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Technical Assistance for “A Smart Network for Technology Transfer and Commercialisation  
with Funnel Model (SMARTNET)”

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INCEPTION REPORT

ANNEX 6 TRAINING NEEDS ASSESSMENT REPORT

25/07/2022

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## 1. INTRODUCTION

The overall objective of the Technical Assistance For A Smart Network For Technology Transfer And Commercialisation With Funnel Model (SMARTNET) project is to increase qualified intellectual properties (IP), technological products and service capacity, commercialisation and export potential of Turkiye by improving efficiency and cooperation among TTIs.

To reach the above-mentioned objective, the purpose of this contract is to establish effective cooperation between TTIs for development of technology transfer and commercialisation activities through artificial intelligence based smart network and technology acceleration application. An effective entrepreneurial training system to be established by the Project is one of the key pillars of the intervention logic. This training system will contain e-learning, in-class training and mentor supervision/support, and training programs for mentors and entrepreneurs.

In order to design sound training programmes for Yıldız Technical University (YTU), Istanbul Technical University (ITU), Gebze Technical University (GTU), Hasan Kalyoncu University (HKU) and other potential beneficiaries and target groups, an early Training Needs Assessment (TNA) was proposed to be completed during the Inception Period.

The TNA have been conducted by the team composed of 4 experts between July 1-23, 2022. The TNA have been conducted towards 3 of 4 main beneficiaries as YTU, GTU and HKU and also 59 potential companies as beneficiaries and the stakeholders. As the ToR of the Project has a comprehensive training list and the consortium's proposal covers additional training subjects, the TNA's methodology have been based on weighting and prioritizing as well as determining the needs and expectations of the interviewees.

Based on the interviews and questionnaires' analysis and the comments derived form the focus group meeting<sup>1</sup> held on July 19<sup>th</sup>, 2022 at YTU premises, the TNA team's suggestions take place under section 3 of this report.

Necessary to note that, this report is merely a recommendation to draw a portrait of the subjects and training programs.

## 2. METHODOLOGY and TOOLS

The Training Needs Assessment for YTU, GTU and HKU as ERA and partners and for the potential beneficiaries and target groups have been conducted simultaneously. As the Technical Assistance Team has realized the initial meetings with the ERA and the partners and noted the general situation and the expectations, the Training Needs Analysis Team has focused on the analysis of need towards the training headings mentioned in the Terms of Reference of the project and the Technical Assistance Proposal.

The TNA Team has worked between July 1-23, 2022 to conduct the analysis based on the below work flow;

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<sup>1</sup> The participant list of the Focu Group Meeting is provided as Annex 2 to this report.

WP.1.	Preparation Activities	
A.1.1.	Formulation of Online Questionnaire	Online questionnaire will be prepared for defining the quantitative data.
A.1.2.	Formulation of Face2Face Meeting Forms	Interview form will be prepared for defining the qualitative information of participants needs and expectations from training.
A.1.3.	Discussion and Evaluation Meeting with Beneficiary for Questionnaire and Implementation Methodology	An discussion and evaluation meeting held via online meeting platform. Feedbacks and evaluation of beneficiary received.
A.1.4.	Finalization of Surveys	Online questionnaire and face to face interview forms finalized.
WP.2.	Conducting the Interviews and Questionnaire	
A.2.1.	Defining the Participants	Participants defined.
A.2.2.	Sharing the Online Questionnaire	Online questionnaires shared via e-mail and online platform.
A.2.3.	Organizing the Meeting Agenda for face-to-face Interviews	Meeting agenda prepared for face-to-face interviews.
A.2.4.	Face to Face Interviews with Participants	53 face to face interviews conducted physically and via online meeting platform.
WP.3.	Analysing the Meeting Results and Preparing the Training Proposal	
A.3.1.	Formulation of Results	Data collected through online questionnaire and face to face interviews formulated
A.3.2.	Analysing the Results of Questionnaire and Face to Face Meetings	Data and answers from face to face interviews analysed.
A.3.3.	Formulation of Training Proposal	Training proposals will be identified by experts.
W.P.4.	Focus Group Meetings	Focus group meeting organized.

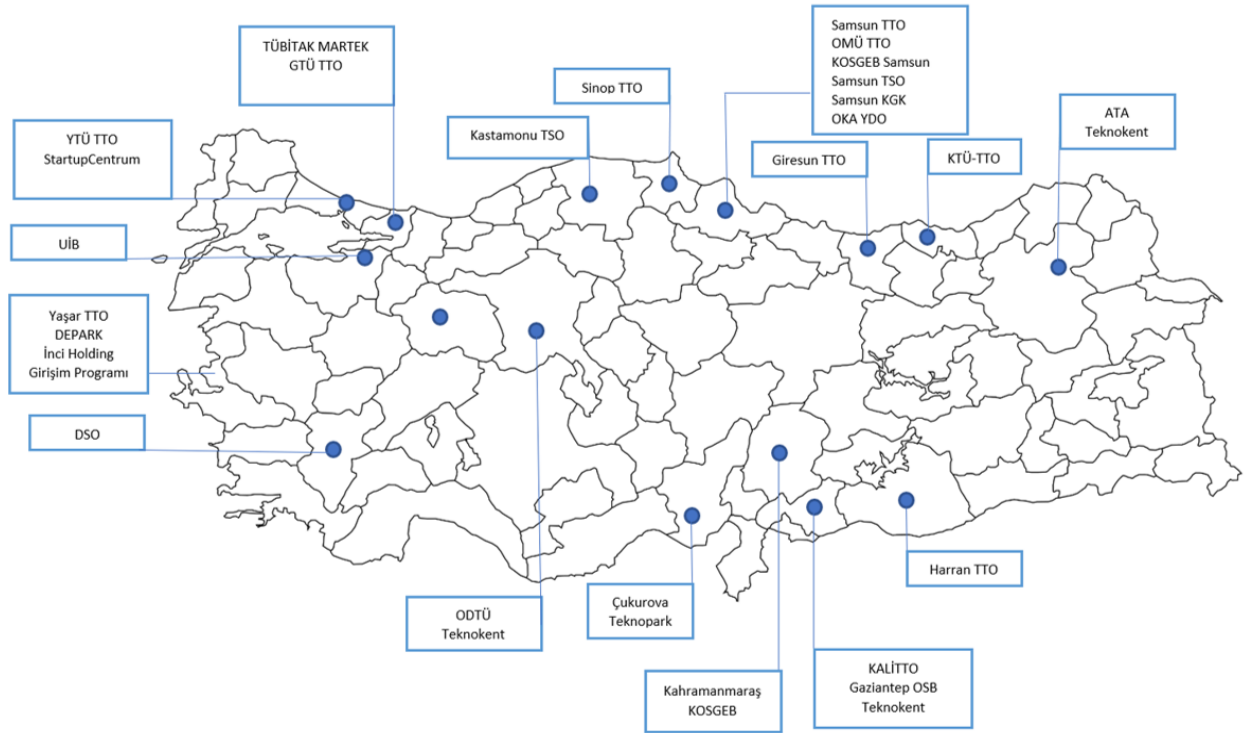
A.4.1.	Realizing the Focus Group Meetings	Focus Group Meeting organized. During the focus group meetings results of online questionnaires, in-depth interviews, proposed training programs presented to the beneficiaries. All feedbacks and evaluation of participants collected.
A.4.3.	Focus Group Meetings Result Report	Focus Group Meetings Result Report prepared.
W.P.5.	Preparation of Training Program	Training programs revised by experts.
A.5.1.	Combining the Feedbacks and Evaluation of Focus Group Meetings	All feedbacks and evaluations of Focus Group Meetings combined.
A:5.2.	Finalizing the Training Programs	Training programs finalized.
A.5.3.	Preparation of the Training Needs Analyses Report	Training Needs Analyses Report finalized and submitted.

The TNA team firstly approached to the target groups as three separate target groups; (1) the ERA and the partners, (2) the institutional ones including the TTIs and the stakeholders and (3) the companies covering entrepreneurs and start-ups.

3 different interview forms and questionnaires have been prepared by the TNA team, discussed and finalized with the TL and then presented to the ERA before conducting. Following the approval of the TL and then the ERA during the meeting on July 4th, 2022;

- The appointments from ERA and the partners have been arranged by the TAT,
- Face to face meetings have been conducted with the YTU and GTU staff, and online face to face meetings have been conducted with the HKU representatives. Apart from ERA and project partners, 17 more TTIs and stakeholder institutions were interviewed.
- Simultaneously, online questionnaires have been disseminated to the entrepreneurs and startups via ERA and partner TTIs, and through e-mail and LinkedIn by the TAT. More than 800 companies resident within the technoparks and incubation were sent e mail. 59 answers were received from the start ups and entrepreneurs.

All ERA and partner university representatives have been met face to face. In total 36 TTI staff has been met and their answers constitute an important part of the analysis in line with the objective and spirit of the project. The online face to face interviews with the related stakeholders composed of TTIs, CCIs, NGOs, KOSGEBs and participants from the entrepreneurship ecosystem from various regions of Turkiye as shown in below map provide us the general needs and expectations of the TTIs, start-ups and entrepreneurs. Their contribution from a wide geographical coverage provided a sound qualitative analysis. On the other hand, the questionnaire answers were analysed quantitatively as presented in Section 3.3.



### 3. TRAINING NEEDS ASSESSMENT

#### 3.1. DESKTOP STUDY

The term technology transfer can be defined as the process of movement of technology from one entity to another (Souder et al. 1990; Ramanathan 1994). The movement may involve physical assets, know-how, and technical knowledge (Bozeman, 2000). Technology transfer in some situations may be confined to relocating and exchanging of personnel (Osman-Gani 1999) or the movement of a specific set of capabilities (Lundquist 2003). Technology transfer has also been used to refer to movements of technology from the laboratory to industry, developed to developing countries, or from one application to another domain (Philips 2002).

To utilize the Technology Transfer the Technology Transfer Interfaces play an important role. They make possible that, commercialization and exportation to global markets of high value-added products and services were generated as a result of R&D and innovation efforts in Türkiye. In Türkiye, these TTIs are mostly structured together with the Technoparks or Technology Development Zones (TDZs). They act very important role in terms of increasing production and revitalizing the manufacturing industry and by this way for increasing the funds allocated to R&D and initiating mechanisms to transfer research outcomes to the industry through starting up new enterprises with the innovation produced by the university. These mechanisms form the Ecosystem of Innovation, Entrepreneurship and Competitiveness.

Mostly acting as an umbrella for these ecosystem actions and programmes, the Technoparks and/or Technology Development Zones had undertaken a mission to take an idea generated by an entrepreneur candidate, follow up and support the R&D process, give preincubation, services, select

the start-up, focusing on the selected start-ups to incubate and give the accelerator services, scale up and finally internationalize and make a competitive enterprise in the global market.

To take a look at the current situation of the Technology Development Zones, according to the 2020 Activity Report of Ministry of Industry and Technology, as of July 2022 the following statistics have been published:

*Table 1: Statistics for Technology Development Zones Statistics (as of July 2022)*

<b># of Active Technology Development Zones</b>	79
<b># of TDZs Under Construction</b>	14
<b># of Companies in TDZs</b>	7944
<b># of Companies in Incubation</b>	1998
<b># of Employed People</b>	81283
<b># of Projects (completed and ongoing)</b>	59163
<b># of Patents Registered</b>	1478

Source: MoIT, 2022.

78 of 79 active TDZs are established within or by the universities. In addition to the Technology Development Zones, in many universities there are Technology Transfer Offices, Accelerators and Incubation Centres with or without TDZs in the universities acting as the Technology Transfer Interfaces.

There are 76 Incubators reside in Turkiye according to the latest update by startups.watch (2021). 36 of them also provides pre-incubation services. Commenting on the geographical coverage of the project 28 of 76 incubators are in İstanbul, 1 in Gaziantep and 2 in Kocaeli covering approximately 40% of the incubators in the country.

The Accelerators and Co-working Spaces also have great important role in terms of matching the start-up to the investors. Prior to 2010, there were only 6 active start-up accelerator programs in Turkiye (The State of Turkish Start up Ecosystem, 2020). By the beginning of 2021, this number had reached 66, a 10-fold increase in 10 years. Among them, 55 is active and serving now.

There is also one international acceleration centre established by Turkish actors in Silicon Valley, USA, not coincidentally the founders are also the ERA and partners of this project. The Starcamp Innovation Centre, founded by KOSGEB fund is a Turkish Star at international arena with 15 companies using virtual office, 10 companies using physical office and 30 companies established in the USA.

The services provided by the TTIs are mostly structured under the following main modules;

- Entrepreneurship & Commercialization
- IPR
- University Industry Cooperation
- Project Development
- Consultancy

The crosscutting service under each module is training and mentor programs.



Many studies discuss that the common obstacle in front of the success of entrepreneurs is lack of education, training or mentoring on related subjects. There are several entrepreneurship training programs provided by public, private and academic institutions. Especially after the development of online training facilities, from Harvard to Oxford, many prestigious institutions provide these trainings. However, the general contents may not fit to all trainees. Then, tailor made, need assessment based and personal trainings and mentoring programs shall be developed. In this respect, this assessment of training needs of local and regional start-ups and entrepreneurs will provide the ERA and project partners to design accurate training programs with best fitting contents.

Below, the qualitative and quantitative analysis take place, after which the TNA teams’ proposed training programs under 38 subjects will be presented as **Annex 1**.

