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McKinsey&Company

1. Where we have been

Extract from Brave new world? Container transport in 2043

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IS MANAGED
BY **THOMAS MILLER**

Where we have been

1968. It was the year of the Prague Spring, the Tet Offensive, and the assassinations of Dr. Martin Luther King Jr. and Bobby Kennedy. It was the year Richard Nixon was elected U.S. president, the Rolling Stones released Beggar's Banquet, Apollo 8 first orbited the moon, Boeing unveiled the 747, Mexico City hosted the summer Olympics, the S&P 500 touched 100 for the first time, and Yale University opened admissions to women.

China was gripped by Mao's Cultural Revolution, the United Kingdom announced the withdrawal of its military forces east of Suez, Singapore held its first election since independence, Japan was rapidly industrialising, and Dubai was taking the first steps on its impressive development journey. Real global GDP grew by 6.2% that year, resulting in a total global economic output of US$17 trillion. Global trade amounted to 22% of global GDP and was concentrated between North America and Europe with much smaller volumes flowing into and out of East Asia, primarily Japan.

Amid all this activity, a little-noticed innovation was taking hold of global trade: the "container box," commercialised in 1956 by Malcom MacLean. By 1968, containerised trade was still miniscule: less than 1% of total trade. But it was in rapid ascent. This was the year TT Club was founded.

Trade volumes in 1967

TRADE ROUTES AND VOLUMES
(1,000 freight tons a year)

