



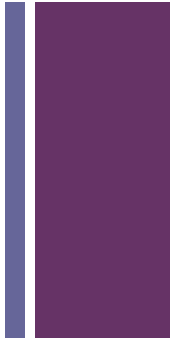
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of the European Union



**ARRANGE-ICT**  
pArtneRship foR AddressiNG mEgatrends in ICT



ALEXANDER  
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# pArtneRship foR AddressiNG mEgatrends in ICT

## Output 3 (O3) Foresight Study

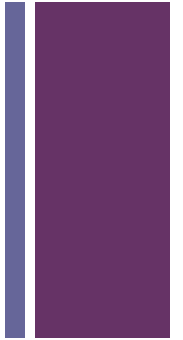
Thessaloniki, 19<sup>th</sup> November 2020

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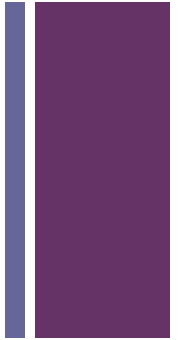
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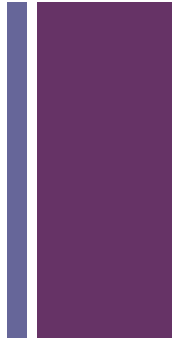
# Foresight Study for the ICT sector



- Technology Foresight (TF)
  - an essentially important tool for long-term planning at
    - Regional,
    - National or even International level
  - exploring the future to record trends and potential developments
  - the primary aim
    - improving and preparing today's decisions and strategic choices as best as possible



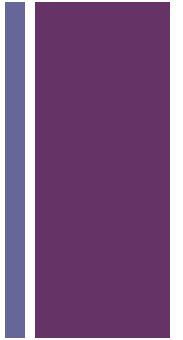
# Existing tools that can be used in order to deliver the TF



- The 10 Most Common Technologies of Foresight in Europe (EFMN)