**3.2. QUANTITATIVE ANALYSIS of COMPANY RESPONSES**

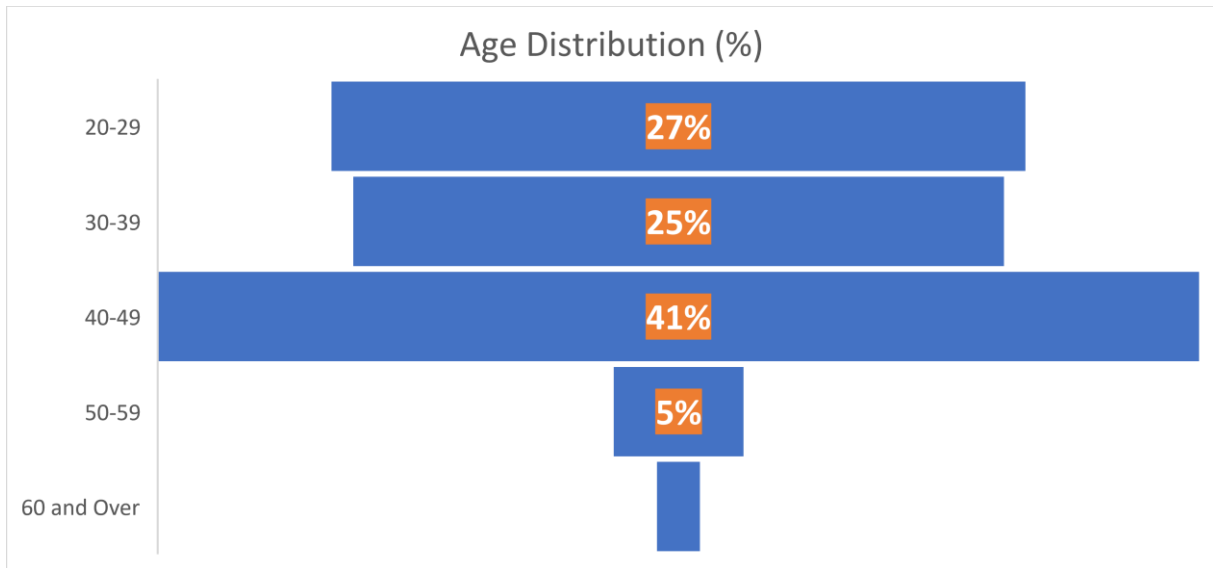
The Training Need Assessment has been conducted utilizing both qualitative and quantitative methodology. To identify the companies’ -covering entrepreneurs and start-ups- training needs, the importance level of the training subjects pre-identified within the ToR of the Project have been measured through a Likert scale which is a rating scale that quantitatively assesses opinions, attitudes, or behaviours.

The questionnaire prepared to measure the importance level of pre-set training subjects and identify their suggestions through open ended questions enable to identify a useful training programme for the entrepreneurs and start-ups to be provided through e-learning and face to face training activities. The questionnaire also includes information about company, the replying representative, and their background of traineeship.

The structure of the questionnaire is as below;

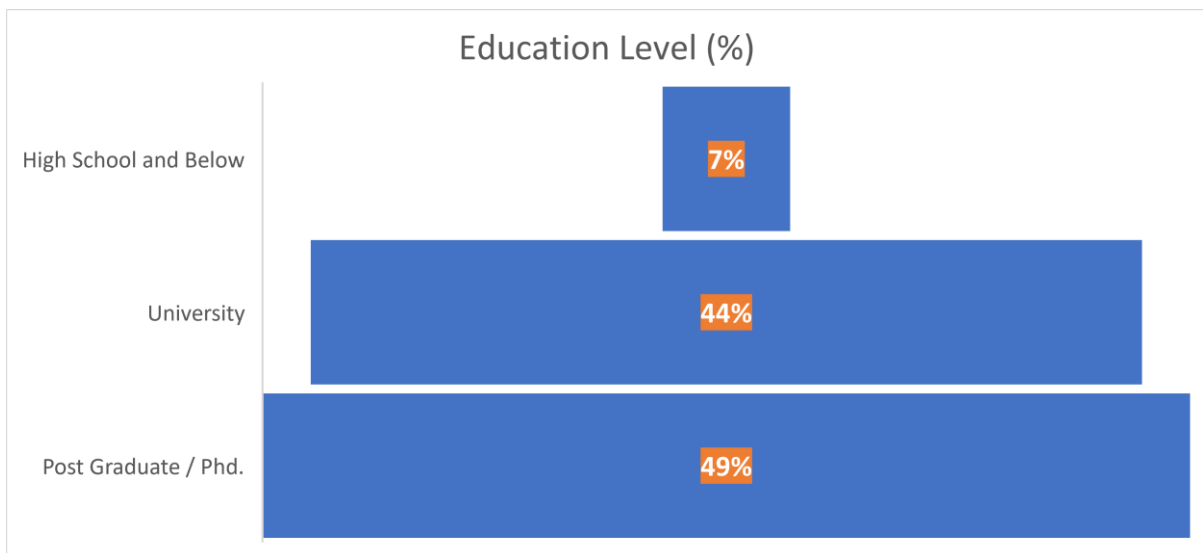
- **Part 1: Personel Information**
  - Education Level
  - Graduated Department
  - Foreign Language Level
  - Position
  - Professional Experiences
- **Part 2: Company Informations**
  - Sector Informations
  - Company Operationg Time
  - Number of Employees
  - Information Sources for Innovation
  - Factors That Prevent Company’s Development
- **Part 3: Training Suggestions**
  - Training Priority Level
- **Part 4: Training Application Details**
  - Training Application Method
  - Training Application Time
  - Training Application Day
  - Training Application Time Frame
- **Part 5: Suggestions and Evaluations**

The data gathered from 59 companies who were conducted the questionnaire are quantitively analysed below;



*Graph 1. :Age Distribution of Questionnaire Responders (%)*

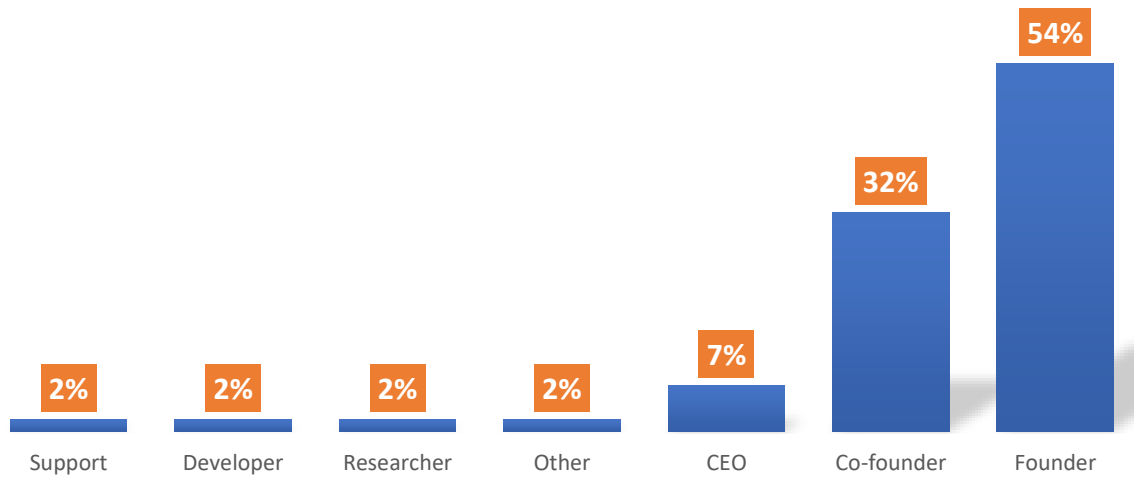
Age is an important criterion to determine the subjects of training and the training delivery methodology. The data gathered through this question gives us an important result that is not surprising. According to the data, while 41% of the company representatives who filled the questionnaire are between the ages of 40-49, 52% are under the age of 40 meaning that our target group is mostly composed of young and dynamic entrepreneurs who are open to learning and seeking to access to the knowledge more dynamically.



*Graph 2. Education Level of Questionnaire Responders*

The representatives of the companies most of them is composed of founders and co-founders (Graph.3) are well educated among which 93% is composed of university graduates and post-graduates (Graph.2).

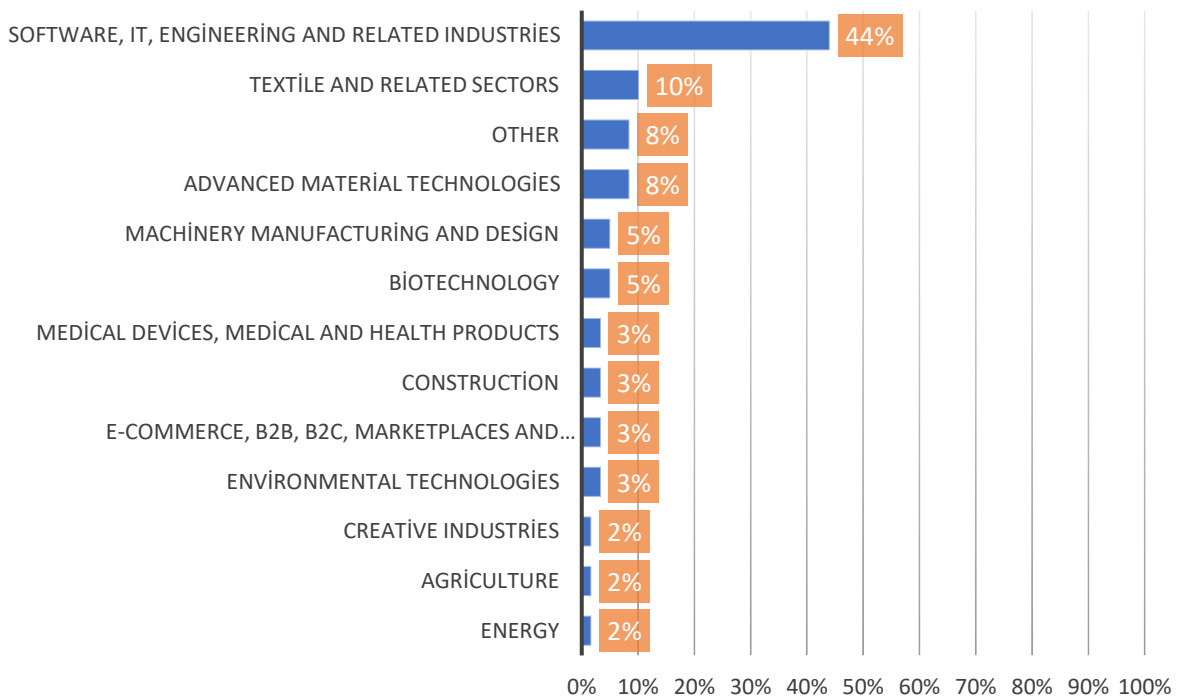
### Position in the Company (%)



Graph 3. The Responders' Position in the Company

In parallel with the general start-up sector distribution in Türkiye and Europe, 44% of the responders were operating in Software, IT, Engineering and Related Industries. Textile and related sectors, advanced material technologies, machinery manufacturing and design and biotechnology are other following mostly represented sectors.

### Sectorial Distribution (%)

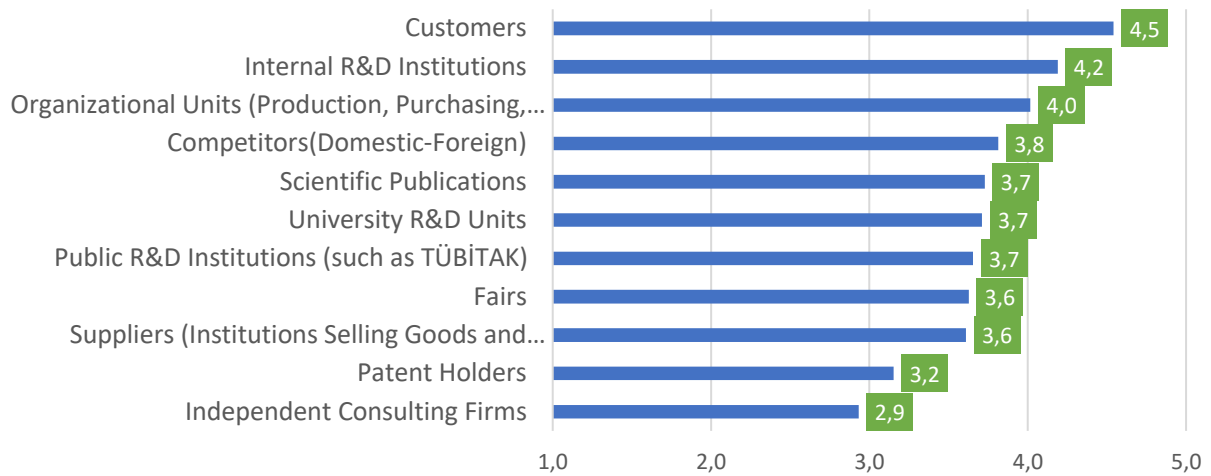


Graph 4. Sectorial Distribution of Companies (%)

To establish the linkage between their innovation activity and their prior information resources for innovation and to set the training's place among them the responders were asked to weight the presented information resources (Graph 5).

## Information Resources for Innovation

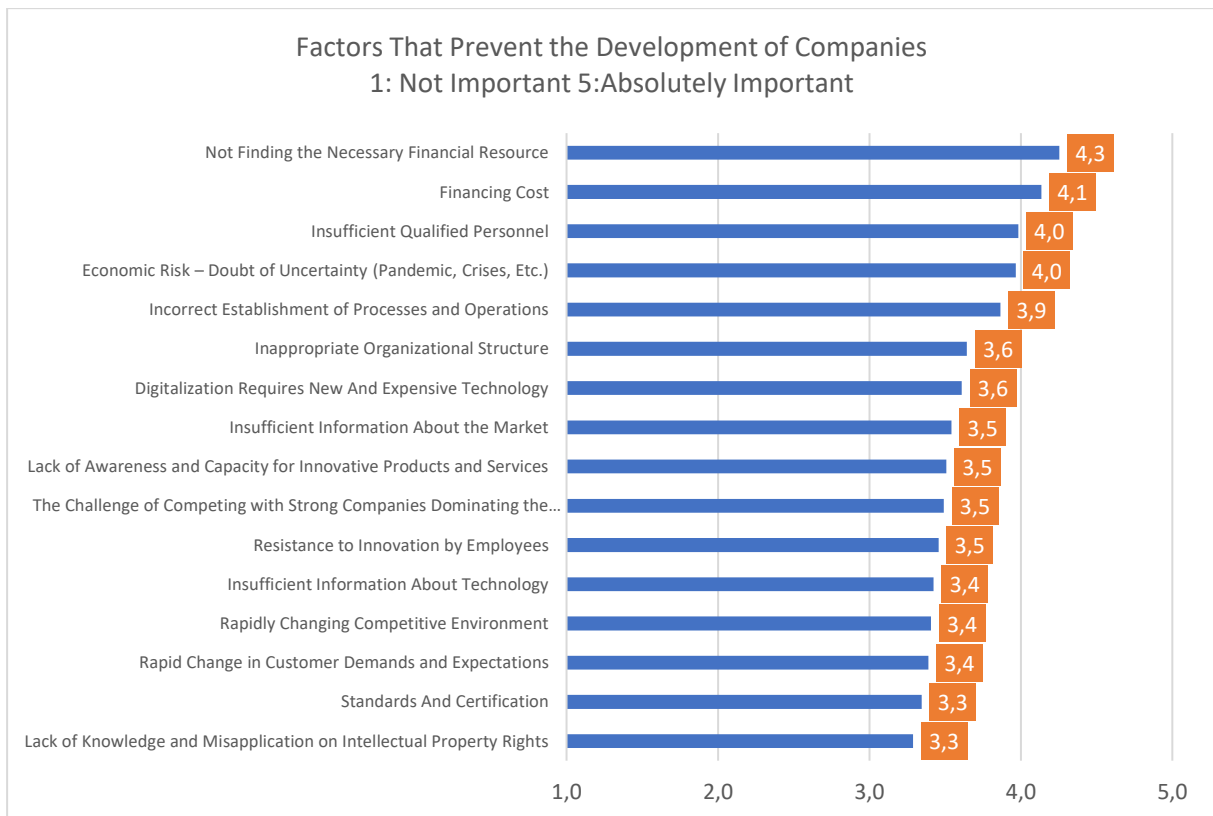
(1: Not Important 5: Absolutely Important)



Graph 5. Information Resources for Innovation

According to the above graphic, the companies mostly learn from their customers, then their internal units and then from the competitors. University R&D units and Public R&D Institutions belong to an average importance. To increase the Universities' role as innovation information providers, the training subjects and methodology may focus on the target groups' innovation activities' features.