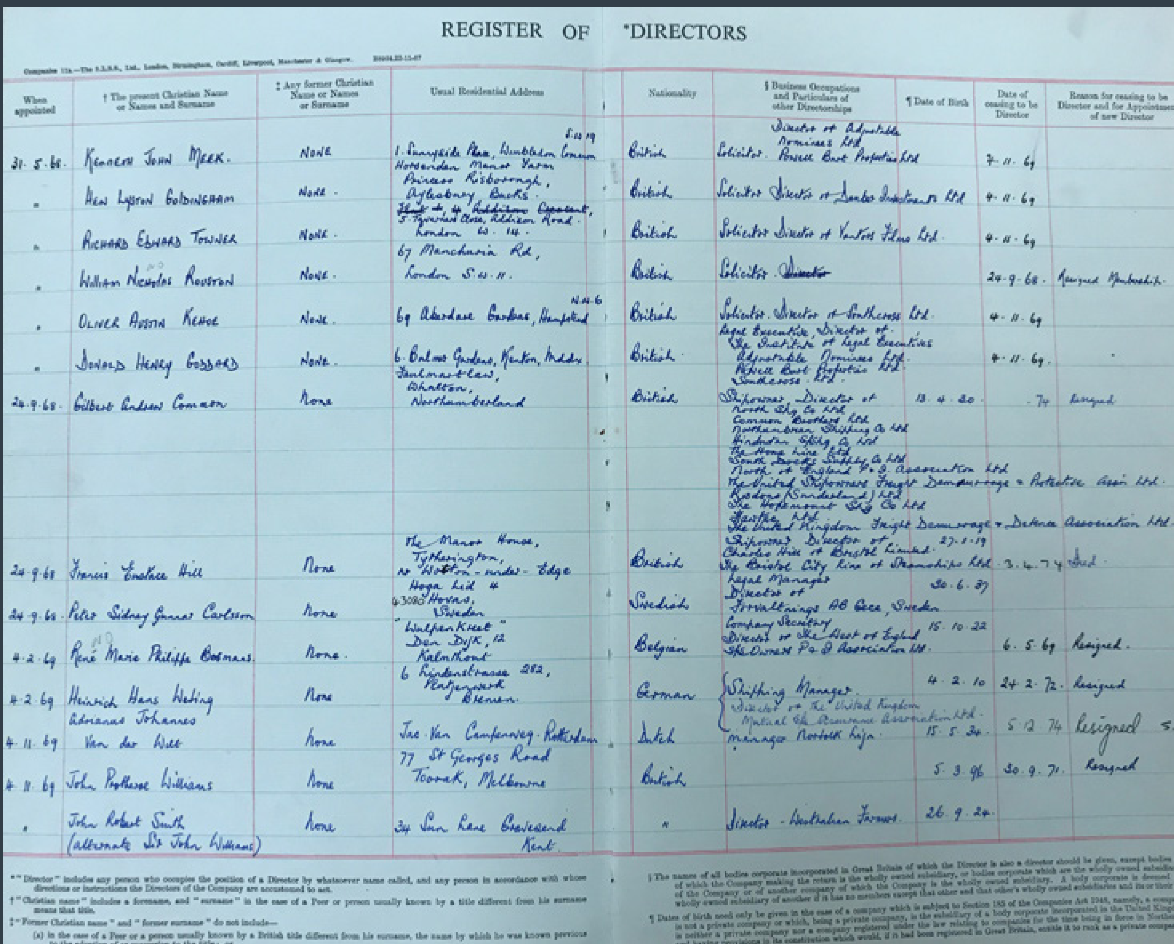
	Total		U.K.		Scandinavia		Benelux		France		W. Germany		Iberia		Italy	
	Imps.	Exps.	Imps.	Exps.	Imps.	Exps.	Imps.	Exps.	Imps.	Exps.	Imps.	Exps.	Imps.	Exps.	Imps.	Exps.
North America ...	11,318	6,272	5,509	1,936	715	842	790	703	925	842	2,483	934	392	176	505	840
Central and South America	7,569	2,525	1,112	320	1,078	306	797	461	638	354	2,613	661	650	140	681	282
West Africa	4,130	2,373	460	411	122	169	174	258	2,488	1,229	565	156	58	30	262	119
East and South Africa	3,496	2,029	1,929	951	145	101	188	176	460	233	623	294	27	22	125	252
Mediterranean and Middle East	1,012	1,822	411	583	128	132	74	283	60	216	246	363	27	10	67	235
India and Pakistan ...	1,534	791	1,270	384	36	38	59	72	39	38	99	216	0.9	0.7	30	43
Far East	1,701	2,780	737	739	174	252	154	542	96	252	418	795	32	17	90	182
Australasia	5,108	1,496	3,079	1,029	382	95	112	90	229	50	1,030	163	14	4	263	64
U.K.	3,957	6,994	—	—	867	1,608	1,199	2,449	406	899	803	1,095	362	444	321	498
Total	39,825	27,082	14,507	6,353	3,647	3,543	3,547	5,034	5,341	4,113	8,880	4,677	1,562	843	2,344	2,515

Source: "Containerization: the key to low-cost transport", A report by McKinsey & Company, Inc. for the British Transport Docks Board, June 1967.

The role of TT Club

The "Through Transport" Club, or TT Club[1] was formed in 1968 by seven early players in the container transport industry. Based on the mutual insurance model, it filled a gap in the rapidly evolving market: other insurers were willing to cover cargo liabilities from port to port, but were unwilling to cover containerised liabilities landside or the containers themselves. Today the Club insures 80% of all maritime containers, and covers port, terminal, and stevedore interests in almost half of the top 100 ports globally. TT Club also insures hundreds of freight forwarders and logistics operators, as well as other interests through the supply chain.

