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Interest of Asian shipping companies in navigating the Arctic

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ABSTRACT

Climate change in the Arctic is leading to the fast recession of sea ice in the summer. This evolution leads several observers, scientists, media and government officials, to consider the possibility of developing new shipping routes along Arctic routes, as these routes are much shorter between Europe and Asia. The literature displays a strong discourse about interest from Asian countries for these potential shipping routes. This paper tackles with this idea and examines to what extent Asian shipping companies, the ultimate economic agents, are really interested in Arctic shipping routes. The image the research portrayed is that only a minority of Asian shipping companies are indeed interested, and those that are interested stress the destination dimension of Arctic shipping, not transit shipping.

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1. Introduction

The impact of climate change on melting Arctic sea ice has been widely discussed in the scientific literature, but also in the media. It has triggered debates among scholars, government officials and journalists about the potential development of commercial shipping in the Arctic, in particular along the fabled Northwest and Northeast Passages, which offer much shorter distances between Europe and Asia than the classical itineraries through Panama or Suez and Malacca. In the frame of climate change, sea ice conditions are changing and the length of the navigable season, depending on the vessel ice class, is expected to increase (Stephenson et al., 2014). These debates often turned to dramatic reports or assertions about the oncoming surge in commercial traffic in the Arctic: for instance, Yang Huigen, of the Polar Research Institute of China, predicted that 5–15% of China's international trade would use the NSR by 2020 (The Economist, 2014). Jong-Deog Kim, head of the Polar Policy Research Center at the Korean Maritime Institute in Seoul, predicted that traffic between Europe and Asia along the Northern Sea Route would grow by 6.5 percent a year and could potentially account for a quarter of all cargo traffic by 2030 (Reuters, 2013). Didier Schmitt estimated (Schmitt, 2014) that by 2030, the proportion of

global traffic that will pass through [the Northern Sea Route] would be 15%. These estimates may seem optimistic given the discrepancy between the order of magnitudes of the maritime routes: the Northwest Passage saw only one commercial transit per year between 2012 and 2014, and zero in 2015 (Nordreg, 2015). For the Northern Sea Route, administrative transits are as follow: 4 in 2010, 34 in 2011; 46 in 2012; 71 in 2013; 31 in 2014 and 22 in 2015 (NSRA, 2016). These figures underline the interest for the NSR is greater, partly because Russia offers services for transiting ships; partly because natural resources projects, like the Yamal Project, are much more developed than in the maritime Canadian Arctic. By comparison, in 2014, 17,148 ships crossed the Suez Canal; 11956 ships crossed the Panama Canal; 79,344 vessels transited the Malacca Strait (Guy and Lasserre, 2016).

Beyond the scientific issue regarding the likelihood of commercial shipping developing in Arctic waters, the prospect of a fast-developing traffic along Arctic routes is at the very heart of an ongoing debate on security in the Canadian and Russian Arctic, for it raises the issue of control of such navigation, and therefore of the Canadian-claimed and Russian-claimed sovereignty over their respective Arctic passages; claims that remain challenged by the United States and the European Union. Similarly, these debates rest on the idea potential routes are shorter, which is usually true (it depends on the origin and destination, see Lasserre, 2014) but also depends on the amount of drifting ice that is present: a dense pack

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may force a ship to change course several times to avoid ice. Many shorter routes will be affected in the Arctic by lower ship speeds.

Asian shipping companies were often depicted among the media and scientists as among the most likely to be interested in Arctic shipping (Borgerson, 2008; Spears, 2009; Hong, 2014; Stokke, 2014), because of the strong dependence on maritime trade of Asian economies like Japan, South Korea or China, both for their raw material imports as well as for their manufactured goods exports. Shorter Arctic routes would therefore likely be of interest to them, an image depicted notably through the quotations above. However, if the governments of these Asian countries did express interest for Arctic natural resources and potential sea routes (Jakobson, 2010; Jakobson and Peng, 2012; Blunden, 2012; Solli et al., 2013; Jakobson and Lee, 2013; Stokke, 2014; Huang and Lasserre, 2014), to what extent is this vision shared by Asian shipping companies? In other words, is the commercial strategy of Asian shipping companies consistent with this widespread discourse on Asian interest for Arctic seaways? This paper will examine the results of a survey conducted with 72 Asian shipping companies so as to try and assess their interest for Arctic shipping. It turns out few shipping companies are really interested in the Arctic market; those that are interested are mainly focusing on the natural resource exploitation submarket.

2. Shipping companies survey – methodology

2.1. An empirical and comparative survey in four steps

Our approach is a qualitative analysis based on the triangulation described by Webb et al (Webb et al., 1966), and completed by authors like Arksey and Knight (1999), Bertrand et al. (2007), Creswell (2007) and Lejeune (2014). We designed our survey in a way that allowed us to combine the questionnaire method, sent by email, and the phone interview method in order to gather more information, more descriptions about the positioning of the shipping companies on the Arctic market, and in order to limit the drawing of wrong or biased conclusions. We coupled these two methods with a series of observations ensuing from the collection of collateral data (ice-class ships, composition of the fleets... etc.) and the results obtained with the European companies so as to make sure the coding process was thorough and that we did not forget any major keyword.

We divided our work into four phases. During the first phase, we designed a short questionnaire (9 questions) using similar topics to the first survey published in 2011 (Lasserre and Pelletier, 2011) for comparison sake, and we added new topics about risks and monitoring systems. The objective was to have the companies detail their views on the challenges, opportunities presented by Arctic routes and how they position themselves regarding this market. Following this, we gathered from the companies' websites all the data available on their fleets, in particular, information on their ice-class ships (if applicable), and their major traffic. Then we tried to find the most appropriate contacts to send the survey to and/or to call. The fourth and last phase was dedicated to analyzing the replies based on a broad set of keywords and the occurrence of those keywords in the responses of each company and question. Most of our questions are open-ended, hence providing qualitative data from which we tried to measure the results from our sample and represent it in charts.

