

## Industry 4.0 Awareness In Furniture Enterprises: Case Study Of Ordu And Giresun<sup>[\*]</sup>

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**Abstract:** Industry 4.0 forces enterprises to set up new teams in which know the software systems well, catch up with the new technologies, plan and program them, open for change and development. The Turkish furniture industry, having a suitable structure for development, may become an important sector where digital technologies stand out in the near future. Nevertheless, the structural and economic problems caused by the fact that the sector is composed of small and micro-sized enterprises, are emerging as a huge impediment in the use of digital technologies. This study aims the awareness of the furniture industry about the Industry 4.0 approach, the present possibilities, plans, and where they see themselves in terms of these developments. As a target group of the study, furniture enterprises of Ordu and Giresun selected. Data were collected through questionnaires from the 45 enterprises in these provinces and analyzed in a computer environment. The possible effects of Industry 4.0 on the furniture industry highlighted. What should be done in this transition process was emphasized. Suggestions developed and discussed.

**Keywords:** Furniture industry, industry 4.0, industry 4.0 awareness, SMEs.

## Mobilya İşletmelerinde Endüstri 4.0 Farkındalığı: Ordu ve Giresun Örneği

**Öz:** Endüstri 4.0, işletmeleri, yazılımı iyi tanıyan, yeni teknolojileri takip eden, planlayan ve programlayan, değişime ve gelişime açık yeni ekipler kurmaya zorlamaktadır. Mobilya endüstrisi yapısı gereği gelişmeye açık olması dolayısıyla, yakın gelecekte dijital teknolojilerin ön plana çıktığı bir sektör haline gelebilir. Bununla birlikte, sektörün küçük ve mikro ölçekli işletmelerden oluşması ve küçük olmasının neden olduğu yapısal ve ekonomik sorunlar dijital teknolojilerin kullanımında büyük bir engel olarak ortaya çıkmaktadır. Bu çalışma ile mobilya işletmelerinin Endüstri 4.0 yaklaşımına yönelik farkındalıkları, mevcut imkânları, gelecek planları ve kendilerini bu gelişmelerin neresinde gördükleri ortaya konmaya çalışılmıştır. Hedef kitle olarak Ordu ve Giresun illerindeki mobilya işletmeleri seçilmiştir. Bu illerde 45 işletmeye gidilerek anket yardımıyla veriler toplanmış ve bilgisayar ortamında analiz edilmiştir. Sonuç olarak, Endüstri 4.0'ın mobilya endüstrisine olası etkileri, işletmelerin bu geçiş ve dönüşüm sürecinde neler yapması gerektiği vurgulanmış ve öneriler geliştirilerek konu tartışmaya açılmıştır.

**Anahtar sözcükler:** Endüstri 4.0, endüstri 4.0 farkındalığı, KOBİ, mobilya endüstrisi.

## INTRODUCTION

With the onset of the industrial age towards the last quarter of the eighteenth century, a great change and development occurred in the industry. These changes and developments defined as industrial revolutions. There are four industrial revolutions to date. The first one took place in the nineteenth century, and in addition to human power in the industry, machinery, water, and steam power also used. After the first quarter of the 1900s, the concept of mass production started to the use of integrated machines together with electricity, and this change called the second industrial revolution. From the third quarter of the twentieth century, electrical and computerized machines started to use in the production line with the appearance of computers. This change also defined as the third revolution in the industry. Since then, countries and societies still have been experiencing the changes brought about by the Third Industrial Revolution. While this change has not been completed, while especially as the SMEs continued to resist this change, the industry has faced a new revolution. Since the middle of the first quarter of the 21st century, powerful sensors, artificial intelligence, learning, communicating, and managing processes, also known as the digital revolution or Industry 4.0, have named The Fourth Industrial Revolution.

Industry 4.0 brings a whole new way of life. It has occurred many technological concepts with this new concept that such as the internet of objects (IoT), the internet of systems, powerful sensors, three-dimensional printers, robotics, intelligent manufacturing systems, large data, cloud computing, artificial intelligence (Dirsehan, 2017). Keeping up with the rapid development of these newly emerging concepts is very important for the countries. Evaluating our country especially in terms of SMEs, it is seen that they are between the 2nd and 3rd Industrial Revolution, and far away from a deal with these new concepts. While machine investments, mass production technologies and production capacities in the 20th century seem to be a competitive advantage for companies, nowadays knowledge is providing a competitive advantage (Dirsehan, 2016).

