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## TURKISH SHIPBUILDING INDUSTRY – CHALLENGES AND POTENTIAL

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### Summary

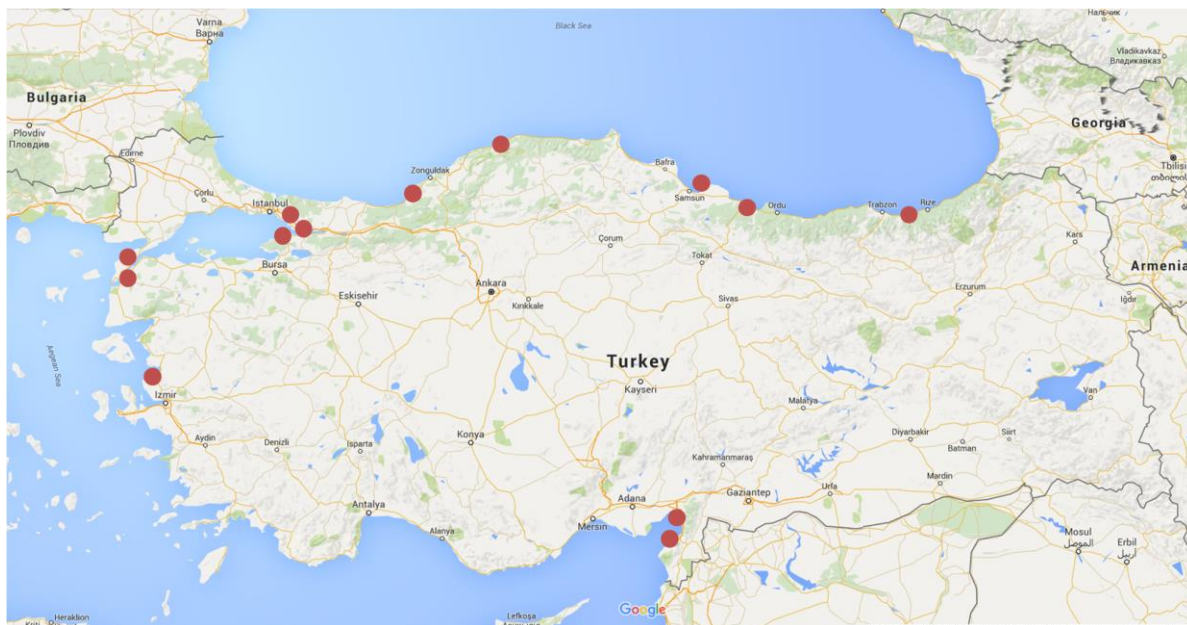
Shipbuilding industry was developed and grown in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries. The Turkish shipbuilding industry started to develop in an international level around 15 years ago with specialization in small tonnage vessels. The global economic crisis that started in 2008 has affected the enhancement of shipbuilding industry in Turkey. This study addresses the important factors affecting the development of Turkish shipbuilding industry by focusing on the global shipbuilding during the crisis and the current state of the industry with the application of a survey to the key decision makers. The data was obtained from the survey collected from the Turkish shipyards and maritime companies that represent the considerable share of the industry. The surveys were conducted between 2012 and 2013. The current state of shipbuilding industry concerning the most relevant factors for the development of the industry according to the respondents has been designated, and it was seen that the highlighted factors were lower in the current state of the industry. Moreover, the strongest and weakest factors for the Turkish shipbuilding industry were pointed out. Herein, general views of the respondents regarding the development of Turkish shipbuilding industry were presented.

*Keywords: Turkish shipbuilding; shipyard; Turkey; shipbuilding; sectoral analysis; survey;*

### 1. Introduction

The late 19<sup>th</sup> and early 20<sup>th</sup> centuries are the periods that the shipbuilding industry was developed and grown globally as well as all the other heavy industries. The development and competitiveness of the Turkish shipbuilding industry in international a manner was started 15 years ago with particular specialization in the building of small tonnage vessels such as chemical tankers and yachts (Celik, Erturk, & Turan, 2013). The global economic crisis also affected the shipbuilding industry in Turkey. However, the Turkish shipbuilding industry has an increasing leadership in the international trade of new ships that is a niche market that are mainly small tonnage chemical/oil tankers (up to 10 thousand deadweight (DWT) (OECD, 2011). The ship repair and conversion activities have been increasingly growing in the shipyards in contrast to the shipbuilding activities.

The general location of Turkish shipyards is shown in Fig.1. The shipyards are mainly located in Tuzla and Yalova regions in Turkey. The epicentre of shipbuilding activities in Turkey is Tuzla Bay, situated some 50 km east of Istanbul. Since Tuzla area is overcrowded, it can no longer offer suitable places for new yards. Some entrepreneurs have focused on nearby inland locations, such as Yalova-Altınova and Izmit. In particular, some enterprises in these nearby facilities specialise in the manufacture of individual hull blocks that are then transported to other shipyards, where they are assembled (OECD, 2011).



