

Providing an Example of Scheduling Model for Marine Transportation Companies

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Abstract In this study a scheduling model provided for a given marine transportation company, so that, long term organizational objectives could be achieved through formulated scheduling. We have also evaluated advantages, barriers, and problems existing on the way of goal achievement from different perspectives, in order to improve the organization's transcendental objectives, make an assessment of various positions, opportunities, and weakness as well as strength points of that organization. First, we present a definition for scheduling and then proceed with necessity of its usage, processes, strategy development, strategy performance and evaluation, and then strategy evolution is processed. Importance and status of strategic management in an organization, and characteristics of strategic scheduling are then investigated. Critical questions of the organization in performing strategic scheduling are answered, and different steps in strategic scheduling approach are presented. Here, scheduling process will be explained according to appropriate analyses depending on the type of organization, strategic scheduling advantages and disadvantages are listed, and finally, an explanation about formulation of scheduling, tactic setting and initialization of operation will be provided, according to aforementioned descriptions.

Keywords: *scheduling, marine transportation, SWOT analysis*

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1. Introduction

Two key subjects exist in any business, which considering them could help improvement of conditions in each and every company or organization. First, it is leadership, in a way that effective performance of strategy leans on strong leadership. Second, there are strategy and scheduling, both important but different from each other. Companies normally concentrate on short term and routine operations and problem solving. Often, little time and resources are allocated to strategic scheduling. Of course, this does not mean not to concentrate on operations and their improvement, however, the meaning is that strategic scheduling not only specifies the path, but also makes the results gained, transparent. Strategy and operations are both important and one of the biggest mistakes made in companies could be sacrificing one to another. It is the long term strategy of direction and scope of activities within a company that coordinates an organization's resources with its changing environment, especially market needs and customers, in a way that, a good response would be given to the peoples and stakeholders expectations and values [1]. Besides, importance and status of marine transportation, especially its share of global trade and industry is no secret, since most of transportations are taking place through the sea. High importance of marine transportation not only

pertains to high volume of displacement, but also it is considered as the cheapest and safest method of displacement by the industries managers. For this, a given company with developed equipments and improved volume of displacement in global competition was assumed in the research, so that, the company could sustain in global competition, via development of programs, using scheduling techniques. This is planned according to creation of a transparent perspective, setting strategic objectives and supply of resources. Accordingly, the assumed company has set the strategies after determining capabilities, weaknesses, opportunities and threats via SWOT (Strengths, Weaknesses, Opportunities and Threats) technique and analyzing findings; and connecting strategies to operations, the company evaluated the performance according to balanced scorecard.

Allmendinger et al. [2] presented an effective method for offering a road map, using positive topology technique and provided a theory for scheduling their model. Amara et al. [3] examined impacts of academic researches on setting governmental strategy, using available documents. Bachrach et al. [4] investigated power of scheduling and its influence within the organization. Banfield [5] evaluated averaging statistical methods, etc. in improvement of scheduling accuracy. Applying strategic analyses, Banister [6,7] studied the impacts of scheduling in transportation companies and the way these companies are made sustainable. Aud Tennoy [8] paid attention to the influence of taking advantage of experienced professionals

in modeling and scheduling within transportation companies, and validated this through three real instances in Scandinavian area.

2. SWOT Analysis

SWOT analysis is an efficient tool for identification of environmental conditions as well as internal capabilities of an organization. Its basics underlies in strategic management, marketing, and understanding the environment surrounding the organization, for strategic scheduling. Abbreviation SWOT stands for Strength, Weakness, Opportunity and Threats. Weakness and strength naturally are related to the inside of a company, while opportunity and threats usually are affected by the environment. Here, we introduce SWOT and then we will use it to analyze a given international marine transportation company. Inches regard, Xunpeng Shi [9] has offered a new SWOT analyzing method for strategic scheduling. Peter Rauch [10] also developed a strategic program for fuel supply chain in North Europe War, applying SWOT analysis.