In one of World Economic Forum reports published in 2015, 21-turning points that will shape our future's digital were mentioned. All of these turning points are expected to take place until 2025. These transformations that will occur in such a short period will significantly affect the competitiveness of our country's industrial sector. These mentioned turning points and expectation percentages are shown in the table below (Schwab, 2017).

It is almost impossible to predict the scope and breadth of this digital revolution, which will cause the economic, social, and cultural change in large dimensions. One of the biggest impacts in all of these areas is the strengthening of the governments, citizens, businesses' employees, shareholders, customers, and superpower relationships in smaller countries. Due to the disruptive

impact of Industry 4.0 on the existing political, economic, and social models, these actors need to be aware that they have become part of a dispersed power system that demands more collaborative forms of interaction for them to succeed (Schwab, 2017).

**Table 1.** Turning points expected to occur by 2025.

Turning Points	Expected (%)
10% of people wearing clothes connected to the internet	91.2
90% of people having unlimited and free (advertising-supported) storage	91.0
1 trillion sensors connected to the internet	89.2
The first robotic pharmacist in the US	86.5
10% of reading glasses connected to the internet	85.5
80% of people with a digital presence on the internet	84.4
The first 3D-printed car in production	84.1
The first government to replace its census with big-data sources	82.9
The first implantable mobile phone available commercially	81.7
5% of consumer products printed in 3D	81.1
90% of the population using smartphones	80.7
90% of the population with regular access to the internet	78.8
Driverless cars equalling 10% of all cars on US roads	78.2
The first transplant of a 3D-printed liver	76.4
30% of corporate audits performed by AI	75.4
The tax collected for the first time by a government via a blockchain	73.1
Over 50% of internet traffic to homes for appliances and devices	69.9
Globally more trips/journeys via car-sharing than in private cars	67.2
The first city with more than 50,000 people and no traffic lights	63.7
10% of global gross domestic product stored on blockchain technology	57.9
The first AI machine on a corporate board of directors	45.2

*Source: Deep Shift - Technology Tipping Points and Societal Impact, Global Agenda Council on the Future of Software & Society, World Economic Forum, Survey Report, September 2015, pp. 7."*

It is almost impossible to predict the scope and breadth of this digital revolution, which will cause the economic, social, and cultural change in large dimensions. One of the biggest impacts in all of these areas is the strengthening of the governments, citizens, businesses' employees, shareholders, customers, and superpower relationships in smaller countries. Due to the disruptive impact of Industry 4.0 on the existing political, economic, and social models, these actors need to be aware that they have become part of a dispersed power system that demands more collaborative forms of interaction for them to succeed (Schwab, 2017).

It is not enough for enterprises to make only the production lines and technology compatible with the transition to Industry 4.0. Complete planning of production, marketing, delivery, after-sales services, customer relations, and feedback processes are required for a complete transition and success. Industry 4.0, which stands before us as a complex structure, is a long process starting from the ordering stage of the product, from designing, developing, and manufacturing to delivery to the end-user and feedback. This means that businesses need to completely renew themselves and integrate all systems. The positive effects of this revolution, which integrates people, objects and systems into one another and transform the world into a great information system in this process, can be summarized as follows (Kılıç, 2016):

- More automation in manufacturing with industry 4.0, mass production more connected to customer preferences, maximum manufacturing quality, localized

manufacturing processes, rapid innovation process, and less resource use,

- Identification of the possibilities of production processes more flexible and free of system and applications,
- The minimum cost of producing highly personalized products for customers,
- Increase in data transmission speed and simplification of logistics operations by enabling products to be produced at closer centers utilizing 3D printers,
- The efficient use of energy resources.

A qualified workforce is one of the essential elements of Industry 4.0. Most of today's professions will disappear soon, and some will change. Surviving ability of today's operating systems, and aligning with Industry 4.0 depend on the ability to innovate from scratch, to perform digital transformations, and to become a new player on the market. To comply with Industry 4.0, changes in the qualifications of existing employees, work patterns, and job descriptions need to redefine. Soon, employees will be asked to have higher qualifications than today's employees. For these high qualities required, it will be necessary to restructure the education system and introduce radical change and transformation from beginning to end (Öztürk & Koç, 2017).

