



## **MATEO PROJECT: TETRINNO SMARTEX**

### **Work Package 3:**

**“Study and analysis of the solutions with regard to the specific characteristics of the sector at the regional level”**

## INDEX

1	Introduction to the methodology .....	3
1.1	Questionnaire .....	3
1.2	Methodology for gathering of company's information .....	4
2	Results of the regional evaluations.....	7
2.1	Evaluated companies and employee numbers.....	7
2.2	Actual resources.....	9
2.3	Capacity for innovating .....	15
3	General Results .....	21
3.1	Evaluated companies and employee numbers.....	21
3.2	Actual resources.....	21
3.3	Capacity for innovating .....	21
4	Annex I: Questionnaire.....	21

## 1 Introduction to the methodology

In the present document, the methodology used for the collection of information during the work package 3 is presented.

It consists mainly of a questionnaire where the companies describe some general information about their current production and their interest in smart textiles.

Companies can fill out the questionnaire by three channels: by the web, by cards, mails or fax and by means of individual visit to the company.

Afterwards, the information collected by this questionnaire has been gathered in two levels: at the regional and at the interregional level.

In the following sections the questionnaire is described and then the methodology to analyse this data is presented.

### 1.1 Questionnaire

The questionnaire consists of two parts:

- ✓ **General data of the company:** In this section, the data collected is the name, the location and the number of employees in the company
- ✓ **Data about the actual resources:** The points evaluated in this section are:
  - Capacity of production
  - Type of production: Considering the main textile activities (Spinning, Preparation for weaving (warping), Weaving among others)
  - Type of raw materials: Taking into consideration the main raw materials, like natural fibres, synthetic fibres, etc.
  - Type of machinery
  - Destination of the production: Regional, National or International

- Field(s) of application: The markets where the production is addressed, like clothing, medical, sport applications among others.
- Smart textile used: In case the company is already working on smart textile, define their category (Phase changing Materials, Electroactive polymers, Chromic Materials, Conductive Materials, etc)
- Interest in innovative solutions
- Interested in increasing the field(s) of competences
- Interested in receiving the final catalogue of the project
- Ideas or proposals to develop into the Smart Textile

In the annex I the whole questionnaire is enclosed.

## 1.2 Methodology for gathering of company's information

In order to facilitate the gathering of the information obtained during the work package 3, a methodology that both ensure the confidentiality at regional level and a good evaluation of the resource has been established.

At regional level, each participant has treated and gathered the information in an excel document where each point has been treated on a separated page in order to facilitate the gathering at interregional level. Regional results and circular graphics have been made by regional partner.

At the interregional level, the same methodology has been used by the LEITAT to integrate the regional data.

The methodology is as follows:

### 1. Evaluated companies

1.1 A list of evaluated company has been included.

1.2 An approximation of the tools that have allowed the collection of information.

- % of companies that have answered by web
- % of companies that have answered by cards, mails or fax
- % of companies that have answered by means of individual visit.

**2. Number of employees.** The companies have been gathered in groups:

- < at 10 employees
- < at 50 employees
- < at 100 employees
- > at 100 employees

**3. Actual resources**

3.1 Capacity of production: It has been difficult to gather this kind of information, so the circular type graphic rang has been defined after gathering all partners info.

3.2 Type of production.

- % of yarn producers
- % of Fabrics producers
- % of dyeing, coating, finishing
- % of textiles commercial goods for public

3.3 Type of raw materials

- % of companies that use natural yarns and fibres
- % of companies that use synthetic yarns and fibres
- % of companies that use woven textiles
- % of companies that use non woven textiles
- % of companies that use membranes – inks- colorants
- % of others

3.4 Destination of the production

- % of regional
- % of national
- % of international

3.5. Field of application of the production

- % of companies that produce for Clothing applications
- % of companies that produce for Medical applications
- % of companies that produce for Sport applications

- % of companies that produce for Automobile applications
- % of companies that produce for Army applications
- % of companies that produce for Personal protection equipment applications
- % of companies that produce for Home textile applications
- % of companies that produce for Geotextile applications

#### **4. Capacity for innovating**

##### 4.1 Company that used Smart materials

- % of company that used Smart materials
- % of company that don't used Smart materials

##### 4.1.2 About the company that used Smart materials.

- % of companies that use phase changing materials
- % of companies that use electroactive polymers
- % of companies that use conductive materials
- % of companies that use luminescent materials
- % of companies that use antimicrobial materials
- % of companies that use solar cells
- % of companies that use electronic textile

##### 4.2 Company that have manifested concrete ideas of development

- % of company that have completed the last paragraph of the questionnaire
- % of company that have not completed the last paragraph of the questionnaire

##### 4.3 % of company that demonstrate an interest for innovating solutions

##### 4.4 % of company interested in increasing their field of competences

##### 4.5 % of company interested in receiving the questionnaires

**In most cases, the results are presented in a circular type graphic with the corresponding %.** Companies that apply in various choices have been counted in each sector.

## 2 Results of the regional evaluations

In this section, the conclusions with regard of the specific characteristics at the regional level are presented. Those results are compared among them and with the global results to draw conclusions.

In some cases the sum of the different items gives results over 100% per region. The reason of it is that some companies are considered in the different categories. However in the graphics it is considered the total amount proportionally

### 2.1 Evaluated companies and employee numbers

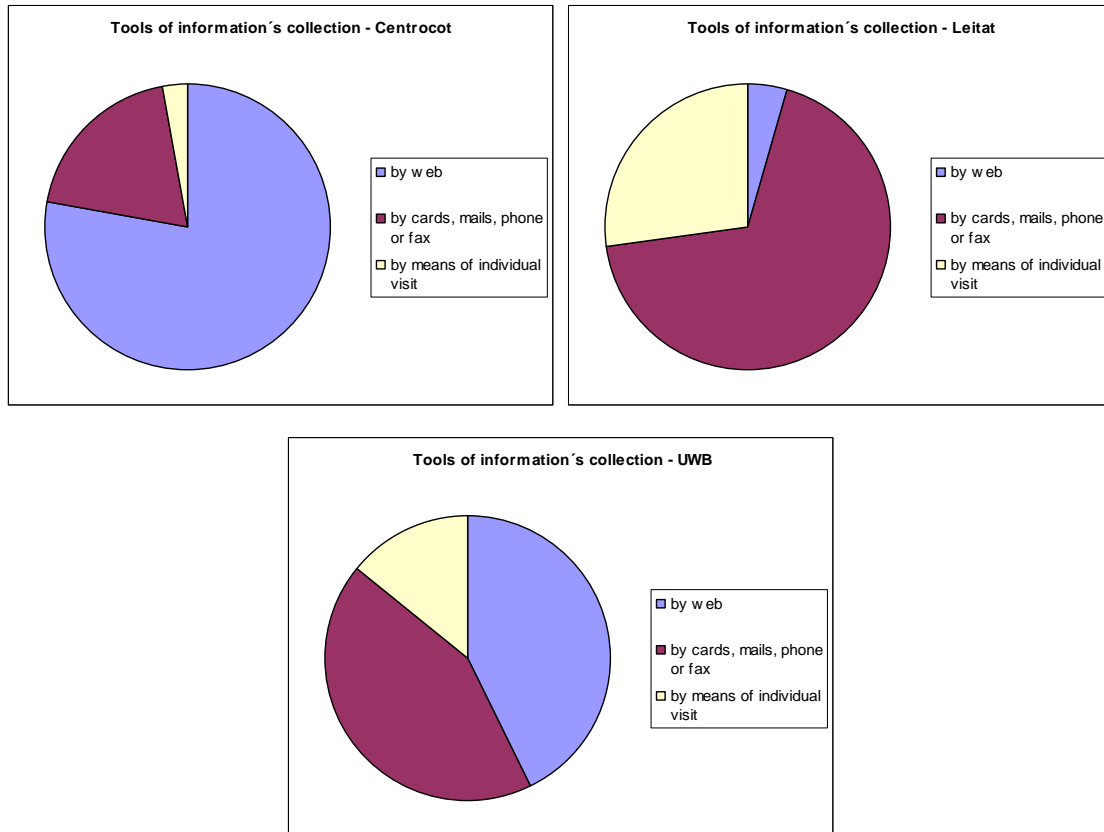
The whole number of companies that have taken part in this Work Package 3 is **72**:

- ✓ **Centrocot**: 36 companies
- ✓ **Leitat**: 22 companies
- ✓ **UWB**: 14 companies

In reference to the tools that have allowed the collection of information, we find the following results:

Tools that have allowed the collection of information.			
Evaluation Mode	Centrocot	Leitat	UWB
by web	77,78 %	4,55 %	42,86 %
by cards, mails, phone or fax	19,44 %	68,18 %	42,86 %
by means of individual visit	2,78 %	27,27 %	14,29 %

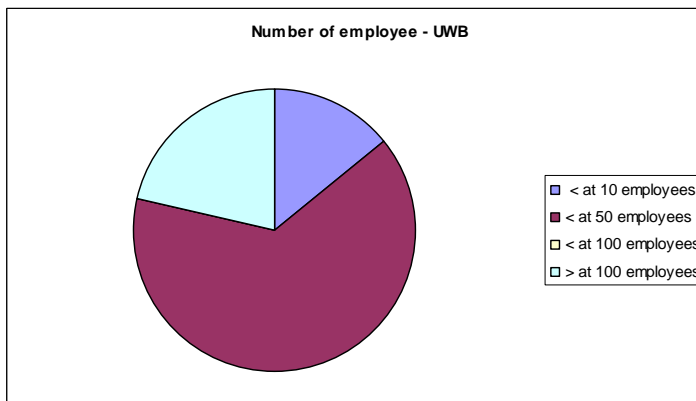
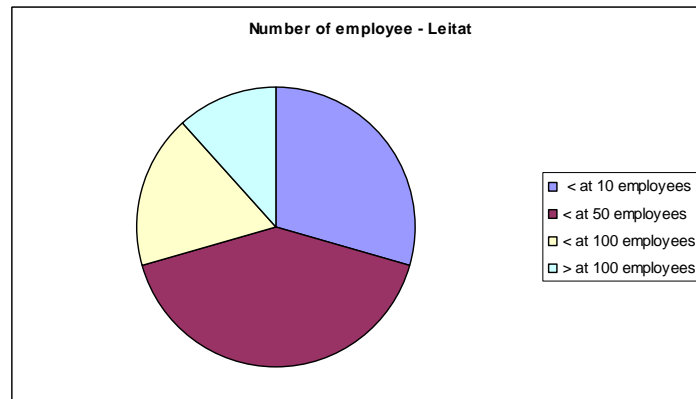
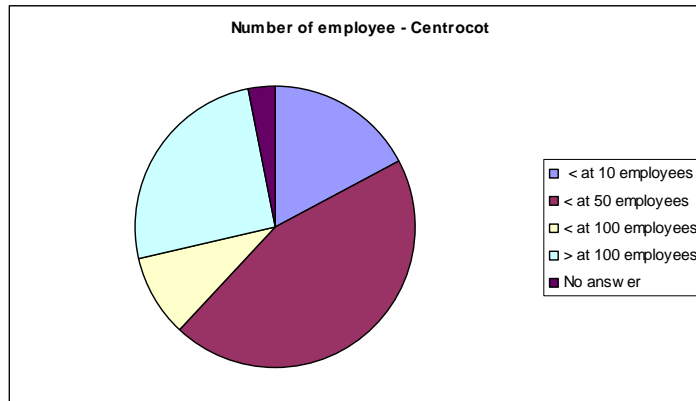
The results are shown in the figures below:



As we appreciate in the results above, depending on the region the distribution of the main tools varies, and we can not identify a clear trend among the territories. However we can observe that the companies have been contacted mainly by web in Centrocot, by cards, mails, phone or fax in the case of Leitat and by web, cards, mails, phone or fax in UWB.

In the following table and figures, we compare the rank of number of employees in the companies participating in the project:

Number of employee	Centrocot	Leitat	UWB
< at 10 employees	16,00 %	22,73 %	14,29 %
< at 50 employees	41,18 %	31,82 %	64,29 %
< at 100 employees	8,82 %	13,64 %	
> at 100 employees	23,53 %	9,09 %	21,43 %
No answer	2,94 %	22,73 %	



The most common rank of employees in the different regions is the one from the companies that have less than 50 and more than 10 employees. In Centrocot and in the UWB it is also remarkable the high percentage of companies which have more than 100 employees. In the case of Leitat, it is also relevant the percentage of companies with less than 10 employees.

## 2.2 Actual resources

In reference to capacities of production, from the companies contacted by,

- ✓ Centrocot, the 47%
- ✓ Leitat, only the 27%

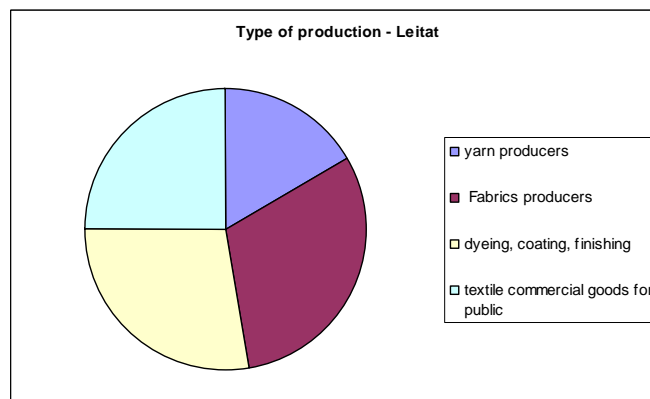
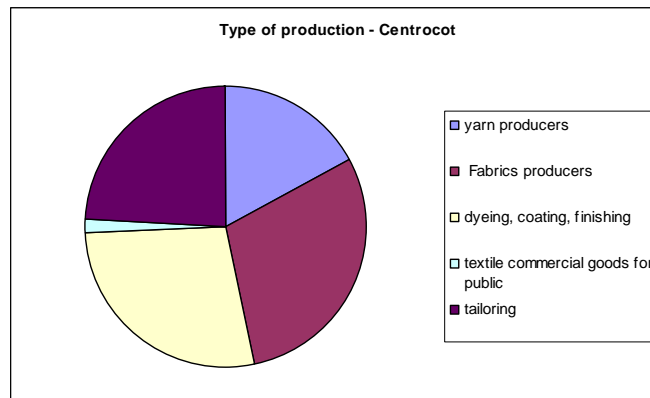
✓ UWB, the 42%

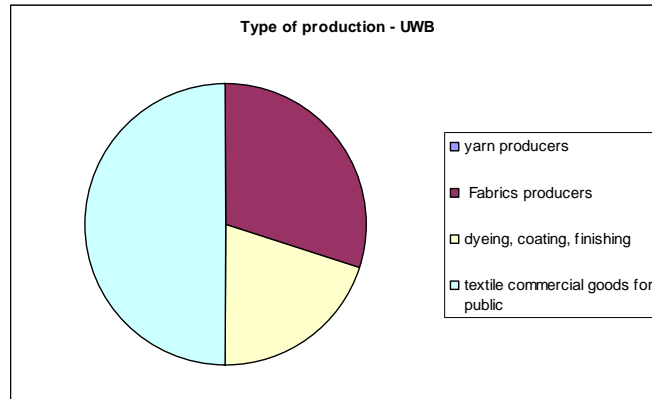
have answered the question about the capacity of production.