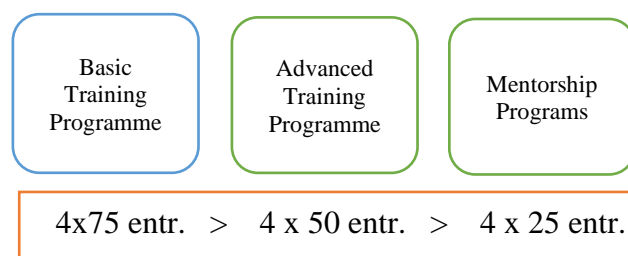
When it is asked to the companies about the factors that prevent their development, financial options and reasons are the most important factors preventing their development. Economic risks and uncertainty are the other most important factors. Besides, to reach and find qualified human resources is another problem together with not being able to design the organizational structure correctly. More technical issues such as using digital technologies, doing market research, or providing necessary certification and standards come later in their list since they cannot solve their establishment problems at the first glance.



*Graph 6. Factors That Prevent Company's Development*

Companies think that money is the key. The company representatives assume that information and knowledge-based reasons follow on. For that reason, it is firstly important to convince the companies about the importance of knowledge to found, operate, finance, access to market, innovate and compete. In this respect the SMARTNET Project will apply a funnel model to train the entrepreneurs and start-ups under an acceleration programme.

The flow of the capacity building activities under the acceleration program of entrepreneurs including the different levels of trainings as below;



The Training Needs Assessment will shed light upon the preparation of the training programs. Based on the questionnaire conducted to the start-ups and entrepreneurs.

Within the questionnaire conducted to the companies, firstly an overall analysis was made over the importance level of 23 training programs as presented in Table 2. Then, other suggested 25 optional training programs as presented in Table 3 were analysed in terms of benefit level to the companies in order to pick suitable additional 15 training programs. At the end, it was also asked participants' opinions about additional beneficial training and mentoring program subjects which is analysed at the part of qualitative analysis.

Table 2. Common 23 Training Program Subjects

COMMON 23 TRAINING PROGRAM SUBJECTS	
1. Process Analysis and Process Development	2. Analysis of Error Types and Effects
3. Performance and Function Analysis	4. Market Analysis and New Market Entry Strategies
5. Intellectual Property Rights	6. Product Positioning
7. Project Development and Management	8. Branding
9. Technology Roadmap Development	10. Access to Financial Resources and Investor Relations
11. Innovative Product / Process Development	12. Value Proposition Management
13. Statistical Process Management	14. Value Creation
15. Production and Engineering	16. Business Model Development
17. Computer Aided Design	18. Company Management
19. Modelling and Simulation	20. Customer Management
21. Experimental Development	22. Innovation Management
23. Prototyping	

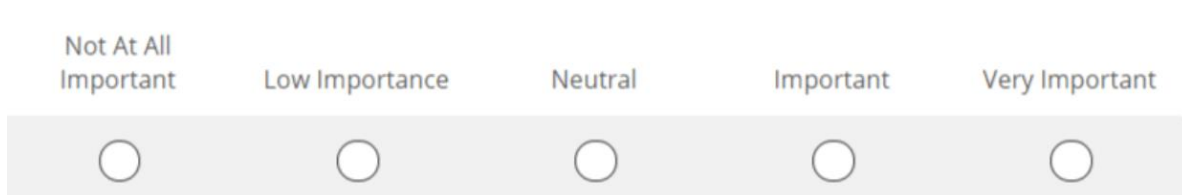
Table 3. Optional 25 Training Program Subjects

OPTIONAL 25 TRAINING PROGRAM SUBJECTS	
1. Understanding Global Markets: Macroeconomics for Executives	14. Effective Social Media Use Training
2. Corporate Strategic Management- Implementing and Evaluating Strategy	15. Unlocking The Power of Perspectives: Problem Solving with Clarity, Creativity, And Collaboration
3. Systems Thinking for Sustainability: Complex Systems Analysis	16. Business Networking: Finding A Business Partner

<b>4. Change Management: Organisational, Analytical Skills and Data-Driven-Advanced Leadership with Sense</b>	<b>17. Finance Data Analysis: Better Business Through Financial Management</b>
<b>5. Technology Forecasting for Strategic Decision Making</b>	<b>18. Strategic Cost Analysis for Managers</b>
<b>6. Machine-Learning Concepts and Tools: Technology and Product Manager's Data-Driven Decision Making</b>	<b>19. How to Effectively Manage Your Business Through a Crisis and Problem-Solution Fit</b>
<b>7. Technopreneurship and Growth Strategies for Tech Start Ups</b>	<b>20. Internet Of Things: Business Implications and Opportunities</b>
<b>8. Elevator And Investor Pitch Training</b>	<b>21. Artificial Intelligence and Automation &amp; Robotics</b>
<b>9. Business Of Tech: How to Write a Tech Business Plan</b>	<b>22. Advanced and Applied AI On Microsoft Azure</b>
<b>10. Business Entities and Company Formation In USA And EU</b>	<b>23. Advanced Cyber Security</b>
<b>11. Digital Marketing: Lead Generation &amp; Sales Conversion</b>	<b>24. AI Design and Engineering with Microsoft Azure</b>
<b>12. Effective Presentation Techniques</b>	<b>25. Deep Learning and Python Programming for AI With Microsoft Azure</b>
<b>13. Negotiation Skills for Entrepreneurs</b>	

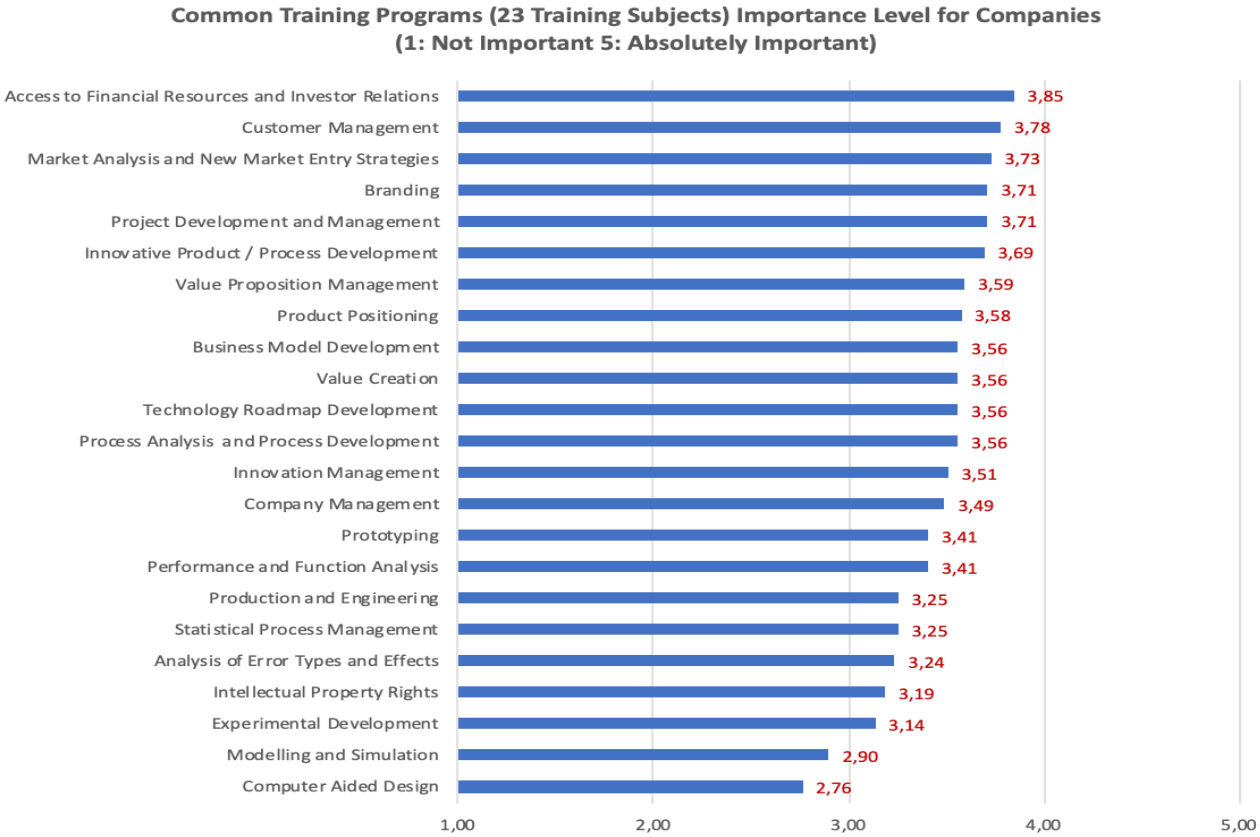
Besides training subject preferences, it is also analysed the training delivery preferences of the companies on Training Implementation Method, Training Duration, Training Day and Training Time Frame.

For the first analysis, the application methodology for evaluation of 23 training programs is to define an importance level scale from 1: Not Important to 5: Very Important.



According to the general results of the ranking of 23 Training Programs by the target group, the most important first three training programs in parallel with the Graph 6 showing the factors that prevent the company's development are "Access to Financial Resources and Investor Relations (3,85)", "Customer Management (3,78)" and "Market Analysis and New Market Entry Strategies (3,73)". On the other hand, according to the average of the answers the least important three training programs are "CAD (2,76)", "Modelling and Simulation' (2,90)" and "Experimental Development (3,14)". The

below graph is showing the average ranking of both individual importance level and importance level for companies for all 23 common training programs.

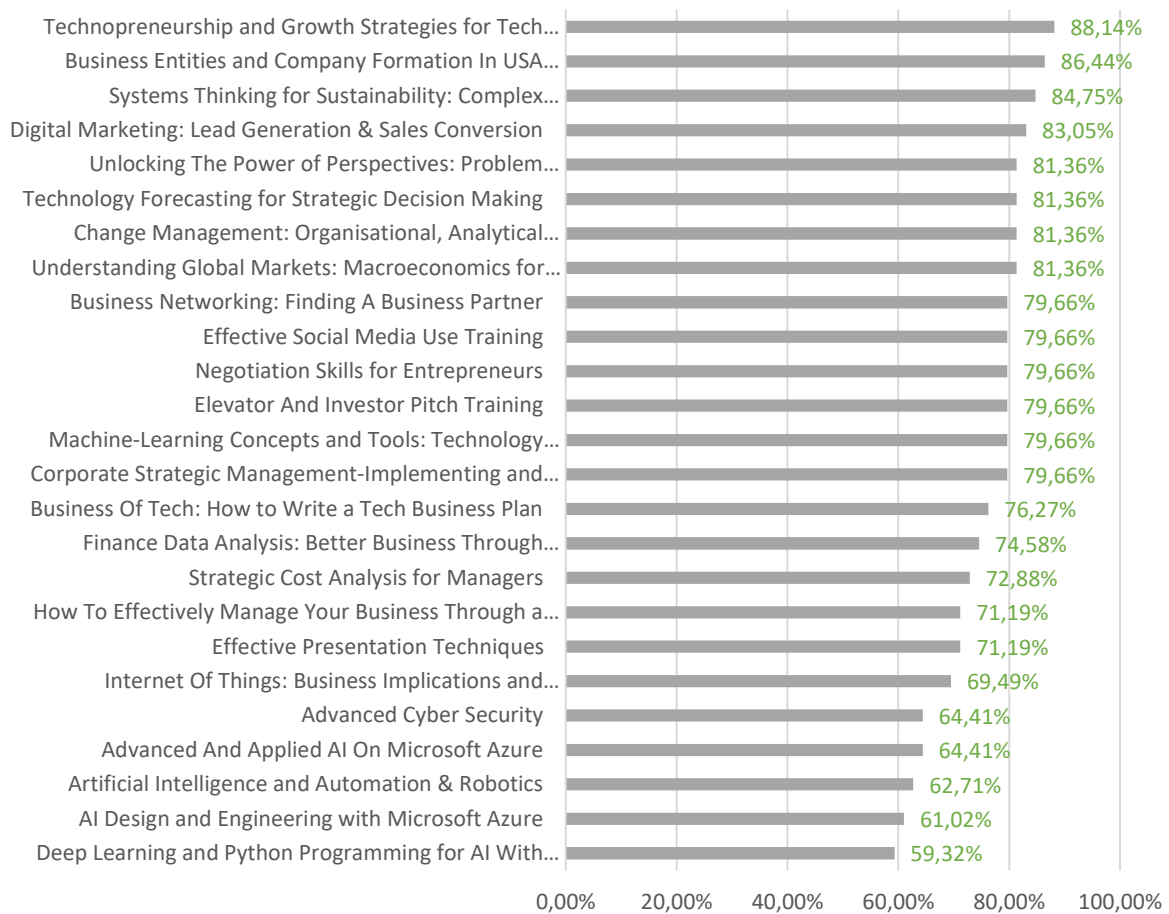


*Graph 7. General Results for the Importance Level of 23 Training Programs*

In addition to the 23 ToR based training programmes, as the TAT propose to deliver 15 more training programmes, 25 proposed subjects were also asked if these headings are beneficial or not. As presented in below graph, while “Technopreneurship and Growth Strategies for Tech Start Ups (%88,14), Business Entities and Company Formation in the USA and the EU (%86,44), Systems Thinking for Sustainability: Complex Systems Analysis (%84,75)” are considered as the most beneficial ones, “Deep Learning and Python Programming for AI With Microsoft Azure (%59,32), AI Design and Engineering with Microsoft Azure %61,02), Artificial Intelligence and Automation & Robotics (62,71)” are considered as the least beneficial ones.



