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Capturing Managerial Cognition and Investigating the Impact of Scenario Planning in the Shipping Industry

Summary

This paper outlines the research aims and some initial findings from two systematic literature reviews that were recently conducted by the authors. Starting with the question ‘how do managers think about the future?’, this paper engages in a conversation framed within the context of corporate foresight on how stakeholders in shipping industry engage with it in turbulent times. Deriving from the findings of reviews of literature, it sets out the evolution of the application of the scenario technique in the shipping industry as well as the technique’s impact on participants in general. The paper further describes the proposed research design to attempt to answer the proposed research questions and articulates some expected outcomes.

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Keywords: scenario technique, managerial cognition, the maritime shipping industry

1. Introduction

Shipping is an essential mode of transport in the world (Duru, Bulut, & Yoshida, 2011) and it plays a key role in the global economy (Stopford, 2009, p. xiii). It is also a highly capital-intensive (Omrani & Keshavarz, 2015) and cyclical industry (Chen, Meersman, & Voorde, 2012; Chisté & van Vuuren, 2014; Nielsen, Jiang, Rytter, & Chen, 2014). In a market that is full of ups and downs, predicting the freight rate trend is crucial for the successful strategic planning of shipping companies (Nielsen et al., 2014). On the other hand, academics and consultants in the maritime industry agree on that forecasting in shipping is infamous as it quite often fails (Gomez Paz, Camarero Orive, & González Cancelas, 2014; Goulielmos & Psifia, 2011; Nielsen et al., 2014; Qingcheng, Chenrui, Adolf, & Xiaofeng, 2015; Stopford, 2009). Given drawbacks of statistical forecasting methods, judgemental forecasting methods have started to receive attention (Huang, Qiao, & Wang, 2014), and judgemental forecasts in shipping seem to produce more reliable results in comparison to the forecasts by the quantitative methods (Duru & Yoshida, 2009; Huang et al., 2014).

According to Stopford (2009), another approach to forecasting used in shipping is scenario analysis. Most academics, however, look at scenarios distinctively rather than ‘a forecast or a precise prediction’ (Lindgren & Bandhold, 2003; Wulf, Brands, & Meißner, 2011). Van der Heijden et al. (2002, quoted in Burt et al., 2006, pg. 60) provide a precise definition of scenario as: “Scenarios are not predictions, extrapolations, good or bad futures, or science fiction. Instead, they are purposeful stories about how the contextual environment could unfold in time”.

The aim of this proposed study is to start with the question ‘how do managers think about the future?’ and further engage in a conversation framed within the context of corporate foresight on how stakeholders in shipping industry engage with it. Scenario planning, which is a prominent corporate foresight tool (Rohrbeck, Battistella, & Huizingh, 2015), was chosen to put under scrutiny by the authors in terms of its applications in the shipping industry and the technique’s effectiveness on participants and analysed in two systematic literature reviews. By doing so, this paper contributes to the scenario planning literature in two ways, it provides insights into the technique’s use in the shipping business and contributes to the theory of scenario planning.

Potential research questions are as follows;

- i. How do ship owners do foresight and make sense of the future?
- ii. What is the impact of presenting the future shipping scenarios on the industry stakeholders' thinking?

2. Research Design

This paper has been developed based on potential research questions and systematic reviews of literature in the field of inquiry. Due to the scarcity of research on managerial cognition in the maritime shipping business, this phenomenon is planned to be investigated in the empirical part of this research. On the other hand, two systematic literature reviews that were conducted between June 2018 and December 2018 have functioned as structuring the backbone of this paper. Both reviews were conducted by following the suggestions made by Tranfield, Denyer, and Smart (2003) and Thorpe, Holt, Macpherson, and Pittaway (2005).

Even though primary data collection methods are yet to be finalised, currently, the empirical research is planned to be conducted in two main global shipping centres namely, Greece and Singapore. A Delphi-based survey followed by in-depth semi-structured interviews with the stakeholders in shipping (e.g., shipowners, shareholders, ports, banks, financiers, NGOs) (Parviainen, Lehtikoinen, Kuikka, & Haapasaari, 2018) is projected.