**Fig. 1** General location of Turkish shipyards.

● Shipyard Zones in Turkey ("Google Maps," 2015 ; UDHB, 2013)

In addition, recently, the industry has been expanding beyond its traditional zone, and diversifying into new areas throughout Turkey, including Yalova, Izmit, the regions of Black and Mediterranean Sea. After Tuzla, the second largest shipbuilding location the Yalova-Altınova Shipyard Region was founded in 2004 in order to increase the capacity of Turkish yards to meet the growing demand for new vessel both nationally and internationally (OECD, 2011).

The Turkish shipbuilding industry has enhanced its capacity in production and export, including a significant product range in last decade when the global market tended to show development. According to the order books, Turkey has been in the top ten countries on the basis of its DWT production, and in the top five countries on the basis of the number of ships (OECD, 2011). Therefore, the Turkish shipbuilding also reflects accurately the members of the entire World shipbuilding industry. On the other hand, Turkey had 316,000 GT (Gross Tonnage) and 582,000 Compensated Gross Tonnes according to Order book by countries 1st July 2015 (SEAEurope, 2015).

In the literature, there are various studies regarding sectoral analysis. Some of those studies use input-output analysis while others employ surveys. Sartaş (Sartaş, 2010) analyzed the growth dynamics in Turkish commercial shipbuilding sector and its prospects between 1992-2008 and presented the reasons for the growth of the industry in Turkey. Savsar (Savsar, 1998) investigated the past, present and future of the maritime transportation sector in Saudi Arabia, and presented the current situation and forecasts on the future shipping capacity requirement. As a result, general steps that could be followed in analysing a country's maritime industry and its shipping fleet requirement have also been illustrated in

the study. Benito *et al.* (Benito, Berger, De la Forest, & Shum, 2003) analyzed maritime sector in Norway and they reported that Norwegian maritime sector is in a better situation compared to the other sectors. In the study of Managi (Managi, 2007), total productivity of Japan's shipping industry was analyzed with the application of Luenberger productivity indicator and found large productivity increases in three significant maritime firms in Japan. They emphasized that although the shipping industry average is declining over the periods, the increasing trends of the maritime shipping firms in the study might reflect the restructuring of the organisation together with the adoption of new technologies. Cai *et al.* (Cai *et al.*, 2009) made a sectoral analysis for international technology development coal-fired power generation, cement and aluminum sectors in China and compared the characteristics of these sectors as a result. Zakaria *et al.* (Zakaria, Iqbal, & Hossain, 2010) evaluated the shipbuilding industries in Bangladesh. They took an overall picture of shipbuilding industries in both public and private sector through an extensive review of the literature, field visits, interacting with shipyards and ship owners using structured, unstructured and open-ended questionnaires. According to the results of the study, the shipbuilding industry has been found as an attractive industry for Bangladesh with respect to long heritage and cheap labor costs. However, it is also pointed out that the productivity in shipbuilding should be upgraded since it is at the lowest level in the World.

Additionally, Zsuzsanna *et al.* (Zsuzsanna, Marian, & Sándor, 2014) investigated the ceramic sector in Romania by using a survey in order to find out the current situation of the enterprises, to see their current financial situation and to determine the importance given to competitiveness, flexibility, adaptability and reactivity by these companies. It was shown in the results that in order to improve the performances of companies, an increase of these mentioned parameters and efficient management is required. Alrashed and Asif (Alrashed & Asif, 2014) reflected the findings of a survey applied to architects, engineers, project managers, construction contractors, developer and investors in Saudi Building Industry in their study. The findings of the study according to survey results indicate that the industry has to be aware of the importance of sustainability, education and work experience. Hadžić *et al.* (Hadžić, Tomić, Vladimir, Ostojić, & Senjanović, 2015) carried out a study on the current state of the shipbuilding industry in Croatian and defined a significant role within national economy, and EU since it produces custom made and relatively complex products with the considerable perspective of their value and complexity enhancement. They gave recommendations for its future development in the results of the study.

Kwak *et al.* (Kwak, Yoo, & Chang, 2005) performed an input-output (I-O) analysis to the maritime industry in Korea and figured out the role of maritime industry in the national economy. They have concluded that maritime industry has a low forward linkage effect, a high backward linkage effect, a high production-inducing effect, a low supply shortage cost, a low pervasive effect of price changes and a high employment-inducing effect. Morrissey and O'Donoghue (Morrissey & O'Donoghue, 2013) also conducted a study on the role of marine sector in the Irish national economy by using an input-output methodology and pointed out that especially maritime transportation sector has a significant position in the economy of Ireland. Additionally, they also presented that the marine industry has a low forward linkage effect, a relatively high backward linkage effect, a high production-inducing effect and a high employment- inducing the effect.