To develop the company’s strategy, primarily we identified and studied its strength and weaknesses as well as the business opportunities and threats through extensive sampling, while trying to identify and adopt suitable strategies in various types of businesses for the company, via creating SWOT matrix. In continuation, we will

briefly explain the way through which the matrix was created, and subsequently refer to adopted strategies. For this, we had to prepare a list of weaknesses, strengths, opportunities and threats at first hand, to create the following matrix called SWOT profile:

Table 1. SWOT profile

Weaknesses	Strengths	
W-O strategies	S-O strategies	Opportunities
W-T strategies	S-T strategies	Threats

Applying SWOT analysis, four kinds of strategies could be identified:

- **S-O strategies:** strategies seeking for using opportunities which are appropriately in coordination with the organization’s capabilities, and also take maximum advantage of the organization’s strength points;
- **W-O strategies:** strategies applied to overcome weaknesses, so that, opportunities could be benefited;
- **S-T strategies:** strategies used by companies, so that, they could minimize their risk taking from threats;
- **W-T strategies:** totally defensive strategies, preventing companies to be damaged due to their weaknesses against threats from external environment.

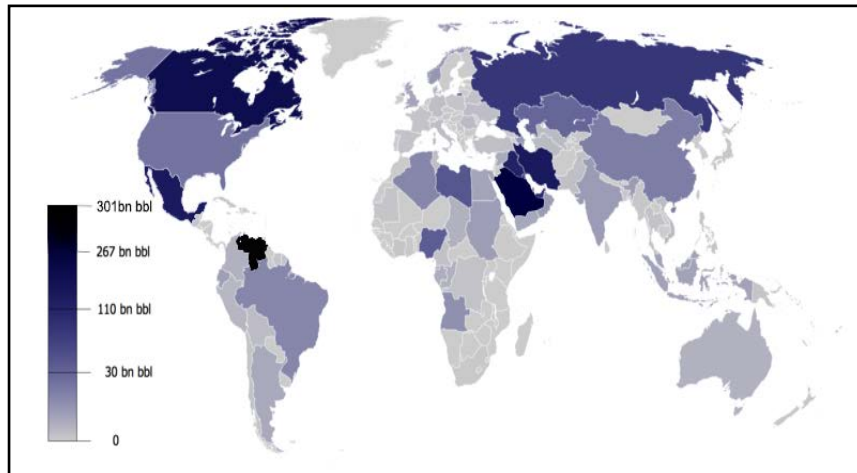


Figure 1. The world reserves in 2013 [11]

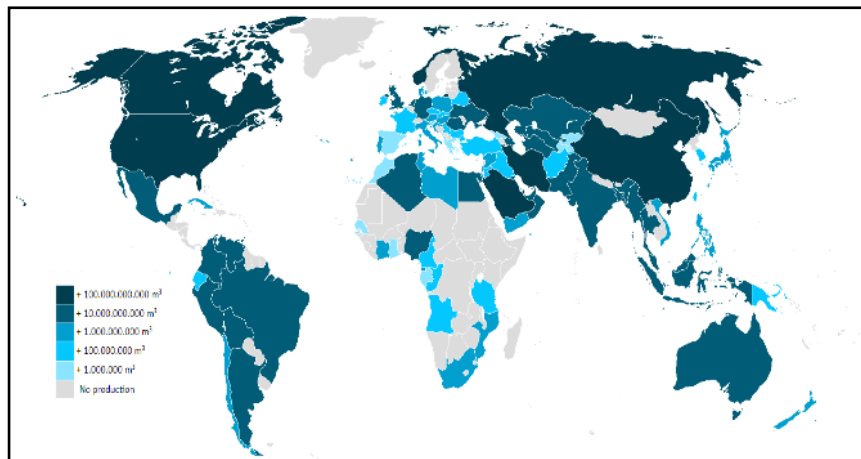


Figure 2. Amount of gas production (m³/year) [11]

In order for opportunities, threats, weaknesses and strengths to be recognizable, internal and external organizational study is a must. Following, you are presented with some charts extracted as examples for better understanding of external environment of the organization in terms of energy. In Figure 1 and Figure 2

respectively, the world oil and gas reserves are shown in addition to the way distribution areas and competition market are extended. In Figure 3 and Figure 4 also, 5 superior countries in terms of oil and gas reserves are depicted.