The units of measurement are quite different depending on each company interviewed. Some instances are: m/day, garments/month, tons/year, garments/month, kg, tons/year, kg/year among others.

In reference to the type of production, the percentage of companies for each type is as follows:

Type of production			
	Centrocot	Leitat	UWB
Yarn producers	17,24 %	27,27 %	
Fabrics producers	29,31 %	50,00 %	42,86 %
Dyeing, coating, finishing	27,59 %	45,45 %	28,57 %
Textile commercial goods for public	1,72 %	40,91 %	71,43 %
Tailoring	24,14 %		

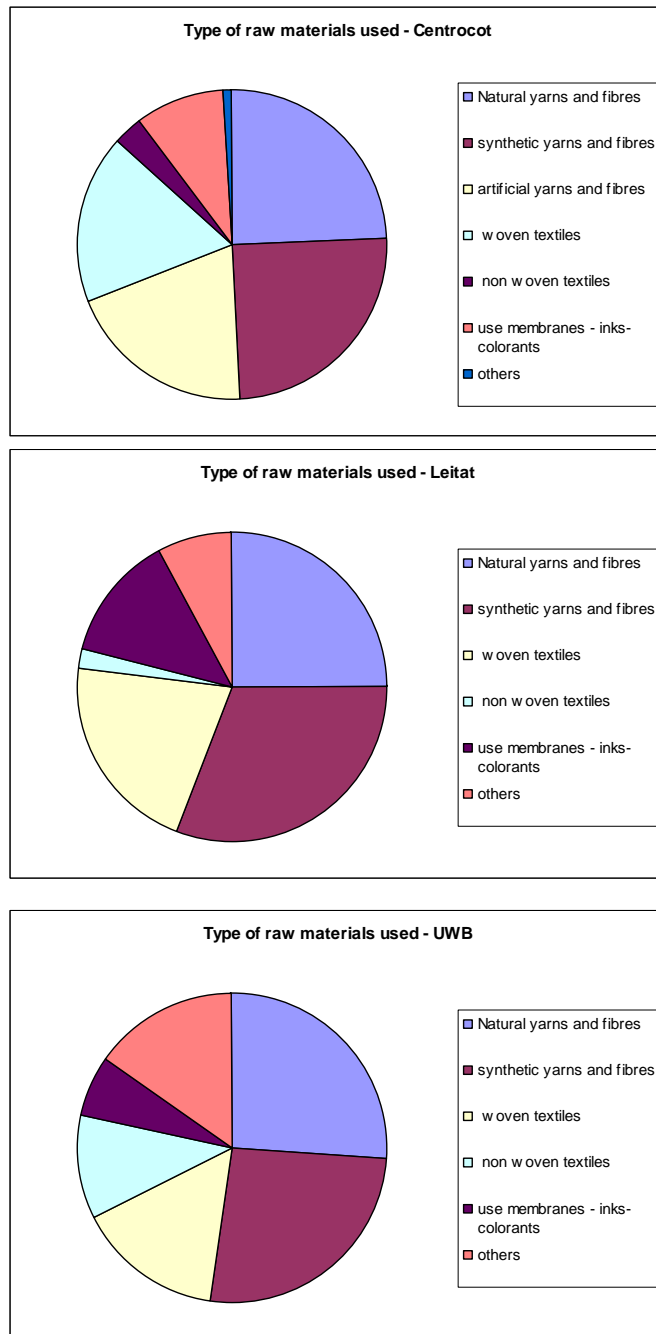




The companies contacted by Centrocot are mainly fabric producers, dyeing, coating and finishing and tailoring companies. In the case of the companies contacted by Leitat, are mainly fabric producers, dyeing, coating and finishing companies like Centrocot, but on the other hand, the textile commercial goods for public are also relevant. Finally, the companies reached by UWB produce mainly textile commercial goods for public, but also fabric producers are important.

In relation to the raw materials used, we find the following distribution:

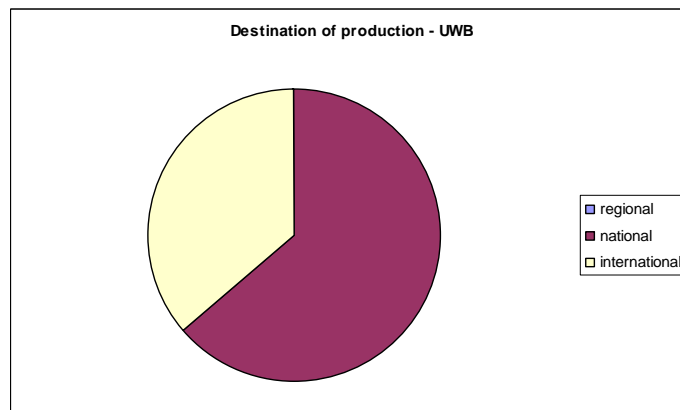
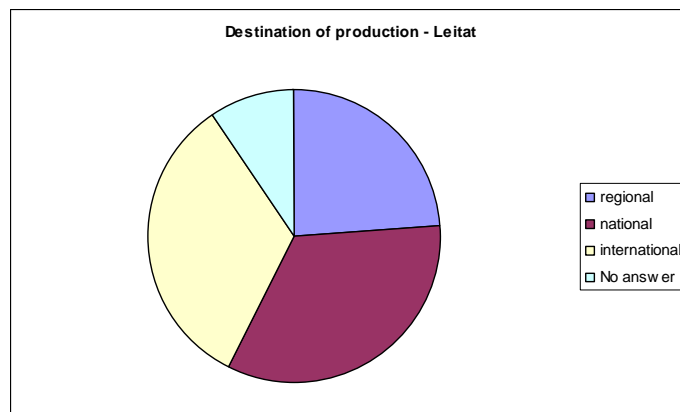
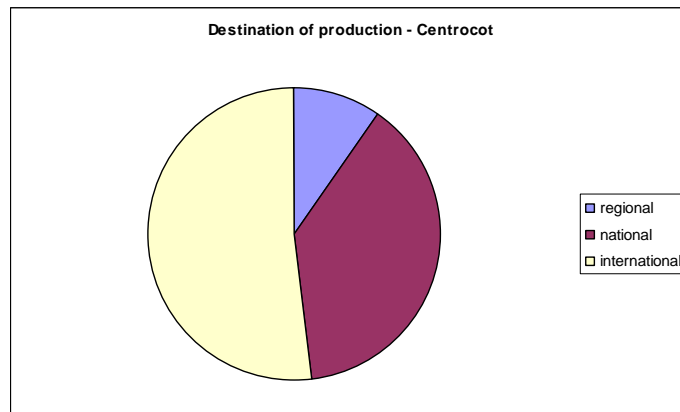
<b>Type of Raw materials used</b>			
	<b>Centrocot</b>	<b>Leitat</b>	<b>UWB</b>
Natural yarns and fibres	24,53%	59,09%	85,71%
synthetic yarns and fibres	24,53%	72,73%	85,71%
artificial yarns and fibres	19,81%		
woven textiles	17,92%	50,00%	50,00%
non woven textiles	2,83%	4,55%	35,71%
use membranes - inks- colorants	9,43%	31,82%	21,43%
others	0,94%	18,18%	50,00%



As it can be observed in the table and graphics above, the companies contacted by Centrocot use mainly natural yarns and fibres, also synthetic yarns and fibres and to a lesser extend artificial yarns and fibres and woven textiles. The same observations apply to the companies contacted by Leitat and UWB which also use the same raw materials except for the artificial yarns and fibres.