Apart from above studies, Čagalj (Čagalj, 2009) suggested a new organizational approach for shipbuilding industry relying on scientifically based organizational theories in order to provide for decentralization, flexibility, innovativeness. Moreover, Luttenberger *et al.* (Runko Luttenberger, Ančić, & Šestan, 2013) analyzed the advantages of short-sea shipping (SSS) sector in Croatia and environmental concerns sourced by shipping. They undertook a strengths-weaknesses-opportunities-threats (SWOT) study with regard to the

strategy of SSS development in Croatia. As a consequence, suggestions for diminishing the weaknesses and threats have been given for ships, ports and maritime procedures.

In today's increasing competition among all the shipyards in the world, and depressed market conditions, improvement of Turkey's competitiveness may be possible with the determination of the current situation of the industry and taking precautions for the unsuccessful points. In this context, the key players in the Turkish shipbuilding industry were surveyed, and the results derived from the surveys were presented herein. To the best knowledge of the authors, this is the only study in the literature with such comprehensive analysis applied to shipbuilding industry. It is known that there are some reports both confidential and commercial prepared by private research companies. However, these are not public and intended for particular trade purpose. Therefore, this study provides important insights on challenges and potential of Turkish shipbuilding industry.

## **2. Methodology**

The analysis in this study is based on the data from a survey that was applied to the key decision makers in the shipbuilding industry in Turkey to measure the importance of the development and current success of the industry. There are around 100 leading companies that 69 of them are the member of Turkish Shipbuilders' Association ("Turkish Shipbuilders' Association," 2015). These companies entirely represent the shipbuilding industry in Turkey and mainly located in the Tuzla and Yalova Shipyard Zones, as well as in Korfez (Izmit), Karadeniz Ereğlisi, Gelibolu, and Çanakkale (OECD, 2011) Other companies are marine equipment manufacturers and suppliers, classification societies, design companies and consultants. The surveys were conducted between 2012 and 2013 with the 47 of the 69 member companies that responded positively to participate this study.

The survey is divided into five sections exploring the development of the Turkish shipbuilding industry. In the first and second part of the survey, the respondents were asked about their position in the company, and how long they have worked in the shipbuilding industry. In the third part, 35 factors on the sectoral development of the industry were given to define both the importance of the development and current success of shipbuilding industry. The respondents were requested to rate the factors based on their level of optimism with a scale from 0 to 100, with 0 being not optimistic at factor and 100 being very optimistic. Moreover, in the fourth part, participants were asked to express their opinion on when the industry will attain the uptrend period again. The final section is comprised of open-ended question that is their opinion on the development of Turkish shipbuilding industry in the future.

## **3. Data Analysis**

Data was analysed using SPSS predictive analytics software (SPSS 15.0). The variables were arranged based on the mean values, maximum - minimum values,  $\pm$  standard deviation (SD), and frequency distributions. The differences between sectoral experiences of the respondents were determined using the one-way analysis of variance (ANOVA) test. The differences between positions in the company of the respondents were determined using an independent sample *t*-test. Using these tests, all the responses to the inquiries were statistically analysed for significant differences between the groups: type of position in the company, experience in the sector.

The reliability of all responses to the inquiries was checked with Cronbach's Alpha. Participants were requested to rate inquiries in respect to both the importance of the development and current success of shipbuilding industry. Thus, the reliability statistics was given for these two groups. Responses to the development of shipbuilding industry

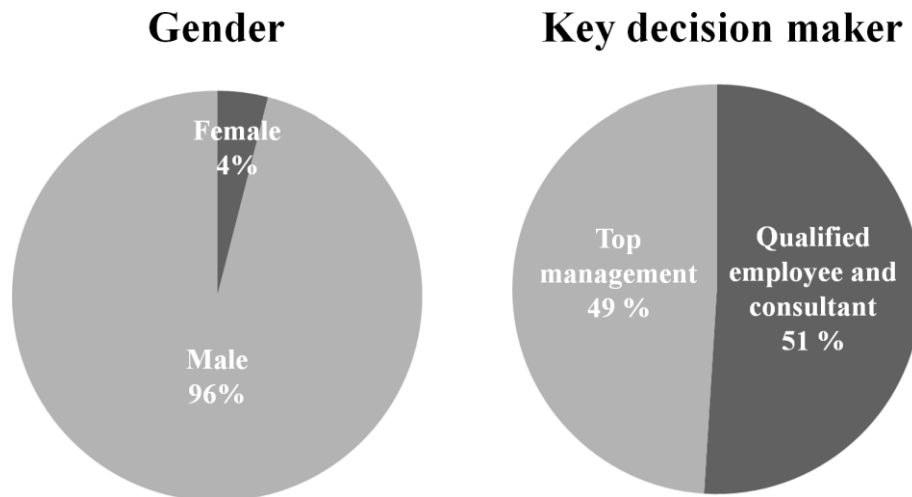
(Cronbach's  $\alpha = 0.967$ ) and for the current state of the shipbuilding industry (Cronbach's  $\alpha = 0.942$ ) has high internal reliability.