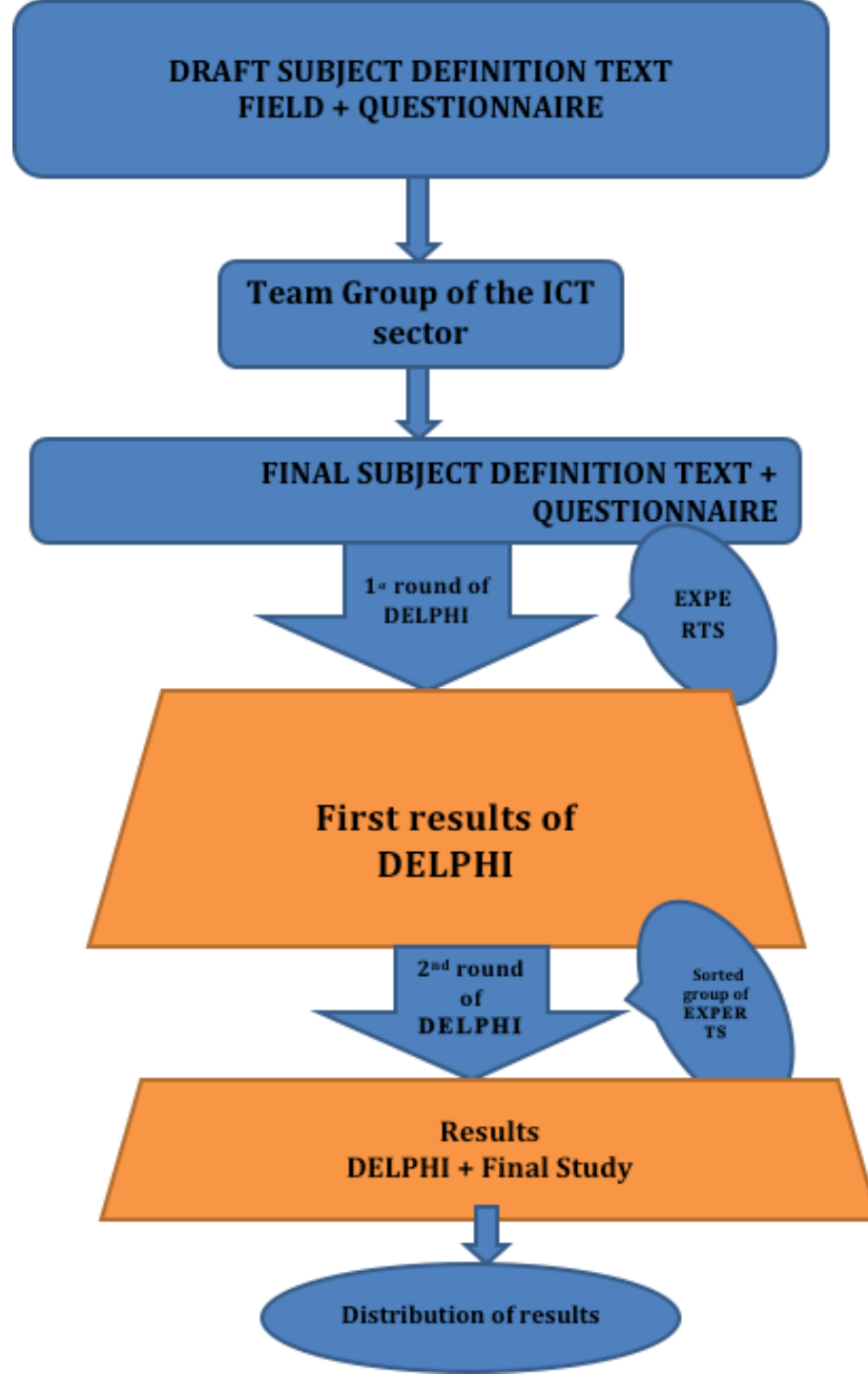


# DELPHI technique



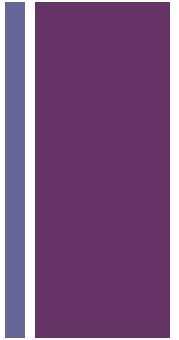
## ■ Delphi

- a research methodology widely used in a wide range of disciplines
- obtains the maximum possible consensus of a pre-selected group of experts on a topic,
  - by providing them with a series of consecutive questionnaires.





# Delphi Research Questionnaire (1/2)



## 1. Methodology

- Internet based research Delphi

## 2. Research Period

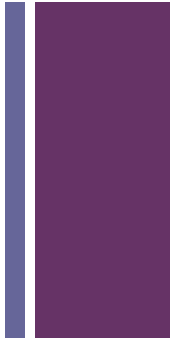
- Phase 1: July-August 2020
- Phase 2: September-October 2020

## 3. Interviews conducted

1. 1st Phase:  $n_1 = 48$   
(Percentage of answers: 81.25 %)
2. 2nd Phase:  $n_2 = 39$   
(Percentage of answers: 89.74 %)



# Delphi Research Questionnaire (2/2)



## 4. Selection of experts

- Representatives from:

- business,
- academic community,
- public bodies

invited to participate in the research,

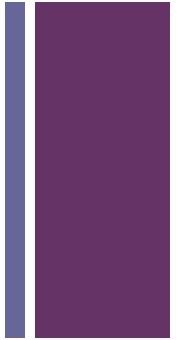
- based on their specialization and experience in ICT

<b>Business</b>	<b><math>n_1 = 14</math></b>	<b><math>n_2 = 12</math></b>
<b>Academics</b>	<b><math>n_1 = 20</math></b>	<b><math>n_2 = 17</math></b>