## Proposed Optional Training Programs (25 Training Subjects) Benefits for Companies (%)

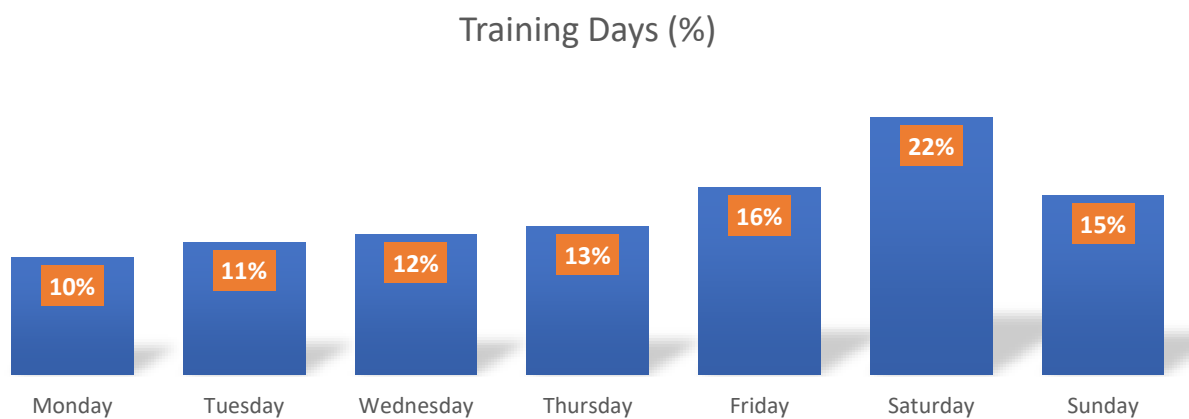
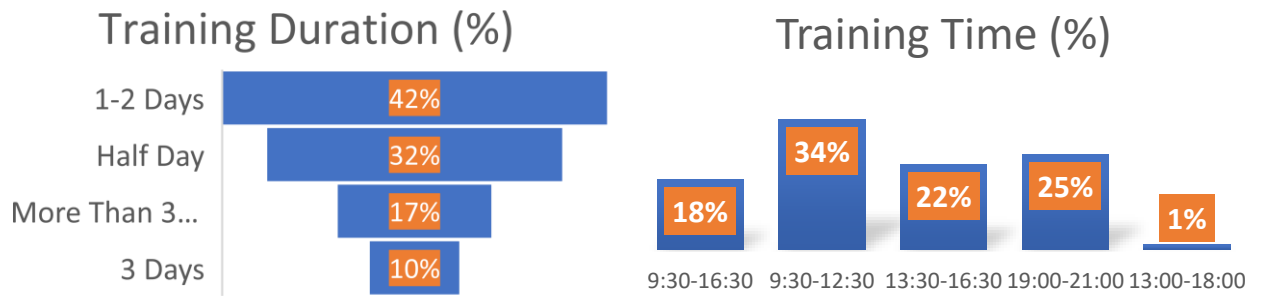


*Graph 7a. General Results for the Benefit for Companies*

Regarding the Training Implementation Details the companies answered that the trainings shall be short, in the weekend, in the morning hours and via hybrid tools.

### Training Implementation Method (%)





### 3.3. QUALITATIVE ANALYSIS FROM FACE-TO-FACE INTERVIEWS AND QUESTIONNAIRES

While conducting the quantitative analysis, the two forms of questionnaires which were prepared to ask to the TTIs and related stakeholders were divided into six parts as indicated below;

- **Part 1: Interview information**
- **Part 2: Personal Information**
- **Part 3: Education Information**
  - Graduation Department
  - Training Programs
- **Part 4: Technopark / TTO Capacity**
  - Established Year

There are similar parts in both questionnaires. In parallel with the objective of the training needs assessment, the main important point is to define the needs and priorities of the companies, forming from the start-ups and entrepreneurs, in the training and mentorship programs. For that reason in the parts of training program analysis, it was asked to participants to evaluate a common 23 training programs list (Table 1) and an optional 25 training programs (Table 2) list written in the project proposal in a methodological way.

Since it is also important to define the organization of training programs implementation, there is also a common part in both questionnaires to get the expectations and suitable time periods of the target group. Related questions were prepared based on the below framework;

- A. *Training Implementation Method*
- B. *Training Duration*
- C. *Training Day*
- D. *Training Time Frame*

In the first part of the analysis, a general framework is tried to be revealed about the **capacity of ERA (YTU) and partners (GTU and HKU)** under the below seven indicators;

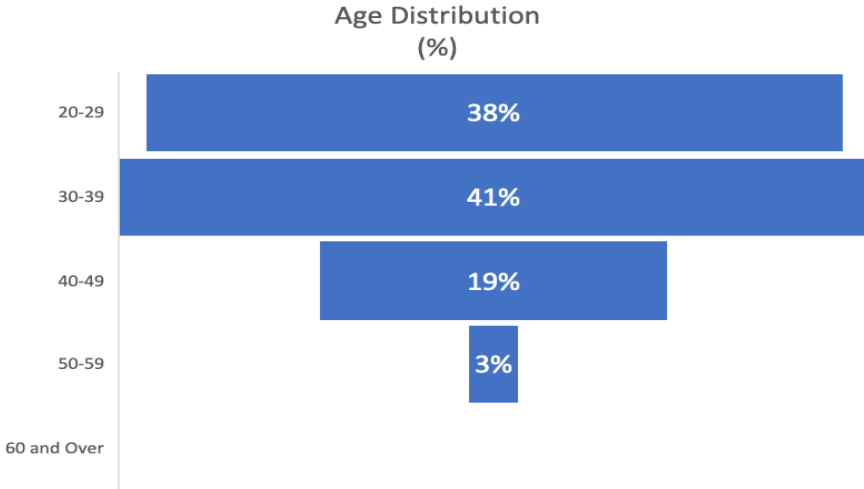
1. Age Distribution
2. Total Working Years in Technopark / TTO
3. Graduation Area
4. Trainings Received
5. Number of Companies and Entrepreneurs in Technopark / TTO
6. Service Areas of Technopark / TTO
7. Training Programs Provided to Companies and Entrepreneurs by Technopark / TTO

The interviews were made via face to face meetings with YTU and GTU employees. Due to the transportation restrictions, online interviews were done with HKU representatives. 36 employees and representatives of the ERA and partner universities attended the interviews. For that reason, all the

indicators and results, that will be mentioned under the employees analysis, will refer to the number of interviewed employees.

**Age Distribution:**

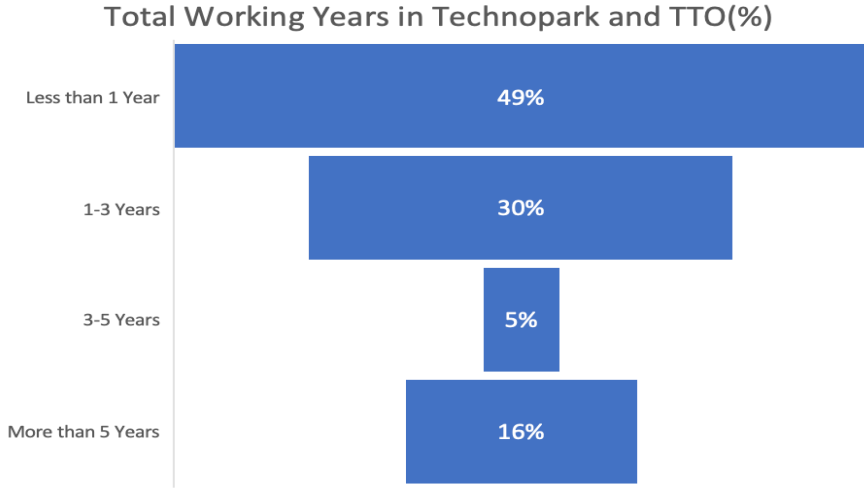
The employee number ratio between the age of 20-29 is %38, 30-39 is % 41, 40-49 is %19 and 50-59 is %3. There aren't any employees below the age of 60. Most of the employees with the total ratio of %79 are under the age of 40. This ratio shows that the ERA and partners (GTU and HKU) have a young generation employee capacity as well as the companies’ representatives.



*Graph 8. ERA & Partners’ Interviewed Employees Age Distribution (%)*

**Total Working Years in Technopark / TTO:**

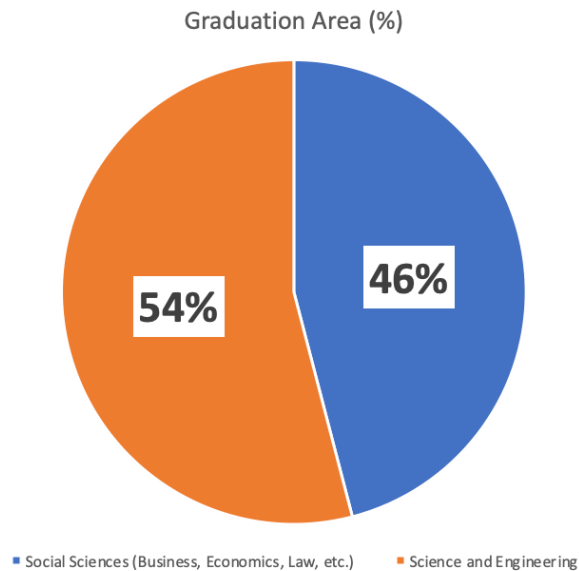
Supporting the general perception of quick staff circulation within the TTIs, %49 of the employees have been working less than 1 year. %30 of the employees have been less than 3 years. %5 of the employees have been working between 3-5 years. The ratio of employees that have been working more than 5 years is %16. Most of the employees with the total ratio of %79 have been working in Technopark / TTO for less than 3 years.



*Graph 9. ERA & Partners’ Employees Total Working Years Distribution (%)*

### Graduation Area:

While %54 of the employees graduated from social sciences, %46 of them graduated from science and engineering fields. It is meaningful that, the administrative support taken from the TTIs are given by social science graduates and other consultative and mentoring supports may be given by the science and engineering graduates. This ratio is prone to the engineering and science fields when it comes to Company representatives (entrepreneurs and start-ups).



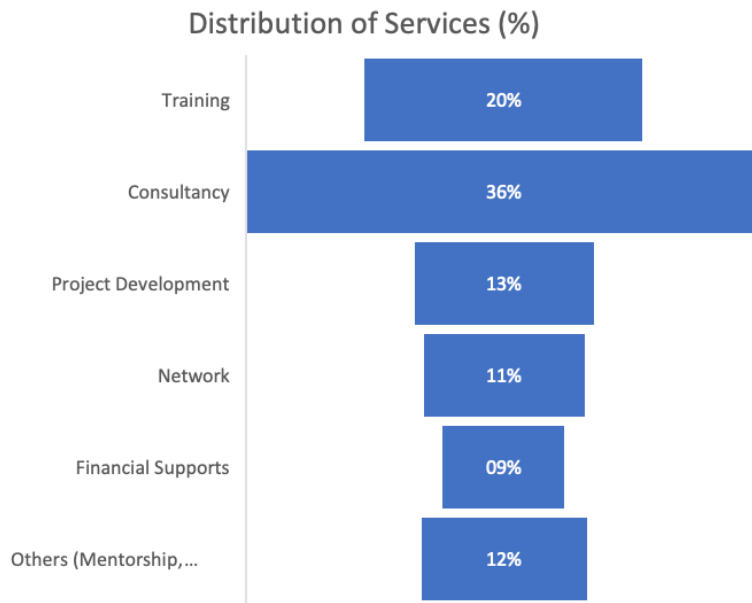
Graph 10. ERA & Partners' Employees Graduation Area Distribution (%)

### Trainings Received:

When it was asked the training programs subject taken within the last 3 years to the participants, the most common answers were;

- Project Management (Horizon, R&D, Grant Resources, ARDEB, TUBITAK etc.) with 10 answers
- Patent Management with 7 answers
- Technopark Regulations Trainings with 4 answers
- Commercialization Training Programs with 4 answers

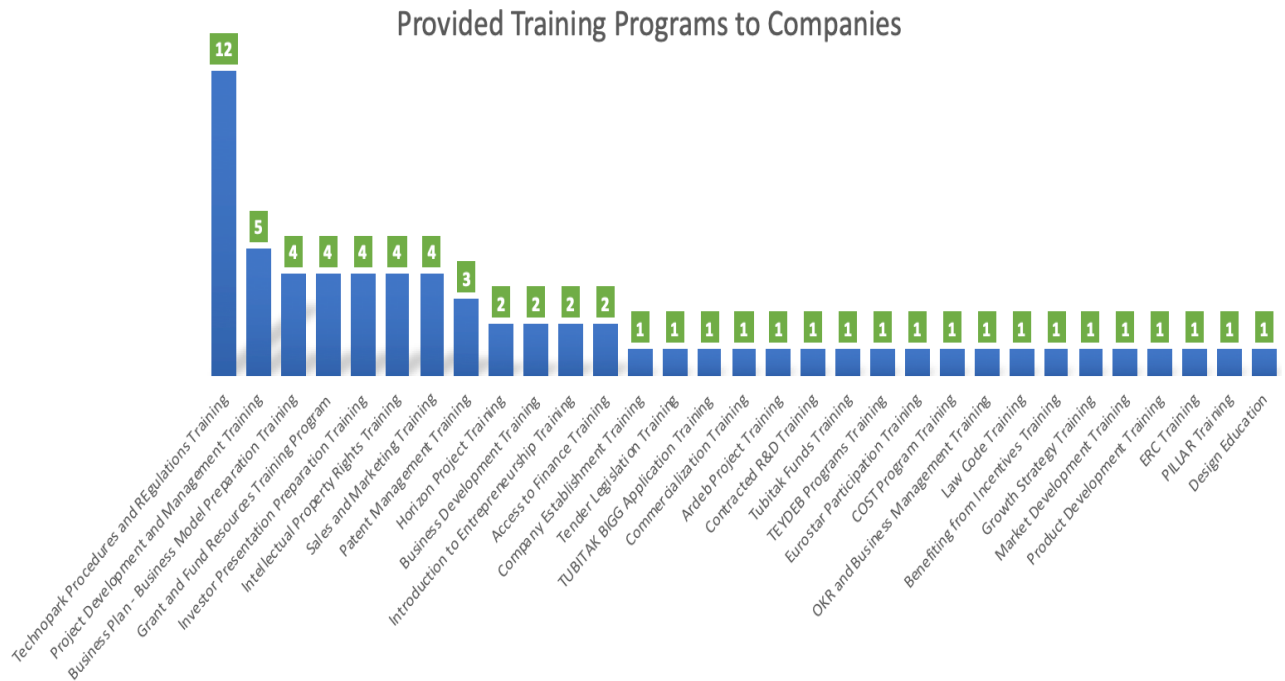




*Graph 11. Service Areas Distribution of ERA and partners*

**Training Programs Provided to Companies and Entrepreneurs by Technopark / TTO:**

When it was asked to the participants about the provided training programs to companies in the last 3 years as Technopark or TTO, there were 31 different training subjects obtained from the responses. Among them, “Technopark Procedures and Regulation” is the most common delivered training program, ranked 12 times by the participants. “Project Development and Management” training subject comes in second with 5 times ranking. The training programs under the subject of “Preparation of Business Plan and Model”, “Grant and Fund Resources”, “Preparation An Investor Presentation”, “Intellectual Property Rights” and “Sales and Marketing” come in third with 4 times ranking. The rest of the training program names, provided to the companies and entrepreneurs by ERA and partners, are shown in the below graph.