The sectoral experiences of the 47 the respondents are listed in Table 1. The majority of the respondents have more than 20 years of experience in the shipbuilding industry.

**Table 1** Sectoral experience of the respondents (n = 47).

Experience (years)	Percent of the respondents (%)
≤5	12.8
6-10	19.1
11-15	19.1
16-20	14.9
>20	34.0

As shown in Fig. 2, 96% of the respondents are men and 4% of them are women. All respondents are key players being 49% of them are top management and 51% of them are qualified employees and consultants.

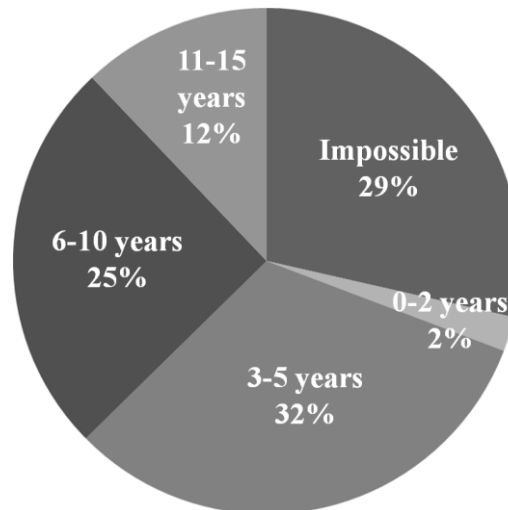


**Fig. 2** Descriptive statistics for the respondents

#### 4. Results and Discussion

The global crisis that started in 2008 affected the Turkish shipbuilding industry, and the growth of the industry decreased gradually. Thereby, the Turkish shipyards had difficulties to have new orders, and were struggling to continue their activities. When the respondents were asked “*when the sector will attain the uptrend period again?*”, 26% of the respondents stated that it was impossible; 29% of the respondents replied that it could be possible in a period of 3-5 years; the 23% replied that it could be possible in a period of 6-10 years; the 11% replied that it could be possible in a period of 11-15 years, and the 2% replied that it could be possible in a period of 0-2 years. Opinions of the respondents for the inquiry of when the sector will attain the uptrend period again have been illustrated in Fig. 3. The results obtained from the survey showed that the majority of the respondents do not think that the sector will attain the uptrend period in a short-term time zone. Rest of inquiries were asked to determine the important factors for the development and current state of the shipbuilding industry.

### When the sector will attain the uptrend period again



**Fig. 3** Opinions of the respondents for the inquiry of when the sector will attain the uptrend period again

#### 4.1 Results on the Important Factors for the Development of Shipbuilding Industry

The respondents were requested to give a grade to each of the 35 factors with a range from 0 as the lowest point to 100 as the highest point. The statistical data about the importance of the development of shipbuilding industry is given in Table 2. Large differences within the responses were found to be for three factors: (i) success in marketing, (ii) national customer loyalty, (iii) international customer loyalty (Fig. 4). It was seen that the respondents gave minimum 5, maximum 100 points to those three factors above. This large difference indicates that there are problems with marketing activities in the sector.

The respondents gave 93 points in average with a maximum of 100 points and a minimum of 40 points for the factor related human resources capability profile to which the highest average point was given. It shows that the respondents think that the human resource is sufficient.

**Table 2** Descriptive statistics for the data of the factors that were graded between 0 and 100 by the respondents for importance of the factors for having a developed industry.

Factors on Sectoral Development	Mean	Minimum	Maximum	Standard Deviation
*Infrastructure of human resources capability profile	92.9	40.0	100.0	12.0
*Quality level of the national sector	88.5	50.0	100.0	14.3
*Success in delivery time of the products or services	88.3	0.0	100.0	21.5
*Opportunities and technological level in the industry	87.6	50.0	100.0	13.6
*Availability of the qualified managers	87.5	20.0	100.0	15.8
Incentives for global competitors	87.0	50.0	100.0	15.0
Effective collaboration with domestic suppliers	87.0	50.0	100.0	14.0
Competence of the domestic suppliers	87.0	50.0	100.0	15.0
Success in marketing	87.0	5.0	100.0	18.0
Global sectoral reputation and recognition	86.0	20.0	100.0	17.0

