its customers to buy less []" to counter overconsumption		
hallenge: How to fit Product Lifecycle Initiative with growth targets and increasing competition?		
tagonia's context		
listorically 6% average annual growth in net sales, target of 10% annual growth in net sales		
onation of 1% of revenues to environmental groups, high investment in process improvements with regard to		
nvironmental performance		
sses the market Patagonia is operating in		
efine the business and operations strategy at Patagonia; which role does the link between these play?		
re sales/profit targets feasible and desirable?		
C at H D er		

Topic 4: The economics of Amazon

0	amazon.com * E-commerce marketplace, platform for trade	
Companies	■ Started as an online book store	
	Some concerns on Amazon	
	■Concern 1: Human resource management	
	■Concern 2: Tax avoidance strategies	
	Concern 3: System-relevance (too big to brake?)	
Summary	Context	
	■Founded in 1994 as online book store	
	■Rapid expansion to wide range of products and services	
	Services to other industries and businesses (trade platform)	
	■ Highly profitable company in Western countries	
	Evaluate the Amazon's success criteria so far, highlight role of operations for success	
Tasks	■ Critically assess Amazon on 3P performance, highlight working conditions and policy of product returns	
	■ Define a strategy how to cope with these risks Amazon faces or could face in the future	

Topic 5: Alibaba - Building a Social Sustainability Ecosystem for e-Commerce

Companies	■ E-commerce marketplace	
	Alibaba.com • "Amazon of China" or "eBay of China"	
	Two rural initiatives	
	■ Taobao villages: Estimate that e-commerce created more than 840,000 direct job opportunities by 2016	
	Rural Taobao: Estimate that initiative reached 22 provinces and established 9,278 village-level service	
	stations by August 2016.	
Summary	Context	
	Alibaba's founding purpose was to facilitate access of world markets to small businesses in China	
	Established various digital marketing platforms "to make it easy to do business anywhere"	
	■Alibaba turned out being more profitable than Walmart, eBay and Amazon combined in 2015	
	■ Alibaba proclaimed profitability, inclusiveness and social sustainability as key objectives	
	Assess key enablers of Alibaba's economic success in China, highlight the role of politics and competitiveness	
Tasks	Critically assess the applicability of the term 'social sustainability' and overall dedication of Alibaba to 3Ps	
	■ Should Alibaba put more emphasis on "sustainability" in its operations and marketing campaigns?	

Topic 6: Apple - Planned Obsolescence of High-tech Products

Companies	Technology company Design of consumer electronics, computer software, and online services
	Planned obsolescence "[] Apple announced its iPhones, iPad and iWatches were built to last three years" "[] Concerning the Mac or Apple TV, their lifetime is extended to four years" Context
Summary	 Since creation in 1976, Apple has become #1 in the world regarding market capitalization in 2014 #1 in the world regarding brand value in 2014 Apple's success was mainly driven by increase of number of units sold All-in-one approach used in product design (non-modularity of products)
Tasks	 Assess the impact of Apple's strategy (all-in-one, planned obsolescence) on Triple Bottom Line Devise alternative (design and sales) strategy, highlight its relevance for consumers and public authorities If Apple is challenged by stricter (take-back) legislation, consult Apple with appropriate strategy adjustments

 $1\ https://www.apple.com/environment/pdf/products/iphone/iPhone6sPlus_PER_sept2015.pdf$

Topic 7: Toyota Product Recall: Does Quantity and Quality Go Hand-in Hand

Companies	Leading automobile manufacturer	
Companies	TOYOTA Japan-based, quality-focused	
	Toyota culture	
	Objective: Build high-quality automobiles	
	■Approach: Proprietary concepts and practices (such as TPS¹, Kanban)	
	■ Challenge: Quality-growth trade-off (increasing customer expectation)	
Summary	Context	
	■Toyota Motors was founded in 1937	
	■ Second world war entirely destroyed Japan's auto industry	
	■ In 2007, Toyota become largest automaker in the world in terms of number of cars sold	
	■ In 2018, Toyota was by far the biggest automotive brand in the world (source: Statista²)	
	■Define the meaning of "quality" in Toyota's context, assess its relevance in business-operations interlink	
Tasks	Highlight requirements/challenges/insights Toyota had to meet/overcome/gain to become quality leader	
	■ Analyse Toyota's dedication to quality nowadays (2019); Should Toyota put emphasis on quality or growth?	