*Graph 12. Provided Training Programs by ERA and partners (Number)*

**Training Program Analysis of Institutions (ERA, Partner Universities, Stakeholders):**

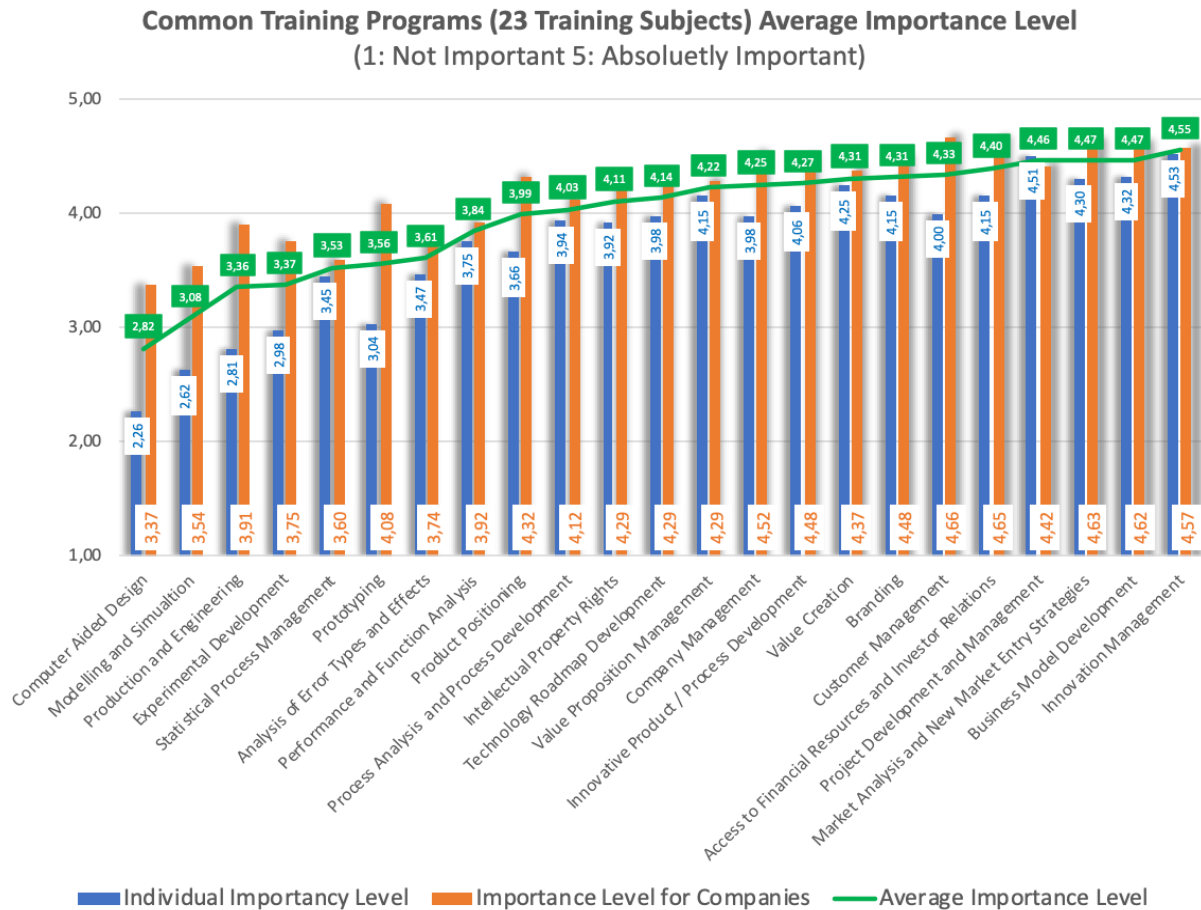
Although the above-mentioned information provides us the TTIs capacity to sustain the project, the training needs assessment for the companies and individually for TTI staffs is assessed together. So, the responses of the other technoparks, TTOs and stakeholders are also combined with the responses of the ERA and partner universities. The main objective of this part is to define the most important and beneficial training program subjects to implement for start-ups and entrepreneurs can be called as companies, beside for staff of ERA and partner universities in common programs. For that reason, firstly, an overall analysis is done to reach best results to see the importance level of 23 training programs (Table 2), planned to be implemented in the project technical proposal. Then, other suggested 25 training programs (Table 3), written in the project proposal, are also analysed in terms of benefit level to the companies and entrepreneurs in order to pick suitable 15 additional training programs. At the end, it was also asked participants’ opinions about additional beneficial training and mentoring program subjects.

Similar to the Company’s quantitative analysis, for the first analysis, the application methodology for evaluation of 23 training programs is to define an importance level scale as 1: Not Important, 5: Absolutely Important. The target group of this questionnaire is ERA and partner universities, other Technoparks and TTOs, and Stakeholders. It is asked to the target group to rank the training subjects based on two important levels, namely; *individual* importance level and importance level for *companies*. According to the general results of the ranking of 23 Training Programs by the target group, the most important first three training programs are “Innovation Management (4,55)”, “Business Model Development (4,47)” / “Market Analysis and New Market Entry Strategies (4,47)” and “Project Development and Management (4,46)”. 14 training programs among 23 training programs were ranked over 4. On the other hand, the least important three training programs are “CAD (2,28)”,



“Modelling and Simulation’ (3,08)” and “Production and Engineering (3,36)” parallel to the companies’ own weighting practice.

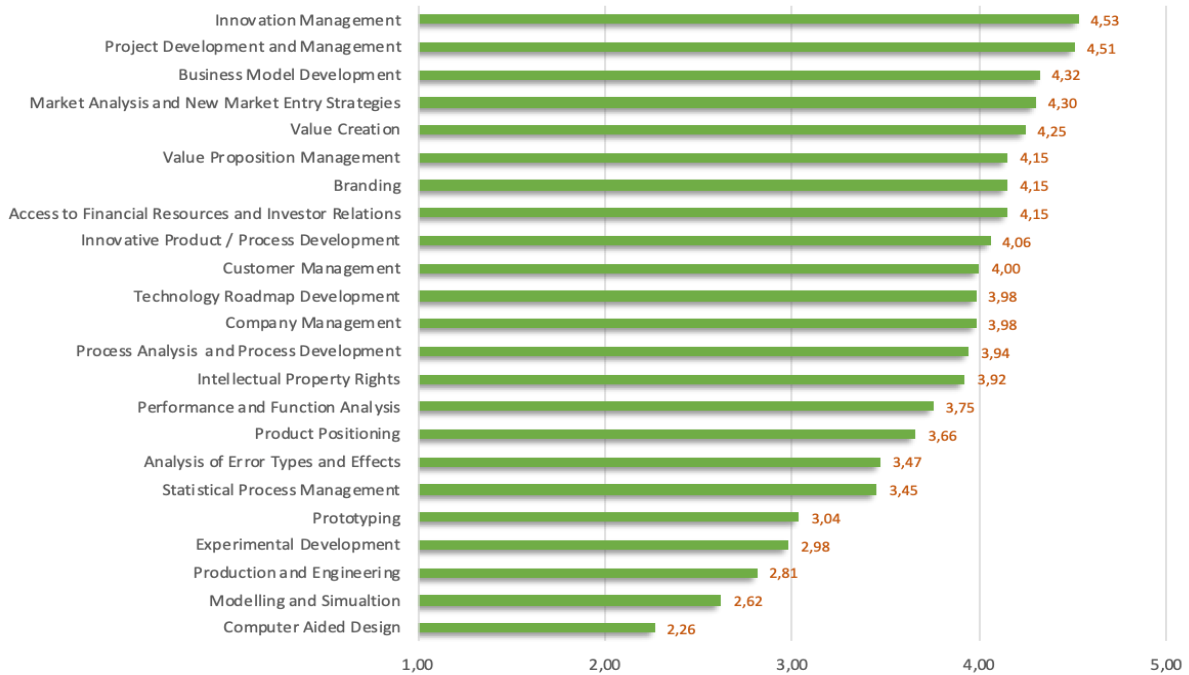
The below graph shows the average ranking of both individual importance level and importance level for companies for all 23 training programs.



**Graph 13. General Results for the Importance Level of 23 Training Programs**

In the breakdown of the rankings as individual importance level, the most important three training program subjects are “Innovation Management (4,53)”, “Project Development and Management (4,51)” and “Business Model Development (4,32)”. The least important three training program subjects are “CAD (2,26)”, “Modelling and Simulation (2,62)” and “Production and Engineering (2,81)”.

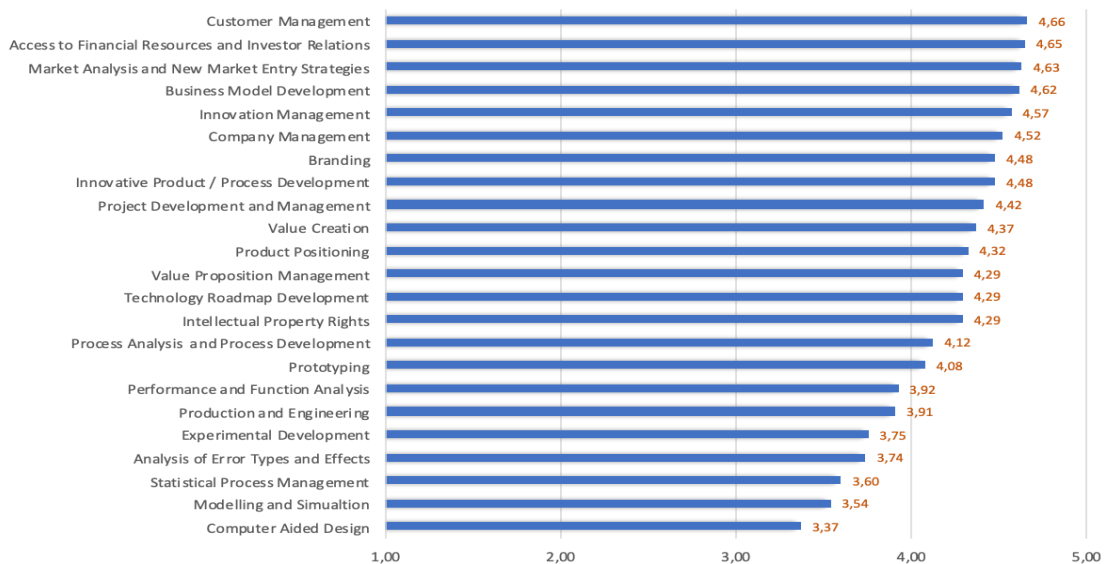
**Common Training Programs (23 Training Subjects) Individual Importance Level**  
(1: Not Important 5: Absolutely Important)



*Graph 14. Individual Importance Level of 23 Training Programs*

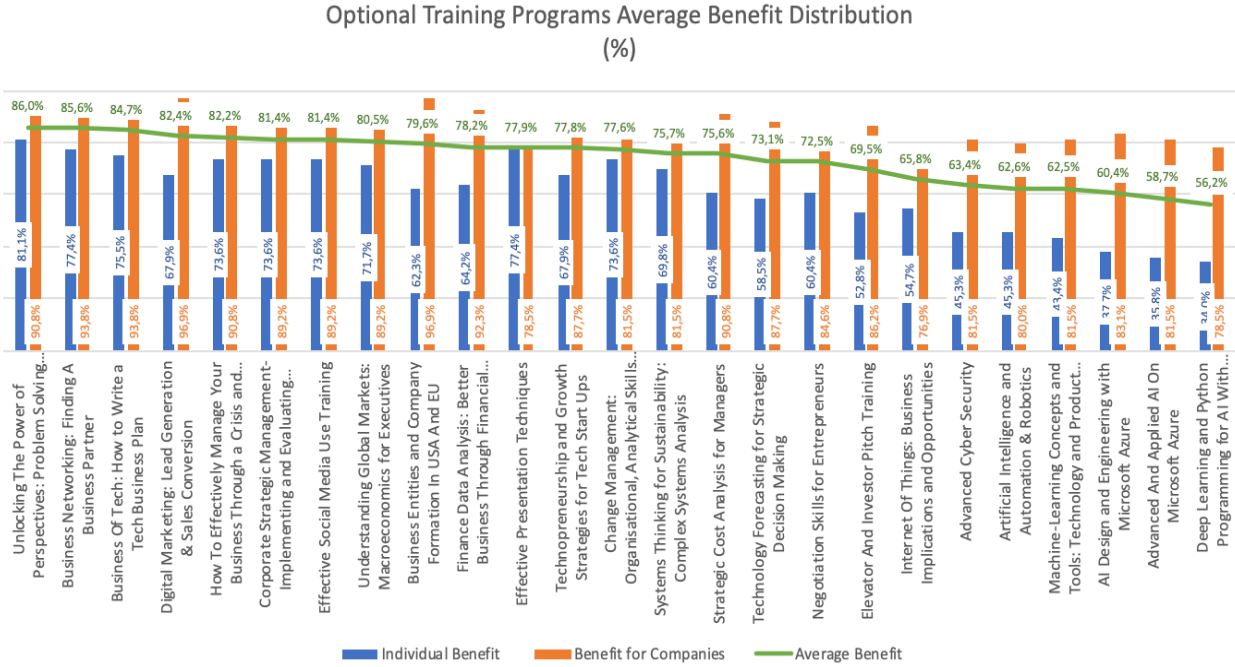
In the breakdown of the rankings as an importance level for companies, the most important three training program subjects are Innovation Management (4,53), Project Development and Management (4,51) and Business Model Development (4,32). The least important three training program subjects are CAD (2,26), Modelling and Simulation (2,62) and Production and Engineering (2,81).