Industry 4.0 has entered into business life in the industry as internet technologies started to offer business solutions in production. "In this way, digitization and mutual relations have increased in business models. Companies in the manufacturing and engineering, automotive, process industries, electronics, information, and communication industries believe that digitalization will lead to transformation. This digitalization requires an investment of 40 Billion Euros in Germany and 140 Billion Euros in the EU each year until 2020." (Koch et al., 2015; cited by Şenkayas et al., 2016). The biggest problem at this point is that there are ambiguities in the way that countries cannot afford these huge investments, how soon SMEs can benefit from this system, and the industrial internet can be fully understood. Particularly SMEs need to establish partnerships with technology and infrastructure companies, even with their competitors, to carry on their vital activities. In this context, the EU plans to support SMEs for high value-added and technologically advanced manufacturing (Davies, 2015; cited by Şenkayas et al., 2016).

When Turkey evaluates in terms of Industry 4.0, it seems to be quite far away from the desired point in this subject. Looking at the technological infrastructures of the enterprises in our country, we see that they could not complete the Industry 3.0 revolution yet, and they are in a position between Industry 2.0 and Industry 3.0. When TSI 2016 statistics examine, it seems that the total number of enterprises is 2.689.910, and the number of SMEs is 2.684.838. Proportionately, 99.81% of the total number of enterprises is SME. It is known that large-scale enterprises do not have difficulty in the transition to Industry 4.0 and are

already beginning to implement the transformations. However, the fact that the enterprise structure is SME-dominated, and especially the majority of SMEs is also micro-scale, it is a sign that we are quite far from the reality of Industry 4.0. As a country, we are still discussing the issue conceptually.

According to TSI 2016 data, when we look at the operating structure of the furniture sector, it is seen that the total number of enterprises is 34.477, and the number of SMEs is 34.417. When the enterprise numbers in the sector are evaluated proportionally, it is determined that 99.83% of the total number of enterprises is SME. The sector stands as a sector with producing in 61 provinces at the country scale, interacting with 19 different sectors, receiving input or giving input, having a high sector connection, and having a market share of 10 billion dollars (Öztürk & Koç, 2017).

"One of the factors that the furniture industry should consider in its forward-looking strategies is the growth of digital consumer mass. The result of the study is shown that 65% of consumers in Turkey are digitalized and digital consumers use every channel. It has been determined that digital consumers prefer products and services that make life easier for them, with competitive pricing and campaigns as a priority, and it has been determined that 60% use of them both digital and traditional channels." (Dumansızoğlu, 2017).

"Today's furniture is now seen as a high-tech design object. Large-scale enterprises in the sector know the concept of "Smart Factory" and Industry 4.0. They have started production processes with a new generation of project-based lines consisting of full automation and robotic processing. Branded furniture companies representing 75% of the sector are turning their production facilities to the AR-GE base. The use of full-automatic production lines with CNC-controlled and ERP systems has become a necessity, not the luxury, for brands anymore." (Anonymous, 2017). On the contrary, It is a question mark that whether SMEs understand this new concept or not, and do they know what is waiting for them in the future or not. "It is stated that in the first 6 months of 2018, the economic situation in the country, and the increase in the prices of raw materials are not reflected in the final product sales prices. It seems that enterprises are trying to reduce the number of workers to resist for surviving the adverse effects of this downsizing" (Anonymous, 2018).

This study aims that while putting great digital changes in the world until the year 2025, to look at the current situation of our country -especially in terms of SMEs. While the changes and transformations started at Industry 4.0 in terms of large-scale enterprises, it is aimed to create a conceptual, business-based, and country-based awareness for SMEs, especially small-scale enterprises. At this point, the furniture sector, which we consider to be one of the locomotive sectors of our country's economy, has been chosen as the subject of the study.