As the three first stages of the survey are very straightforward, we will focus on the last step: the analysis of the answers.

2.2. Text analysis: categorizing, coding and filtering

We opted for a classical qualitative analysis process. Our first

step was to create a database of information related to the shipping company (name, country, and major type of traffic), and including the data extracted from the answers we received (coding process). The second stage of the data processing was to extract systematically, and in an exhaustive way, the indicators that would allow us to compare between shipping companies, to determine trends and to analyze the level of knowledge and interest the shipping companies have on the Arctic shipping market; here, we use the terms indicators and keywords interchangeably. For each answer given we extracted keywords and coded them with a simple coefficient: 0 for no answer and 1 when the keywords were present in the survey response. There were some main categories such as ice or weather, for which we detailed the indicators when possible. For example, question 4 of our survey was dedicated to the risks and one of the main categories was "ice". We detailed the topic with sub-categories such as drifting ice, multi-year ice, ice ridges, growlers, etc.

Going through the responses one-by-one we generated a list of keywords, then reassessed each response to quantify the presence of each keyword.

Once we finished categorizing and coding the responses we applied filters to cross the information we extracted from each answer. For example, we looked only at the container companies and the operational challenges they think they will meet in the Arctic. A cross tabulation is also possible in order to compare, for example, the strategies of companies specialized in container traffic with the companies which are specialized in bulk.

For each indicator we aggregated the results using absolute values and percentages. Then we used bar charts and frequency tables to visualize our results; both are very common methods.

2.3. The collected sample

In 2011, Lasserre and Pelletier published a first analysis of the shipping industry's views on Arctic shipping after conducting a survey with 142 shipping companies from the Northern hemisphere; 98 answers were compiled. We used the database used in 2011 as it enables this survey to offer a follow-up on the possible changes of strategies by shipping companies; we extended the database through professional lists of Asian shipping companies (Lloyds, Drewry, Maritime Professional, Clarkson, Japan Shipping Exchange).

For this survey, 95 Asian shipping companies were contacted; 72 answered: 27 from China, 20 from Japan, 11 from South Korea, six from Singapore, four from Taiwan, one from Indonesia, Singapore/Japan, Vietnam, and one joint venture from China/Poland (see the list in Appendix 1). This empirical comparative study, with a set of nine questions (Appendix 2), is only focusing on commercial shipping; the sample does not include fishing or cruise companies.

Of the 72 companies that replied to the survey, 99% are not commercially active in the Arctic; one said it is offering occasional services, but in fact made only one test run in 2013. Only five companies (7% of our sample) are planning on developing their services in the Arctic; eight are looking at the market, reassessing the potential and waiting to see. 58 companies (82%) are definitely not interested in the Arctic mostly because "it is not their business", because "the ratio of investments to gains is too low", or because the market is considered too small.

3. Results by questions

Q1. Commercial potential of the Arctic

Q1.1. General views from the companies

When asked about the commercial potential for the shipping industry in general, companies answered in two ways: either describing their views of the general market, or from their specific viewpoint (see Fig. 1). 45 companies responded from the perspective of the industry as a whole: 28 said there is potential for the industry; 14 said there is no potential yet for the industry; and three said there is no potential for the industry. 24 companies responded from the perspective of their company (possibly also for the industry as a whole): two said yes there is potential for their company; 19 said there is no potential for their company; and three said they are not sure for their company. 15 companies didn't answer the question.

None of these companies are currently active in the Arctic, and only two companies conducted test-runs: 1) Hyundai Glovis, (South Korea) mainly interested in Ro-Ro and dry bulk market, made a test in 2013 via the NSR with a ship contracted from Stena Bulk (Sweden); and 2) Cosco (China), made test runs in 2013 and twice in 2015 across the NSR with a multipurpose cargo ship, the *Yongsheng*.

What type of traffic do these shipping companies envision for the Arctic? 65 firms answered this question.

35, mostly container companies, do not see a commercial potential or see a very limited potential; 14 said not yet and 21 said no (three on behalf of the industry and 17 on behalf of their company).

30 companies (28 on behalf of the industry and two on behalf of their company) see a commercial potential in the Arctic for shipping; most companies in this segment are active in the dry bulk traffic, others in liquid bulk. Some companies also recognized that there may be a commercial potential but not for their markets.

Q1.2. Limitations according to the shipping companies

When asked about the factors that refrain or limit the entry into the Arctic shipping market, companies answered with terms that described the market potential or interest; their risks and cost analysis; or limiting factors specific to the Arctic region (Fig. 2).

In terms of general market potential, 11 companies think there is no real market in the Arctic, while 10 estimate it to be small (niche market), and eight not to be their market (too different from their segment). Overall, 29 companies mention a perceived limited market opening. In terms of risk, seven say the Arctic market is risky, eight mention that it is too costly. Three companies also mention the lack of infrastructure and one, the restrictive nature of regulations.

Q1.3. Where is the potential competitiveness of the Arctic for the shipping companies?

Shipping companies also expressed views on the reasons for the potential of Arctic shipping, or expressed what segment could benefit from a development of this market (Fig. 3).

Among the quoted advantages for the shipping industry in general, 14 quote the shorter distance or travel time using routes across the Arctic. Three mention the melting ice, probably meaning navigation will be easier through these routes. Two mention a reduced fuel cost; one, a reduced risk of piracy; one, the possibility to tap into a growing market; and one, the lower fees billed by the Russian Northern Sea Route Administration compared to the Suez Canal Authority. It is striking that among these general advantages, shorter distances is by far the factor most often thought of.