**Common Training Programs (23 Training Subjects) Importance Level for Companies**  
(1: Not Important 5: Absolutely Important)



*Graph 15. Importance Level of 23 Training Programs for Companies*

At the second part of analysis, a different methodology is applied for the evaluation of additional 25 training program subjects. The same target group, ERA and partner universities, Technoparks and TTOs, Stakeholders, defines the 25 training program subjects as “Beneficial” or “Not Beneficial” by answering as “YES” or “NO” and commenting on their answers. According to the general results of additional 25 Training Programs by the target group, the most beneficial first three training programs are “Unlocking The Power of Perspectives: Problem Solving with Clarity, Creativity, And Collaboration (%86)”, “Business Networking: Finding A Business Partner (%85,6)” and “Business Of Tech: How to Write a Tech Business Plan (%84,75)”. 15 training programs among 25 training programs got the ratio over %75. On the other hand, according to the results, the least beneficial three training programs are “Deep Learning and Python Programming for AI With Microsoft Azure (%56,26)”, “Advanced And Applied AI On Microsoft Azure (%58,75)” and “AI Design and Engineering with Microsoft Azure (%60,45)”. The below graph is showing the average ratio of both individual benefit level and benefit level for companies for all optional 25 training programs.



Graph 16. General Benefit Distribution Ratio of Optional 25 Training Programs (%)

In the breakdown of the ratio at the individual benefit level, the most beneficial three training program subjects are “Unlocking The Power of Perspectives: Problem Solving with Clarity, Creativity, And Collaboration (%81,1)”, “Effective Presentation Techniques (%77,4)”, “Business Networking: Finding A Business Partner (%77,4)” and “Business Of Tech: How to Write a Technology Business Plan (% 75,5)”. The least beneficial three training program subjects are “Deep Learning and Python Programming for AI With Microsoft Azure (%34)”, “Advanced And Applied AI On Microsoft Azure (%35,8)” and “AI Design and Engineering with Microsoft Azure (%37,7)”.

### Optional Training Programs Individual Benefit Distribution (%)



**Graph 17. Individual Benefit Level of Optional 25 Training Programs**

In the breakdown of the ratios of benefit level for companies, the most beneficial three training program subjects are “Digital Marketing: Lead Generation & Sales Conversion (%96,9)”, “Business Entities and Company Formation In USA And EU (%96,9)”, “Business Networking: Finding A Business Partner (%93,8)”, “Business Of Tech: How to Write a Tech Business Plan (%93,8)” and “Finance Data Analysis: Better Business Through Financial Management (%92,3)”. The least beneficial three training program subjects are “Internet Of Things: Business Implications and Opportunities (%76,9)”, “Deep Learning and Python Programming for AI With Microsoft Azure (% 78,5)”, “Effective Presentation Techniques (% 78,5)” and “Artificial Intelligence and Automation & Robotics (%80)”.

### Optional Training Programs Benefit for Companies Distribution (%)

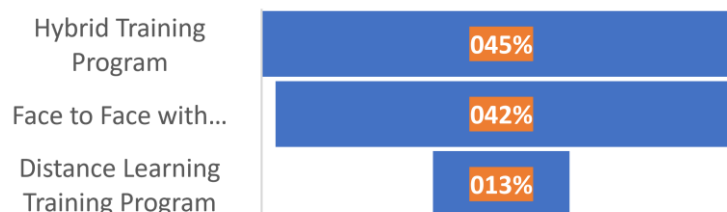


Graph 18. Benefit Level of Optional 25 Training Programs for Companies

### Training Implementation Method:

It was asked participants to rate three types of training implementation method, namely; hybrid training implementation (use of face-to-face and online tools), face-to-face with social distance training implementation and online training implementation (online tools such as zoom, skype). While, %61 of the participants prefer the hybrid training implementation method, %27 of them prefer face-to-face with social distance training implementation. A few of them, at a ratio of %13, prefer online training implementation tools.

### Training Implementation Method (%)

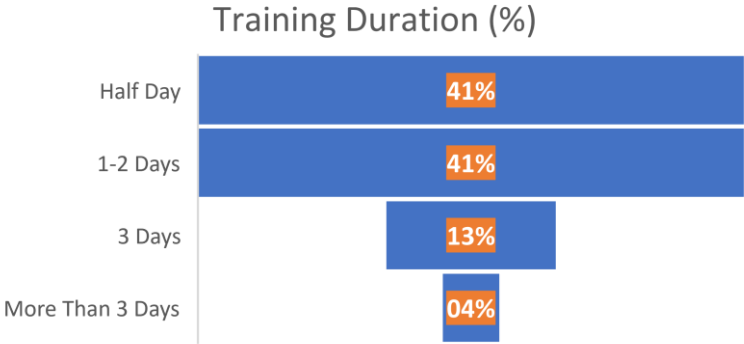


Graph 19. Training Implementation Method:

### Training Duration:

About the duration of a training program among the given options of half day, 1-2 days, 3 days and more than 3 days, %82 of the participants preferred short periods for a training. %41 of them prefer a half-day training program. %41 of them prefer 1-2 days training programs. %13 of them prefer 3 days

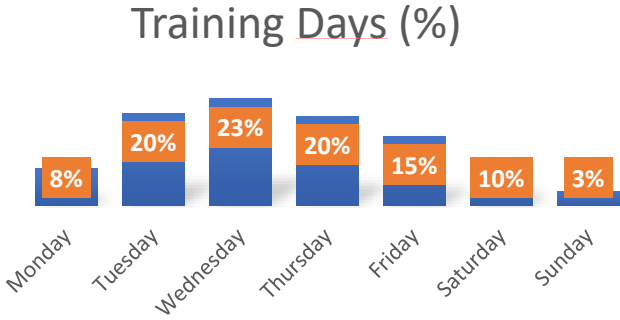
training programs. Only a few of them at a ratio of %4 prefer more than 3 days training program. It is important to note that, the interviewees from the stakeholders, ERA and the partner universities emphasized that there may be some trainings that shall be more than 3 days. As multiple choices were possible to be selected, for few of trainings depending on the content and subject more than 3 days choice was mentioned. Compared to the companies, the TTIs and the stakeholders are more flexible but agree about the duration of training programmes to be short.



Graph 20. Training Duration (%)

**Training Day:**

When it was asked about the day preferences of the participants, the average preference mostly weekdays instead of weekends. Among the weekdays, participants mostly pick the midweek days.

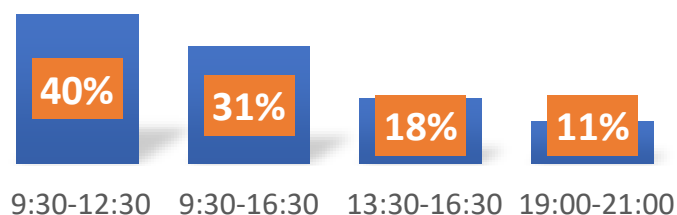


Graph 21. Training Day Preference (%)

**Training Time Frame:**

When it was asked the training delivery time period preference during the day, institutions mostly prefer morning time or whole day training delivery instead of afternoon or evening time periods. %40 of them prefer 9:30-12:30 time period, % 31 of them prefer 9:30-16:30 time period, %18 of them prefer 13:30-16:30 time period and %11 of them prefer 19:00-21:00 time period.

## Training Time (%)



Graph 22. Training Time Period Preference

### Additional Suggested Training Program and Mentoring Program Subjects

It was also asked to the participants of questionnaires who ERA, partners, institutions, stakeholders and companies about their additional training and mentoring program suggestions were.

They gave 68 answers for additional suggested training program question. The most repeated training program subjects are;

- Design Thinking Training Program (3 times)
- Grant and Fundings Training Program (6 times under different subjects)
- Communication Training Program (2 times)
- Business Law Training Program (3 times)
- Lean Entrepreneurship Training Program (2 times)

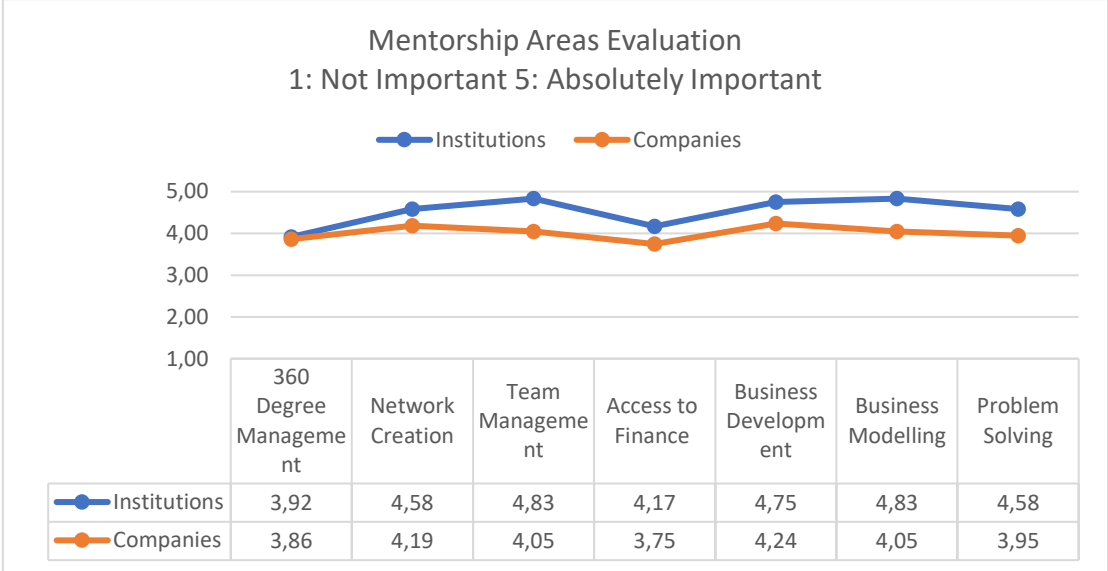
The list of other answers are indicated in the below table;

Table 4. Suggested Training Programs

#	Suggested Training Program	#2	Suggested Training Program2	#3	Suggested Training Program3
1	MARKET ENTRY STRATEGIES	24	COMMUNICATON	47	COMPETITOR ANALYSIS
2	AGIL	25	COMMUNICATION TRAINING	48	SECTORAL LEGAL PERMIT CERTIFICATIONS
3	SUCCESSFUL EXIT STRATEGIES	26	RELATIONSHIP MANAGEMENT TRAINING	49	CULTURE OF WORKING WITH A STARTUP
4	CERTIFICATION	27	IMAGE TRAINING	50	STRATEGIC PLANNING TRAINING
5	BLOCKCHAIN	28	HUMAN RESOURCES MANAGEMENT	51	SUSTAINABILITY
6	BUDGET MANAGEMENT	29	BUSINESS LAW	52	PROCESS ANALYSIS
7	VALUE CHAIN MANAGEMENT	30	BUSINESS LAW	53	DESIGN TRAININGS
8	DESIGN THINKING	31	BUSINESS LAW	54	TECHNOLOGY TRANSFER
9	DESIGN THINKING	32	PARTNERSHIP	55	DOCUMENTATION ON MEDICAL DEVICES
10	DESIGN THINKING	33	CANVAS MODEL	56	COMMERCIALIZATION
11	EMOTIONAL INTELLIGENCE	34	COACHING AND MANAGEMENT	57	TRIZ EDUCATION
12	EIC	35	FORMING A CONSORTIUM	58	CONTACT FOR TTO
13	TEAM MANAGEMENT	36	KOSGEB SUPPORT	59	UI UX DESIGN
14	EMPATHY EDUCATION	37	CORPORATE CAPACITY	60	INTERNATIONAL FUNDING PROGRAMS
15	E-COMMERCE	38	MATERIAL USE	61	INTERNATIONAL FUNDING PROGRAMS
16	EFFECTIVE COMMUNICATION (STYLE)	39	BRAND AND DESIGN	62	INTERNATIONAL FOCUS PROJECTS
17	FINANCIAL LITERACY	40	ORGANIZATION MANAGEMENT	63	INTERNATIONAL PATENT MANAGEMENT
18	ACCESS TO FINANCE	41	MAKING THE STUDENT ENTREPRENEUR	64	INTERNATIONALIZATION/NETWORKING
19	FUND PROGRAMS	42	PATENT LITERACY	65	DATA ANALYSIS TRAINING
20	FUNDING AND INCENTIVE APPLICATIONS	43	THE MARKET RESEARCH	66	LEAN ENTERPRISE
21	CONTACT FOR ENTREPRENEURS	44	PERFORMANCE ANALYSIS	67	LEAN ENTERPRISE
22	GROWTH	45	FROM PROBLEM TO BUSINESS IDEA	68	USE OF TIME EFFECTIVELY
23	ADVANCED IP EDUCATION	46	PROJECT WRITTEN PROCESS		