## MATERIAL and METHODS

The main aim of the study is to measure awareness and to compose awareness about Industry 4.0 in SME furniture enterprises. The universe of the study limits to Ordu and Giresun located in the Black Sea Region. The absence of large and medium-sized furniture enterprises in these provinces is an important influence in the election. Social Security Institution (SSI), Turkey Employment Agency (TEA), and Small and Medium Enterprises Development Organization's (SMEDO) records have been taken into consideration in determining business numbers. It determines that there are 43 enterprises in Ordu and 22 enterprises in Giresun. It was tried to reach all the furniture enterprises actively operating and producing in Ordu and Giresun.

The survey method was selected to collect data in the study. Firstly literature survey about awareness concepts, awareness scales and Industry 4.0 were done. As a result of the literature search, a previously prepared scale related to the topic didn't find. For this reason, a form with 80 questions organized with the help of the information obtained from a literature review. This form consists of four parts: demographic information, conceptual awareness, business-based awareness, and country-based awareness. The prepared questionnaire applied to a sample enterprise, and the clarity of the questions on the questionnaire was tested. Factor analysis conducted to measure the consistency of these four sections on the questionnaire. With the information gathered, necessary regulations made in the questionnaire form and were put into practice. This prepared form was sent to the chosen enterprises via the internet environment. 45 enterprises responded to the questionnaire forms. 30 of these enterprises located in Ordu and 15 of them located in Giresun.

The survey was implemented in June-August 2018. 5 Likert Scale (Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree) were used to evaluate the awareness of the businesses.

## FINDINGS

**Demographic Information:** A total of 45 enterprises responded to the survey. 66.7% of these enterprises are in Ordu (30 enterprises), and 33.3% are in Giresun (15 enterprises). 62.2% of the enterprises are named as Private Company, 33.3% as Limited Company, and 4.4% as Joint Stock Company. 48.9% of the enterprises were established after 2000.

55.6% of the respondents are business owners, 22.2% are professional managers, 11.1% are engineers/architects/technicians, and 11.1% are the employee. When the respondents' gender distribution is examined, it is seen that 84.4% is male and 15.6% is female. When we look at age distribution, approximately 80% of respondents are 33 years of age or older. 45% of the

respondents are university graduates, and 42% are vocational or high school graduates. Only 13% are primary and secondary schools graduated.

31.1% of the enterprises are in the organized industrial zone, 31.1% are in the urban neighbourhood, and 37.8% are in the small industrial zone. 64.4% of enterprises responding to the survey are micro-scale enterprises, and 33.3% are small-scale enterprises. Only 1 of the enterprises is medium-sized enterprises. Engineers at 9 enterprises, architects at 12 enterprises, technicians at 28 enterprises, and industrial designers at 11 enterprises are employed. It states that 77.8% of the enterprises have a medium level technology, 20% have a high-level technology, and 2.2% have the low-level technology. Approximately 75% of the participating enterprises say that they do not use CNC or NC looms in production. Up to now, 65% of the enterprises have not benefited from any support such as incentive, credit or KOSGEB support.

### Industry 4.0 Awareness in Furniture Enterprises

**Conceptual Awareness:** The ratios of "strongly agree" and "agree" responses among the 20 questions prepared at 5 points Likert scale (Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree) are as follows.

The average of the responses to the questions was calculated as 3.436, standard deviation score of 0.985, and standard error score of 0.033.

**Table 2.** Conceptual Awareness in enterprises.

Questions	Percentage (%)
I know the 1st Industrial Revolution.	44
I know the 2nd Industrial Revolution.	44
I know the 3rd Industrial Revolution.	53
I know the 4th Industrial Revolution.	58
I know mechanization in production.	78
I know what serial production is.	87
I know about electrically and computerization in production.	80
I know the concept of the internet of objects.	47
I know intelligent production technologies.	64
I know 3D printers.	78
I know smart factories.	80
I know artificial intelligence.	71
I know the concept of wearable internet.	31
I know the concept of Industry 4.0.	36
When production is mentioned, the mind first comes to work with factories and physical power.	73
I understand the production of information from the concept of production and the work done with brainpower.	51
When I say Industry 4.0, I understand that machine power manages the production processes instead of human power.	38
3D printers are used only for 3-D books and similar prints.	33
Machines can connect and communicate with each other in the virtual environment and manage the process.	60
Industry 4.0 is a process that creates intelligent factories that can be developed and transformed by production technology, cyber-physical systems, Internet of objects and cloud computing.	36

A significant difference between the distribution of the respondents' enterprises and the level of awareness was not determined. It has found that the awareness levels of the enterprises are around 50%. A significant relationship found between the production sites and awareness levels of the enterprises. It is determined that as the technical infrastructure of the production sites improves, there is an increase in awareness level. While the awareness level of the enterprises in which producing between neighborhoods in the

inner-city is around 38%, the awareness of those produced in the organized industrial zones is 74%.