¹ Toyota production system

Topic 8: Apple vs Samsung: The \$2 Billion Case

Companies	SAMSUNG *Technology companies *Consumer electronics software enline services and other
Companies	Consumer electronics, software, online services, and other
	The sue by Apple
	■Objective: Samsung accused of patent violation (esp. touch capabilities), asking for ~\$2 Billion fine
	■ Approach: Conjoint Analysis to assign a value to the product features in question
	Context
Summary	■"Duopoly" in Smartphone market, with Samsung and Apple sharing >90% market profits
	Samsung focusing on volume (market share)
	Apple focusing on value (margins)
	■Both companies also competing in the tablet market
	■Constant innovation and patenting is a key success criterion in the market
	Design an appropriate discrete choice conjoint analysis for a smartphone
Tasks	■Conduct an analysis, estimate the most relevant attributes and discuss importance of durability attribute
	■Is conjoint analysis applicable in the Samsung-Apple case? How can Samsung reply to the ~\$2 Billion ask?

 $^{2\} https://www.statista.com/statistics/316786/global-market-share-of-the-leading-automakers/$

Topic 9: Sustainability at IKEA Group

C	Home furnishing company	
Companies	Sweden-based, founded in 1943	
	People & Planet Positive initiative	
	Objective: Sustainability in the entire value chain	
	■Approach: Sustainable life of consumers, resource and energy management, community support	
	■ Challenges: Lack of well-developed, sustainable supply markets in target countries	
Summary	Context	
	■Largest home furnishing company by 2014	
	Challenging growth plan (2012): Double sales to €50 billion by 2020	
	■Main beliefs: "We can grow and be sustainable", "Sustainability is a driver of growth"	
	New role of "Chief Sustainability Officer" created in 2011, role part of Group Management (decision body)	
	Review IKEA's growth plans, discuss their implications on 3Ps (need to differentiate old vs. new market¹?)	
Tasks	Discuss the wood supply chain alternatives, consult IKEA on the appropriate alternative choice	
	Assess the success of growth plan and sustainability initiative from today's perspective, highlight the interlink	

1 Growth via taken customers away from others? Or growth via creating more customers/demand?

Topic 10: Preserve: Growing a Sustainable Consumer Goods Company

Companies	preserve • Consumer goods company, focusing on housewares and personal care
	Nothing wasted. Everything gained: Mission to create benefit for all stakeholders, founded in 1996
	Company mission
	Objective: Grow company beyond the niche it is currently operating in, but keep sustainability mission
	■Approach: Transform recycled material into new products with distinguished design, local production
	Challenges: Meeting both sustainability and financial goals
Summary	Context
	Company founded with the mission to preserve the environment
	Main goal: Transform recycled materials into consumable products + distinguished design
	Small company (only 14 employees in 2017)
	Preserve encouraged people to consider their impact on environment; effort ended in a loyal customer base
	Review the business and operating model of Preserve, highlight the role of partnerships
Tasks	Assess the source of Preserve's new product ideas, highlight the importance of the company's mission
	"Does Preserve need to grow just like any business out there"?; consult Preserve on an appropriate strategy

Topic 11: Philips' Transition to Circular Economy: Can the Innovation Sustain?