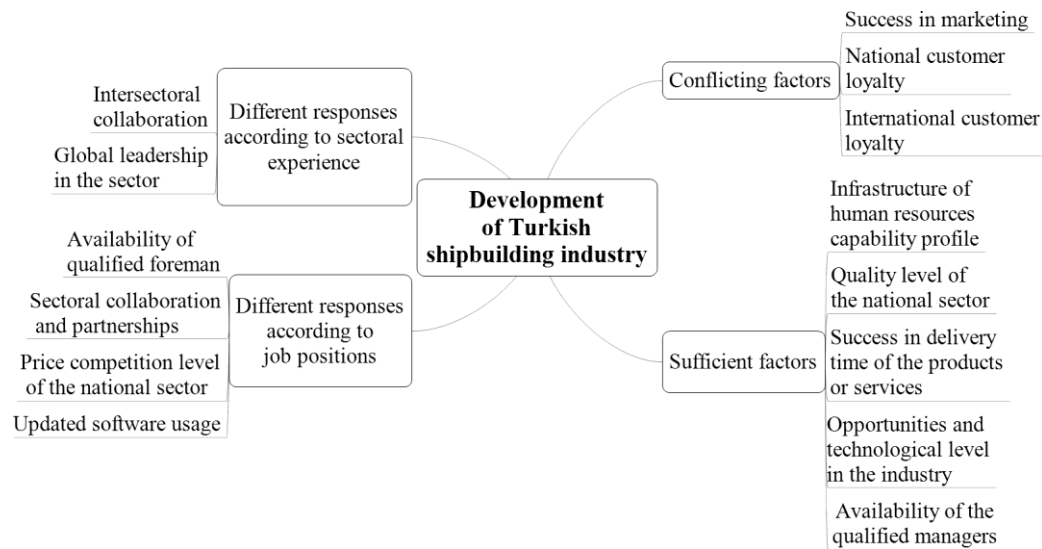
Availability of sectoral strategies and plans	86.0	10.0	100.0	20.0
Price competition level of the national sector	86.0	40.0	100.0	19.0
Availability of financial instruments in the sector	86.0	30.0	100.0	17.0
Level of the research and development activities	85.0	0.0	100.0	22.0
Dynamism of the global market	84.0	10.0	100.0	21.0
Sectoral collaboration and partnerships	82.0	10.0	100.0	22.0
Availability of the qualified foreman	82.0	50.0	100.0	15.0
Guarantee letters	82.0	40.0	100.0	19.0
Effective lobbies for local and international sectoral trade	81.0	20.0	100.0	21.0
International customer loyalty	80.0	5.0	100.0	20.0
Potential of the global competitors	80.0	30.0	100.0	19.0
Collaboration with the universities	80.0	10.0	100.0	21.0
Customer focality	80.0	0.0	100.0	22.0
Loyal customer's purchasing power	80.0	10.0	100.0	20.0
Strength of the global competitors	79.0	0.0	100.0	21.0
Management information systems	79.0	20.0	100.0	20.0
Incentives and legislation	79.0	10.0	100.0	24.0
Global follower in the shipbuilding market	79.0	0.0	100.0	22.0
Updated software usage	78.0	0.0	100.0	21.0
Capacity of the current facilities	77.0	25.0	100.0	21.0
Effective consultancy utilization	77.0	0.0	100.0	21.0
Product/service differentiation	75.0	0.0	100.0	24.0
Global leadership in the sector	72.0	0.0	100.0	26.0
National customer loyalty	70.0	5.0	100.0	23.0
Intersectoral collaboration	70.0	10.0	100.0	22.0

\*The top graded factors for the development of the industry.

A *t*-test was used to compare the difference between answers of the top management and employees. Significant differences were found in four inquiries. The respondents were requested to give points for the factors of “availability of qualified foreman”. Top management gave 87 points in average; qualified employees and consultants gave 78 points in average for this inquiry. ( $\mu_{\text{manager}} = 86.74$ ,  $\mu_{\text{employee}} = 77.92$ ,  $p = 0.038$ ). Top management also gave 76 points in average, qualified employees and consultants gave 89 points in average for the inquiry of “sectoral collaboration and partnerships”. ( $\mu_{\text{manager}} = 75.65$ ,  $\mu_{\text{employee}} = 88.75$ ,  $p = 0.042$ ). Moreover, the top management gave 91 points in average, qualified employees and consultants gave 81 points in average for the inquiry of “price competition level of the national sector”. ( $\mu_{\text{manager}} = 90.65$ ,  $\mu_{\text{employee}} = 80.83$ ,  $p = 0.073$ ). Additionally, top management gave 84 points in average, qualified employees and consultants gave 73 points in average for the inquiry of “updated software usage” (Fig. 4). ( $\mu_{\text{manager}} = 83.70$ ,  $\mu_{\text{employee}} = 73.33$ ,  $p = 0.090$ )