<b>Public bodies</b>	<b><math>n_1 = 14</math></b>	<b><math>n_2 = 10</math></b>





# Delphi statement catalog (1/3)



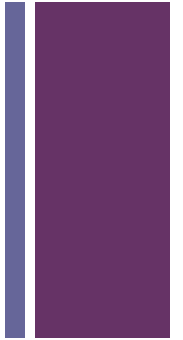
- The sector encompasses a diverse range of roles and skills.
- The questionnaire includes specific questions concerning the identification of gaps in ICT skills on 2 categories and 13 sectors:
  - Horizontal Sectors
  - Vertical Sectors

**How important do you think  
the statement is?**

**(1 = not important; 2 = hardly important;  
3 = important; 4 = quite important;  
5 = totally important)**



# Delphi statement catalog (2/3)

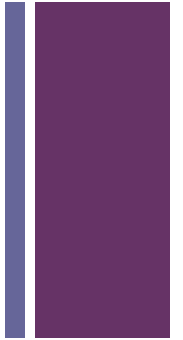


## Horizontal Sectors:

1. **Programming**
2. **Device, Network and Cloud Infrastructure**
3. **Cyber Security**
4. **ICT Business Change**
5. **Artificial Intelligence**
6. **Data Science**
7. **Web Services**

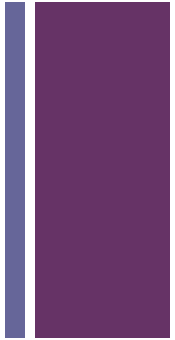


# Delphi statement catalog (3/3)



## Vertical Sectors:

8. **E-learning**
9. **E-health care**
10. **E-government**
11. **E-payments**
12. **E-culture/tourism**
13. **Generating IT ancillary/soft/moderate skills**