In reference to the destination of the production, we find out the following data:

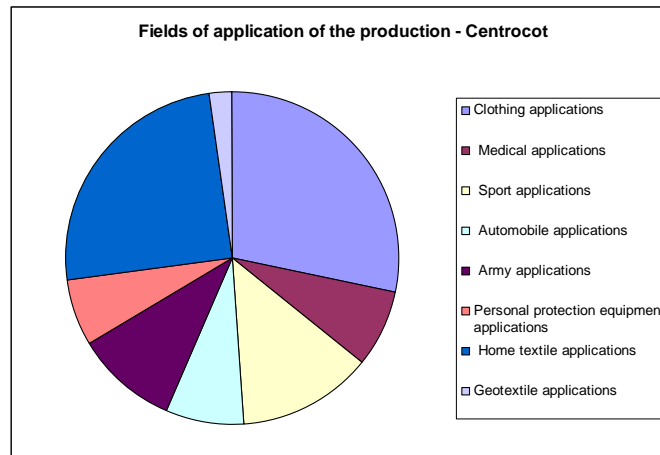
Destination of production			
	Centrocot	Leitat	UWB
regional	9,62%	45,45%	
national	38,46%	63,64%	100,00%
international	51,92%	63,64%	57,14%
no answer		18,18%	

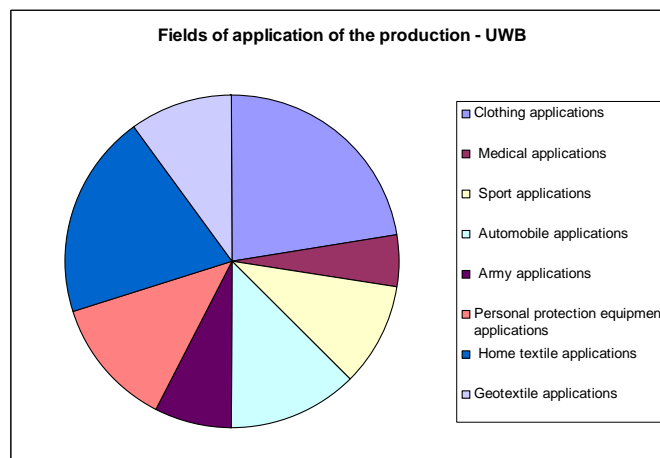
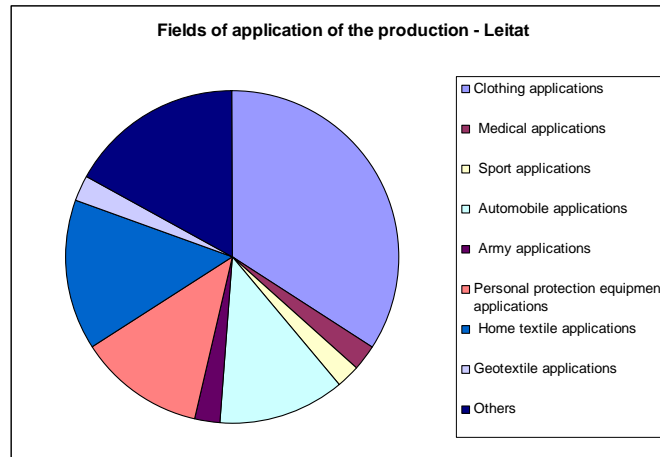


As it can be seen in the data and graphics above, the companies reached by Centrocot destine their production to the national and international markets. The companies contacted by Leitat also destine their production to the national and international markets, but the regional markets are also relevant. Finally, the UWB companies destine their production to the national and international markets, and they don't have production in the regional markets.

The application of the production is distributed among different fields:

Field of application			
	Centrocot	Leitat	UWB
Clothing applications	25,74%	63,64%	64,29%
Medical applications	6,93%	4,55%	14,29%
Sport applications	11,88%	4,55%	28,57%
Automobile applications	6,93%	22,73%	35,71%
Army applications	8,91%	4,55%	21,43%
Personal protection equipment applications	5,94%	22,73%	35,71%
Home textile applications	22,77%	27,27%	57,14%
Geotextile applications	1,98%	4,55%	28,57%
Other	8,91%	31,82%	





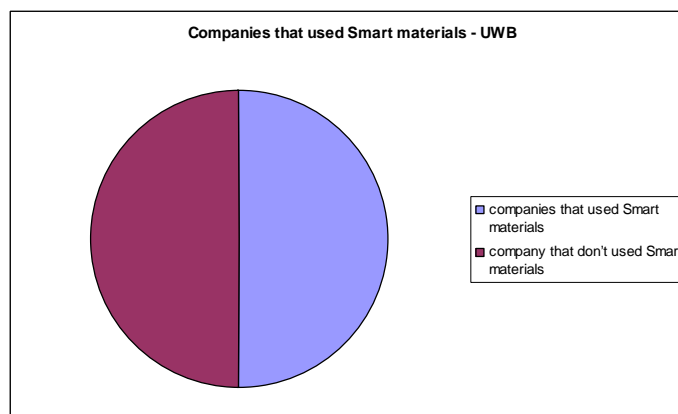
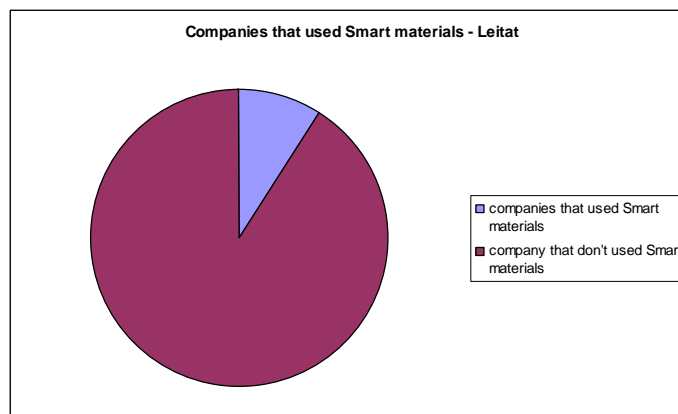
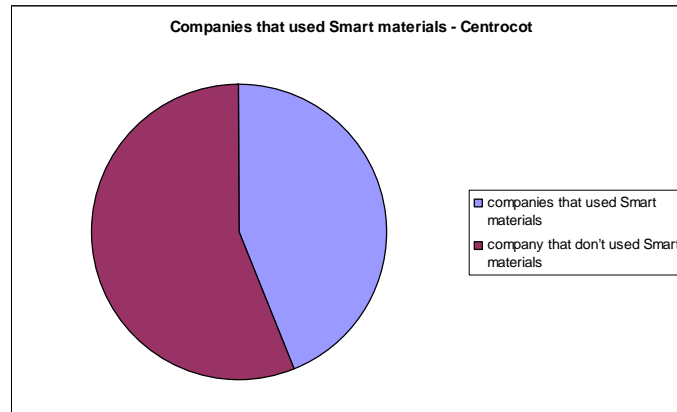
The main fields of application of the production in the companies contacted by Centrocot are the clothing and the home textile applications. Those fields are also relevant for the companies contacted by Leitát, but it is also remarkable the fields of automobile and personal protection equipment applications. In the companies contacted by UWB, the clothing and home textile applications are also the most important, but like in the case of Leitát, the other relevant areas are automobile and personal protection equipment applications.