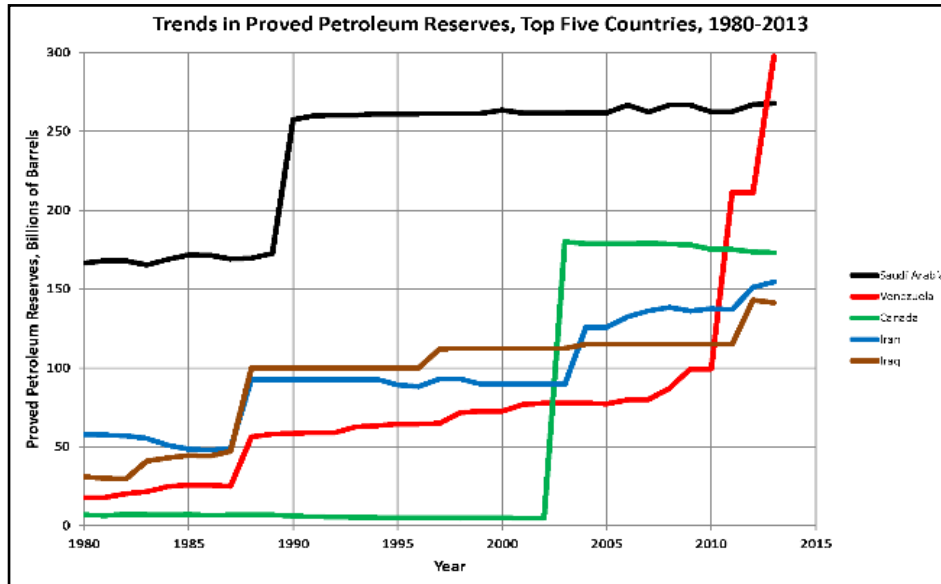


Figure 3. 5 world superior countries oil reserves in 1980-2013 periods [12]

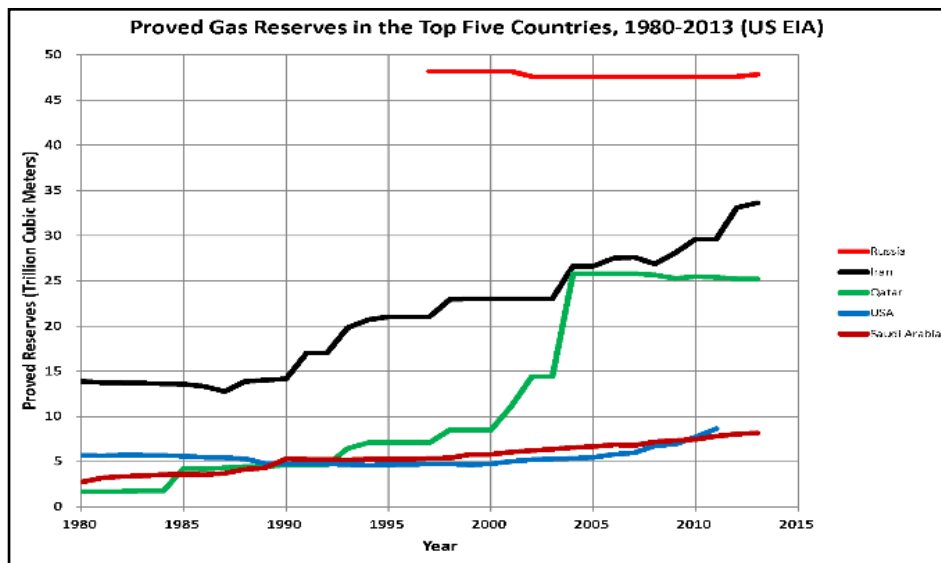


Figure 4. Natural gas reserves in 5 superior countries in 1980-2013 periods [12]

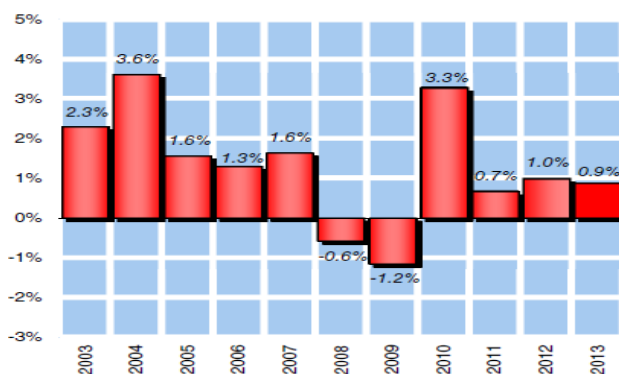


Figure 5. World oil demands for each scenario [12]