The ANOVA test was used to determine whether there are any significant differences between the means of sectoral experiences of the respondents. According to the sectoral experiences, statistically significant responses are found. Different points were given to the inquiry of “intersectoral collaboration” according to the sectoral experience. The respondents who have  $\leq 5$  years of experience gave 84 points in average, while the respondents who have 16-20 years of experience gave 51 points in average for this inquiry ( $\mu_{\leq 5 \text{ years}} = 84.16$ ,  $\mu_{6-10 \text{ years}} = 71.66$ ,  $\mu_{11-15 \text{ years}} = 68.33$ ,  $\mu_{16-20 \text{ years}} = 51.42$ ,  $\mu_{>20 \text{ years}} = 72.33$ ,  $p = 0.097$ ). On the other hand, the respondents who have  $\leq 5$  years of experience gave 79 points in average for the inquiry of “global leadership in the sector”, while the respondents

who have 16-20 years of experience gave 51 points in average for the same inquiry (Fig. 4). ( $\mu_{\leq 5 \text{ years}} = 79.17$ ,  $\mu_{6-10 \text{ years}} = 76.67$ ,  $\mu_{11-15 \text{ years}} = 78.89$ ,  $\mu_{16-20 \text{ years}} = 47.29$ ,  $\mu_{>20 \text{ years}} = 74.69$ ,  $p = 0.08$ )



**Fig. 4** Main factors for the development of Turkish shipbuilding industry

#### 4.2 Results on the Current State of Shipbuilding Industry

In the second part of the survey, the views of the respondents were asked regarding the current state of the shipbuilding industry. The respondents gave grades with a range from 0 as the lowest point to 100 as the highest point for the 36 inquiries. Table 3 shows descriptive statistics for the data of the factors that were graded between 0 and 100 for their development status in the current state of the industry. Moreover, strongest and weakest factors for Turkish shipbuilding industry have been given in Table 3 and Fig. 5.

**Table 3** Descriptive statistics for the data of the factors that were graded between 0 and 100 for their development status in the current state of the industry.

Factors on Sectoral Development	Mean	Minimum	Maximum	Standard Deviation
*Incentives for global competitors	69.4	0.0	100.0	33.2
*Potential of the global competitors	67.3	0.0	100.0	32.2
*Strength of the global competitors	61.1	0.0	100.0	33.6
*Quality level of the national sector	58.6	20.0	100.0	21.3
*Availability of the qualified foreman	57.9	10.0	100.0	20.2
Infrastructure of human resources capability profile	52.7	5.0	100.0	20.4
Capacity of the current facilities	51.8	5.0	100.0	23.6
Competence of the domestic suppliers	51.0	10.0	100.0	21.4
Effective collaboration with domestic suppliers	51.0	0.0	100.0	25.2
Price competition level of the national sector	49.9	10.0	100.0	22.9
Opportunities and technological level in the industry	49.3	10.0	100.0	22.2
Updated software usage	49.2	0.0	100.0	24.6



Customer focality	46.9	0.0	100.0	24.8
Availability of the qualified managers	45.3	10.0	100.0	20.4
Success in delivery time of the products or services	44.7	0.0	100.0	26.1
Product/service differentiation	44.1	0.0	100.0	26.0
Global sectoral reputation and recognition	43.6	0.0	100.0	21.1
Availability of financial instruments in the sector	42.1	10.0	90.0	20.5
Guarantee letters	41.2	10.0	80.0	19.0
Success in marketing	39.8	0.0	100.0	23.8
Dynamism of the global markets	39.5	0.0	100.0	21.4
Loyal customer's purchasing power	37.9	0.0	100.0	24.2
National customer loyalty	36.4	0.0	90.0	23.7
Management information systems	36.1	0.0	100.0	22.8
Collaboration with the universities	35.6	0.0	75.0	20.1
Global follower in the shipbuilding market	33.5	0.0	100.0	24.7
International customer loyalty	31.3	0.0	75.0	18.3
Intersectoral collaboration	30.6	0.0	100.0	23.4
Incentives and legislation	29.2	0.0	80.0	21.6
Effective lobbies for local and international sectoral trade	27.8	0.0	75.0	18.9
**Global leadership in the sector	27.6	0.0	80.0	21.1
**Sectoral collaboration and partnerships	26.8	0.0	75.0	22.1
**Effective consultancy utilization	25.5	0.0	60.0	17.0
**Availability of sectoral strategies and plans	25.4	0.0	100.0	24.4
**The level of the research and development activities	22.2	0.0	50.0	17.5

\* High-scored factors which represent strong and weak points in the Turkish shipbuilding industry.

\*\*Low-scored factors which represent weak points in the Turkish shipbuilding industry.