3. Reviews of the Literature

3.1.Scenarios for the shipping industry

The review has revealed that the earliest use of scenario technique in shipping was in 2005. Although its popularity did not gain pace until 2013, before the 2009 economic crisis, scenario-based studies in marine transport research were almost non-existent. One explanation for that might be due to the shipping market's unpredictability. Researchers and practitioners in the field started to turn to scenario planning and scenario-based research in the last years, after the sudden unexpected and crushing impact of the economic crisis on the shipping industry. The declining trend of scenario-based studies in shipping could be due to theoretical saturation. As will be mentioned in detail, most shipping scenarios were aimed for the development of the next 20 to 30 years and most scenarios pointed out similar futures.

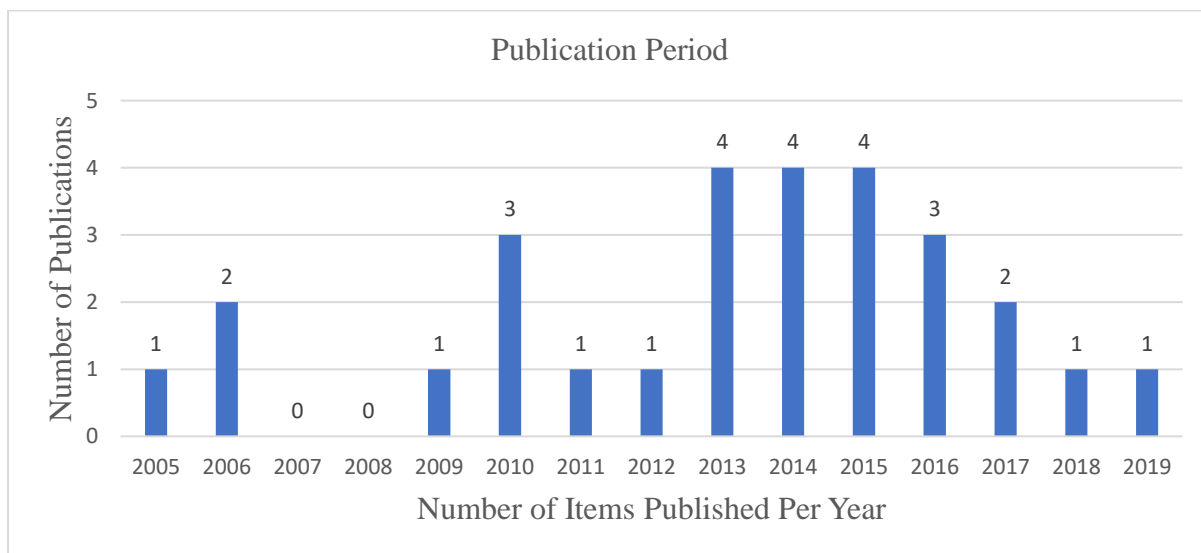


Chart 1: Publication period

The review found that eighteen studies aimed at developing future scenarios for the shipping and logistics industry (see Chart 2 below). Six out of eighteen studies focused on the future of global shipping whereas the same number of publications covered Europe exclusively or some parts of Europe. Due to the growing concerns regarding global warming and emissions generated by ships as a contributing factor, they were manifested in another research stream. This stream which investigated the future of maritime shipping and the Arctic region was consisted of three studies. Other three scenario studies focused on the USA, China-Pakistan transport corridor, and Indonesia.

Most studies in the review utilised key drivers and key uncertainties before scenario development. Global economics was chosen in sixteen studies as a key driver and five of which later considered it as part of key uncertainties and further was considered during scenario building (see Chart 3). This was not a surprise since shipping in a demand-derived business (Stopford, 2009) and affected by any changes in the global economy. Technology and resources were, followed global economics, the second and the third mostly evaluated key drivers, respectively. Technology plays an important role in shipping from design to construction, fuel types in use to efficient and capable engines. However, it was chosen as a key uncertainty in only one study, and the rest considered technology as an element

helped them to build the scenario narratives. The 90% of the world trade is shipped by seaborne transport (International Chamber of Shipping, 2018) meaning that the resources have been predominantly distributed across the globe by shipping and this relationship seems to be reflected in scenario studies and in three studies it was chosen as a critical uncertainty. Environment and politics, each accounted for a major part of key drivers in reviewed publications after technology and resource. Lastly, social dynamics and fuel prices were other elements considered in scenario studies. Other various key drivers were as follows, speed, traffic, changes to transport modes, ship size changes, containerisation and safety.