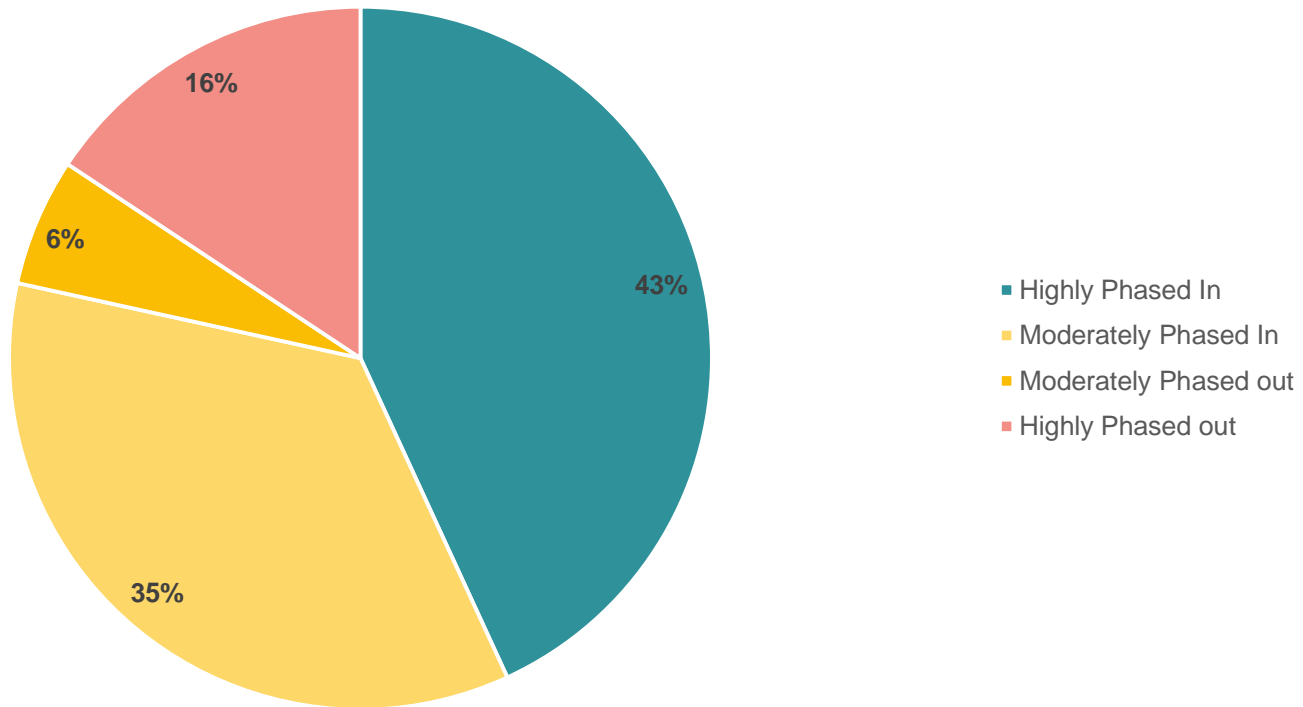
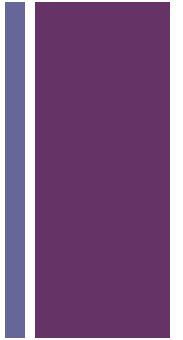


# Table: Description of the classifications

	Highly Phased In	$M \geq 4, QD \leq 0.5$	Keeping
	Moderately Phased In	$M \geq 4, 0.5 < QD \leq 1$	Keeping
	Moderately Phased Out	$M < 4, 0.5 < QD \leq 1$	Keeping
	Highly Phased Out	$M < 4, QD \leq 0.5$	Discarding

