Inland Waterway Transport

Challenges and prospects

Edited by Bart Wiegmans and Rob Konings



Inland Waterway Transport

Challenges and prospects

Edited by Bart Wiegmans and Rob Konings



First published 2017 by Routledge 2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

and by Routledge 711 Third Avenue, New York, NY 10017

Routledge is an imprint of the Taylor & Francis Group, an informa business

© 2017 selection and editorial matter, Bart Wiegmans and Rob Konings; individual chapters, the contributors

The right of Bart Wiegmans and Rob Konings to be identified as the author of the editorial material, and of the authors for their individual chapters, has been asserted in accordance with sections 77 and 78 of the Copyright, Designs and Patents Act 1988.

All rights reserved. No part of this book may be reprinted or reproduced or utilised in any form or by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying and recording, or in any information storage or retrieval system, without permission in writing from the publishers.

Trademark notice: Product or corporate names may be trademarks or registered trademarks, and are used only for identification and explanation without intent to infringe.

British Library Cataloguing in Publication Data A catalogue record for this book is available from the British Library

Library of Congress Cataloguing in Publication Data Names: Wiegmans, Bart, editor. | Konings, J. W., editor. Title: Inland waterway transport : challenges and prospects / Bart Wiegmans and Rob Konings.

Description: New York: Routledge, 2017.

Identifiers: LCCN 2016004655 | ISBN 9781138826717 (hardback) |

ISBN 9781315739083 (ebook)

Subjects: LCSH: Inland water transportation. | Inland navigation.

Classification: LCC HE617.W54 2016 | DDC 386-dc23 LC record available at http://lccn.loc.gov/2016004655

ISBN: 978-1-138-82671-7 (hbk) ISBN: 978-1-315-73908-3 (ebk)

Typeset in Times New Roman by Out of House Publishing



Inland Waterway Transport

Inland waterways are a host for a mode of transport that is neither as visible to the general public, nor as widely used, as it once was. However, it is generally perceived to be very important to today's freight transport system. A closer look into the inland waterway transport system reveals the strengths and opportunities of this mode of transportation.

This book gives the reader a thorough understanding of the current role of inland waterway transport as a freight transport system and its conditions. Drawing on case studies from across Europe, this text explores the economic, logistic, technological and policy issues and challenges related to inland waterway transport. It also explores the strategies for the inland waterway transport sector to secure and then enlarge its role in the future of freight transport.

Inland Waterway Transport will be an invaluable resource for students and researchers of transport studies. In addition, the book will be useful to policy makers and practitioners in the field. It will also appeal to wider readers with an interest in the fascinating business of inland waterway transport.

Bart Wiegmans is senior researcher at the Faculty of Civil Engineering, Delft University of Technology, the Netherlands. He specializes in spatial and transport economics related to maritime and intermodal freight transport.

Rob Konings is senior researcher at the Faculty of Architecture, Delft University of Technology, the Netherlands. He is an economist specializing in spatial and transport economics.

Routledge Studies in Transport Analysis

- 1. Maritime Logistics Value in Knowledge Management Eon-Seong Lee and Dong-Wook Song
- 2. The Management of Maritime Regulations Hristos Karahalios
- 3. Public Private Partnerships in Transport
 Trends and Theory
 Edited by Athena Roumboutsos
- 4. Climate Change and Adaptation Planning for Ports

 Edited by Adolf K. Y. Ng, Austin Becker, Stephen Cahoon,

 Shu-ling Chen, Paul Earl and Zaili Yang
- 5. **Maritime Networks**Spatial Structures and Time Dynamics *Edited by César Ducruet*
- 6. Inland Waterway Transport
 Challenges and Prospects
 Edited by Bart Wiegmans and Rob Konings

Contributors

Claude Comtois is professor of geography at the University of Montreal, senior member of the Interuniversity Research Centre on Enterprise Networks, Logistics and Transportation, and scientific advisor for Transport Canada's Port Working Group. His teaching and research are centred on ports and maritime transport. He currently supervises projects on the competitiveness of port systems, configuration of ocean shipping networks, and adaptation measures of maritime transport to environmental changes.