Among the market segments or mode that could benefit from Arctic shipping, 13 mention natural resources transportation, either for transit or from the local exploitation. The latter seems more consistent as six answers mention destination shipping as a major winning activity and three mention bulk shipping: two transit shipping, and one the cruise industry. Transit must be understood here as trans-Arctic shipping, as used in the AMSA report (Arctic Council, 2009), as opposed to destination – ships calling at an Arctic port or stopping in the Arctic to perform economic activities. This specification is all the more necessary as the NSR Administration, for instance, calls “transit” ship movements between the Kara Gate and the Bering Strait, even for ships to or from Murmansk for instance, whereas these are by definition destination movements as the ships stopped in an Arctic port. As far as transit for natural resources is concerned, nuance has to be considered: Asian economies imports coming from Southeast Asia and Australia will remain extremely competitive in comparison with Arctic trade.

Q1.4. Visions depending on the market segment

Based on a filtering of the responses by major type of traffic for each company (composition of their fleet), it is possible to see how the shipping companies describe the Arctic potential depending on their commercial specialization. These answers relate to the general description on the Arctic market, produced by the shipping companies. It turns out no segment believes in the profitability of transit shipping, except maybe the multipurpose segment (with only two answers); most underline the destination segment as the most likely to pull Arctic shipping in the future.

Dry bulk companies (29 cie) mention that there is potential for the exploitation of Arctic natural resources (10 mentions), all the more interesting because of shorter distances from the Arctic to major markets. They envision a destination market: only two consider transit. However, six responded that there is no potential.

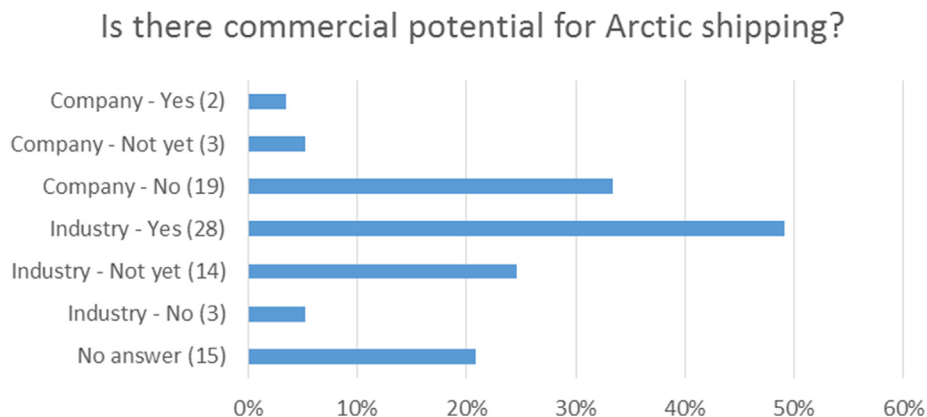


Fig. 1. Answers: Commercial potential of the Arctic.

Why is the Arctic not competitive?

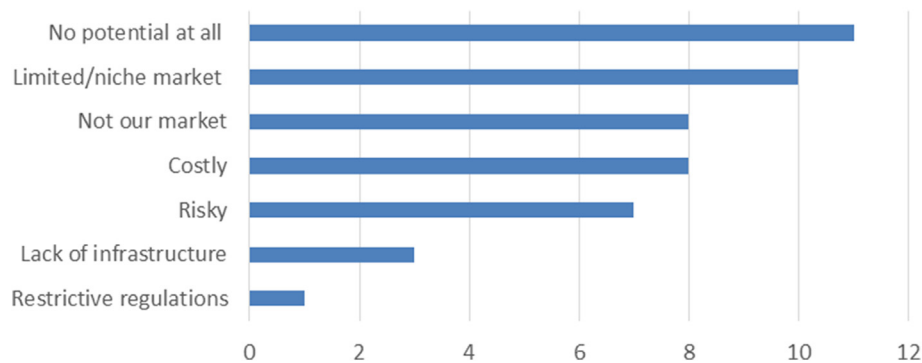


Fig. 2. Answers from shipping companies about why is the Arctic is not competitive.

Why is the Arctic interesting for shipping?

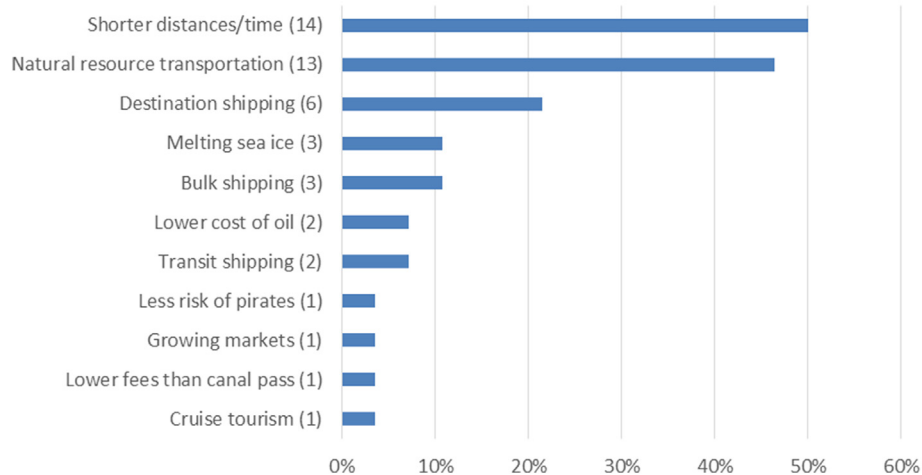


Fig. 3. Why is the Arctic interesting for shipping?.