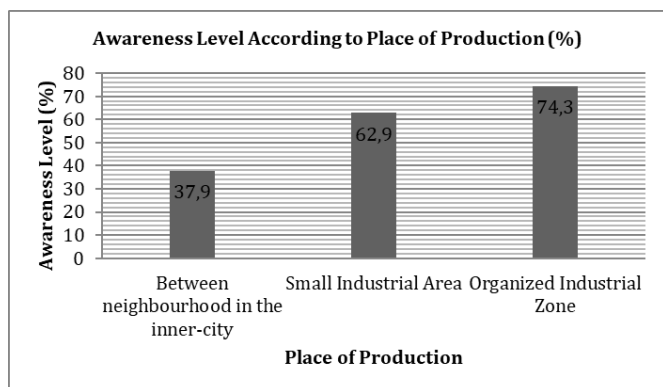


Figure 1. Awareness levels according to the place of production.

A meaningful relationship found between the title of the respondents and awareness levels. It determines that the level of awareness of employer or employee is well below the level of awareness of professional managers or engineers/architects/technicians in the enterprises. The employees' awareness level is 37%, that of employers is 49%, that of engineers/architects/technicians is 72%, and also that of professional managers is 80%.

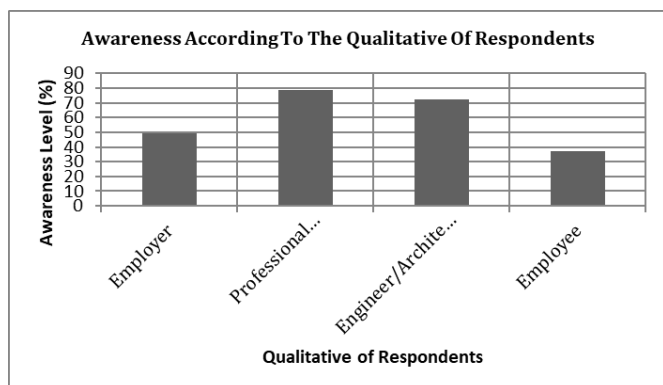


Figure 2. Awareness levels according to the qualitative of respondents.

When the respondents' awareness level to the questionnaire examined according to the age criterion, it seemed that there was a significant difference between the age group of 19-25 and the other age groups. As a person's age grows older, the awareness level has been reduced. Awareness levels of people aged between 19 and 25 determined as 78%.

There is also a significant relationship between the levels of education and awareness of respondents in the enterprises. As education levels of respondents increased, awareness levels increased too. It seems that the awareness level of primary graduates is 35%, that of secondary graduates is 27.5%, that of high school graduates is 37%, that of vocational high school graduates is 45%, that of bachelor's degree is 77.6%, and that of the master's or doctoral graduates is 95%.

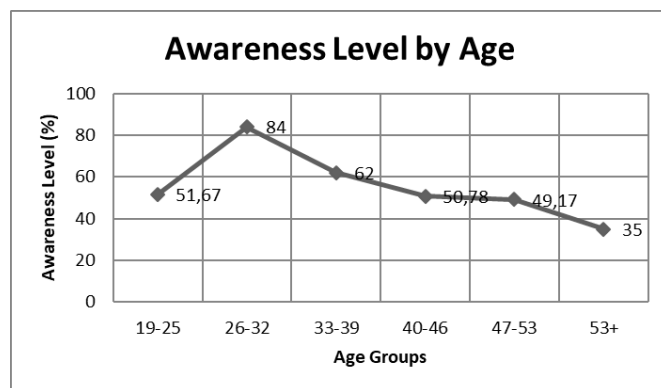


Figure 3. Survey respondents' awareness levels by age.