### 2.3 Capacity for innovating

The companies that have used smart materials previously can be seen in the following table and graphics:

Companies that used Smart materials			
	Centrocot	Leitát	UWB

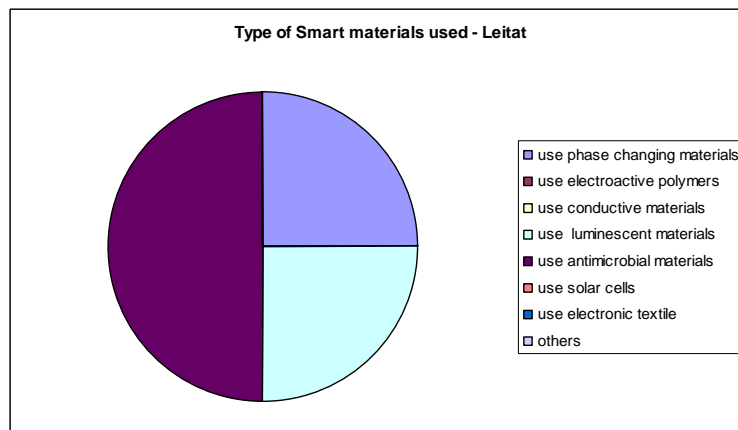
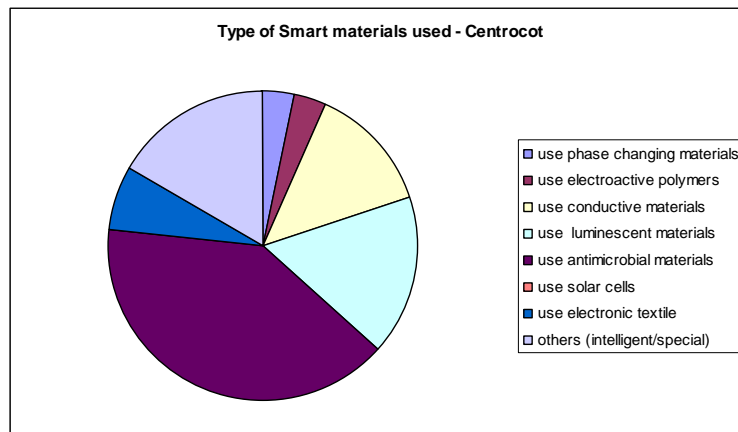
Companies that used Smart materials	43,75%	9,09%	50,00%
Company that don't used Smart materials	56,25%	90,91%	50,00%

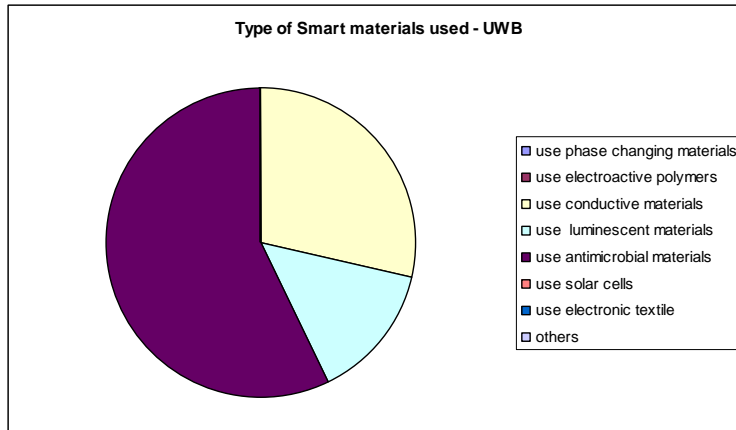


As it can be observed, nearly the half of the companies has used previously smart materials in the case of companies of Centrocot and UWB. On the contrary, the vast majority of Leitat companies haven't used smart materials previously.

Referred to the type of smart material used by the companies which have previous experience with smart materials, we find the following information:

Type of smart materials			
	Centrocot	Leitat	UWB
use phase changing materials	3,33%	4,55%	
use electroactive polymers	3,33%		
use chromic materials			
use conductive materials	13,33%		14,29%
use luminescent materials	16,67%	4,55%	7,14%
use antimicrobial materials	40,00%	9,09%	28,57%
use solar cells			
use electronic textile	6,67%		
others (intelligent/special)	16,67%		

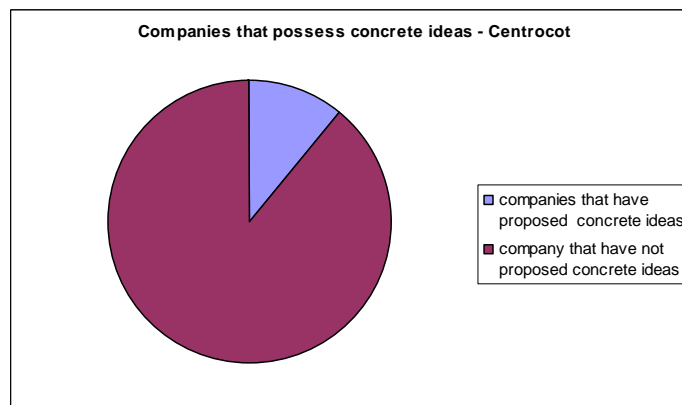


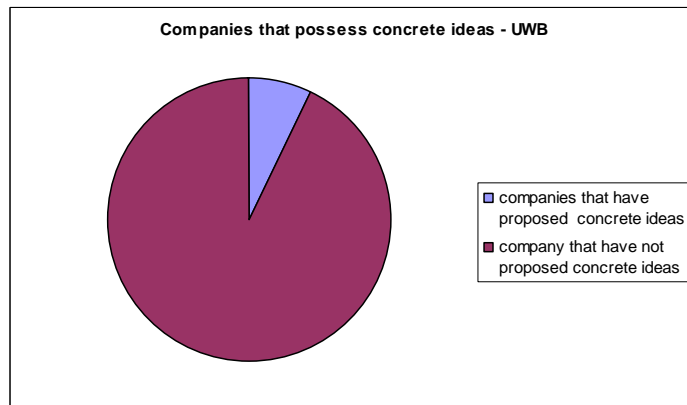
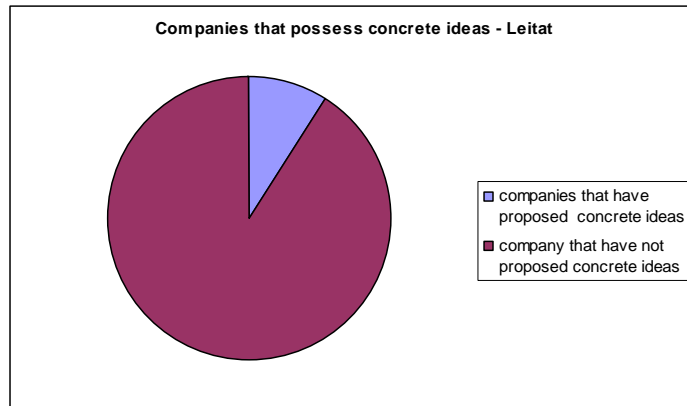


The most used smart materials are the antimicrobial materials in the three regions. The luminescent materials are also one of the most recurrent smart materials used by the companies. Conductive materials are important in the companies contacted by Centrocot and UWB.