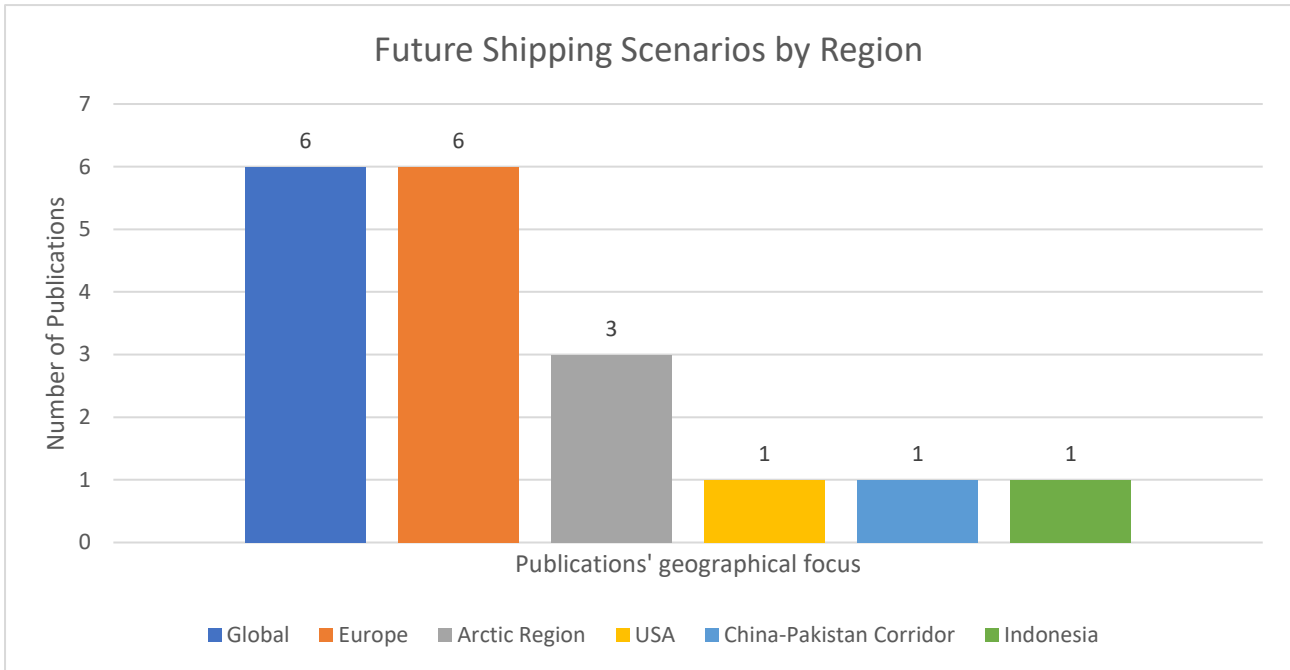


Chart 2: Geographical Distribution of Shipping Scenarios

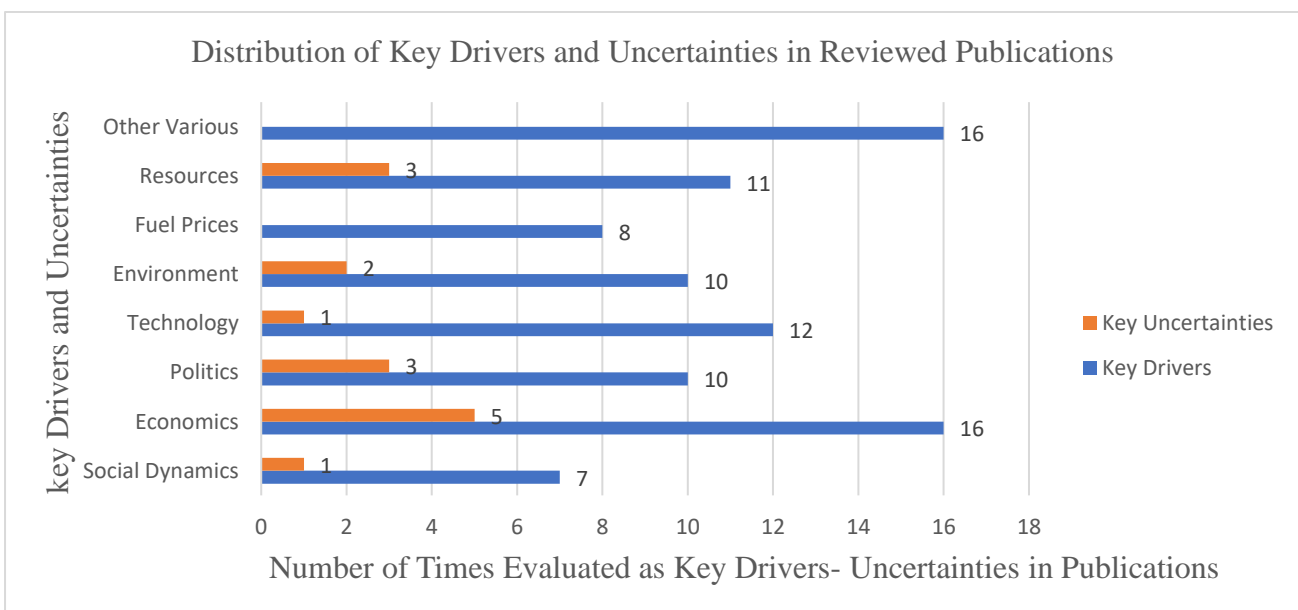


Chart 3: Common Key Drivers and Uncertainties in Reviewed Publications

3.1.1. The Future of the Shipping Industry by Scenarios

The analysis has revealed that the future of the shipping industry has been envisaged mostly in a set of three to four scenarios. Most of these studies were published between 2010 and 2015 (see Figure below), and around half of them included a business-as-usual scenario. Those BAU scenarios allowed the authors to control the structure of scenario mapping. Having analysed the key uncertainties that the scenarios were based on; the left-hand side of the map was assigned to the scenarios in which free trade and the improved economy were the main characteristics. The right-hand side of the map is based on the scenarios which were characterised by slow economic growth and de-globalisation. The scenarios positioned on the leftmost that indicate a future that is consumption driven and unconcerned with environmental issues. On the contrary, the rightmost side represents a de-globalised world where economic growth is sluggish, and the environmental issues are negligible.