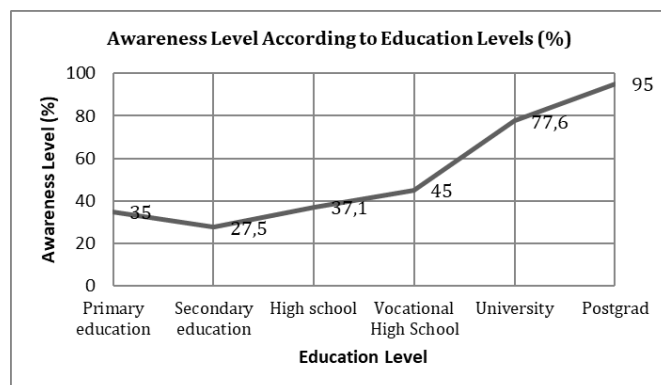


Figure 4. Awareness levels of survey respondents according to their education level.

**Awareness Based on Enterprise:** The answers given in 20 questions, which prepared for awareness based on enterprise, are shown in the table below. It has been calculated that the mean score of the responses to the questions is 3.11, the standard deviation is 1.086, and the standard error is 0.036.

Table 3. Awareness based on enterprise.

Questions	Percentage (%)
I use a computer effectively in my enterprise.	49
I make use of the internet in production.	60
I follow technological developments closely.	78
I use computerized tools and machines in production.	40
I use CNC machines effectively on my production line.	31
Workers in the production line usually work using physical force.	80
The effective use of computers and the internet in my enterprise provides me with administrative convenience.	47
The usage of computerized tools and machines in production reduces the effectiveness of my employees.	18
Usage of many computers or more internet leads to security weaknesses in my enterprise.	18
It is unnecessary to use a 3D printer in my enterprise.	11
As the number of computerized tools and machines in production increases, the need for employees decreases.	42
Technological developments make it difficult to train and find qualified workers.	58
Industry 4.0 is a threat to the future of my enterprise.	13
It is not affected by my enterprise that big enterprises have adopted Industry 4.0.	16
I have to combine and grow with my opponents for Industry 4.0.	13
Smartphone usage at my enterprise is sufficient for the transition to Industry 4.0.	13
Industry 4.0 is a great advantage for the growth of my enterprise and competition with my opponents.	36
The roadmaps that governments will set for Industry 4.0 do not adversely affect my enterprise.	31
The transition to Industry 4.0 will increase production capacity in my enterprise.	44
I do not have any difficulty in finding a qualified employee to work in my enterprise.	22

There was no relationship between the distribution according to provinces of enterprises responding to the survey and awareness level. Although awareness levels of enterprises in Ordu are higher than enterprises in Giresun, the awareness level of the enterprises is very low. The level of

awareness of enterprises in Ordu was 40% while the level of awareness of enterprises in Giresun was 25%.

There was also no significant relationship between the foundation year of the enterprises and awareness levels. However, it has seen that the enterprises established between 1991 and 2000 have a higher awareness than the enterprises established in the other years.

It is founded that there was a meaningful relationship between respondents and awareness levels in the enterprises. It has been determined that awareness levels of the enterprises' employers or employees are lower than awareness levels of professional managers or engineers/architects/technicians in the enterprises. The level of awareness is 18% in employees, 28% in employers, 55% in professional managers, 58% in engineering/architect/technicians.

When the level of awareness of respondents to the questionnaire was examined according to the age criterion, it was seen that there was a significant difference between the age group of 19-25 and the other age groups. As a person's age grows older, the awareness level has been reduced. Awareness levels of people aged between 19 and 25 were determined as 78%.

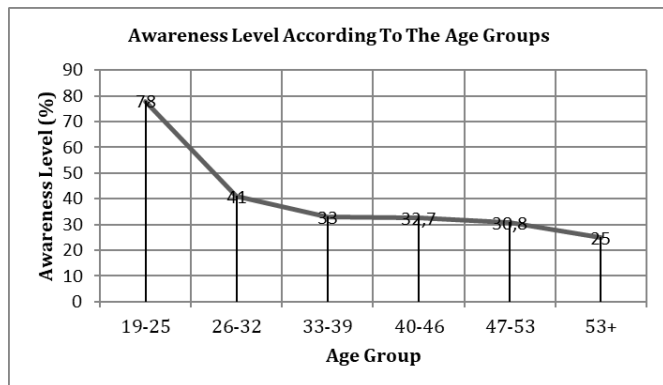


Figure 5. Survey respondents' awareness levels by age.