Container (19 cies) and *Ro-Ro* (2 cies) companies, all working in liner shipping, underline that they do not see any interest in the Arctic market (3 mentions) or that it is not a market for them (4 mentions), rather for natural resources exploitation (3 mentions), or with a very limited market potential (3 mentions) despite shorter routes (3 mentions). Only one company (container and tanker) sees commercial potential.

The majority of *tanker* companies (12 cies) do not see potential in the Arctic (8 mentions), perceived as too costly and with a very limited market. One sees a reduced distance between Russia and Northern Europe (production zone of gas, oil and minerals) and destination markets in Asia; another dry bulk and tanker company also sees interest in shorter distances. However, two LNG companies see a great potential for the exploitation of natural gas in the Arctic; here again, a destination market for the Arctic.

Half of the *multipurpose* companies (4 cies total) are interested because shorter distances that will reduce cost and shipping time; they responded that they will wait to see the evolution of the ice coverage (climate change). One company sees the Arctic market as destination and the other one as fueled by natural resources exploitation.

Q2. Costs associated with Arctic shipping

After sketching out the market potential, we asked the shipping companies how they understood the main costs associated with Arctic shipping (see Fig. 4).

By far, the biggest cost is understood to be ice-class ship construction (capital cost) and operation; 91% responses included these factors (49/54 responses). Specific insurance costs is mentioned by 54% of respondents (29/54 responses) and training of crew and ice navigators by 48% (26/54 responses). 16 companies mention that the costs are perceived too high when compared with expected business. Other factors are listed but with a lower frequency, including administrative issues with the NSR (administration fees, 13 mentions; ice-breaking fees, 9 mentions); specific maintenance of ice-class ships (12 mentions); higher fuel consumption associated with ice-class ship and specific fuel for low temperatures (7 mentions). Cost is indeed perceived to be a major factor: out of the 58 companies that said they were not going to develop Arctic operations, and of the 52 that gave a reason why, 22 (42%) gave the reason “too big an investment/cost exceeding benefit” for not developing Arctic operations.

16 companies did not directly answer the question of cost, but gave relevant elements when answering the question about why they are or are not considering entering the Arctic market: nine companies find the market too small and too difficult to enter; and

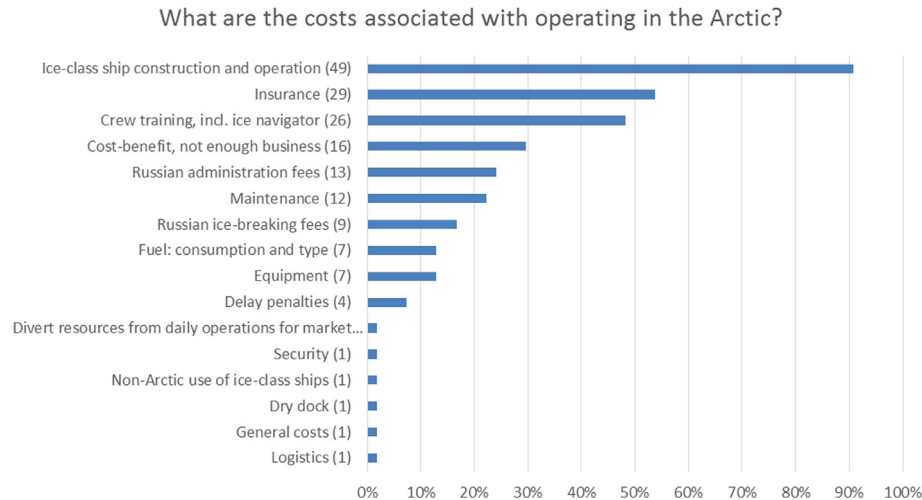


Fig. 4. What are the costs associated with operating in the Arctic?.

nine companies find the ratio of investments to benefits too low (dual answers are possible).

Q3. Operational challenges

The answers have been divided into three main categories. We separated the answers or part of the answers related to:

1. The availability of business in the Arctic, an answer that also relates to the market potential; eight companies mentioned this point when answering about operational constraints.
2. The importance of logistics: schedules and just-in-time
3. The Arctic environment

Q3.1. Logistics

Interestingly, 32 companies see logistics as an operational challenge in the Arctic, because of the specific environment constraints. If only seven referenced “just-in-time” delivery explicitly, most of which are in the container and Ro-Ro segments, 13 companies mention the difficulty of managing seasonal schedules or routes, as shipping in winter is still much more difficult than in the summertime, and 11 the need to respect just-in-time or transit time. Nine mentioned random transit times and the need for regularity and reliability, and nine mentioned that Arctic constraints make it hard to respect/enforce schedules. Delays are a synonym of penalties (7 mentions); reliability of the service is crucial (not respecting schedules give the company a bad reputation) (4 mentions). Eight companies mention the market dimension of the Arctic routes: lack of intermediate ports; poor load factor, lower capacity of ice-class ships; higher cost per TEU, poor charter rate.

Q3.2 The challenge of the Arctic environment

For 40 companies (77% of our sample) the Arctic environment is an operational challenge. Under this umbrella, the two biggest challenges cited are 1) the ice and the difficulty to operate in ice, and 2) the unpredictable and variable conditions (see Fig. 5). The category “risk” was omitted because the responses are included in other areas.

Q3.3 Summary of operational constraints

31 companies underline the challenge of the feasibility of

business in the Arctic: reliability and seasonality of the routes, variability in conditions, and delays (see Table 1). Just in time, delays, and the need for regularity are concepts associated with liner shipping (container; Ro-Ro; some general cargo and special projects). The companies operating in these market segments are prompt to underline the difficulties in operating in the Arctic as the environmental constraints preclude the implementation of reliable logistics. Market constraints from the container industry are also present; the absence of intermediate markets and poor load factor (6 mentions), the low charter rate (3 mentions) and the high cost per container (3 mentions) are all contributing factors.