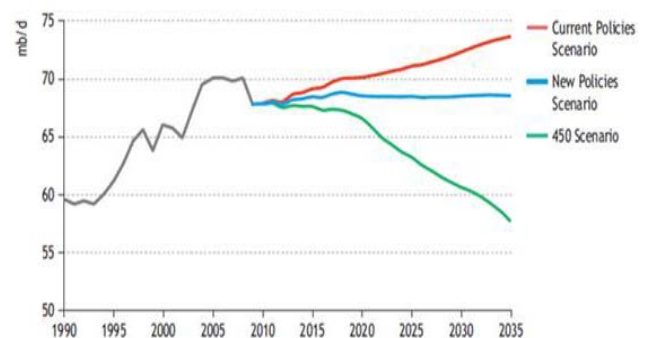


Figure 6. World petroleum supply for each scenario [12]

Energy perspective is another effective parameter in data analysis; the way global supply is changed is shown in [Figure 5](#) and [Figure 6](#) through three scenarios: pessimistic, average and optimistic.

Following, a sample of opportunities and threats (external), as well as strengths and weaknesses (internal) are presented in tables in terms of priority ([Table 2](#), [Table 3](#), [Table 4](#), and [Table 5](#)), then creating SWOT matrix for the company, we will identify adopted strategies, scope of which are mentioned below.

Table 2. Some opportunities a company may be confronted (external), in terms of priority

Opportunities	
1	Existence of great oil and gas reserves and the demand resulting there from, in Iran
2	New technology
3	Emergence of new economic powers such as China and India
4	European countries intended to supply energy (especially gas) from among various countries
5	Rate of population growth

Table 3. Some examples of threats confronting a company (external), in terms of priority

Threats	
1	Possibility of oil exports through pipeline
2	Potential and actual competitors
3	Increasing environmental policies
4	Presence of pirates
5	Number of competitors

Table 4. Some examples of strengths existing in a company (internal), in terms of priority

Strengths	
1	Trained human resources
2	International credit of the company
3	Low average age of the fleet
4	International work experience
5	Holding high capacity of transportation

Table 5. Some examples of weaknesses (internal) within a company, in terms of priority

Weaknesses	
1	Shortage of financial resources
2	Uni-based incomes
3	Degree of access to the data bases of the company
4	Updated marine activities in international market not being accessible or attainable
5	Creative, efficient and effective publicity

2.1. S-O Strategies

In order to adopt S-O strategies for the company, in SWOT matrix we have made use of strengths and opportunities mentioned in [Table 3](#) and [Table 1](#), respectively and the following strategies were achieved:

1- Formation of expert groups in various contexts for professional decision making and scheduling regarding different company's issues;

2- Formation of workgroups, including experts from the company and its subsidiaries, in order to improve collaborations;

3- Holding regular meetings and courses through participation of active international companies for exchange of views, and signing marine memorandums of understanding in addition to observing marine laws, while the company acts as a host;

4- Expansion of the company's income portfolio through entering gas, petrochemicals and dry materials transportation market;

5- Supplying spare parts, provision of supplies and maintenance services by local companies;

6- Expansion of the company's income portfolio via entering new businesses;

7- Cooperation with Khazar States for entering new markets;

8- Development of international marine educational centers;

9- Upgrading the company standards in line with international standards, for entering international markets;

10- Branding vessels' inspection companies according to the rules and regulations of big oil companies, through the company's cooperation;

11- Taking advantage of offshore educational potentials for young workforces of the company;

12- Expansion of transportation fleet in various areas such as LNG, LPG, CHEMICAL CARRIER;

13- Formation of a cultural workgroup within the company, so that, cultural issues would be strengthened for creating more a sense of union, empathy and alignment, in order to improve the objectives;

14- Development of a code of conduct for proposals;

15- Formation of a workgroup to do identification and feasibility study regarding new markets and side services for entrance to various areas;

16- Holding specialized internal and international courses, and participating in them for keeping employees updated;

17- Strengthening potential of the Company's educational center and holding applied courses for employees' performance improvement;

18- Local recruitment;

19- Making efforts to create relationship with global transportation industries through continuous international publicity.