Table 4. Awareness on the basis of country in the enterprises.

Questions	Percentage (%)
With the 1st Industrial Revolution, people working in agricultural areas have been fronted to the factories.	44
With the 4th Industrial Revolution, there will be lived comeback from agricultural areas to factories.	40
With Industry 4.0, there will be entrepreneurship in the country and sectoral growth in SMEs.	40
Integrating new systems with Industry 4.0 increases data security issues.	18
Industry 4.0 is reduced human efficiency in protecting the integrity of the production process.	16
The inclusion of robots and robotic systems in the production process will lead to the mobility of the workforce.	42
Due to technical problems that may be experienced in new technological systems, there may be big losses.	29
For Industry 4.0, our country has sufficient R&D infrastructure and an accumulation of knowledge.	22
For Industry 4.0, the qualification of the University and Public Research Institute are insufficient.	16
Current legislation is appropriate and sufficient for the transition to Industry 4.0.	24
The R&D experience and infrastructure of the enterprises across the country are sufficient.	24
It is sufficient for enterprises across the country to integrate Intelligent Automation Systems and related technologies into production lines.	33
The digital maturity level in our country's industry is between Industry 2.0 and Industry 3.0.	38
The transition to Industry 4.0 leads to an increase in unemployment across the country.	20
In our country, new work fields have been developed for the manpower that will be made redundant with Industry 4.0.	11
Information and communication technologies are used intensively in our country to reduce production costs.	33
Our country is prepared for the cyber-security problems that may arise after the Industrial 4.0 transformation.	11
Public financing resources and incentives directed at SMEs for Industry 4.0 technology investments are adequate.	9
There are training and qualification programs in schools and universities in our country to educate people with sufficient qualifications for Industry 4.0.	22
SMEs should be supported separately as they can deal with financial, technological and personnel problems less than large enterprises.	71

There is no significant relationship between the respondents' levels of education in enterprises and awareness levels. As the education levels of people increase, the awareness level increases. But this increase remains at a pretty low level. Even the people having a postgraduate degree's whose conceptual awareness level about Industry 4.0 is 95%, their enterprise-based awareness level remained at about 45%.

It seemed that there was no significant relationship between awareness levels and production sites when enterprises analyzed according to their production places. As the technical infrastructure of the production sites improves, awareness levels increase slightly. While enterprises in organized industrial zones' awareness are 55%, the awareness of those in small industrial sites is around 30%.

**Awareness Based on Country:** The answers given for 20 questions, which prepared for country-based awareness, are shown in the table below. It has been calculated that the mean score of the responses to the questions is 3.17, the standard deviation is 0.76, and the standard error is 0.025.

It is determined that there is no relationship between the location of enterprises responding to the survey and the awareness level. The awareness level of the enterprises in Giresun is ultra-low. While awareness level in Ordu is 33%, the awareness level of enterprises in Giresun determined as 19%.

There aren't any links between the establishment date of the enterprises and the awareness level. The awareness level of enterprises established between 1991 and 2000 is higher than that of other enterprises. Still, this level is around 38%. It has found that as well as there is no significant relationship between the type of enterprises and awareness levels and that the employers' awareness is an ultra-low level. This level is approximately 18%.

In enterprises, there is a relationship between the respondents' qualifications and the awareness level. If the respondents are employers or employees, the level of awareness is low, whereas if they are professional managers or engineers/architects/technicians, awareness levels are relatively higher. Even so, awareness levels are ultra-low. While the awareness of employers is 20%, the awareness level of engineers/architects/technicians is 48%.