TT Club's first Register of Directors, 1968



REGISTER OF *DIRECTORS

When appointed	† The present Christian Name or Names and Surname	‡ Any former Christian Name or Names or Surname	Usual Residential Address	Nationality	§ Business Occupations and Particulars of other Directorships	¶ Date of Birth	Date of ceasing to be Director	Reason for ceasing to be Director and for Appointment of new Director
31.5.68	Kenneth John Meek	None	1. Sunnyside Place, Wimbledon Common S.W.19	British	Solicitor. Director of Adjustable Nominees Ltd, Powell Bust Properties Ltd		7.11.69	
"	Alan Lynton Goldingham	None	Hotsenden Manor Farm, Princes Risborough, Aylesbury, Bucks.	British	Solicitor Director of Dundee Investments Ltd		4.11.69	
"	Richard Edward Towner	None	~~Flat 4, 4 Addison Crescent~~, 5 Tynwald Close, Addison Road, London W.14.	British	Solicitor Director of Ventors Films Ltd		4.11.69	
"	William Nicholas Rouston	None	67 Manchuria Rd, London S.W.11.	British	Solicitor ~~Director~~		24.9.68	Resigned Membership
"	Oliver Austin Kehoe	None	69 Aberdare Gardens, Hampstead N.W.6	British	Solicitor. Director of Southcross Ltd		4.11.69	
"	Donald Henry Goddard	None	6 Balmoral Gardens, Kenton, Middx.	British	Legal Executive, Director of: The Institute of Legal Executives, Adjustable Nominees Ltd, Powell Bust Properties Ltd, Southcross Ltd		4.11.69.	
24.9.68	Gilbert Andrew Common	None	Soulmartlaw, Whalton, Northumberland	British	Shipowner, Director of North Shg Co Ltd, Common Brothers Ltd, Northumbrian Shipping Co Ltd, Hindustan Shg Co Ltd, The Home Line Ltd, South Docks Supply Co Ltd, North of England P & I Association Ltd, The United Shipowners Freight Demurrage & Protective Assn Ltd, Readone (Sunderland) Ltd, The Hopemount Shg Co Ltd, Gareths Ltd, The United Kingdom Freight Demurrage & Defence Association Ltd	13.4.20	-74	Resigned
24.9.68	Francis Eustace Hill	None	The Manor House, Tytherington, nr Wotton-under-Edge	British	Shipowner Director of Charles Hill of Bristol Limited, The Bristol City Line of Steamships Ltd	27.1.19	3.4.74	Died
24.9.68	Peter Sidney Gunnar Carlsson	None	Hoga Lid 4, 43080 Hovas, Sweden	Swedish	Legal Manager, Director of Forvaltnings AB Gota, Sweden	30.6.37		
4.2.69	René Marie Philippe Bosmans	None	"Walpen Kreek" Den Dijk, 12 Kalmthout	Belgian	Company Secretary, Director of The West of England Ship Owners P & I Association Ltd.	15.10.22	6.5.69	Resigned.
4.2.69	Heinrich Hans Weling	None	6 Lindenstrasse 282, Platjenwerk, Bremen	German	Shipping Manager; Director of The United Kingdom Mutual Steamship Assurance Association Ltd	4.2.10	24.2.72	Resigned
4.11.69	Adrianus Johannes Van der Wiel	None	Jac. Van Campenweg, Rotterdam	Dutch	Manager Norfolk Lijn	15.5.24	5.12.74	Resigned
4.11.69	John Prothero Williams	None	77 St Georges Road, Toorak, Melbourne	British		5.3.96	30.9.71	Resigned
"	John Robert Smith (alternate Sir John Williams)	None	34 Sun Lane Gravesend Kent	"	Director - Australian Farms	26.9.24		

* "Director" includes any person who occupies the position of a Director by whatsoever name called, and any person in accordance with whose directions or instructions the Directors of the Company are accustomed to act.

† "Christian name" includes a forename, and "surname" in the case of a Peer or person usually known by a title different from his surname means that title.

‡ "Former Christian name" and "former surname" do not include—
(a) in the case of a Peer or a person usually known by a British title different from his surname, the name by which he was known previous

§ The names of all bodies corporate incorporated in Great Britain of which the Director is also a director should be given, except bodies of which the Company making the return is the wholly owned subsidiary, or bodies corporate which are the wholly owned subsidiary of the Company or of another company of which the Company is the wholly owned subsidiary. A body corporate is deemed wholly owned subsidiary of another if it has no members except that other and that other's wholly owned subsidiaries and its or their