PHILIPS • Manufacturer of domestic appliances, medical systems, and other • Netherlands-based, founded in 1981	
 'EcoVision 5' initiative (2010) Objective: Address social and ecological issues (focus on waste reduction) Approach: 'Circular economy' (CE) principles Challenges: Change management required to shift from the old paradigm Context Phillips already addressing energy efficiency topics by leading the LED bulb development, waste reduction as a next step Ellen MacArthur foundation founded in 2010, mainly concerned with CE model Phillips worked closely with Ellen MacArthur foundation on implementation of CE 	
Discuss challenges and benefits associated with adoption of CE at Philips, highlight the role of customers Exemplify the total cost of ownership concept for a Philips product, highlight its role for customers Which strategic choices should Philips make to meet its objective? How should Philips manage this change?	

1 Total cost of ownership

Topic 12: Sustainable Development at PepsiCo

Companies	PEPSICO Consumer pack	aged goods manufacturer (food, snack, and beverage)	
Companies			
	'Performance with Purpose' initiative (2009)		
	Objective: Balance excell	ence in financial performance with sustainable business practices	
	■Approach: Measures alor	g the entire value chain	
	■ Challenges: Criticism, that	sustainability has come at the cost of sales performance	
Summary	Context History of success (rapid growth) and failure (bankruptcy) after foundation		
	Challenging 2000s due to public/consumer controversies on PepsiCo's operations and products		
	■PepsiCo overtook Coca Cola in 2005 in terms of revenues		
	■In 2011, PepsiCo was named top food and beverage company in DJSI¹ Food and Beverage sector		
	Discuss implications of PepsiCo's move towards sustainability, identify key competitors		
Tasks	Review 'Performance with Purpose' measures, highlight their impact on TBL (focus on critical measures)		
	■Review PepsiCo's performance;	How should PepsiCo respond to the criticism?	

1 Down Jones Sustainability Index

Topic 13: Natura Cosmeticos, SA

Companies	Personal care and cosmetics company		
Companies	natura Brazil-based, founded in 1969		
	Triple Bottom Line initiative		
	■Objective: Implement an integrated reporting, representing an integrated management culture		
	■Approach: Triple Bottom Line based on GRI¹ principles and framework		
	■ Challenges: Need to change a long-standing paradigm (focus on financials)		
Summary	Context		
	Leadership position in cosmetics, fragrances and toiletries industry; strongly motivated employees		
	■Focus on CSR since 1990s, first in Brazil to produce an integrated report/Triple Bottom Line (2002)		
	Main belief: CSR activities as a source of success (in terms of growth), building a strong premium brand		
	■ Note: Natura &Co acquired The Body Shop from L'Oreal in 2017 as part of it's overseas expansion strategy		
	Highlight requirements/challenges/insights Natura had to meet/overcome/gain to implement the TBL report		
Tasks	Exemplify Natura's TBL decision-making process ² and discuss its applicability to all management decisions		
	Going forward, which criteria should Natura base their decisions on (economic vs. environmental)?		

1 Global Reporting Initiative

2 E.g., synthetic vs. organic alcohol use; palm oil use; Both examples provided in the case

Topic 14: CDL: Creating Value Through Sustainability



Topic 15: Accenture challenge: Hack for good (Hackathon)

Companies	Service-company (strategy, digital, technology, operations, security, consulting) ->460.000 employees worldwide, 7.500 employees in DACH-region (11 locations)	
Summary	Develop a solution for 1 of 4 challenges for "Teach First" TeachFirst: World-wide NGO supporting adolescents in socially challenging circumstances Challenges with technical and managerial problem-mix (in German or English) Support by a dedicated Accenture coach onsite ("coaching on the case") Presentation of the results at the end of the weekend to a Jury of Accenture and Teach First Organizational When: 25. October 2019 (12:00pm) – 27. October 2019 (18:00pm) Where: Campus Kronberg (near to Frankfurt) Who: Interdisciplinary teams (3 management students, 3 technical students)	
Cases	 Optimization of matching process: matching teacher (fellow) and school Optimization of application process: evaluation of teacher applications Optimization of talent marketing: recruiting of teachers (e.g., target group analysis) Automatization of diagnostics: evaluation of pupils 	