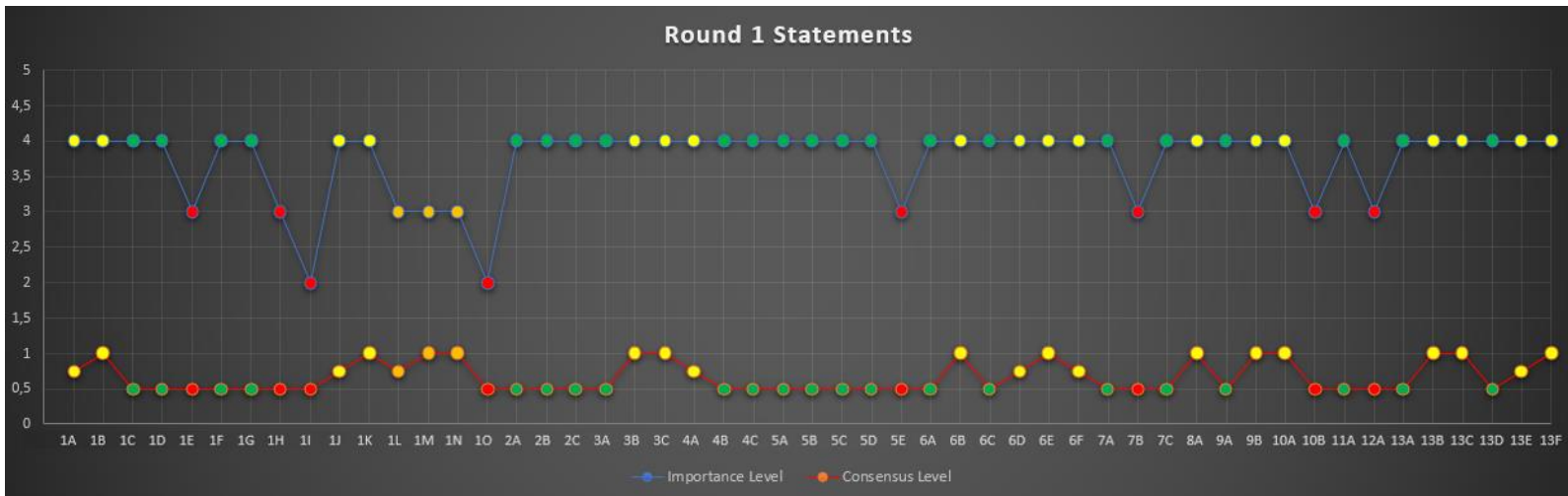
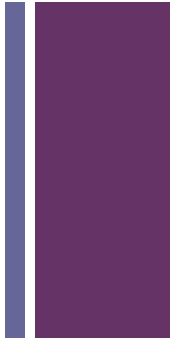


# Delphi Round 1 - Results (1/2)



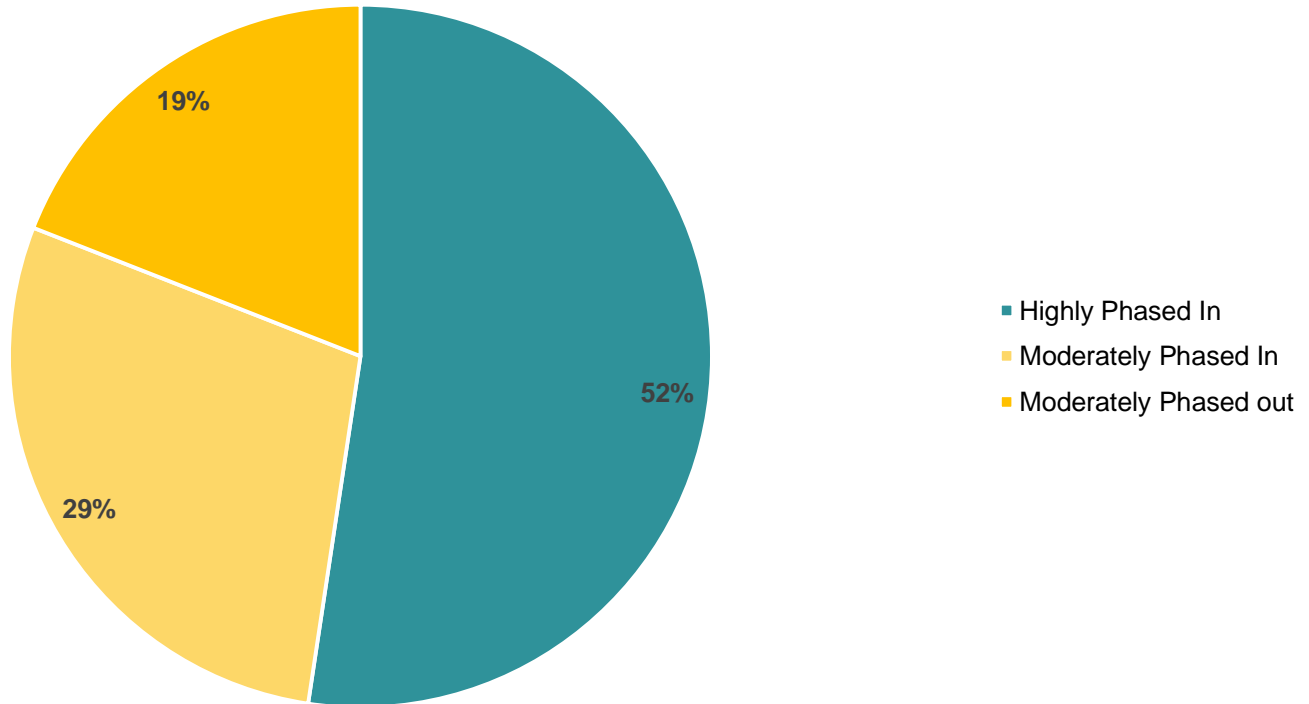
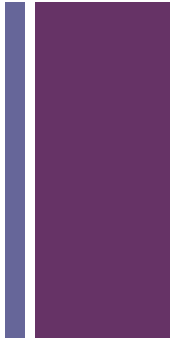