Having decided on the main structure of scenario mapping, the authors positioned the BAU scenarios in a theme order. The themes were as follows,

- Global Shipping Scenarios
- Regional Shipping Scenarios
- Shipping Emissions Scenarios including the Arctic Region.

As illustrated in the scenario map, the global commons scenario of Global Marine trends study falls between the pursued growth and sustainable growth scenarios of the E.U. study and, in the same way, the Status quo scenario falls between sustainable growth and fragile recovery, and the competing nations scenario between fragile recovery and boom and bust.

3.2.Scenario Planning Effectiveness Literature

The systematic review of the literature on the effectiveness of scenario planning on participants gathered nineteen peer-reviewed publications. The earliest publication in the field was published in 1987 by Schnaars and Topol (1987) but the highest number of publications were made in 2012 with six studies. (see Chart 4).

The most notable author was Chermack with eight publications (see Chart 5) (Chermack, Coons, Nimon, Bradley, & Glick, 2015; Chermack, Coons, O'Barr, & Khatami, 2017; Chermack & Nimon, 2008; Glick, Chermack, Luckel, & Gauck, 2012; Haeffner, Leone, Coons, & Chermack, 2012; Marquitz, Badding, & Chermack, 2016; Veliquette et al., 2012; Visser & Chermack, 2009).