Cornelis van Dorsser is senior researcher on port economics and inland water-way transport at the Faculty of Civil Engineering of the Delft University of Technology, as well as a business developer at the Mercurius Shipping Group, a renowned Dutch IWT company. He graduated as a naval architect and transport economist on two innovative IWT projects and has worked as an IWT specialist in several IWT development projects throughout the world. He holds a PhD on the 'Very long term development of the Dutch IWT system' and wrote the shipping scenarios for the Dutch Delta Programme.

Edwin van Hassel is senior researcher at the Faculty of Transport and Regional Economics, Antwerp University, where he is also teaching three courses. He has an engineering degree in naval architecture and a PhD in applied economics. His main research interests and expertise are in inland navigation, port hinterland transport, ship design and transport modelling. He holds a PhD in the field of inland waterway transport. More recently the scope of his work has been extended to maritime cost chain modelling. He is also involved in several research projects ranging from logistics projects to infrastructure cost-benefit analysis and transport modelling projects.

Robert Hekkenberg is assistant professor at the Faculty of Mechanical, Maritime and Materials Engineering, Delft University of Technology. He is a naval architect specializing in inland ships. His main research interest and expertise is the conceptual design and optimization of inland ships. He holds a PhD in the field of naval architecture. He is involved in national and international research projects, supervises PhD candidates and dedicates a significant part of his time to the education of marine technology students.

- Gerhard Klatt is senior expert at via donau Österreichische Wasserstraßen-Gesellschaft mbH. He is a lecturer and supervisor at the University of Applied Sciences Technikum Wien. He holds a PhD in the field of business administration and specializes in inland navigation, transport and logistics, multimodal transport, IT in logistics, intelligent transport systems (ITS) and transport security. He has been involved in several European and national research and implementation projects.
- Rob Konings is senior researcher at the Faculty of Architecture, Delft University of Technology. He is an economist specializing in spatial and transport economics. His main research interest and expertise is freight transport with a focus on intermodal transport and related topics. He holds a PhD in the field of intermodal inland waterway transport. More recently the scope of his work has been extended to sustainability issues regarding transport systems. He is a member of editorial boards of transport journals and a member of research networks. He has been active in several national and international research projects.
- Tom van Lier is a postdoctoral research associate in the research group MOBI led by Prof. Dr. Cathy Macharis at the Vrije Universiteit Brussel, Belgium. His work focuses on evaluating the sustainability of transport solutions by means of external transport cost calculations. He has been involved in several research projects dealing with topics such as social cost-benefit analysis of transport options, external cost savings of freight bundling, carbon footprint calculations and life-cycle assessment of transport services. He earned his PhD in Applied Economics Business Engineering focusing on the development of an external cost calculator framework for evaluating the sustainability of transport solutions.
- Jialun Liu is a PhD candidate at the Faculty of Mechanical, Maritime and Materials Engineering, Delft University of Technology. He has a background in navigation technology and transport information engineering. His PhD project concerns the impacts of rudders on inland vessel manoeuvrability. The goal of the project is to achieve a highly manoeuvrable inland vessel with minimal fuel consumption. He specializes in optimizing ship design with CFD tools and simulating ship manoeuvring behaviours. His research interest lies in the field of ship manoeuvrability, rudder design and Computational Fluid Dynamics.
- Cathy Macharis is leading the MOBI research group (Mobility, Logistics and Automotive Technology Research Centre) and is chair of the BUTO department (Business Technology and Operations) of the Vrije Universiteit Brussel, Belgium. She is a professor at the Vrije Universiteit Brussel. She is also chairwoman of the Brussels Mobility Commission (RMC) and of the subcommission on freight transport. Her research focuses on sustainable logistics and urban mobility. She has been active in different national and international research projects.