# Delphi Round 1 - Results (2/2)



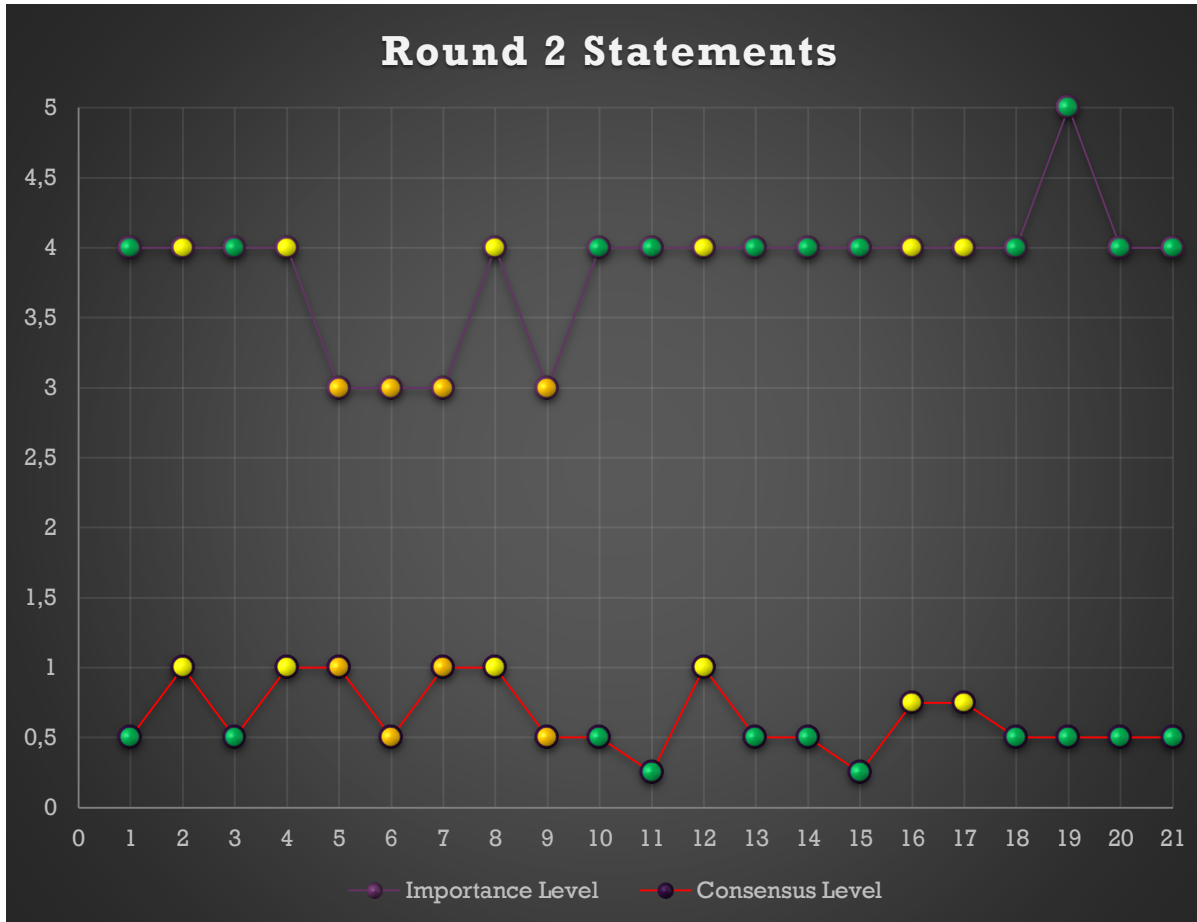


# Delphi Round 2 - Results (1/4)





# Delphi Round 2 - Results (2/4)



- 1 1A. SQL
- 2 1B. JAVA
- 3 1J. PYTHON
- 4 1K. PHP
- 5 1L. OBJECTIVE C
- 6 1M. AJAX
- 7 1N. ASP.NET
- 8 3B. Communication security
- 9 3C. Quantum cryptography Expert
- 10 4A. ICT Business analyst
- 11 6B. Database Designer
- 12 6D. Big Data Modeling
- 13 6E. Data Analysis
- 14 6F. Data visualization
- 15 8A. Education and e-learning
- 16 9B. Advanced health monitoring system
- 17 10A. Digital Certificates Specialists
- 18 13B. Teamwork
- 19 13C. Communication
- 20 13E. Negotiation
- 21 13F. Technology Leadership

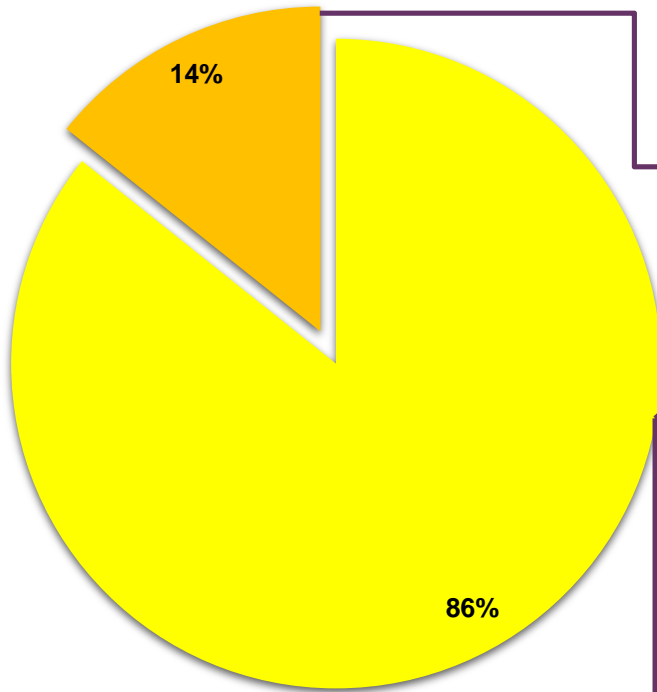




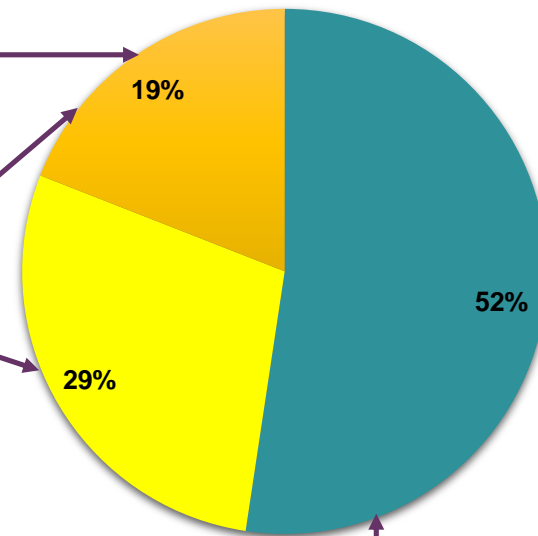
# Delphi Round 2 - Results (3/4)