In the questionnaire some companies proposed concrete ideas about developments in smart materials:

<b>How many companies have manifested concrete ideas of development in the questionnaire?</b>			
	<b>Centrocot</b>	<b>Leitat</b>	<b>UWB</b>
companies that have proposed concrete ideas	11,11%	9,09%	7,14%
company that have not proposed concrete ideas	88,89%	90,91%	92,86%

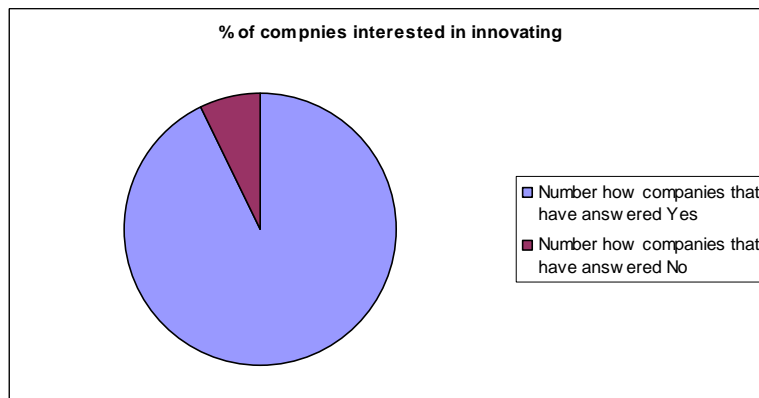
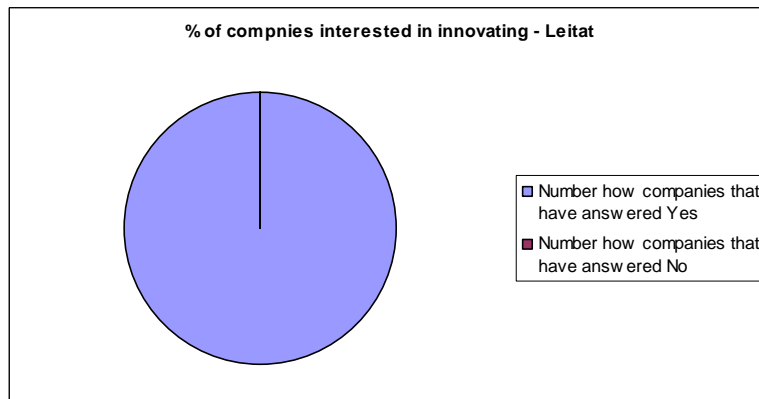
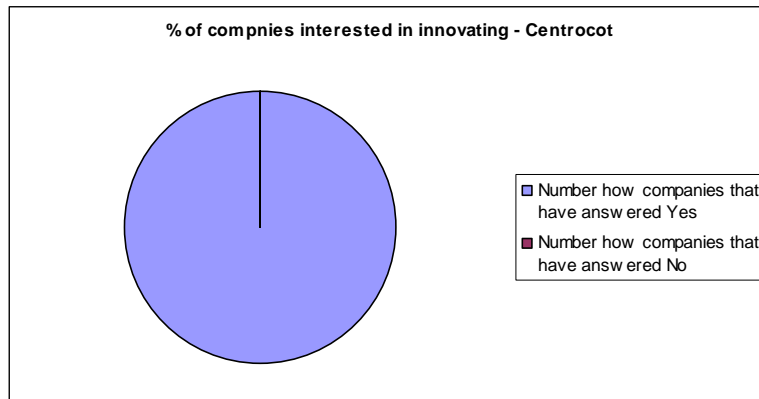




Most companies haven't proposed concrete ideas in the three regions.

In reference to the companies that interested in innovating solutions:

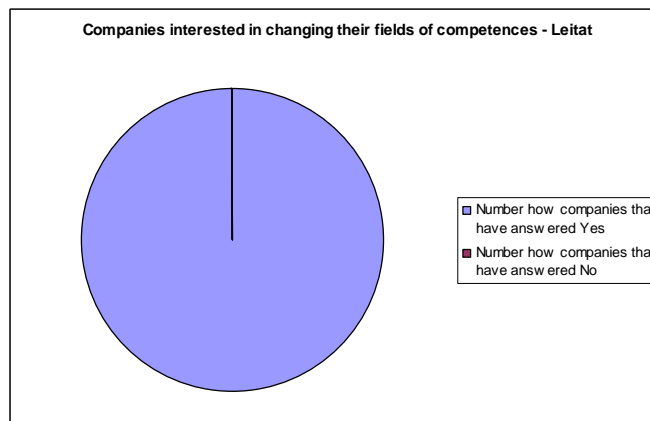
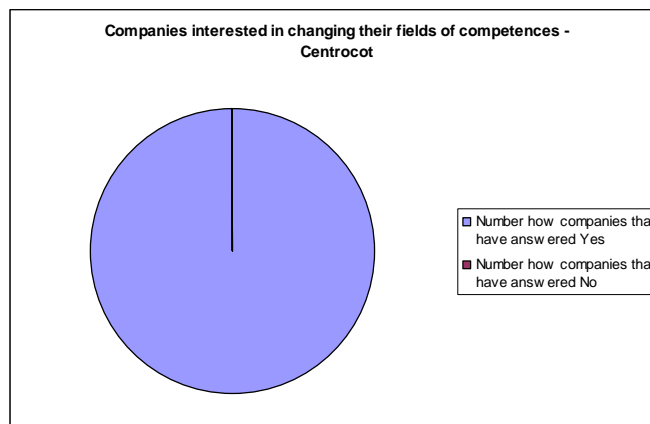
<b>% of companies that are interested in innovating solutions</b>			
	<b>Centrocot</b>	<b>Leitat</b>	<b>UWB</b>
Number of companies that have answered Yes	100,00%	100,00%	92,86%
Number of companies that have answered No			7,14%

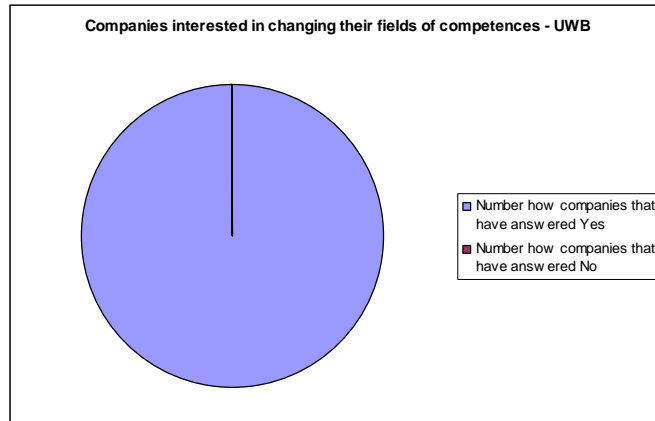


Most companies are interested in innovating solutions in the three regions.