- Vladislav Maraš is assistant professor in the Faculty of Transport and Traffic Engineering at the University of Belgrade. He holds a PhD in technological sciences in the field of intermodal inland waterway transport. His main research interests and expertise are transport planning, fleet planning and operations, transport safety, and transport and environment with particular focus on inland waterway transport. He has contributed to several national, regional and EU projects. He is a member of the editorial board and a reviewer of several transport journals and conferences.
- Dries Meers acquired an MSc in Urban Geography in a joint programme of the Universities of Leuven and Brussels. Currently, he is a researcher at MOBI (Mobility, Logistics and Automotive Technology Research Centre), led by Prof. Dr Cathy Macharis at the Vrije Universiteit Brussel. In his PhD, he focused on intermodal transport and the development of decision support methods to enhance a mental and modal shift.
- Koen Mommens is a research associate in the research group MOBI (Mobility, Logistics and Automotive Technology Research Centre), Vrije Universiteit Brussel, led by Prof. Dr Cathy Macharis. He acquired an MSc in Geography at the Vrije Universiteit Brussel, in cooperation with Katholieke Universiteit Leuven. His PhD work focuses on the development of a freight transport model for Belgium and the modal shift of palletized goods. He therefore developed the LAMBTOP model, tackling the intermodal possibilities for transports of palletized goods, and TRABAM, a trimodal agent-based freight transport model considering different commodity types and loading units.
- Tilman Platz is professor in the Faculty of Business at Baden-Wuerttemberg Cooperative State University, Mannheim. He is head of the freight forwarding, transport and logistics course. He received his PhD from the Radboud University Nijmegen. He has been involved in several national and European research and development projects. As a transport economist, his thematic focus is on inland waterway transport, intermodal transport, transport policy and sustainability in transport.
- Brian Slack is Distinguished Professor Emeritus at Concordia University, Montreal, and a member of the Inter-university Research Centre on Enterprise Networks, Logistics and Transportation in Montreal. A geographer, he was educated at the London School of Economics and McGill University. His research focuses on maritime transport and intermodal transportation. He is a recipient of the Ullman Award from the American Association of Geographers for contributions to transport geography, and was awarded an honorary doctorate from the University of Le Havre, France. He consults regularly for governments and private institutions on issues relating to ports and shipping.
- Christa Sys jointly graduated as a doctor in Applied Economics at the Ghent University and the University of Antwerp in 2010. Her doctoral research

xvi Contributors

dealt with the competitive conditions, the concentration and the market structure of the container liner shipping industry. This research was awarded the General Manager Fernand Suykens Prize for Port Studies by the Section of Technical Sciences of the Royal Academy for Overseas Sciences.

Thierry Vanelslander graduated as a doctor in Applied Economics at the University of Antwerp in 2005. He is currently tenure track assistant professor at the Department of Transport and Regional Economics. Until 2013, he was holder of the BNP Paribas Fortis chair on transport, logistics and ports. Until midway through 2009, he was director of the Research Centre on Freight and Passenger Transport, hosted by the Department of Transport and Regional Economics, of which he is still a promoter. He is currently course coordinator for the courses 'Management of Innovation and Technology' and 'Port Economics and Business' at C-MAT, and 'Transport Economics' at the Faculty of Applied Economics. His research focuses on business economics in the port and maritime sector, and in land and air transport and logistics. His PhD dealt with cooperation and competition in seaport container handling.

Bart Wiegmans is senior researcher at the Faculty of Civil Engineering, Delft University of Technology. He specializes in spatial and transport economics related to maritime and intermodal freight transport. His main research interest and expertise is in performance research, cost modelling and competition issues. He holds a PhD in economics in performance conditions of intermodal container terminals. He is a reviewer of many scientific journals and is a member of several research networks.