¶ Dates of birth need only be given in the case of a company which is subject to Section 185 of the Companies Act 1948, namely, a company which is not a private company or which, being a private company, is the subsidiary of a body corporate incorporated in the United Kingdom, is neither a private company nor a company registered under the law relating to companies for the time being in force in Northern Ireland, would, if it had been registered in Great Britain, entitle it to rank as a private company

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1 Originally styled as "Through Transit Marine Mutual Assurance Association"

The last 50 years have been nothing short of remarkable for the container transport industry, which has grown at breakneck speed. This has been fuelled by the expansion of global trade and by the growing share of container transport. Global trade has exploded from 22% of global GDP to 59% in 2015 – at a time when real global GDP has burgeoned from US$17 trillion to US$77 trillion. Japan's manufacturing- and export-led development strategy was later adopted by South Korea, Taiwan, and China. China's integration into the global economy – catalysed by establishing the Shenzhen Special Economic Zone and Deng Xiaoping's reforms in the 1980s, and culminating in its 2001 accession to the World Trade Organization – unlocked a low-cost labour force of almost one billion people. This led to a wave of offshoring and the fragmentation of supply chains, ultimately making China the "factory to the world."

Already riding this wave, container trade also took share from breakbulk trade. Its modularity, simplicity, resistance to pilferage, and efficiency proved far too attractive for shippers of cargo; many goods are now only transported by container. Whereas fewer than one million twenty-foot equivalent units (TEUs) of containerised cargo were moved in 1968, 182 million TEUs were moved in 2016.

The industry has done everything it can to keep up with this astronomical market growth. In the early years, the box itself had to be standardised and made compatible with the assets and infrastructure of many different players. Liners recognised that containers unlocked new scale economies and invested in larger and larger ships. At a time when the first fully cellular container ships could carry approximately 1,000 TEUs, McKinsey surmised, "Containerized cargo is effectively becoming like other bulk cargoes, and is subject to the same economies of scale... If container ships follow the tanker trend, ships of more than 10,000-container capacity could be available.[2] " By 2017, ships with capacity in excess of 21,000 TEUs were coming onto the market. The lumpiness of adding capacity has resulted in over-expansion and regular boom-bust cycles, the most recent of which has prompted many line operators to consolidate: the top five liner companies had a 27% share of the market in 1996; today they have 64%.

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2 "Containerization – Its Trends, Significance and Implications", McKinsey & Company for the British Transport Docks Board (July 1966).

The effect of larger ships has been to concentrate cargoes in leading ports and grow the share of trans-shipment volumes.[3] Major regional ports like Rotterdam, Singapore, Jebel Ali, Shanghai, and Los Angeles have captured a disproportionate share of the growth while other ports have faced financial pressure and decline. For terminal operators, enjoying growth meant gaining a position in the best ports with the most efficient hinterland connections. Initially this was a local game, but over time some multi-continent terminal operators have emerged.

Rapid growth had another effect: it enabled so many players to survive across so many jurisdictions that coordinating activity amongst all of them became valuable in and of itself. Freight forwarding, which had been around since the 1800s, came of age in the post-World War II period by ensuring a relatively seamless "one-stop shop" experience for cargo shippers – something the plethora of liners, terminal operators, railroads, trucking companies, and others that physically moved the cargo proved unable or unwilling to do. Without the benefits of scale economies (the business historically was labour- and relationship-intensive), an enormous number of freight forwarders emerged, mainly serving and maintaining long-term relationships with local cargo shippers.

3 The share of trans-shipment TEUs grew from 21% in 1995 to 28% in 2012, but has since modestly declined to 26% in 2016 as overall trade growth has slowed.

The evolution and standardisation of the "container box"

The origin of multimodal containers may be traced to coal mining regions of the United Kingdom in the late 18th century. In 1766 James Brindley designed the box boat "Starvationer" with ten wooden containers, to transport coal from Worsley Delph (quarry) to Manchester by Bridgewater Canal.