A *t*-test was performed to compare the difference between the responses of top management and employees. Significant differences were found in some inquiries and shown in Fig. 5.

According to *t*-test results, top management gave 33 points in average, qualified employees and consultants gave 20 points in average for the inquiry of "availability of sectoral strategies and plans". ( $\mu_{\text{manager}} = 33.41$ ,  $\mu_{\text{employee}} = 18.04$ ,  $p = 0.037$ ). Additionally, top management gave 71 points in average, qualified employees and consultants gave 52 points in average for the inquiry of "strength of global competitors". ( $\mu_{\text{manager}} = 70.91$ ,  $\mu_{\text{employee}} = 52.17$ ,  $p = 0.058$ )

The ANOVA test was used to determine whether there are any significant differences between the means of the sectoral experiences of the respondents. As regards to sectoral experience, statistically significant responses are listed in Table 4 and shown in Fig. 5.

**Table 4** Statistically significant relations between the sectoral experience and factors.

Factors on the Sectoral Development	Mean of the Factors					Significance (p)
	Work Experience (years)					
	≤5	6-10	11-15	16-20	>20	
Intersectoral collaboration	58.3	24.4	22.8	30.6	28.0	0.0
Global leadership in the sector	44.2	25.0	33.9	13.6	25.3	0.1
Price competition level of the national sector	65.0	36.7	59.4	40.3	50.6	0.1

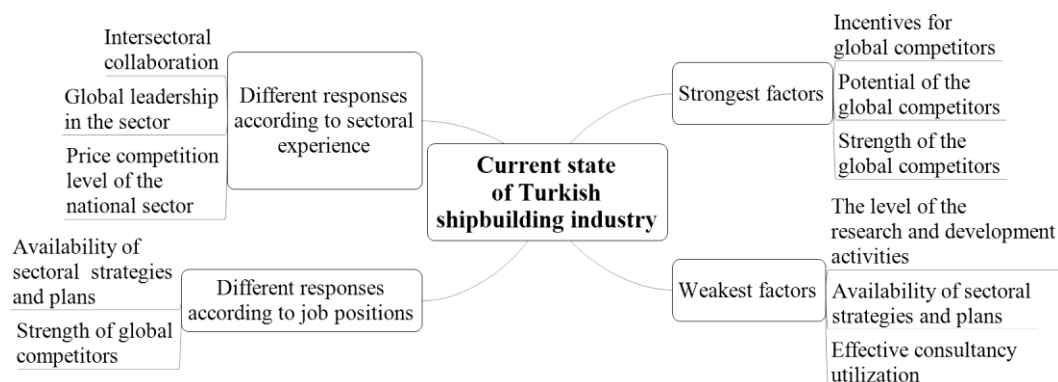


Fig. 5 Main factors for the current state of Turkish shipbuilding industry

The ANOVA test was also conducted to determine whether there are any significant differences in the inquiry of the expectations of “attaining the uptrend period again” with all other inquiries. According to expectations, statistically significant answers are showed Table 5 below.

**Table 5** Statistically significant relations between the expectations and factors.

Factors on Sectoral Development	Expectations of Attaining Uptrend Period						Significance
	Unpredictable	In 0-2 years	In 3-5 years	In 6-10 years	In 11-15 years	Never	
Global leadership in the sector	15.0	10.0	42.1	25.5	28.0	22.4	0.1
Success in delivery time of products or services	39.2	10.0	58.8	30.5	41.0	50.8	0.1
Product/service differentiation	30.0	10.0	58.8	33.2	51.0	46.5	0.1
Potential of global competitors	50.8	10.0	57.9	33.2	69.0	49.6	0.0

### 4.3 Comparison of the Results of the Survey

The evaluation of the current state of the shipbuilding industry concerning the five top graded factors for the development of the industry according to the respondents was indicated with an asterisk in Table 2. The significance of human resources, quality, on-time delivery, technology usage and qualified managers has been highlighted for the development of the Turkish shipbuilding industry. However, these highlighted factors were found to be lower in the current state of the industry. According to the results, the industry should set up

strategic plans for improving the position of the industry as well as for competing with the leading shipbuilder countries.

The high-graded factors that represent the strength and weakest issues of the Turkish shipbuilding industry were indicated with an asterisk in Table 3. According to the results of the survey, the respondents think that international competitors have incentives and opportunities compared to their current state in the industry. Although the quality level of the national sector and foreman is high, the deficiency of incentives related to the shipbuilding industry is seen as a threat for having new projects. The incentives facilitate the global competitors to be more powerful during the tendering stage.

The low-scored factors that represent weakness issues of the Turkish shipbuilding industry were indicated with a double asterisk in Table 3. The answers of the respondents indicate that the level of Turkish shipbuilding industry for global leadership is relatively low. Furthermore, it was inferred from the respondents that the industry does not have strategic plans, future directions, and actions. The industry leaders should attach a particular importance for spectacular success.