For the tramp business, three companies mention the need to secure long-term contracts so as to recoup investment costs; three mention the low charter rate that makes it difficult to absorb the higher costs of shipping in the Arctic. 40 answers point to the harsh environmental constraints, especially because of ice (unpredictable drifting patterns). It is difficult to operate ships in Arctic conditions, and the seasonality of the shipping season as a result of the environment conditions makes it unattractive.

Q4. What are the risks of developing a commercial service in the Arctic?

The objective of this question was to assess how shipping companies perceived risk for shipping in the Arctic. The top three risks are 1) ice at 40 mentions out of 44 (91%), 2) weather at 43%, and 3) remoteness at 39% (see Fig. 6). Uncertainty, unpredictability, variability with respect to ice and weather remain a major concern.

For some companies, risks do not seem to be the first preoccupation; this attitude is noticeable when comparing answers to Q4 (“What are the risks associated with Arctic shipping?”) and Q7 (“Do you intend to enter the Arctic market?”). These companies are not interested in entering the Arctic, as they either find it too costly, too small, or that it is not their business core (from Q2). Their lack of interest from a commercial point of view explains their absence of reflection on risks.

Q4.2. Consistency of answers between Q3 (operational challenges) and Q4 (risks).

There were some inconsistencies between the responses given as operational challenges and risks. A few answered this question as they listed operational challenges when quoting weather,

Challenges associated with the Arctic environment

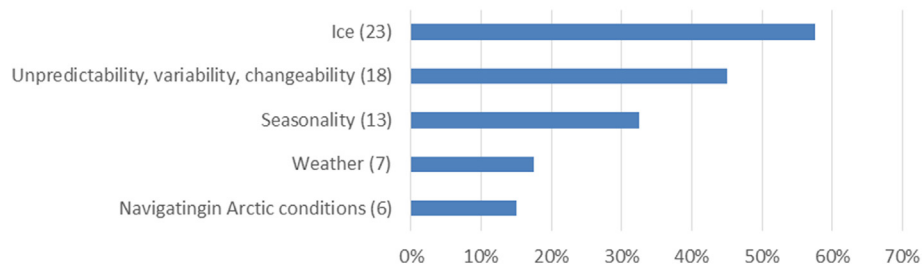


Fig. 5. Challenges associated with the Arctic environment.

Table 1
Detailed operational constraints mentioned by respondents.

Type of operational constraint	Answers for the type	Specific aspects	Number of answers for specific aspects
Availability of business	8/52 = 15%	Small market that is difficult to enter Need long-term contracts to recoup investments	5/8 = 63% 3/8 = 38%
Feasibility of business	31/52 = 60%	No pressure from customers to develop Arctic service. Seasonal schedules and routes Random transit times and the need for regularity Difficulty of respecting and enforcing schedules Challenges associated with "just-in-time" Not enough ports to call, no intermediate markets, poor load factor NSRA is clumsy and not transparent; bureaucracy of the NSR and political conditions Risk of penalties, delays, and receiving a bad reputation Cost per TEU is too high Need higher charter rates, and it is difficult to find charter in the Arctic Generally just too costly Reliability of service provided Technology is lacking Need for incentives Lack of infrastructure Lack of standard rules and regulations Ship operation security	1/8 = 13% 13/31 = 42% 9/31 = 29% 9/31 = 29% 7/31 = 23% 6/31 = 19% 5/31 = 16% 4/31 = 13% 3/31 = 10% 3/31 = 10% 2/31 = 6% 1/31 = 3% 1/31 = 3% 1/31 = 3% 1/31 = 3% 1/31 = 3% 1/31 = 3%
Environment	40/52 = 77%	Ice Unpredictability, variability, changeability Seasonality: operations in summer and in winter are totally different. The transition pattern remains random. Weather Navigating in Arctic conditions	23/40 = 58% 18/40 = 45% 13/40 = 33% 7/40 = 18% 6/40 = 15%

What are the risks of Arctic shipping?

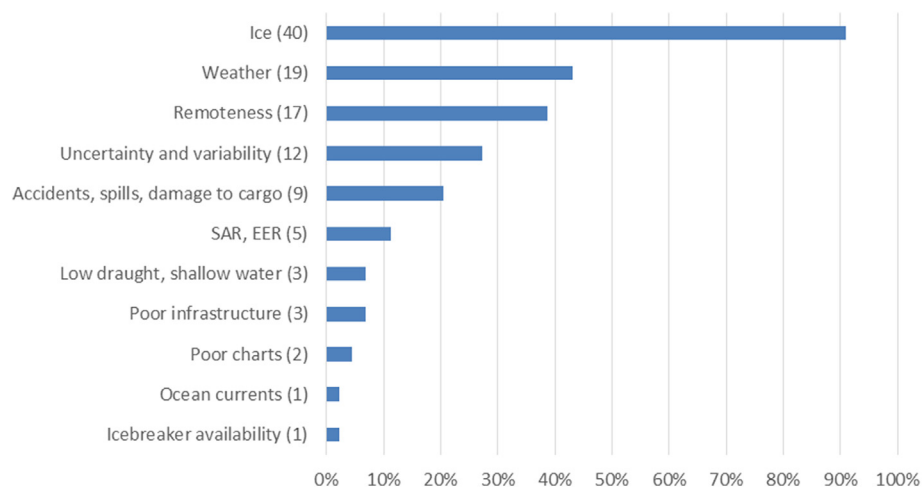


Fig. 6. What are the risks of Arctic shipping?

unpredictability of ice patterns, etc. Four categories were compared:

Q4.2.1 Ice

When Q3 and Q4 are combined, “ice” was included in 50 responses.