Following the Great Depression, initiatives emerged to ease transport, particularly by rail, in both the United States and Europe. For example, in 1931, Benjamin Franklin Fitch designed the two largest and heaviest containers in existence anywhere at the time, the larger one measuring 20'0" by 8'0" by 8'0", with a capacity of 50,000 pounds (22,680 kilos) in 1,000 cubic feet.

In 1933, the Bureau International des Containers (BIC) was established in Europe under the auspices of the International Chamber of Commerce, and determined a set of Obligatory Regulations for containers handled by means of lifting gear and used in international traffic, forming a first "standard." The United States Army continued to experiment with various dimensions through to the 1950s. In April 1956 a crane lifted 58 aluminium truck trailers aboard an ageing tanker ship, "Ideal-X," moored in Newark, New Jersey, for a voyage to Houston, Texas, where 58 trucks waited to haul these metal boxes to their inland destinations.

Initial size standards were debated by the American Standards Association, which then proposed the establishment of a committee of the International Organization for Standardization (ISO). Technical Committee 104 (TC104) first met in 1964 and over the years has continued to drive standards for freight containers in relation to safety and efficiency. There are now five core standards relating to containers.[4] Furthermore, the concept has been extended for specialist uses, including refrigerated containers and tank containers.

Through the late 1950s and early 1960s the increase in containerised traffic grew considerably, so much so that in 1967 the International Maritime Organization[5] (IMO) initiated a study into the safety of containerisation in marine transport. In 1972, a conference jointly convened by the United Nations and the IMO considered a draft Convention prepared by the IMO in cooperation with the United Nations Economic Commission for Europe. The outcome of the conference was the adoption in December 1972 of the International Convention for Safe Containers (CSC 1972). When the Convention was initially drafted the world-wide fleet of containers was 145,000 TEUs; by the end of 2016 the global fleet has grown to some 38.5 million TEUs.

The interaction between the IMO and ISO through the decades, often prompted by incidents or interventions made by national authorities, has sought to mitigate the risks involved in containerisation. At the time of writing, 84 countries have ratified CSC, for which the sixth edition was published by IMO in 2014.

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4 These are ISO 668 - Series 1 freight containers – Classification, dimensions and ratings; ISO 1161 - Series 1 freight containers – Corner fittings – Specification; ISO 1496 - Series 1 freight containers – Specification and testing – Parts 1 to 5; ISO 3874 - Series 1 freight containers – Handling and securing; ISO 6346 - Freight containers – Coding, identification and marking