2.2. W-O Strategies

In order to adopt W-O strategies for the company, in SWOT matrix we have made use of weaknesses mentioned in [Table 4](#) as well as opportunities cited in [Table 1](#); following strategies were resulted:

1- Creating a direct and continuous relationship between the company's scopes of activities and related internal organizations;

2- Upgrading the company standards in line with international standards, for entering international markets;

3- Increasing cooperation with I.R. of Iran with those Ministries such as Petroleum, Road and Transportation, and Industries and Mines for the purpose of company's investment and development of activities;

4- Optimizing relationships with internal and overseas banks for expediting money transfer procedure;

5- Development of the company's financing solutions through local resources such as stock and capital market, banks, bonds, securities, etc.;

6- Making use of experienced and professional workforces for training the young ones with little experience, in line with knowledge management;

7- Creating a strong software and network system within the company, in order to remove bureaucracy and expedite the matters more;

8- Planning and implementing a process, in order to find talented employees and take advantage of them in a right position;

2.3. S-T Strategies:

In order to adopt S-T strategies, in SWOT matrix we have made use of strength points and threats respectively mentioned in Table 3 and Table 2, resulting in following strategies:

1- Furnishing specific and continuous customers of the company, with facilities and privileges;

2- Cooperation with internal and overseas ship making companies for meeting the company’s needs quickly and expanding income portfolio of it;

3- Taking advantage of today’s knowledge and technology in order to reduce fuel consumption of ships;

4- Formation of a workgroup to study and forecast markets in various work areas, to provide some solutions to adapt future conditions;

5- Improving quality of services to satisfy customers’ needs, and increasing the number of customers;

6- Reducing risks via control management system;

2.4. W-T Strategies:

In order to adopt W-T strategies for the company, in SWOT matrix we have used weakness and threats respectively presented in Table 4 and Table 3; the result was as below:

1- Applying local companies’ potential and their development, and continuing cooperation with them when sanctions are removed;

2- Establishing standard local companies and institutions, categorizing them, cooperating with and supporting them;

3- Taking advantage of meritocracy system in the company;

4- Creating knowledge management setup for keeping information and experience within the company;

5- Cooperation with other governmental and private military organizations to keep the ships safe from marine dangers;

6- Attracting operational forces from populous families, to be able to stay on board;

7- Formation of a group to control repairs and make regular and planned visits to keep the fleet updated and to prevent failure;

8- Selling or scrapping tankers with more than 15 years of age, purchase and replacing the new ones;

3. Making Internal and External Analysis

In order to analyze internal and external factors simultaneously, we make use of a tool named internal and external matrix (IE). It is used to determine the company/ organization or business position. In other words, a company/ organization can make clear configuration and

tasks of its own business units. To create the matrix, the company/ organization should place scores resulted from internal and external factors’ evaluation matrices, in horizontal and vertical dimensions of the said matrix to make clear the position of organization or business in the matrix spaces, and a suitable strategy could be adopted for it. Internal and external matrices are presented in two forms of tiles with 4 and 9 blocks each, which in this case it is a 4 (Figure 7). In this tiled matrix and in terms of scores related to internal and external factors, if the organization or business’s position is located in I block, Conservative (maintenance, internal support); if in II block, Aggressive (growth and development); if in III block, Defensive (removal, assignment, decrease, liquidation), and finally if located in IV block, Competitive (maintenance, external support) strategies are proposed.

		Internal		
	1	2.5	4	
External	2.5	I Conservative	II Aggressive	1
	1	III Defensive	IV Competitive	

Figure 7. Internal and external tiled matrix

Examining resulted numbers from EFE and IFE matrices and depicting IE matrix shown in Figure 8, indicates that strategies at S-O level are the first priority for the company which is considered as aggressive strategy (growth and development).

		Final score of internal factors evaluation				
	1	2	3	4		
Final score of external factors evaluation	3	WO Conservative	SO Aggressive		1	
	2	WT Defensive	ST Competitive			

Figure 8. Result of IE matrix analysis for the company

4. SPACE- Strategic Position and Action Evaluation Matrix

In this evaluation, we examine suitable strategy for the company in terms of four parameters: financial strength, industrial strength, environment stability, and competitive advantage. Evaluation process is as follows:

1- Select those variables introducing: (FS) financial strength, (CA) competitive advantage, (ES) Environment stability, and (IS) Industrial strength.

2- Score these variables from worst (+1) to best (+6) and create two FS and IS axes. Create two ES and CA axes for each of variables and score them from best (-1) to worst (-6).

3- Make a sum of values of each variable located on one axis, and then divide it by number of variables to gain average score for FS, IS, ES, and CA. Put average score of these variables on SPACE matrix axes.

4- Make a sum of all scores located on X axis and specify related point on this axis. Add all scores located on Y axis together, and specify related point on this axis. Connect these two points together.