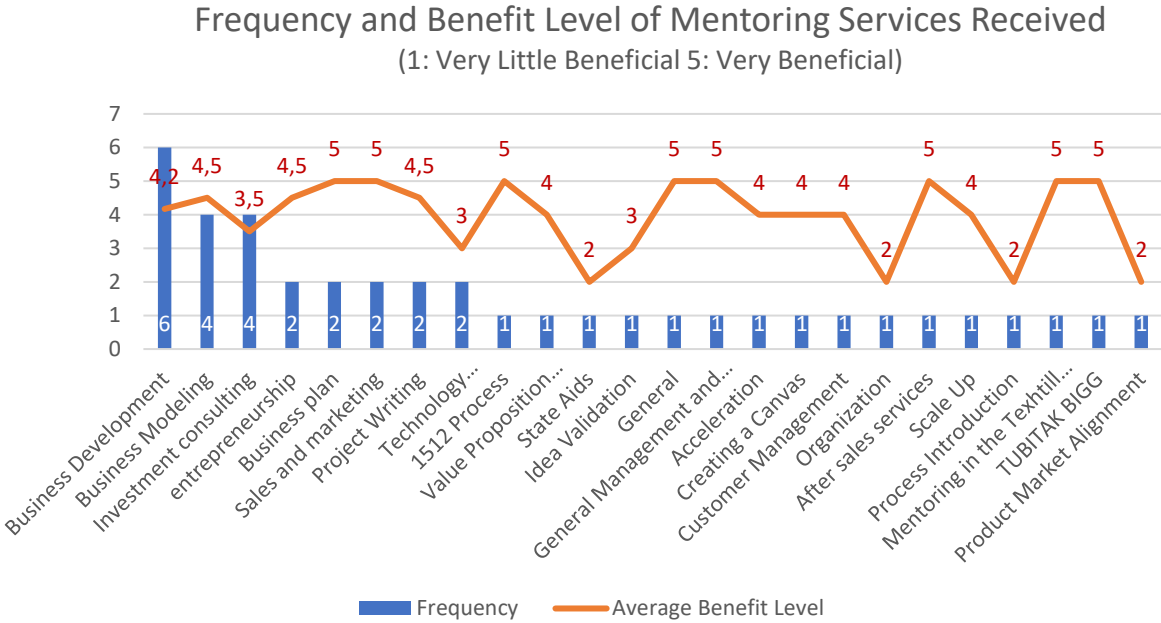
### Mentorship Programs

For the mentorship programs their suggestions and rankings are mostly on Business Model, Access to Finance and Business Development. The least important one is 360 Degree Management. During the face-to-face interviews they mentioned the reason for that the company needs more partial mentoring programs because of their structure isn't big and they need specific interventions. The below graph shows the responses of the participants for suggested mentoring programs.



Graph 23. Mentorship Program Suggestions and Rankings

The companies consist of start-up and entrepreneurs comments for additional mentoring fields. Firstly, they are asked if they have taken any mentoring support and companies answered 24 different but related subjects with the following frequency;



Graph 24. Frequency and Benefit Level of Mentoring Services

The areas where mentoring service is most frequently received are; "Business Development", "Business Modelling" and "Investment Consultancy".



Mentoring services provided to companies are evaluated on average as "4" and "Useful".

### 3.4. FOCUS GROUP MEETING

A focus group meeting was organized in ERA premises in Istanbul with the participation of ERA and the previously identified stakeholders on 19<sup>th</sup> of July 2021. The focus group meeting's main objective was to discuss the findings of interviews and questionnaires as well as to collect further approaches and suggestions. Thus, the project team of SMARTNET will design and develop training programmes based on the needs discussed in further on.

A presentation related to the above findings was prepared and presented by the TNA team before the focus group meeting and first it was shared with the TAT. Regarding to the comments and feedbacks of the TAT, the necessary amendments were made. During the focus group meeting the presentation was done by the TNA team to the participants around one hour time period. At the end of the presentation, under the moderation of TNA experts, the opinions about the participants were asked over the 23 common training subject list ranking and 25 optional training list ranking.

*Table 5. Evaluation Grid of 23 Common Training Programme Subjects*

Training Subject	Institutions	Companies	Mean
Access to Financial Resources and Investor Relations	4,65	3,85	4,25
Customer Management	4,66	3,78	4,22
Market Analysis and New Market Entry Strategies	4,63	3,73	4,18
Branding	4,48	3,71	4,09
Business Model Development	4,62	3,56	4,09
Innovative Product / Process Development	4,48	3,69	4,09
Project Development and Management	4,42	3,71	4,06
Innovation Management	4,57	3,51	4,04
Company Management	4,52	3,49	4,01
Value Creation	4,37	3,56	3,96
Product Positioning	4,32	3,58	3,95
Value Proposition Management	4,29	3,59	3,94
Technology Roadmap Development	4,29	3,56	3,93
Process Analysis and Process Development	4,12	3,56	3,84
Prototyping	4,08	3,41	3,74
Intellectual Property Rights	4,29	3,19	3,74
Performance and Function Analysis	3,92	3,41	3,66
Production and Engineering	3,91	3,25	3,58
Analysis of Error Types and Effects	3,74	3,24	3,49
Experimental Development	3,75	3,14	3,44
Statistical Process Management	3,60	3,25	3,43
Modelling and Simulation	3,54	2,90	3,22
CAD	3,37	2,76	3,07

The opinions of the participants about the above list are to exclude the technical trainings since that seemingly, companies thought that they don't need such kind of trainings as well as institutions. That's why, the common idea was not to take at least five trainings that got the lowest ranking at the list. The second evaluation was realized over the below additional training table list;

*Table 6. Evaluation Grid of 25 Additional Training Programme Subjects*

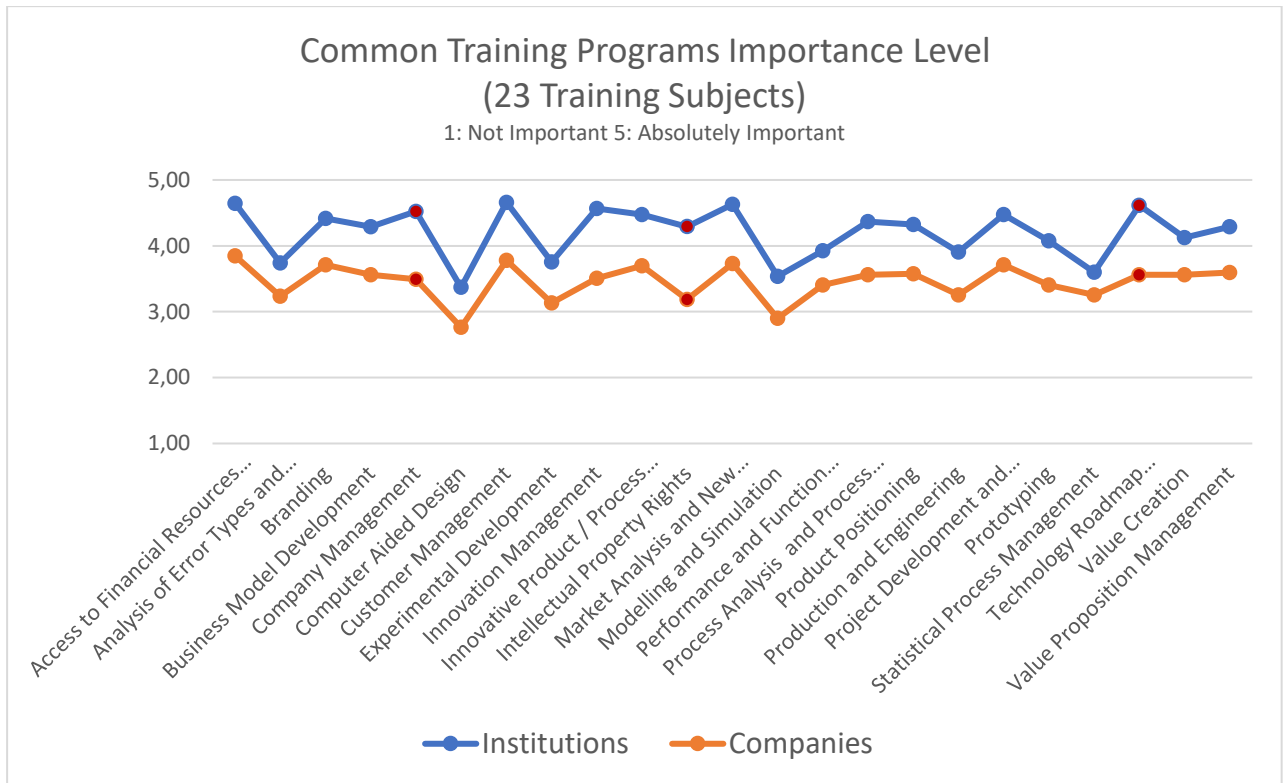
Training Subject	Institutions	Companies	Mean
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Business Entities and Company Formation In USA And EU	96,92%	86,44%	91,68%
Digital Marketing: Lead Generation & Sales Conversion	96,92%	83,05%	89,99%
Technopreneurship and Growth Strategies for Tech Start Ups	87,69%	88,14%	87,91%
Business Networking: Finding A Business Partner	93,85%	79,66%	86,75%
Unlocking The Power of Perspectives: Problem Solving with Clarity, Creativity, And Collaboration	90,77%	81,36%	86,06%
Understanding Global Markets: Macroeconomics for Executives	89,23%	81,36%	85,29%
Business Of Tech: How to Write a Tech Business Plan	93,85%	76,27%	85,06%
Technology Forecasting for Strategic Decision Making	87,69%	81,36%	84,52%
Effective Social Media Use Training	89,23%	79,66%	84,45%
Corporate Strategic Management-Implementing and Evaluating Strategy	89,23%	79,66%	84,45%
Finance Data Analysis: Better Business Through Financial Management	92,31%	74,58%	83,44%
Systems Thinking for Sustainability: Complex Systems Analysis	81,54%	84,75%	83,14%
Elevator And Investor Pitch Training	86,15%	79,66%	82,91%
Negotiation Skills for Entrepreneurs	84,62%	79,66%	82,14%
Strategic Cost Analysis for Managers	90,77%	72,88%	81,83%
Change Management: Organisational, Analytical Skills and Data-Driven-Advanced Leadership with Sense	81,54%	81,36%	81,45%
How To Effectively Manage Your Business Through a Crisis and Problem-Solution Fit	90,77%	71,19%	80,98%
Machine-Learning Concepts and Tools: Technology and Product Manager's Data-Driven Decision Making	81,54%	79,66%	80,60%
Effective Presentation Techniques	78,46%	71,19%	74,82%
Internet Of Things: Business Implications and Opportunities	76,92%	69,49%	73,21%
Advanced Cyber Security	81,54%	64,41%	72,97%
Deep Learning and Python Programming for AI With Microsoft Azure	81,54%	64,41%	72,97%
AI Design and Engineering with Microsoft Azure	83,08%	61,02%	72,05%
Artificial Intelligence and Automation & Robotics	80,00%	62,71%	71,36%
Deep Learning and Python Programming for AI With Microsoft Azure	78,46%	59,32%	68,89%

Based on the above list, the participants accepted to drop last 10 training programs and they mentioned to add least add one training program on English Language for Start Ups specific to start-up ecosystem-based language. But as it would be not practical and fitting to the training implementation methods of this assessment, it is not proposed as a training subject as a common training programme.

#### 4. EVALUATION AND SUGGESTIONS

Based on the data provided from the questionnaire and face to face meetings with entrepreneurs, start-ups, stakeholders, ERA and partners institutions, the importance level differs but their alignment are similar.



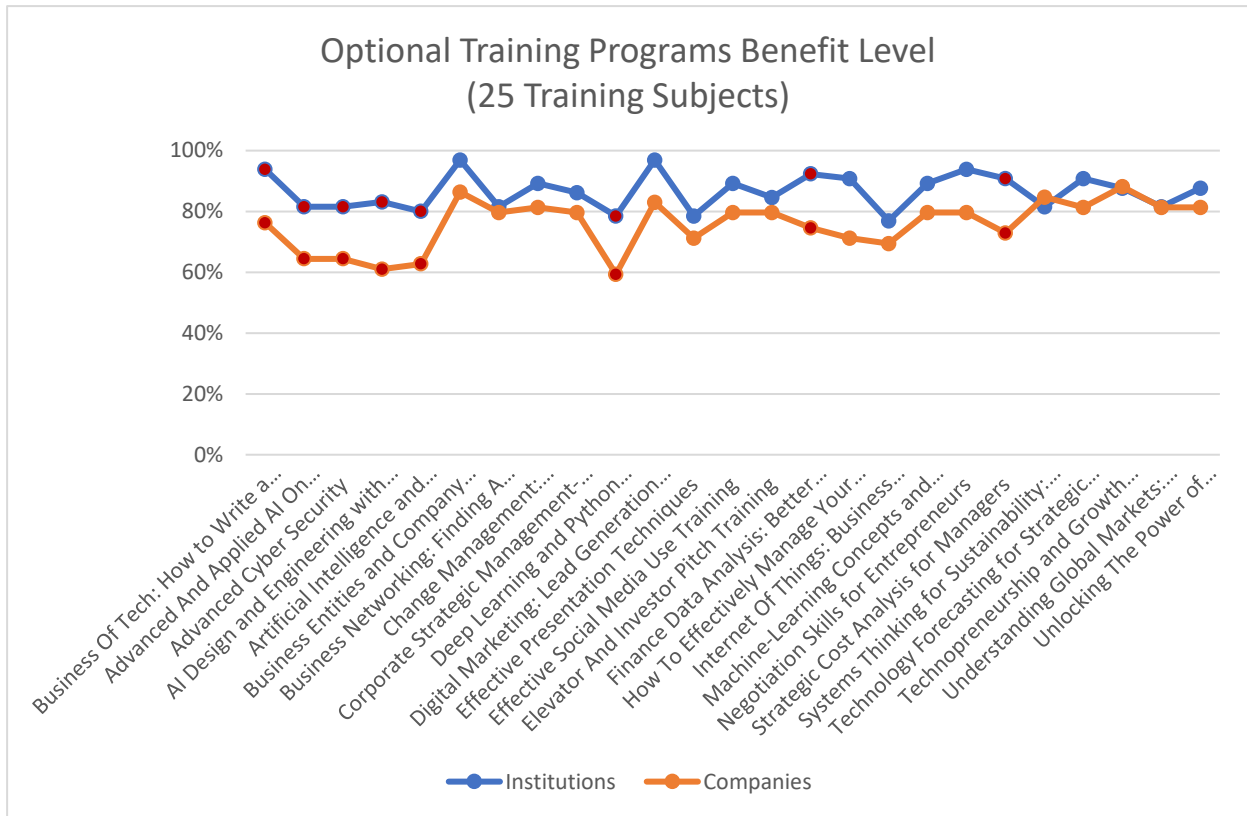
*Graph 25. Common Training Programs Importance Level (23 Training Subject)*

The companies and the institutions mostly differ on the subjects of Company Management, IPR and Technology Roadmap Development. These three subjects are perceived as more important by the TTIs and stakeholders.