Themes	Author	Scenarios			
		Global – Fast Economic Growth		Deglobalised – Slow Economic Growth	
Emissions - Fuels	Smith, Raucci, Sabio, and Argyros (2014)	Global Commons	Status Quo	Competing Nations	
	Lloyd's Register and UMAS (2017)	Green Electricity	Green Ammonia	Green Hydrogen	
	Lloyd's Register (2016)	High-offsetting	High Bio	High Hydrogen (based on RCP 2.6)	BAU
Shipping Emissions incl. Arctic	Smith, Jalkanen, et al. (2014)	SS5 – RCP 8.5 – Fuel Mix – Efficiency improvement	SS1 – RCP 6.0 – Fuel Mix – Efficiency improvement	SS4 – RCP 2.6 – Fuel Mix – Efficiency improvement	SS3 – RCP 4.5 – Fuel Mix – Efficiency improvement
	Eyring, Köhler, Lauer, and Lemper (2005)	DS4	DS3	DS2	DS1
	Dalsøren et al. (2013)	In-Arctic high-growth impact	In-Arctic BAU		

	Corbett et al. (2010)	In-Arctic high-growth	In-Arctic BAU			
	Arctic Council (2009)	Arctic Race	Arctic Saga	Polar Preserve	Polar Lows	
Regional Shipping Scenarios (Excluding the Arctic Region)	Kovacic, Gracan, and Jugovic (2015)	No-constraints Scenario	Intensive Development	Sustainable Development	Special-interest Tourism	
	Zulfitri, Khairul Muluk, and Hermawan (2015)	Conventional Marine Tourism	Advanced marine Ecotourism	Pre-Advanced Marine Ecotourism	Under-developed Marine Ecotourism	
	Ministry of Transport New Zealand and Deloitte Touche Tohmatsu (2014)	Single Hub & Spoke	Hub & Spoke	Partial Hub & Spoke	Emerging Trends	Status Quo
	Hamburgisches WeltWirtschafts Institut and Berenber Bank (2006)	E.U. Ports High Scenarios	E.U. ports BAU Scenario			
	European Commission DG Mobility and Transport (2015)	SSS High Scenarios	SSS Baseline Scenario	SSS Low Scenario		
	Storgård, Lappalainen, Wahlström, and Kajander (2012)	Model Region for Safe Shipping	BAU in the Baltic Sea	Major Disasters in the Baltic Sea		

	Chris Caplice and Shardul Phadnis (2013)	Global Marketplace	One World Order	Naftastique!	Millions of Markets
	Wolters, Gille, de Vet, and Molemaker (2013)	Pursued Growth	Sustainable Growth	Fragile Recovery	Boom & Bust
Global Maritime Shipping Scenarios	Fang, Cheng, Incecik, and Carnie (2013)		Global Commons	Status Quo	Competing Nations
	Wärtsilä Corporation (2010)		Open Oceans	Yellow River	Rough Seas
Global Transport Scenarios	World Energy Council (2011)		Freeway		Tollway
Global Logistics - SCM	Ruske et al. (2010)	The Careless and Globalised World	The Eco-aware, but tempted world	The Restricted, but still ignorant world	The deglobalised and Clean World