5- Draw a line from origin of the coordinates to this point. The line shows type of proposed strategy for the company, whether it should be aggressive, competitive, defensive, or conservative.

In continuation, we identified strategic position of the company as aggressive and developing, similar to IE matrix, through creating SPACE matrix (Table 6) by investigating the company and related parameters, and then we charted the SPACE matrix (Figure 9).

Table 6. Strategic position and action evaluation matrix (SPACE)

Financial Strength (FS)	Score
Return on investment is good in the company.	5
Dividend is proportionally at very good level.	6
Financial supply methods are limited.	2
Total current assets in proportion to debts are at very good level	6
Average	4.75
Industrial strength (IS)	Score
High degree of petroleum transportation required	6
Increasing need of transporting oil, gas, and oil derivatives	5
Available internal expert workforce	5
Advanced transportation technology	3
Average	4.75
Competitive advantage (CA)	Score
Available great oil and gas reserves in Iran	-1
Experienced and professional workforce	-2
Available modern transportation equipments, compatible to environment	-3
Taking advantage of advanced technology	-3
Average	-2.25
Environment stability (ES)	Score
Instability of currency rate	-3
Strict environmental rules	-3
Instability in economic condition of the country	-4
Continuous improvement of transportation industry	-2
Average	-3

$$X = CA + IS = -2.25 + 4.75 = +2.5$$

$$Y = ES + FS = -3 + 4.75 = +1.75$$

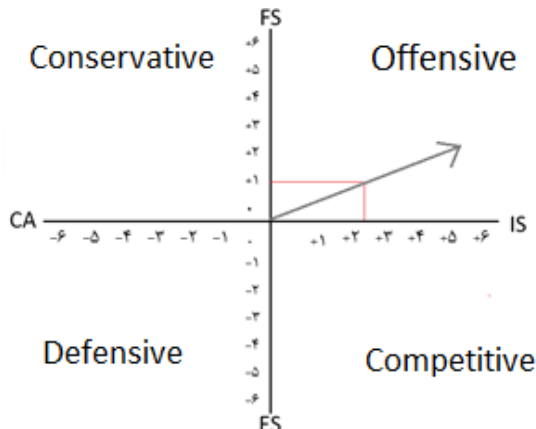


Figure 9. SPACE matrix

5. Conclusion

According to Porter five forces analysis, PEST, SWOT, IE, and portfolio, and also other examinations performed before, it is clear that the main strategy of the company is located within directive, growth and development form of strategies. For this, the following strategies are proposed for the company:

1- Expansion of income portfolio of the company via entering new businesses, such as:

- Gas and petrochemical products transportation market;
- Goods and materials trading market;
- Oil and petrochemical upstream industries;
- Establishing companies' subsidiaries for completion of value chain of the company to supply parts.

2- Feasibility study as to the entering into cooperation with Khazar States.

References

- [1] Poor, Mona Anthology. The world's oil reserves. Vice president of planning and supervision on hydrocarbon resources. 2012.
- [2] Memarian, Ali , Develop a comprehensive performance measurement system using Balanced Scorecard BSC, the first conference on the improvement and development departments, 2009.
- [3] Ansari, Iqbal Shakeri, Ramin. Comparative between strategy formulation techniques. Tehran, May 2011.
- [4] Hunger, Thomas L.Wheelen & J. David. Strategic Management and Business Policy-13 Edition 2012.
- [5] P. Norton, Robert S. Kaplan and David, The Balanced Scorecard: Translating Strategy into Action, 2004, Boston: Harvard Business School Press.
- [6] Birol, Fatih & Cooperators, IEA - World Energy Outlook, 2010.
- [7] Tanker Operator ,TOP 30 TANKER COMPANIES. March 2013, Tanker Operator Magazine Ltd.
- [8] Ingpen, Brian. Teekay: The First 40 Years: Kattegat Limited, 2013.
- [9] Amara et al., N. Amara, M. Ouimet, R. Landry T, New evidence on instrumental, conceptual, and symbolic utilization of university research in government agencies, 2004.
- [10] Aud Tennøy, How planners' use and non-use of expert knowledge affect the goal achievement potential of plans: Experiences from strategic land-use and transport planning processes in three Scandinavian cities, 2013.
- [11] Banister, D. Banister, Assessing the reality – Transport and land use planning to achieve sustainability, 2012.
- [12] Peter Rauch, SWOT analysis and strategy development for forest fuel supply chains in South East Europ, 2015.