Contents

List of figures

1

PA

2

3

transport 36

	List	of tables	X
		es on contributors	xii
	IVOIE	es on contributors	All
			TRACT
		nd waterway transport: an overview	legit a l
	ROB	KONINGS AND BART WIEGMANS	
	1.1	Introduction 1	
	1.2	Waterways: a precondition for inland waterway transport 3	
	1.3	Transport performance 5	
	1.4	Important cargo flows for IWT 9	
	1.5	Emerging markets: container transport 9	
	1.6	Added value to society 12	
	RTI		
20	onom	ics and logistics	
	The	economic performance of inland waterway transport	18
	BAR	T WIEGMANS AND ROB KONINGS	
	2.1	Demand and supply of inland waterway transport 18	
	2.2	The role of costs and quality performances in IWT 21	
	2.3	Competitiveness of IWT with different transport modes	
		and in different markets (dry bulk, liquid bulk, containers,	
		others) 26	
	2.4	Major drivers to improve competitiveness 32	
	The	role of inland waterway transport in the changing logistics	
	envi	ronment	3:
	TILN	MAN PLATZ AND GERHARD KLATT	
	3:1	Definition of the logistics environment of inland waterway	

viii

	3.3	Outlook: opportunities and challenges for IWT in logistics 58	
4	to in	naging capacity in the inland waterway sector: ntervene or not to intervene?	71
	EDW	VIN VAN HASSEL, THIERRY VANELSLANDER AND CHRISTA SYS	
	4.1	Rationale and setting 71	
	4.2	Supply and demand characteristics of the IWT sector 73	
	4.3	Reduction of IWT barge capacity 78	
	4.4	The lack of bankruptcies 83	
	4.5	Which government actions were taken in the past? 88	
	4.6	The way forward: how to control capacity? 92 Conclusions 95	
	RT II	ucture, nodes and fleet	
		a menetion the book in wall the Lock KE Bliffs PLAR (Fix 2003) (0.3 AC)	
5		sting waterway infrastructures and future needs	99
	COR	NELIS VAN DORSSER	
	5.1	Introduction 99	
	5.2	Inland waterway characteristics 99	
	5.3	West European IWT system 104	
	5.4	Trends affecting the IWT system 112	
	5.5	Developing future-proof infrastructures 119	
6	Inla	nd river ports	125
	BRIA	AN SLACK AND CLAUDE COMTOIS	
	6.1	Defining inland ports 125	
	6.2	Inland ports, the role of bulk cargoes 126	
	6.3	Inland ports, new traffic 131	
	6.4	Conclusions 138	
7	Developments in inland waterway vessels		
	ROB	ERT HEKKENBERG AND JIALUN LIU	
	7.1	Inland vessels around the world 142	
	7.2	Innovation characteristics and innovation adoption	
		in inland vessel design 148	
	7.3	The most influential innovations and developments	
		of recent years 153	
	7.4	Impacts of these developments on the competitiveness	
		of IWT 163	

此为试读,需要完整PDF请访问: www.ertongbook.com

3.2 Integration of IWT into logistics chains 47

vi Contents

218

PART	III	

9.3

9.4

Index

Market developments and policies

Conclusion 212

8	A new wave for the infand waterways: panetized goods	108
	KOEN MOMMENS, DRIES MEERS, TOM VAN LIER AND	
	CATHY MACHARIS	
	8.1 Pallets on the inland waterways? 170	
	8.2 Market evolution 174	
	8.3 Location Analysis Model for Barge Transport Of	
	Pallets 180	
	8.4 Conclusion 183	
9	Policies for inland waterway transport: needs and	
	perspectives	188
	VLADISLAV MARAŠ	
	9.1 European IWT master policy programme: an overview 189	
	9.2 An approach for the evaluation of European IWT policy needs and perspectives 190	