R1 Run Statements in R2



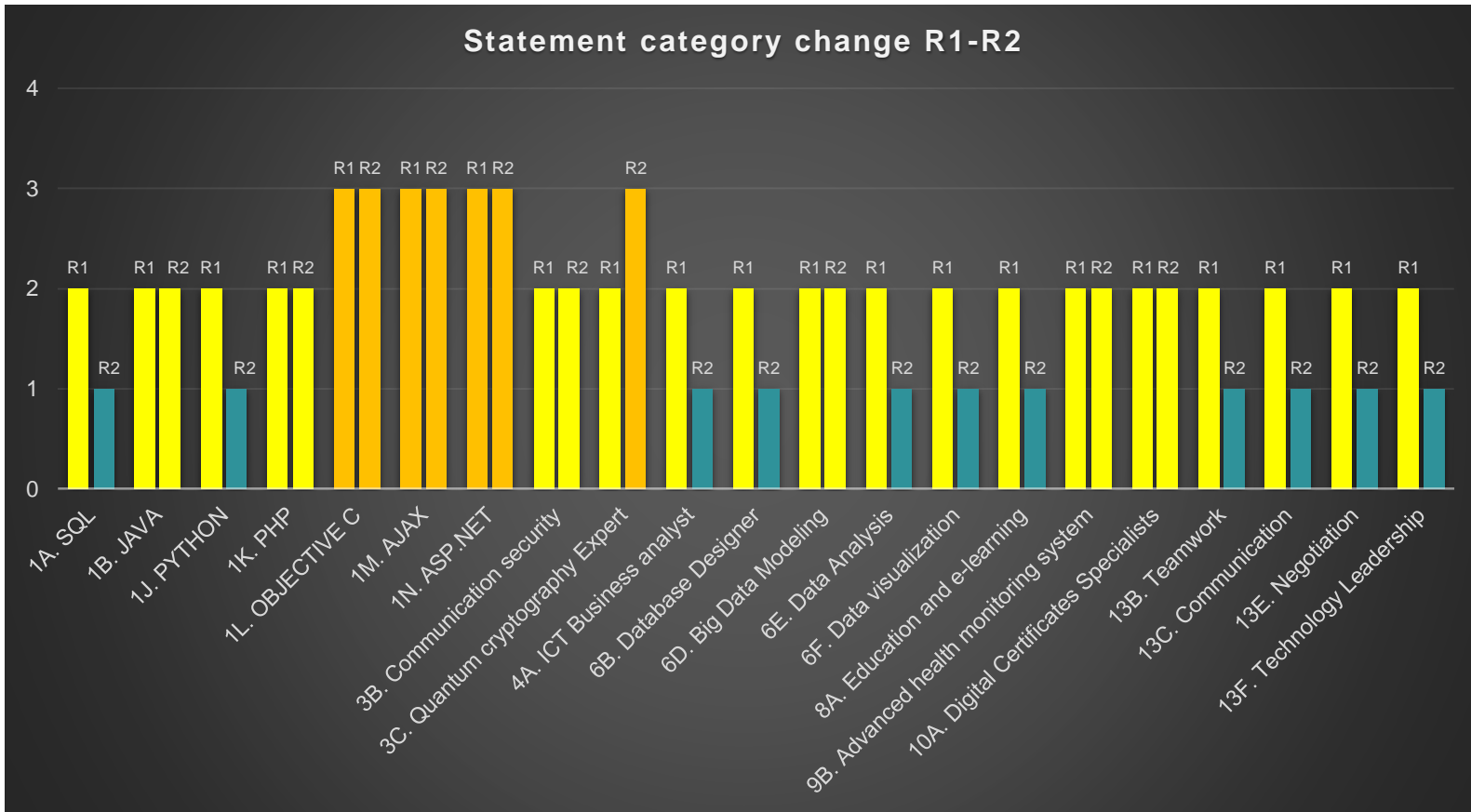
R2 Statements that changed categories from R1 or remained same



- Highly Phased In
- Moderately Phased In
- Moderately Phased out



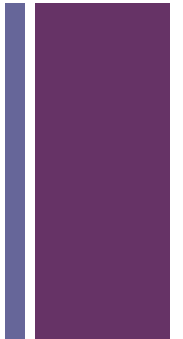
# Delphi Round 2 - Results (4/4)





# Final Results

## (1/3)



<b>Horizontal Sectors</b>	
<b>Programming</b>	<b>Device, Network and Cloud Infrastructure</b>
HTML	<b>Device Management</b>
JavaScript	<b>Networking Hardware</b>
XML	<b>Cloud Computing Infrastructure</b>
C#	<b>Cyber Security</b>
SQL	<b>ICT Security Specialist</b>
PYTHON	



# Final Results

## (2/3)

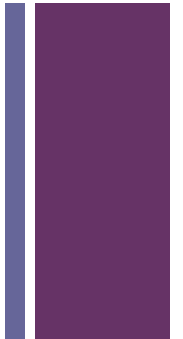


<b>Horizontal Sectors</b>	
<b>ICT Business Change</b>	<b>Artificial Intelligence</b>
<b>ICT Business Development Manager</b>	<b>Machine Learning</b>
<b>Business Intelligence</b>	<b>Automation in Robotics</b>
<b>ICT Business Analyst</b>	<b>Automated Reasoning</b>
	<b>Knowledge Representation</b>
<b>Data Science</b>	<b>Web services</b>
<b>Database Designer</b>	<b>Web Designer</b>
<b>Big Data Analytics</b>	<b>Web Development</b>
<b>Database Designer</b>	
<b>Data Analysis</b>	
<b>Data Visualization</b>	