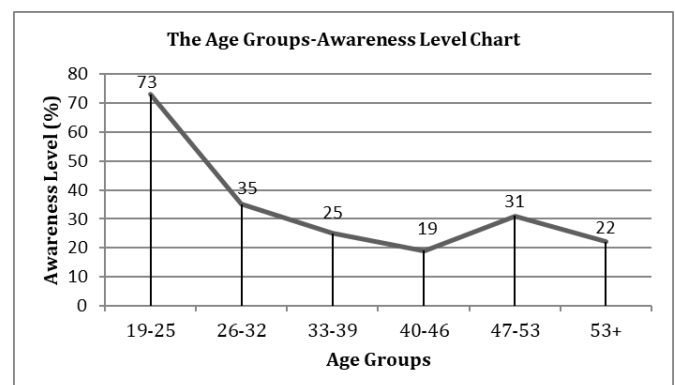
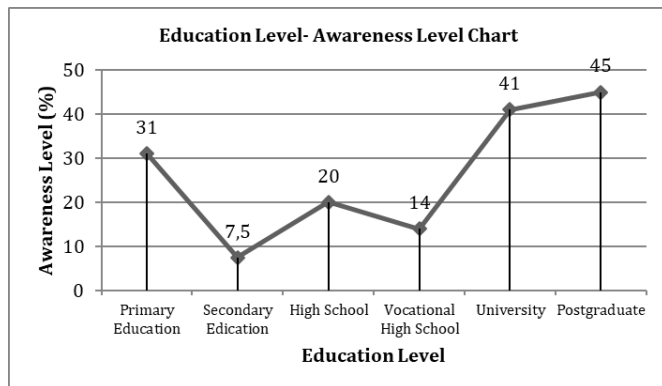


Figure 6. Awareness levels of respondents in the survey by age.

There is an inverse relationship between the age of the respondents and their level of awareness. Awareness levels decrease as people age. For example, those aged between 19 and 25 have a level of awareness of 73%, while those aged between 40 and 46 have a level of awareness of 19%. There was no significant relationship between the education level of the respondents and the awareness level. On the other hand, awareness levels decreased as the education levels of the persons decreased. For example, postgraduate alumni awareness is 45%, while the secondary graduates' awareness level is 7.5%.



**Figure 7.** Level of awareness of respondents according to the education level in the enterprises.

## CONCLUSIONS

The questionnaire applied to 45 enterprises in total. 30 of enterprises are in Ordu, and the others are in Giresun. Of the 45 respondents, 25 are employers, 10 are professional managers, 5 are engineers/architects/technicians, and 5 are employees. When the data obtained is analyzed, it seems that the awareness levels increased in the questions concerning the business in the 3 sections of the questionnaire. It also seems that the awareness levels decreased in the questions concerning the concept of Industry 4.0 and the general situation. In the question of the conceptual and general situation, it determined that the respondents generally gave moderate answers as Undecided. It determined that the awareness level of employers or employees who responded to the survey are lower than those of the professional manager or engineer/architect/technician. Also, there is an inverse correlation between the education level and awareness of the persons.

The conclusion of the research shows that the SME-type furniture enterprises heard about the Industry 4.0 concept and the new technological concepts emerging with this concept, but do not know what these concepts mean. Moreover, when the responses to the demographic questions examined, it is seen that the enterprises still use old technologies in production and cannot accomplish technology renewal due to financial insufficiencies. At the same time, it could be said that this situation also reflects our country's realities. It is to say that technological maturity in our country is between Industry 2.0 and Industry 3.0.

## DISCUSSION

In summary, enterprises have adopted the concept of Industry 4.0 depending on the size of the enterprises. Big enterprises have used new technologies in their production lines and have adapted quickly. However, for especially small-scale enterprises, the same mobility is out of the question. It is quite difficult to capture Industry 4.0 for those enterprises that have not even reached the digital maturity.

The SMEs' resistance to the transition to the Industry 4.0 concept is entirely based on financial insufficiencies and unawareness. For this reason, at first, it is necessary to raise awareness for employees, -especially- employers, about the issue. In order to have well-trained employees in terms of Industry 4.0 and related new concepts, at the point of educating qualified people, training and proficiency programs should organize by the Ministry of National Education and by the universities.

New technological investments should be made to increase the technological maturity level in our country; -especially SMEs- should be encouraged with public financial resources. It is necessary to catch up with the great technological transformations expected to take place by 2025 and to seize the opportunities of developing technologies. Therefore, SMEs should support, since it is more difficult for them to cope with economic and technological and personnel qualifications than bigger enterprises. Since SMEs are suppliers of large-scale enterprises, the gap between large enterprises and SMEs should not increase on Industry 4.0 journey.

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