Figure 1: Scenario Map

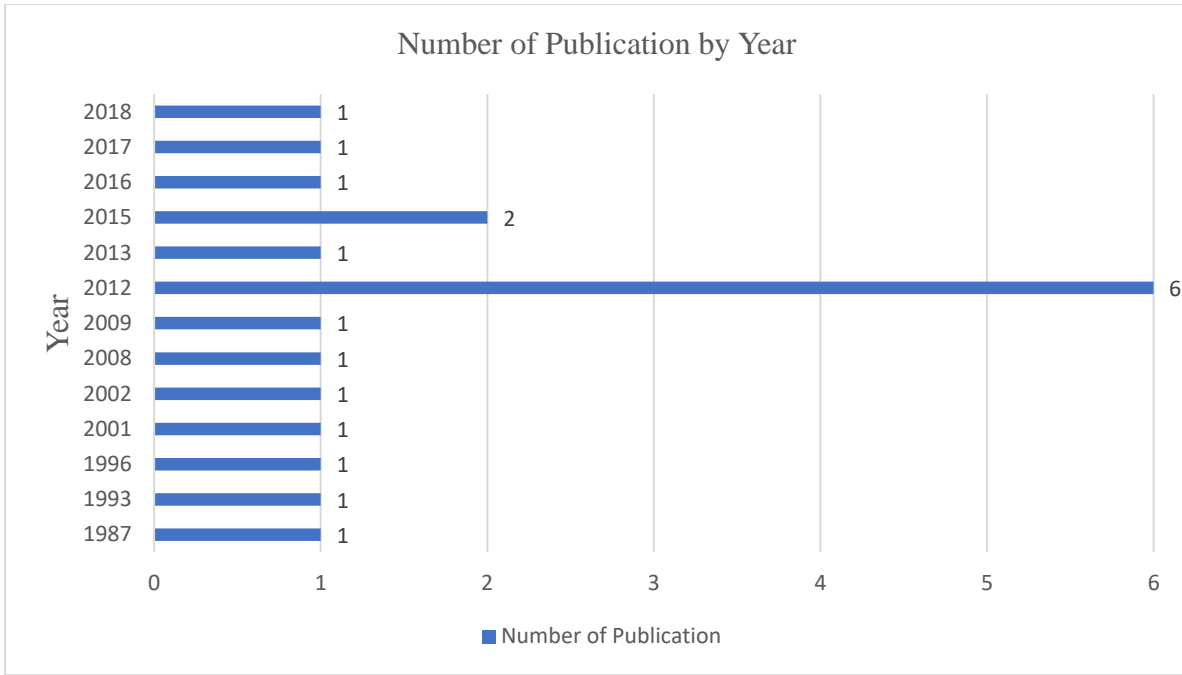


Chart 4: The Impact of Scenario Planning Literature by Years

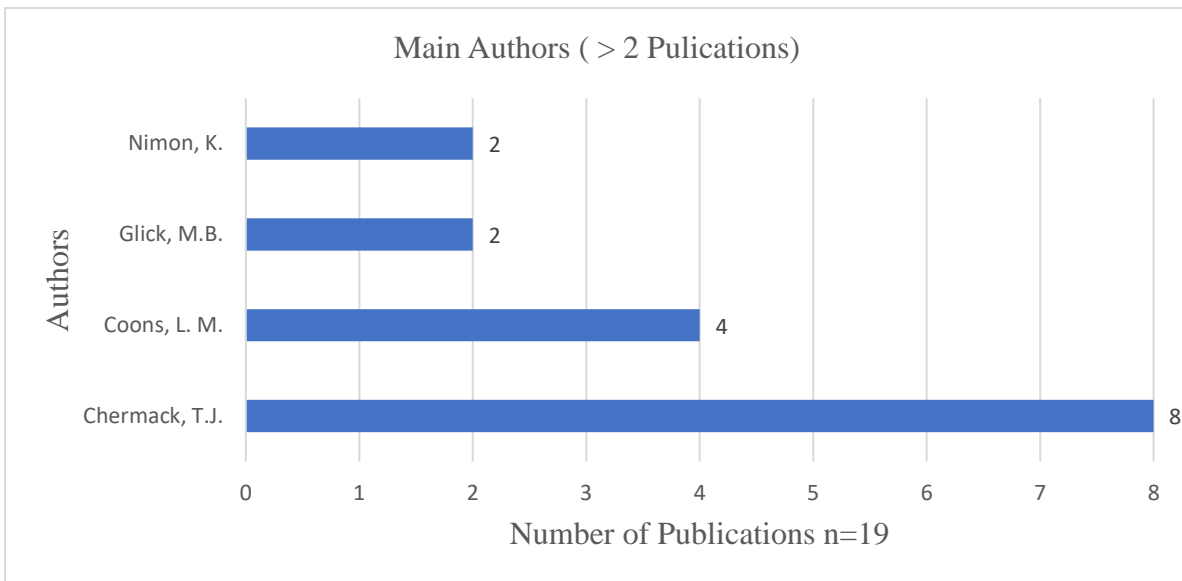


Chart 5: The Impact of Scenario Planning Literature by Author

3.2.1. Scenario Planning Effectiveness Empirical Findings

Similar to Balarezo and Nielsen (2017), the authors' systematic review on the scenario effectiveness literature generated the following impact areas, 'learning', 'thinking', 'cognitive biases', 'judgement, belief, decision making' and 'performance' (see table 1). Although the findings of the studies in the review are preliminary and each impact area requires further research, there seem to be positive outcomes of scenario planning.

Authors	Impact on	Findings
Haeffner et al. (2012); Johnson et al. (2012); Totin et al. (2018)	Learning	Reportedly, during scenario workshops, learning is encouraged, and group learning in the forms of “learning from others”, “knowledge building”, and increased knowledge occurred
Chermack et al. (2015); Haeffner et al. (2012); Johnson et al. (2012); Phadnis, Caplice, Sheffi, and Singh (2015); Totin et al. (2018)	Thinking	Analysis on workshop participant statements have revealed an enhanced understanding of others’ perspectives and increased systematic and flexible thinking. Mental models of participants changed after taking part in scenario workshops.
Kuhn and Sniezek (1996); Meissner and Wulf (2013); Min and Arkes (2012); Schomaker (1993); Sedor (2002)	Cognitive Biases	The application of scenarios suggest a reduction on the framing bias (Torsten Wulf, Philip Meissner, Christian Brands, & Stubner, 2013) and optimistic prediction bias (Min & Arkes, 2012).
Chermack and Nimon (2008); Min and Arkes (2012); Phadnis et al. (2015); Schomaker (1993); Sedor (2002)	Judgement, belief, decision making	<p>Higher impact on subjects’ judgements who received scenarios than the ones who developed (Schomaker, 1993). Another study where subjects received two scenarios depicted less change in their decisions than who received only one (Kuhn & Sniezek, 1996). Another research, where participants developed scenarios, has looked into the application of single and multiple scenarios and the majority of subjects’ judgement changed after scenario evaluation after both single and multiple scenarios at similar rates (Phadnis et al., 2015).