- 9 companies listed ice as an operational challenge (Q3), but did not answer Q4 (risks).
- 1 company listed ice as an operational challenge (Q3), but did not include it in their answer for Q4 (risks).
- 7 companies listed ice as a risk (Q4), but did not answer Q3 (operational challenges).
- 22 companies listed ice as a risk (Q4), but did not include it in their answer for Q3 (operational challenges).

Q4.2.2 Weather

When Q3 and Q4 are combined, “weather” was included in 22 responses.

- 1 company listed weather as an operational challenge (Q3), but did not answer Q4 (risks).
- 2 companies listed weather as an operational challenge (Q3), but did not include it in their answer for Q4 (risks).
- 4 companies listed weather as a risk (Q4), but did not answer Q3 (operational challenges).
- 11 companies listed weather as a risk (Q4), but did not include it in their answer for Q3 (operational challenges).

Q4.2.3 Accidents, spills, damage to cargo

When Q3 and Q4 are combined, “accidents, spills, damage to cargo” was included in 10 responses.

- 1 company listed accidents, spills, damage to cargo as an operational challenge (Q3), but did not include it in their answer for Q4 (risks).
- 3 companies listed accidents, spills, damage to cargo as a risk (Q4), but did not answer Q3 (operational challenges).
- 6 companies listed accidents, spill, damage to cargo as a risk (Q4), but did not include it in their answer for Q3 (operational challenges).

Q4.2.4 Poor Infrastructure

When Q3 and Q4 are combined, “poor infrastructure” was included in 4 responses.

- 1 company listed poor infrastructure as an operational challenge (Q3), but did not include it in their answer for Q4 (risks).
- 3 companies listed poor infrastructure as a risk (Q4), but did not include it in their answer for Q3 (operational challenges).

As a summary, the perceived risk is largely structured, in the eyes of shipping companies, by ice; weather patterns; the relative uncertainty of ice and weather; and remoteness. The risk of accidents (casualties; spills; damage to cargo) is mentioned nine times. Shallow water (3 mentions) and the associated risks of poor charts (2 mentions) appear as a minor risk to shipping firms.

Q5–6–7. Planning about Arctic shipping

As mentioned above, only two Asian shipping companies, Hyundai Glovis (South Korea) and Cosco (China), have undertaken operational tests in the Arctic, and only on a limited basis for Hyundai Glovis. There is no Asian shipping company presently

(March 2016) operating on a commercial basis in the Arctic, although Cosco announced in October 2015 it is considering opening a regular service ([Wall Street Journal, 2015](#)) Among the Asian shipping companies that answered, 82% are not planning to enter the market (see [Table 2](#)). Five answered they would develop the Arctic market: China LNG CLSICO; China Shipping Development Co; Tong Li Shipping (China); Mitsui OSK and Nippon Yusen Kaisha NYK (Japan); all mentioned they envision a market for destination traffic linked to natural resources exploitation, but not transit. Eight companies said they are considering the possibility of entering the Arctic shipping market (‘Maybe’): Hyundai Glovis, Polaris Shipping and Hanjin Shipping (South Korea); China Merchants Energy Shipping Co; China Shipping Bulk; Cosco; Dandong (China); Kawasaki Kisen Kaisha (Japan). Among them, Cosco (recognizing the high risk of container trade across the Arctic), Dandong and Hanjin are considering transit, the five others are looking at the destination segment of Arctic shipping.

There is little current strategy or discussions about short-term development or investment in Arctic shipping from companies that declared their interest or that declared they may be interested, which is a different outlook from the results we received and are presently compiling from European shipping companies. The two companies that carried test runs, Hyundai and Cosco, are apparently still in the process of trying to assess the commercial potential. Both companies reckon the test runs underline strong operational constraints that need to be addressed.

The picture is different for LNG projects. Two Chinese companies, China Shipping Development (CSDEV, a subsidiary of China Shipping) and China LNG Shipping (CLSICO, a subsidiary of Cosco and China Merchants Energy Shipping), are involved in joint-ventures to ship LNG from the Yamal peninsula in Siberia: CSDEV with Mitsui OSK (Japan); CLSICO with Teekay LNG (Bermuda/Canada), Sinotrans-CSC (China) and Dynagas (Greece). Mitsui ordered three ice-class LNG ships in 2014 ([Wall Street Journal, 2014](#); [Seatrade Maritime News, 2014](#)), while in the frame of the joint-venture between CLSICO, Teekay LNG, Sinotrans-CSC and Dynagas. Dynagas has ordered 5 ice-class LNG ships ([Ship and Bunker, 2015](#); [World Maritime News, 2015](#)) and Teekay six ice-class LNG ships.

It appears that for the shipping companies that do not intend to enter the Arctic market at all, it is because the costs are too high (21 mentions) for a limited and very competitive market (16 mentions), or a market for which there is little incentive (36 answers). Risks and uncertainty appear not to be the first factor as they are mentioned 23 times, but a significant one nonetheless. The eight companies that remain open for long-term prospects remain very allusive when describing the likelihood of their entering the Arctic market.

As the major investment concerns the ice-class ships, when outlining a business strategy for Arctic shipping, the companies have to find a balance on the long term between the costs and the benefits. 21 companies estimate that the costs-benefits ratio is too low. This is a major consideration for bulk and tanker shipping companies that must recoup the high investment costs and higher operation costs with ice-class ships over long-term contracts and high freight rates, neither of which is readily available on the small Arctic market. For liner service (container, Ro-Ro, general cargo), higher costs (capital costs; operation costs of ice-class ship, especially if operating in warmer waters during the winter time) are compounded by logistical constraints of the scheduled service associated with just-in-time.