5 Known until 1984 as “Inter-Governmental Maritime Consultative Organization” (IMCO).

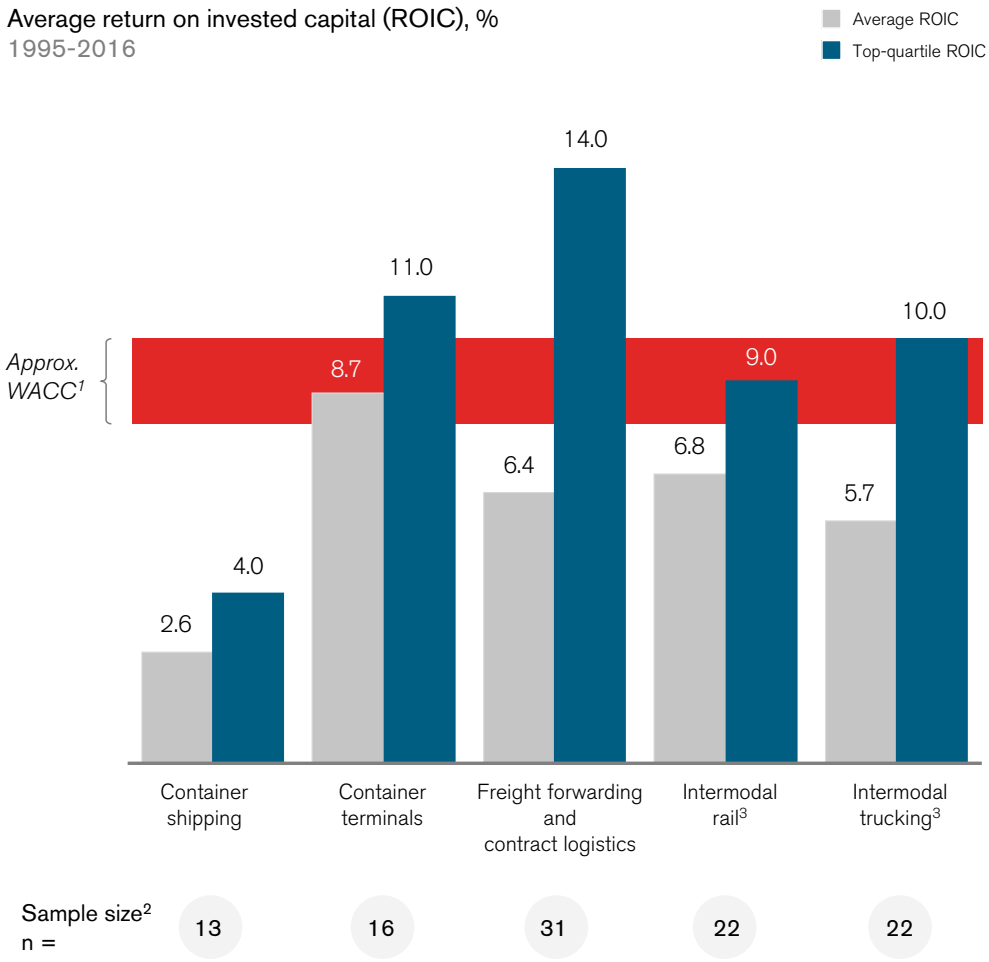
An uncertain glory

In such a bullish growth environment, industry players may have expected reasonable returns. But container transport has proved to be an extremely competitive business and margins have typically been short-lived. During the period 1995-2016, when TEU volumes nearly quadrupled, the average player in the container transport industry did not return its cost of capital (Exhibit 1).

Of course, averages deceive. Some individual companies have been able to generate returns on invested capital far more than their cost of capital over the long run. The "average" top-quartile player in all segments except container shipping has created value. Top performers in freight forwarding and contract logistics returned 14% on average; those in container terminals, 11%. The secrets to success in the face of intense competition are varied but typically relate to scale, world-class operations and the right geographic exposure. For container liners, average returns for the top players were still less than the cost of capital invested, with only a small number of global players or, alternatively, companies focused on "niche" trade routes able to squeeze out a return; a commoditised product and a mismatch between capacity additions and demand growth have proven a recipe for low returns.

Exhibit 1

The container transport industry has struggled to return its cost of capital in the last two decades



1 Weighted average cost of capital; estimated at 8-10%
2 Sample size varies across years due to data unavailability
3 Includes non-containerised transport

SOURCE: Capital IQ, McKinsey analysis

A new era?

The global financial crisis in 2008-2009 was a major watershed for the industry. For decades containerised trade growth has been double or triple that of real global GDP growth. Container traffic had never declined year on year until 2009. Now, as the wave of globalisation has slowed, container growth is only just matching GDP growth. Economic malaise in the wake of the financial crisis – inequality, unemployment, slow-to-recover wages, fears of automation – has fed into populist policymaking. This threatens to upend the pro-globalisation policies that underpinned the expansion of trade over much of the last 50 years. In addition, concerns mount about the sustainability of China's economic model, especially its degree of leverage and whether it can effectively reorient itself from an investment-led development strategy to a consumption-led one.

At the same time, the industry faces new opportunities and threats from the rise of digital, data, analytics, and automation. In an industry traditionally focused on physical assets, the digital era presents a host of new challenges, potentially disrupting business models and creating new value streams. Customer expectations of container transport are also being radically re-shaped by e-commerce and innovations in last-mile logistics; as end-consumers come to expect same-day delivery, the demands on the container transport industry – which is only a couple of steps removed – will only rise. And other innovations like 3D printing and hyperloops may fundamentally change the geography of trade and the container transport sector's role in facilitating it.