Findings of the European IWT policy evaluation 192

Figures

1.1	Touristic narrow boats sailing on the UK canal network	4
1.2	IWT by commodity type for selected regions	10
1.3	Distribution of infrastructure investment between modes in	
	Western European countries, 1995–2011	15
2.1	Beatrix lock and the Lekkanaal, prior to project commencement	24
2.2	Comparison of inland waterway closures, scheduled verses	
	unscheduled, 1992–2006	25
2.3	Importance of barge subsectors in Europe: dry bulk is the	
	main commodity group	30
3.1	Freight transport in Germany by the inland transport modes	
	road, rail and inland waterway by type of good	42
3.2	ITS traffic information and services contributing to transport	
	logistics	45
3.3	Physical goods flow and flow of information	48
3.4	Multimodal waterborne logistics chain (shipper to consignee)	49
3.5	Transport processes: planning – execution – completion	51
3.6	Useful RIS transport logistics services for logistics service	
	providers	56
3.7	Fast and smart logistics chains supporting a floating stock	
	concept for goods with changing demand patterns	62
4.1	Impact of increase in supply on the freight price	72
4.2	Overview of supply and demand in the dry cargo sector in	
	Northwestern Europe	73
4.3	Development of supply and demand in the dry cargo fleet in	
	Northwestern Europe at maximum allowable draught and	
	at 2.99 m	75
4.4	Overview of supply and demand in the tank barge sector in	
	Northwestern Europe	76
4.5	Evolution of ARA liquid bulk throughput and tank	
	barge capacity	77

	I	Figures	ix
4.6	Demolition number of dry cargo vessels		79
4.7	Demolition age of dry cargo vessels		80
4.8	Demolition and export number of tank barges		82
4.9	Demolition age of tank barges		82
1.10	Overview of the tank barge sector		84
.11	Overview of cash flow in the European inland shipping sect	or	85
1.12	Ratio of cost elements in the IWT sector		93
5.1	The relatively deep normalised Rhine		101
5.2	Push barge operation on the Oder		102
5.3	The effect of the beam on the capacity of inland container		
	vessels		103
5.4	Frozen port of Moscow (a) and water hyacinths on Lake		
	Victoria (b)		105
5.5	Rhine at Nijmegen (Braun, 1575)		106
5.6	'Trekschuit', ca. 1850		107
5.7	European inland waterways according to their CEMT-92		
	waterway class	1	111
5.8	Historical and expected development of new transport		
	infrastructure networks		113
5.9	Illustration of watertruck concept		117
6.1	Layout of the port of Mannheim		130
7.1	A six-barge pushtow operating on the Rhine		144
7.2	A self-propelled dry cargo ship		145
7.3	A coupled unit		146
7.4	A tank ship		147
7.5	Container ships		148
7.6	A ship adapted for the transport of cars		149
7.7	Maximum, average and median values of deadweight of		
	newbuilt ships		154
7.8	Numbers of newbuild ships vs length and beam		155
7.9	Top-down graph of Figure 7.8		156
.10	Energy consumption in MegaJoules per tkm of transport		158
.11	The Mercurius Amsterdam		162
.12	The River Hopper, the vessel developed for the Distrivaart		100
112	project which is a first of the state of the		162
.13	A typical aftship form of a self-propelled inland ship		164
8.1	World container traffic and throughput		169
8.2	Intermodal and unimodal transport chain for palletized		172
8.3	goods and the related cost structure From left to right: Madagasagar Pollet Shuttle Barge		172
0.3	From left to right: Madagascar, Pallet Shuttle Barge, Fluviant and Patmar Z	1	176
	Tuvum alla fama Z	Tax Page 1	1/0

x Figures

8.4	Optimal transhipment hub locations for Build-over-Water and ADSEI data, relative to the population density on the	
	municipality level	183
9.1	Policy-theory of the NAIADES II action programme	191
9.2	IWT labour calculation model (IWT-LCM) – required vs	
	available labour force	208

no summi suprembli and missoria A

Tables

5
5
6
7
8
20
29
33
39
40
53
54
57
109
115
116
128
134
136
143
173

	m 11
X11	Tables

8.2	Importance of commodity and supply chain characteristics	
	for modal shift	174
9.1	Average utilization rates, available and required tonnage of	- 183
	the Western European inland navigation fleet	201

Data to define the factor costs of book bandage

此为试读,需要完整PDF请访问: www.ertongbook.com