</p> <p>Regarding the impact of scenario content, when scenarios were presented to participants, some forecast variables seemed to be more likely to shift participant answers on a topic provided (Kuhn & Sniezek, 1996). On this matter, however, Sedor (2002) argued that the differences did not arise from content but the scenario information structure. Joining in the discussion, more insight has come from another research suggesting that rather than content, participants’ interpretation of the process, the feeling of ease in their study, is the significant factor (Min & Arkes, 2012).</p>
Phelps, Chan, and Kapsalis (2001); Visser and Chermack (2009)	Performance	Preliminary evidence for organisational and financial performance increase.

Table 1: Empirical Evidence on Scenario Planning Effectiveness

4. Conclusions

Strategic planning practises of shipping companies is an under-investigated field. One of the few empirical studies in the field by Koufopoulos, Lagoudis, and Pastra (2005) revealed that companies operating in the seaborne industry were primitive in terms of their adaptation of planning tools for long-range planning. They further noted that the use of scenario planning was not observed in their sample. However, since the publication of that study, changes might have happened in the industry. Therefore, the need for revisiting this research area seems prominent.

Furthermore, shipping and scenario planning literature review has revealed the future scenarios built for the shipping industry. As most of these studies were conducted recently, investigating whether businesses make use of such publicly available information or not seems to be another fruitful research area that requires attention. Moreover, inquiring further into their use of scenarios and potentially comparing scenario users with non-users is one of the researches gaps this study can contribute to. A critical element in such research is asking participating companies about planning tools they readily use. The systematic literature review on scenario planning effectiveness has revealed that most research in review ignored that potential confounding factor. Finally, presenting shipping future scenarios to stakeholders in shipping and measuring the changes among participants' in terms of their thinking, judgment and decision making with a pre-post-test design may contribute to the scenario planning literature and provide the much-required empirical support.

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