Q8. Monitoring systems for the Arctic

Only one company provided an answer other than “No” or “I do

Table 2
Does the company intend to enter the Arctic market, and why?.

Answer	Frequency	Reason outlined for their answer	Frequency of the reason
Yes	5 mentions (7%)	Yes: for the Yamal LNG project	3
		Yes: natural resources exploitation and destination bulk market	2
Maybe	8 mentions (11%)	Maybe: if the benefits outweigh the cost in the future.	5
		Maybe: when the risks are lower	2
		Maybe: we may consider it	1
No	58 mentions (82%)	No: not our business or market, and/or there is no demand	31
		No: too big an investment when the cost outweighs the benefit	21
		No: too risky and challenging	18
		No: not enough market/no intermediate market to service	10
		No: too small (niche market), too difficult a market to enter	6
		No: our current business is enough	5
		No: too much uncertainty, variability	5

not know” to the question: do you know about current and planned monitoring systems in the North? A Chinese company that is not currently operating in the Arctic answered “safety control systems”, which does not mean much given the lack of details provided.

Only five companies responded to the question: how do you think monitoring services could be improved in the Arctic? Three companies recommended better communication or better information sharing; three would like to see less bureaucracy (in reference to the NSR). Only one recommended improvements with respect to rescue infrastructure.

The absolute number of answers, let alone percentages, is too low to be interpreted. Compared to the survey we are carrying with European companies, this very low number of answers, coupled with the fact few Asian companies have Arctic shipping experience, leads to the hypothesis that Asian companies do not have the same level of experience nor the same level of interest (yet). They may have studied the investments/gain, market, etc., but did not push far enough to know what type of systems are supposed to be used up North (NSR or NWP).

Q9. Navigation services in the Arctic

Out of 72 companies we received 29 answers (40%) to the question “What are the navigation services you think essential in the Arctic?” Among these answers, five replied candidly that “they have no idea”. Search and rescue was mentioned the most (11), followed by icebreaking (7 mentions). Next was “monitoring” (5 mentions), “meteorology data” (4 mentions), ports (3 mentions) and mooring (2 mentions).

As for Q8, the very general nature of the answers seems to point to a thorough lack of experience and reflection on Arctic shipping; most companies said they are not interested and thus have not thought precisely about essential navigation services in the Arctic beyond generalities. Even companies that may be interested in the future or that declared a real interest, did not elaborate much on the topic.

4. Discussion

The survey highlighted several important conclusions regarding the reportedly incoming interest by Asian shipping companies.

First, most companies portray the future of Arctic shipping as mainly driven by destination traffic, stemming from the exploitation of natural resources (minerals and hydrocarbons). Transit shipping is not really considered as potentially having a major incidence. Another interesting point is that among the answers, the only reference to a specific Arctic route is to the Northern Sea Route (NSR; 12 mentions): no mention is made of the Northwest

Passage.

Second, risks (drifting ice, remoteness, weather) are still considered to be a major liability in the Arctic despite climate change.

Third, shipping in the Arctic is also described as implying severe operational challenges: navigation in ice of course, but also from a commercial and financial point of view: it makes the respect of just in time and scheduled service difficult, both because of drifting ice and seasonality; it makes the recouping of costly ice-class vessels difficult as the market is small and with little prospect for long-term contracts.

Fourth, few shipping companies have indeed made the decision to develop Arctic shipping: only five in the sample of 72 answers declared a definite interest for Arctic shipping, while 8 said they might develop it in the future if conditions change. This is far from the rush to a new Arctic highway the media often talk about when describing Arctic futures.

Fifth, this lack of interest appears to explain the poor knowledge about monitoring systems in the Arctic and about essential services to ships in the area. A large majority of Asian shipping companies do not envision Arctic shipping in their business plans, so they did not investigate the operational aspects of it; but it seems neither did those that said they could be interested.

5. Conclusion

This research is based on a survey conducted with a sample of Asian shipping companies: it is a picture of the industry at a given time and is certainly not an exhaustive reflection of the diversity of strategies. However, it hints at interesting conclusions.

Despite much media attention and the optimism displayed by several analysts, it seems that Arctic shipping, however promising it may appear on paper, does not attract the actual interest of Asian shipping companies. Few are indeed interested in developing this market. Sanko Shipping gave up in 2012; Hyundai Glovis made only one test run in 2013 with Stena but does not seem hurried to follow suit; Cosco made three test runs but readily reckons the logistics of Arctic shipping is difficult. It is in the destination segment focusing on LNG exploitation in the Arctic that investments have begun with Asian shipping companies, with three Chinese and one Japanese companies investing so as to develop the transportation of LNG from the Yamal peninsula and the Sabetta port being built there.

The survey conclusions show Asian companies reason in a no different way from Western shipping firms: they weigh in the risks, logistical difficulties that make the penetration of a niche market difficult and costly. This in line with the conclusion of the previous survey (Lasserre and Pelletier, 2011) and underline the globalisation of Asian shipping companies: they set up their business plans

with the same parameters as European and North American shipping firms.

Arctic shipping is indeed developing and a few Asian shipping companies are seriously investigating the business opportunities, but the market remains small and, at least in the short and medium term, Asian companies remain very prudent about it. There is no rush to what the media prematurely considered a future shipping highway across Arctic waters.

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Appendix 1. List of the Asian shipping companies that replied to the questionnaire.