Focusing on the frequency of the answers, as TNA team we suggest about the 23 training subjects that;

- The subjects over 3 points shall be suggested for the final list.
- If the training subject is under 3 for companies, it can only be suggested as needed if the institutions rate it over 4.

Focusing on the Optional Training Programs the alignment differs more than the above set of training subjects.



Graph 26. Optional Training Programs Benefit Level (25 Training Subject)

Table 7. Optional Training Programs Benefit Level (25 Training Subject)

Training Program	Institutions	Companies	Difference
Business Of Tech: How to Write a Tech Business Plan	93.85%	76.27%	17.57%
Advanced And Applied AI On Microsoft Azure	81.54%	64.41%	17.13%
Advanced Cyber Security	81.54%	64.41%	17.13%
AI Design and Engineering with Microsoft Azure	83.08%	61.02%	22.06%
Artificial Intelligence and Automation & Robotics	80.00%	62.71%	17.29%
Business Entities and Company Formation In USA And EU	96.92%	86.44%	10.48%
Business Networking: Finding A Business Partner	81.54%	79.66%	1.88%
Change Management: Organisational, Analytical Skills and Data-Driven-Advanced Leadership with Sense	89.23%	81.36%	7.87%
Corporate Strategic Management-Implementing and Evaluating Strategy	86.15%	79.66%	6.49%
Deep Learning and Python Programming for AI With Microsoft Azure	78.46%	59.32%	19.14%
Digital Marketing: Lead Generation & Sales Conversion	96.92%	83.05%	13.87%
Effective Presentation Techniques	78.46%	71.19%	7.28%
Effective Social Media Use Training	89.23%	79.66%	9.57%
Elevator And Investor Pitch Training	84.62%	79.66%	4.95%

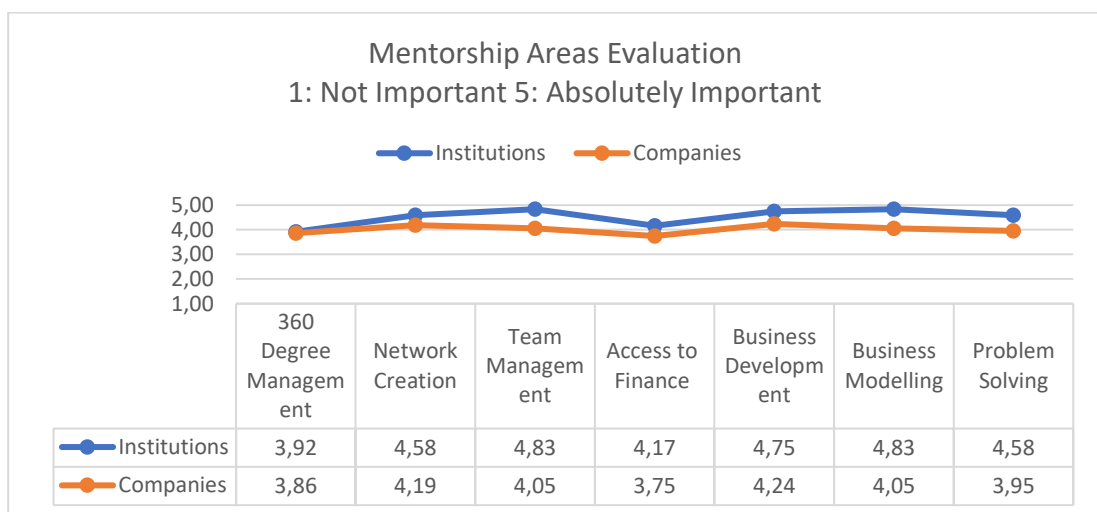
Finance Data Analysis: Better Business Through Financial Management	92.31%	74.58%	17.73%
How To Effectively Manage Your Business Through a Crisis and Problem-Solution Fit	90.77%	71.19%	19.58%
Internet Of Things: Business Implications and Opportunities	76.92%	69.49%	7.43%
Machine-Learning Concepts and Tools: Technology and Product Manager's Data-Driven Decision Making	89.23%	79.66%	9.57%
Negotiation Skills for Entrepreneurs	93.85%	79.66%	14.19%
Strategic Cost Analysis for Managers	90.77%	72.88%	17.89%
Systems Thinking for Sustainability: Complex Systems Analysis	81.54%	84.75%	-3.21%
Technology Forecasting for Strategic Decision Making	90.77%	81.36%	9.41%
Technopreneurship and Growth Strategies for Tech Start Ups	87.69%	88.14%	-0.44%
Understanding Global Markets: Macroeconomics for Executives	81.54%	81.36%	0.18%
Unlocking The Power of Perspectives: Problem Solving with Clarity, Creativity, And Collaboration	87.69%	81.36%	6.34%

Based on the comments and the results of the questionnaires, as TNA team we suggest that;

- The training subjects rated by over 70% can be suggested for the final training programme list.
- If the difference between the company and the institutions is over 20% even if it is below 70 %, it shall be added to the list.

Focusing on the Mentorship Areas, the TAT has suggested on the questionnaire 7 different fields as;

- 360 Degree Management
- Team Management
- Network Creation
- Access to Finance
- Business Development
- Business Modelling
- Problem Solving



*Graph 27. Mentorship Areas Evaluation*

The mentorship programs are proposed to be eliminated according to the rating under 4. As 360 Degree Management is perceived as very general and the participants stated that specific mentoring programs are more useful and result oriented and rated under 4 by both responding groups, it shall be left out of the list and other fields shall take place within the list.

## 5. CONCLUSION

The Training Needs Assessment held under the Technical Assistance For A Smart Network For Technology Transfer And Commercialisation With Funnel Model (SMARTNET) project was conducted towards;

1. 36 Participants from ERA and partner Universities; YTU, HKU and GTU
2. 17 stakeholders including TTIs, KOSGEBs, CCIs, Startup Ecosystem Hubs and Development Agencies.
3. 59 Entrepreneurs and Start ups

Based on the analyses held after conducting physical and online face to face meetings and questionnaires a focus group meeting was organized. Assessing all, the below list of trainings is suggested for basic and advanced trainings to be given firstly online and at the second stage through classroom or hybrid trainings.

Among 38 trainings proposed, 32 are from the previous lists of the ToR and the proposal. 6 of the trainings have been selected from the list of interviewees proposed training list based on comments and the emphasis put on the added subjects.

The training subjects proposed for 23 + 15 training programmes as the deliverable of the project are;

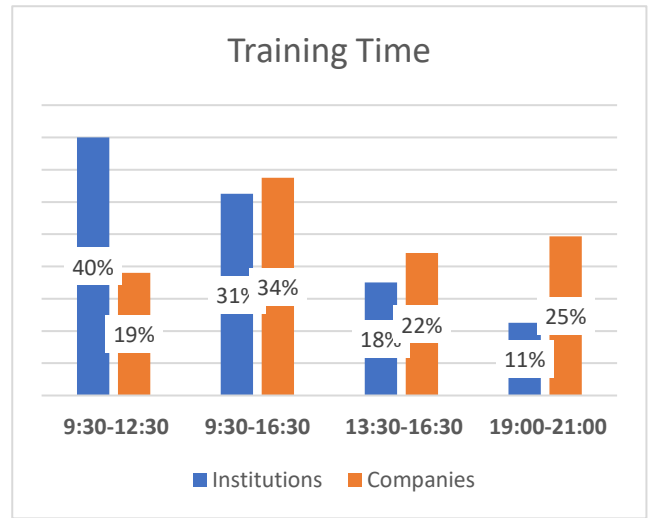
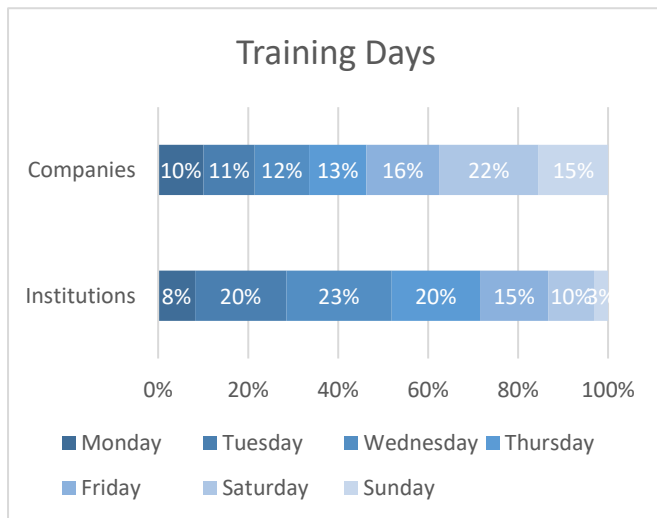
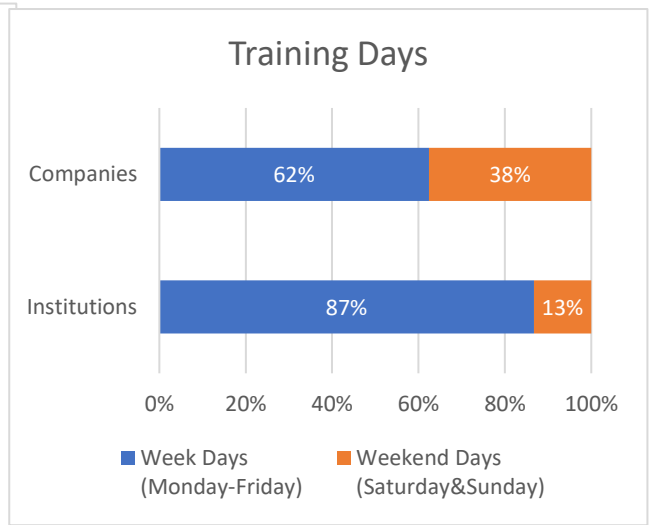
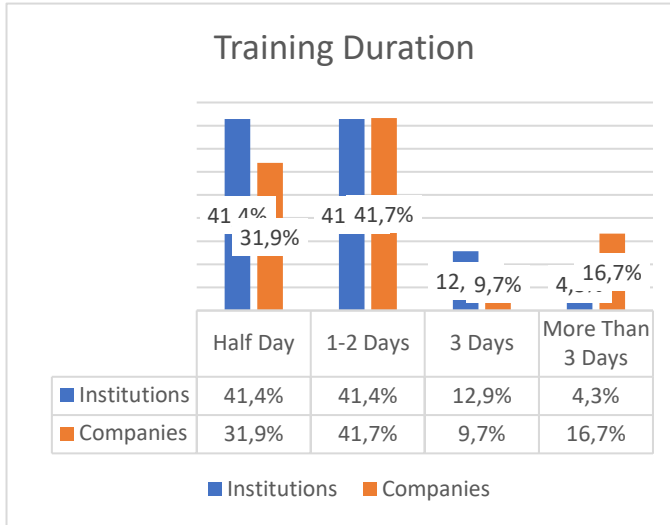
### Final List of Proposed Trainings by the TNA

1	Access to Financial Resources and Investor Relations
2	Analysis of Error Types and Effects
3	Branding
4	Business Model Development
5	Company Management
6	Customer Management
7	Experimental Development
8	Innovation Management
9	Innovative Product / Process Development
10	Intellectual Property Rights
11	Market Analysis and New Market Entry Strategies
12	Performance and Function Analysis
13	Process Analysis and Process Development

14	Product Positioning
15	<b>Design Thinking</b>
16	Project Development and Management
17	Prototyping
18	Statistical Process Management
19	Technology Roadmap Development
20	Value Creation
21	Value Proposition Management
22	<b>Growth Hacking</b>
23	<b>Business Law</b>
+1	Systems Thinking for Sustainability: Complex Systems Analysis
+2	Business Entities and Company Formation In USA And EU
+3	Business Of Tech: How to Write a Tech Business Plan
+4	Digital Marketing: Lead Generation & Sales Conversion
+5	Negotiation Skills for Entrepreneurs
+6	Financial Data Analysis: Better Business Through Financial Management
+7	How To Effectively Manage Your Business Through a Crisis and Problem-Solution Fit
+8	Technology Forecasting for Strategic Decision Making
+9	Technopreneurship and Growth Strategies for Tech Start Ups
+10	Change Management: Organisational, Analytical Skills and Data-Driven-Advanced Leadership with Sense
+11	Elevator And Investor Pitch Training
+12	Business Networking: Finding A Business Partner
+13	<b>Successful Exit Strategies</b>
+14	<b>Team Management</b>
+15	<b>Blockchain</b>

Regarding the delivery of the trainings, based on the answers.

- Hybrid trainings are mostly preferred. The theoretical trainings may be online but implementation sessions shall be face to face.
- Weekends and afternoons hours are more suitable for the companies for attending to a training. Alternatively, evening hours are also specified by 25 % of the participants. But the TTIs are prone to organize trainings in the weekdays and within working hours.
- A training shall endure half day. If more, maximum 2 days is preferred by the companies.



- Content of the trainings are key for a start up or entrepreneur to spend time for a training. For that reason, content of the trainings shall be on-target and the trainers shall be selected among experienced ones.
- Mentoring programs are preferred to trainings. Instead of general mentoring programs, few specific mentoring subjects may be defined.

Additionally, the proposed mentoring subjects based on the suggestions and the participants' answers are;

#### Final List of Proposed Mentoring Fields by the TNA;

1	Team Management
2	Access to Finance
3	Business Development
4	Business Modelling
5	Problem Solving
6	Network Creation
7	Financial Data Analytics



<b>8</b>	Investor Meetings
<b>9</b>	Export
<b>10</b>	Investment Mentoring
<b>11</b>	B2B Collaboration
<b>12</b>	Reaching the Customer / Market

## **6. ANNEXES**

1. Training Programme Contents and Logistic Details
2. TNA Form for ERA, Partners and Stakeholders
3. TNA Form for Companies
4. Interview List with ERA, Partners and Stakeholders
5. Interview List with Companies
6. Focus Group Meeting Participants
7. Focus Group Presentation
8. Photos