In reference to the companies that interested in increasing their field of competences:

% of companies that are interested in increasing their field of competences			
	Centrocot	Leitat	UWB
Number of companies that have answered Yes	100,00	100,00	100,00
Number of companies that have answered No			

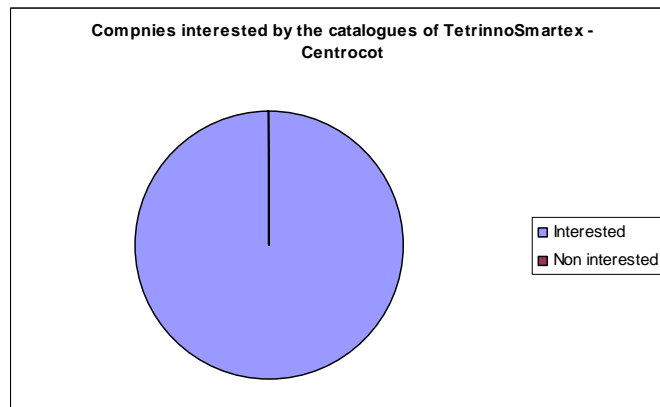


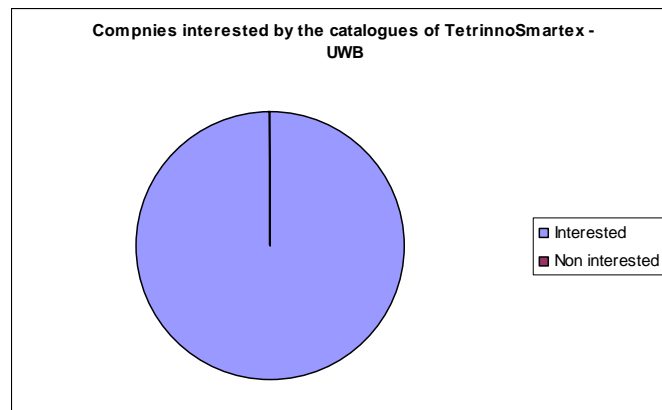
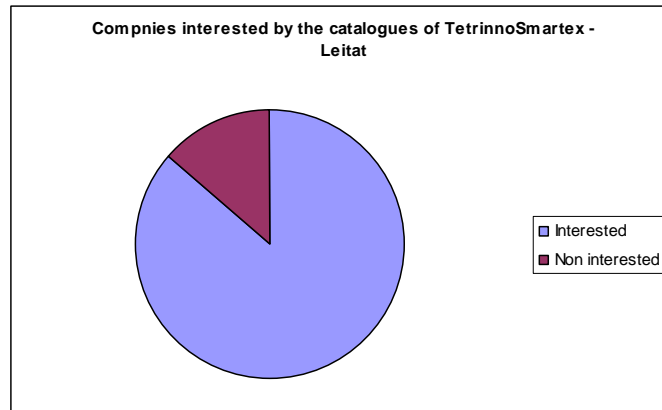


All companies are interested in increasing their field of competences in the three regions.

The number of companies which showed interest in receiving the catalogue resulting from the project:

% of companies that are interested in receiving the catalogue			
	Centrocot	Leitat	UWB
Interested	100%	86,36%	100%
Non interested		13,64%	





Most companies are interested interest in receiving the catalogue resulting from the project in the three regions.

### 3 General Results

In this section, the global conclusions with regard of the results of the questionnaires in the different regions are presented.

In some cases the sum of the different items gives a results over 100%. The reason of it is that some companies are considered in the different categories. However in the graphics it is considered the total amount proportionally

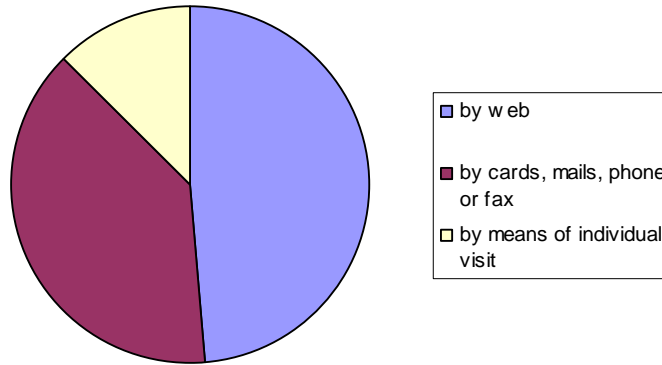
#### 3.1 Evaluated companies and employee numbers

About the tools that have allowed the collection of information three ways have be used to collect the information:

- ✓ **By Web:** 35 companies that represent the 48% of the whole

- ✓ **By mail, phone or fax:** 28 companies that represent the 38% of the whole
- ✓ **By means of individual visit:** 9 companies that represent the 12% of the whole

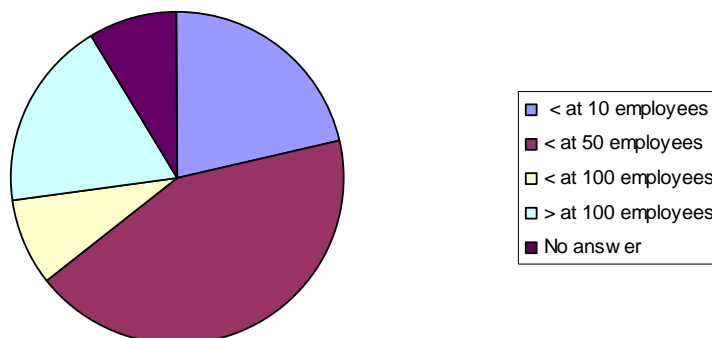
**Tools of information's collection**



In reference to the number of employees in the companies participating in the project, we find the following results:

- ✓ **Less than 10 employees:** 15 companies (21%)
- ✓ **Less than 50 employees:** 30 companies (42%)
- ✓ **Less than 100 employees:** 6 companies (9%)
- ✓ **More than 100 employees:** 13 companies (19%)
- ✓ **No answer:** 6 companies (9%)

**Number of employee**



So we can conclude that most companies have between 10 and 50 employee

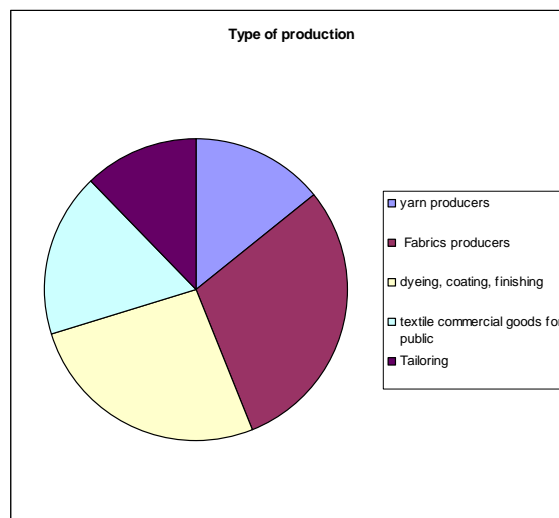
### 3.2 Actual resources

In reference to **capacities of production**, only the **37%** of companies have answered this question

Besides, the unit of measurement is different for every case. The known range is from 350.000 kg /year to 50.000 tones /year.

In reference to the type of production, the companies for each type are as follows:

- ✓ **Yarn producers:** 16 companies (22%)
- ✓ **Fabrics producers:** 34 companies (47%)
- ✓ **Dyeing, coating, finishing:** 30 companies (42%)
- ✓ **Textile commercial goods for public:** 20 companies (28%)
- ✓ **Tailoring:** 14 companies (20%)



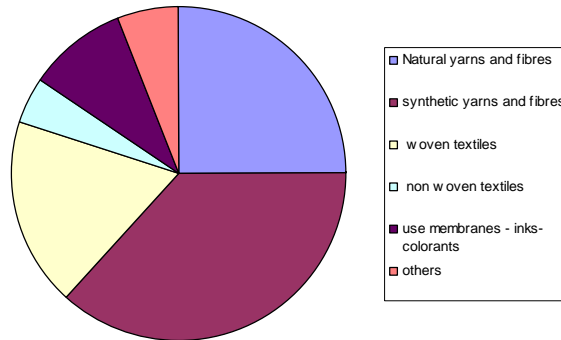
As we observe in the results above, the most relevant are fabric producers, dyeing, coating and finishing.