# Final Results

## (3/3)

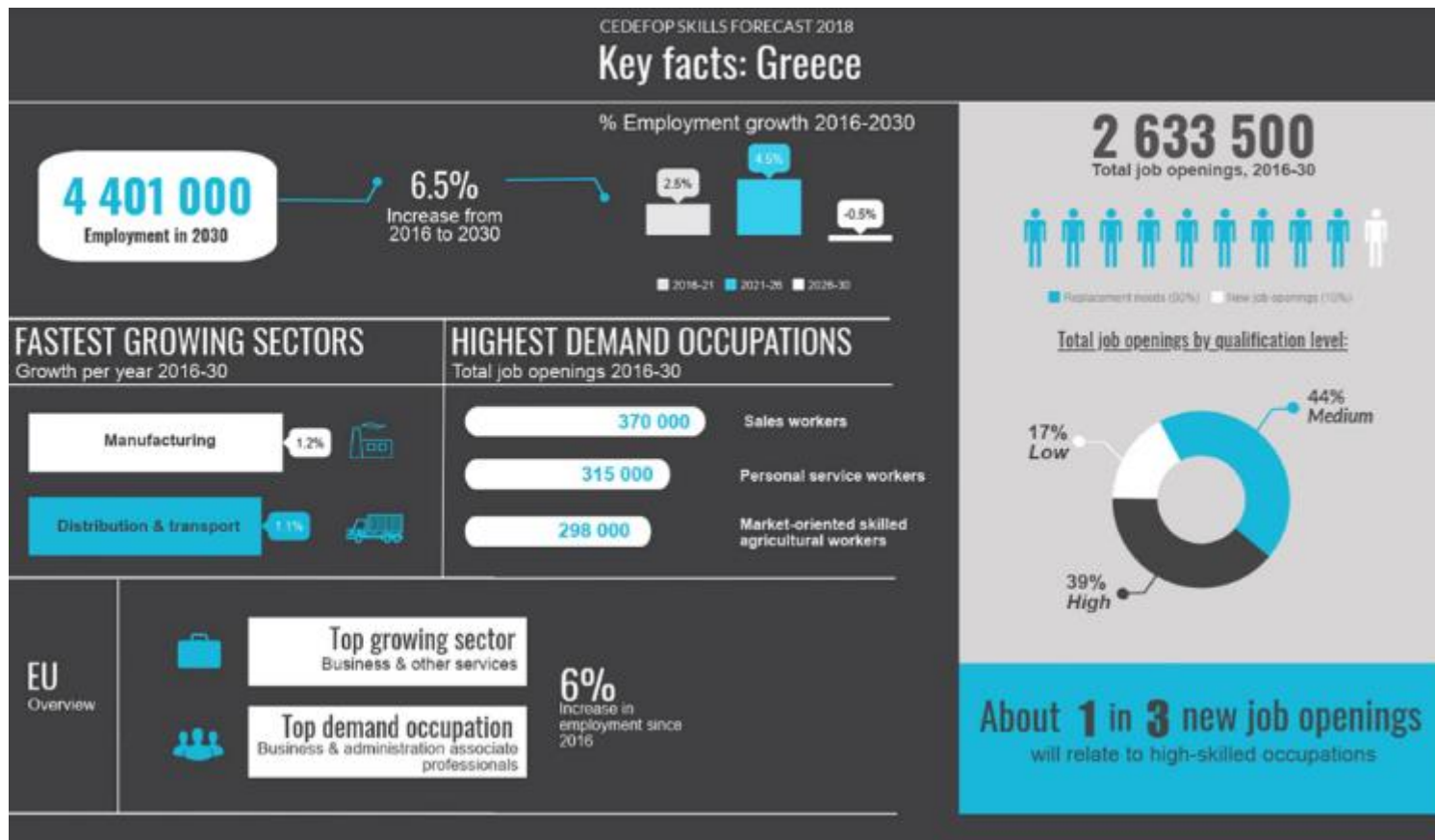
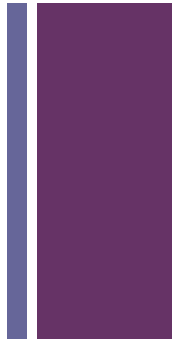


<b>Vertical Sectors</b>	
<b>E-learning</b>	<b>Generating IT ancillary/soft/moderate skills</b>
<b>Education and e-learning</b>	<b>Problem Solving</b>
<b>E-health care</b>	<b>Self-Awareness</b>
<b>24-hour ICT-based care</b>	<b>Teamwork</b>
<b>E-payments</b>	<b>Communication</b>
<b>Mobile Phone Trading</b>	<b>Negotiation</b>
	<b>Technology Leadership</b>



# Key facts for Greece

Source: <https://www.cedefop.europa.eu/>





Thank you for your attention!