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A period of exceptional growth – as the global economy boomed, global trade outpaced the economy, and container captured an ever-increasing share of trade – has begun to feel like a distant memory. At the same time, the rise of digital, data, and analytics is creating new expectations among the end-users of the container transport value chain and other stakeholders – throwing up new strategic dilemmas and investment requirements.

About TT Club

TT Club is the leading provider of insurance and related risk management services to the international transport and logistics industry. As a mutual insurer, TT Club exists to provide its policyholders with benefits, which include specialist underwriting expertise, a world-wide office network providing claims management services, and first class risk management and loss prevention advice.

Customers include some of the world's largest shipping lines, busiest ports, biggest freight forwarders and cargo handling terminals, to companies operating on a smaller scale but whose operations face similar risks. TT Club specialises in the insurance of Intermodal Operators, NVOCs, Freight Forwarders, Logistics Operators, Marine Terminals, Stevedores, Port Authorities and Ship Operators.

For further details, please see our website at www.ttclub.com.

About Thomas Miller

Thomas Miller is an international provider of market leading insurance services, and is the manager of TT Club. Founded in 1885, Thomas Miller's origins are in the provision of management services to mutual organisations, particularly in the international transport and professional indemnity sectors. Today Thomas Miller manages a large percentage of the foremost insurance mutuals and is increasingly bringing knowledge and expertise to the development of specialist insurance services businesses.

Principal activities include:

- Management services for transport and professional indemnity insurance mutuals
- Managing General Agency
- Professional services including legal and technical services, claims and captive management
- Investment management for institutions and private clients

Further details can be found on our website at www.thomasmiller.com.

About McKinsey & Company

McKinsey & Company is a global management consulting firm that serves a broad mix of private, public, and social sector institutions. We help our clients make significant and lasting improvements to their performance and realise their most important goals. McKinsey & Company was founded in 1926 and today has 14,000 consultants and offices in more than 120 cities. We are an advisor to many of the leading container shipping liners, terminals and freight forwarders.

You can learn more about McKinsey's services in shipping and ports at: www.mckinsey.com/industries/travel-transport-and-logistics/how-we-help-clients/shipping-and-ports.

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- Josef Küttel, ERMEWA Group
- Peter Levesque, Modern Terminals
- Roberto Murchison, Murchison Group
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- Erxin Yao, OOCL

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We would also like to thank Jeffrey Lawrence, the Chair of Transportation & Trade at Cozen O'Connor, for his thoughtful review and comments on the report.

Note on methodology

This research combines the insights of the TT Club Board of Directors and other TT Club members; perspectives of customers and suppliers to the container transport industry, including "digital natives" and other start-ups; and McKinsey experts and analysis. During 2017 we interviewed over 30 industry leaders and experts, representing a wide cross-section of the industry including container liner operators, terminals operators, port authorities, freight forwarders, container lessors, financial intermediaries, suppliers of digital solutions to the transport and logistics industry, e-commerce companies, and law firms, among others. We ran a joint workshop with the TT Club Board members to further develop future scenarios. No proprietary data from the participants was exchanged or used to produce this report.

For the purposes of this report, we define the "container transport industry" as container shipping (container lines), container terminals, and freight forwarding. While freight forwarders participate in a wider part of the logistics space than containerised cargo transport, trends in container transport have a significant impact on freight forwarders.

This report is structured in four chapters. Chapter One ("Where we have been") outlines the incredible history of container transport. Chapter Two ("Where we are going") explores the points of fundamental agreement and disagreement about the outlook for the container transport industry. Chapter Three ("Four visions of the future") weaves together these elements to construct four potential futures that each present very different strategic implications. Chapter Four ("Preparing for the next 25 years") provides some closing ruminations on what the container transport industry should be doing now to anticipate a range of uncertain futures.

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