Country	Name	Active in the Arctic?	Major market	Number of ships, 2015
Singapore	American president lines	No	Container	96
Japan	Asahi shipping	No	Dry bulk	15
Japan	Asahi tanker	No	Tanker	105
Japan	Azuma Shipping	No	Dry bulk	26
China	China LNG CLSICO	No	LNG	6
China	China merchants energy shipping Co., Ltd.	No	Dry bulk/tanker	44
China	China shipping bulk	No	Dry bulk	260
China/Poland	Chipolbrok	No	Multipurpose	19
China	Conti-GMT	No	Dry bulk	6
China	COSCO	Tests in 2013 and 2015 Test was planned in 2014 but was refused by Russian authorities	Dry bulk/Container	620
China	CSCL	No	Container	114
China	China shipping tanker	No	Tanker	69
China	China shipping development Co., Ltd.	No	Tanker	207
China	Dandong	No	Multipurpose	14
Japan	Daiichi Chuo Kisen Kiasha DCKK	No	Dry bulk	229
South Korea	Eukor car carrier	No	Ro-Ro	71
Taiwan	Evergreen	No	Container	150
China	GMT Shipping	No	Dry bulk	5
Japan	Hachiuma steamship	No	Dry bulk	9
South Korea	Hanjin shipping	No	Container/Dry bulk	210
China	Hong union	No	General cargo	20
South Korea	Huyndai Glovis	Test in 2013 in partnership with Stena Bulk	Ro-Ro/Dry bulk	53
South Korea	Huyndai merchant marine	No	Container/other	201
Japan	Iino Kaiun Kaisha, Ltd.	No	Tanker	92
Japan	Inui steamship Co., Ltd.	No	Dry bulk	14
Japan	JX Ocean	No	Tanker	58
Japan	Kawasaki K Line	No	Container/other	382
South Korea	KMTC	No	Container	29
Japan	Kokuka Sangyo Co.	No	Tanker	30
South Korea	Korea line corporation KLC	No	Dry bulk	28
Taiwan	Kuang ming	No	Tanker	18
Japan	Kyoei Tanker Co., Ltd.	No	Tanker	19
Japan	Kyowa shipping	No	Container	9
China	Lufeng shipping	No	Dry bulk	40
Japan	Mitsubishi ore transport	No	Dry bulk	45
Japan	Mitsui OSK	No	Dry bulk/tanker	890
Singapore	MT Maritime	No	Chemicals	32
South Korea	Namsung Shipping	No	Container	18
China	Nanjing Tanker	No	Tanker	64
China	Ningbo Jun Hao Ocean Shipping	No	Dry bulk	6
China	Ningbo silver star maritime shipping	No	Dry bulk	16
Japan	Nippon Yusen Kaisha NYK	No	Dry bulk	877
Japan	Nissan Motor Car Carrier	No	Ro-Ro	17
Japan	NS United Kaiun Kaisha	No	Dry bulk	120
China	OOCL	No	Container	50
China	Pacific glory shipping	No	Dry bulk	5
Singapore	PIL	No	Container	126
South Korea	Polaris shipping	No	Tanker	35

(continued on next page)

(continued)

Country	Name	Active in the Arctic?	Major market	Number of ships, 2015
Japan	Sanko steamship	Sent ships along the NSR in 2010 but gave up Arctic service in 2012.	Container/tanker	15
China	Shandong ocean shipping	No	Dry bulk	10
China	Shanghai Fujian Guohang ocean shipping Co., Ltd.	No	Dry bulk	14
Singapore	Simatech	No	Container	26
South Korea	Sinokor	No	General cargo	37
China	Sinotrans-CSC	No	Dry bulk	176
China	SITC	No	Container	61
South Korea	SK Shipping	No	Tanker	135
South Korea	STX Pan Ocean	No	Dry bulk	275
China	Suns shipping	No	Container	2
Singapore	Swire shipping	No	Dry Bulk	62
Singapore	Tanker pacific	No	Tanker	20
Indonesia	Temas	No	Container	22
Japan	Toko Line	No	Dry bulk	33
Japan/Singapore	Tokyo marine asia group	No	Chemicals	39
China	Tong Li shipping	No	Container	2
Japan	Tsurumaru shipping Co., Ltd.	No	Dry bulk	37
Vietnam	Vinalines	No	Container	138
Taiwan	Wan Hai	No	Container	72
China	West Line	No	Multipurpose	4
China	West Line Shipping	No	Dry Bulk	4
China	Winland shipping	No	Multipurpose	20
Taiwan	Yang Ming	No	Container	422
China	Zhongchang shipping	No	Dry bulk	10

95 companies were contacted and 72 answered.

This sample is a picture of the Asian shipping industry; it is relatively representative. For instance, 15 of the top 17 Asian container ships classified by Alphaliner have answered. However, it is not a comprehensive survey, nor was it built so as to achieve a statistical representation of the shipping industry in every country.

It includes major shipping companies with more than 150 ships, as well as smaller actors with less than 10 ships: the survey thus reflects strategies from large, globalized shipping firms as well as from much smaller actors.

Appendix 2. Questionnaire used for the survey

Q1. What do you think is the commercial potential of Arctic shipping?

Q2. What are the costs associated with Arctic shipping? (eg. ice-class ship; equipment; training; specific maintenance; possible penalties for delays...).

Q3. What are the operational challenges associated with Arctic shipping? (eg. seasonal route change; operation of a ship in ice; delays; respect of just-in-time; drifting and unpredictable ice patterns).

Q4. What are the risks associated with Arctic shipping? (eg. icing (from sea spray); extreme cold; blizzards; growlers; ice ridges; multi-year ice; accidents and spills; damage to cargo (intense cold)...).

Q5. Does your company offer services (regular or occasional) in the Arctic?

Q6. If yes, do you intend to increase the level of your activity? Why? For what kind of service (transit, destination...).

Q7. If not, do you intend to enter the Arctic shipping market and develop activities in the area? Why? For what kind of service (destination, transit...)?

Q8. Do you know about current and planned monitoring system in the North? How do you think monitoring services could be improved in the Arctic?

Q9. What are the navigation services you think are essential in the Arctic?

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