#### **4.4 Comments and Opinions of the Respondents for the Development of Turkish Shipbuilding Industry**

In the survey, the respondents were asked to share their opinions and suggestions regarding the development of Turkish shipbuilding industry. General opinions and suggestions were presented below:

- Joint ventures of the shipyards should be encouraged for specialisation and costs should be reduced,
- Value-added vessels should be built and tailor-made production should be adopted,
- The global market should be followed,
- Companies should get into new markets with the adoption of R&D,
- Actual reports should be prepared comprising of capacity, characteristics of the employee, costs and steel processing capacity of the industry, efficient use of available sources,
- Financial instruments should be diversified and access to foreign sources should be improved,
- Government incentives for the shipbuilding industry should be increased,
- Development plans of shipbuilding industry should be prepared,
- Shipbuilding should be adopted as a national policy,
- Local contribution should be increased in the shipbuilding processes,
- Leading countries should be taken as a role model,
- More professional staff should be employed,
- Investments should be made on qualified and experienced employee,
- Technology usage should be increased,
- Marketing activities should be increased,
- Tax reduction should be sustained,
- Strategic alliance of university and industry should be improved,
- Companies should adopt institutionalization,

- Quality should be improved and companies should be customer-focused,
- Flexible production should be established,
- The sub-industry should be strengthened,
- A platform should be formed having representatives from all maritime companies.

## 5. Conclusion

This study addressed the important factors for the development of the Turkish shipbuilding industry and the current state of the industry. Accordingly, the key decision makers were surveyed between 2012 and 2013. The results indicated that human resources capability profile was an advantage for the development of the shipbuilding industry. In contrast, intersectoral collaboration was a weakness for the sectoral development. The top management and qualified employees and consultants gave statistically significant answers to the inquiry of availability of qualified foreman, sectoral collaboration and partnerships, price competition level of the domestic sector and updated software usage. Besides, the sectoral experience was found statistically significant for the inquiry of intersectoral collaboration and global leadership in the shipbuilding market.

The respondents expressed their opinion that incentives for the global competitors were higher than their current state, and this situation was a risk factor for new business contracts. On the other hand, the level of research and development activities was specified as a weakness for the current state of the industry. The responses of top management, and consultants and qualified employee were statistically significant for the inquiry of sectoral strategic plans and power of global competitors. Moreover, the sectoral experiences of the respondents were statistically significant for the inquiry of intersectoral collaboration, global leadership in the shipbuilding market and, price competition level of the domestic sector.

This study showed that the majority of the respondents do not believe the sector will attain uptrend period in a short-term time period. The respondents think that the level of the Turkish shipbuilding industry for global leadership is quite low, and the industry does not have strategic plans for the future. Therefore, this issue should be considered for the future development of industry, and shipbuilding companies need to take precautions to achieve success.

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## Appendix A. A Survey to Development of Turkish Shipbuilding Industry

1. What is your position in the company?

- Manager
- Employee

2. How long have you been working in the shipbuilding industry?

- ≤5 years
- 6-10 years
- 11-15 years
- 16-20 years
- >20 years

3. Please grade the importance of the development and current success of shipbuilding industry between 0 and 100 where 0 is the minimum point, and 100 is the maximum point.

Factors on the Sectoral Development	Importance of the Development of Shipbuilding Industry	Current Success of Shipbuilding Industry
Infrastructure of human resources		
Availability of qualified managers		
Availability of qualified foreman		
Dynamism of the global market		
Availability of financial instruments in the sector		
Guarantee letters		
Incentives and legislation		
Sectoral collaboration and partnerships		
Effective lobbies for local and international sectoral trade		
Global sectoral reputation and recognition		
Availability of sectoral strategies and plans		
Intersectoral collaboration		
Capacity of the current facilities		
Success in marketing		
National customer loyalty		
International customer loyalty		
Loyal customer's purchasing power		
Customer focality		

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Global leadership in the sector

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Global follower in the shipbuilding market

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Strength of global competitors

---

Potential of the global competitors

---

Incentives for global competitors

---

Quality level of the national sector

---

Price competition level of the national sector

---

Success in delivery time of products or services

---

Product/service differentiation

---

Opportunities and technological level in the industry

---

Management information systems

---

Updated software usage

---

Competence of domestic suppliers

---

Effective collaboration with domestic suppliers

---

Collaboration with the universities

---

The level of research and development activities

---

Effective consultancy utilization

---

4. When do you think the industry will attain the uptrend period again?

- Unpredictable
- In 0-2 years
- In 3-5 years
- In 6-10 years
- In 11-15 years
- Never

5. What is your opinion about the development of Turkish shipbuilding industry?

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