In relation to the **type of raw materials** used, the following results can be seen:

- ✓ **Natural yarns and fibres:** 51 companies (71%)
- ✓ **Synthetic yarns and fibres:** 75 companies (104%)
- ✓ **Woven textiles:** 37 companies (51%)
- ✓ **Nonwoven textiles:** 9 companies (12%)
- ✓ **Use membranes – inks - colorants:** 20 companies (28%)

✓ **Others:** 12 companies (17%)

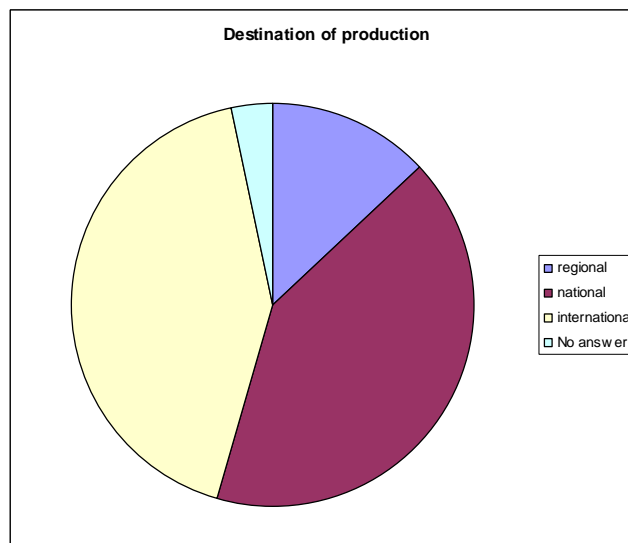
Type of raw materials used



We can observe the raw materials more used with a high percent are synthetic yarns and fibres while only nine companies use nonweven textiles

The **destination of production** is distributed in the following way:

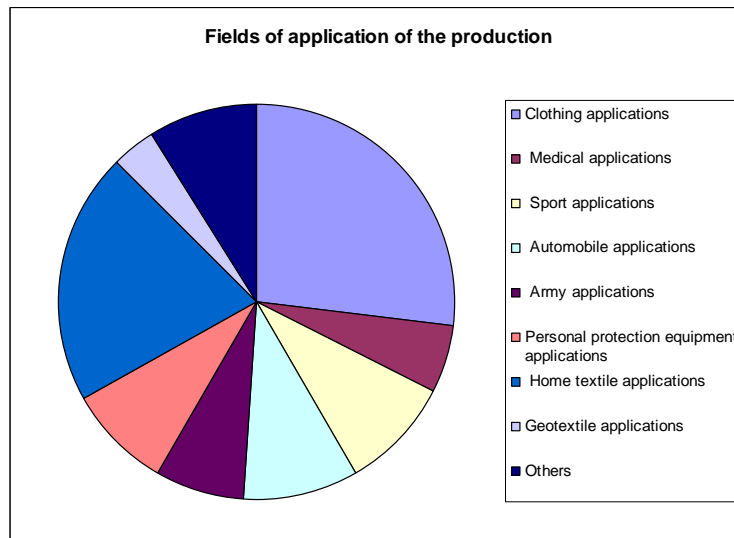
- ✓ **Regional:** 15 companies (21%)
- ✓ **National:** 48 companies (67%)
- ✓ **International:** 49 companies (68%)
- ✓ **No answer:** 4 companies (65%)



We can conclude the main part of the production goes to national and international markets and only a small part to the regional area

The application of the production is distributed among different fields:

Field of application		
	Number of companies	%
Clothing applications	49	68,06
Medical applications	10	13,89
Sport applications	17	23,61
Automobile applications	17	23,61
Army applications	13	18,06
Personal protection equipment applications	16	22,22
Home textile applications	37	51,39
Geotextile applications	7	9,72
Others	16	22,22



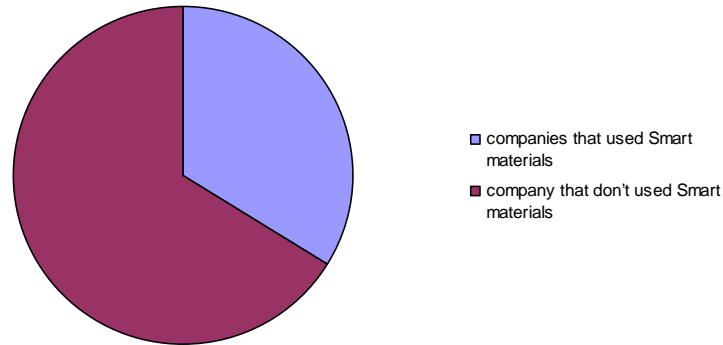
The main final product to which the companies dedicate their production is clothes with a whole of 49 companies, followed by home textile applications (37 companies). The field application with less number of companies is geotextiles, as only 7 companies dedicate their products of this sector

### 3.3 Capacity for innovating

The companies that have used smart materials previously can be seen in the following table and graphics:

- ✓ **Companies that use Smart materials:** 23 companies (32%)
- ✓ **Companies that don't use Smart materials:** 45 companies (63%)

Companies that used Smart materials

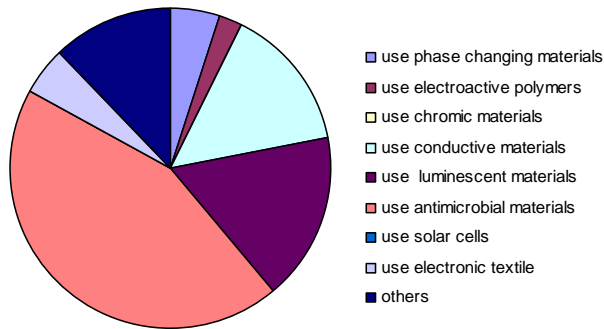


The graphic reflect clearly that there is a main percent of companies that doesn't use smart materials

Referred to the type of smart material used by the companies which have previous experience with smart materials, we find the following information:

	Number of companies	%
use phase changing materials	2	2,78
use electroactive polymers	1	1,39
use chromic materials	0	0,00
use conductive materials	6	8,33
use luminescent materials	7	9,72
use antimicrobial materials	18	25,00
use solar cells	0	0,00
use electronic textile	2	2,78
others	5	6,94

Type of Smart materials used

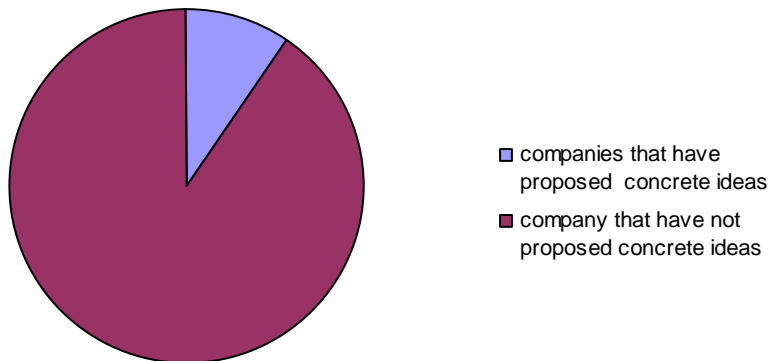


There are few companies that use the different types of existing Smart materials. Nevertheless we can observe antimicrobial materials are the main used.

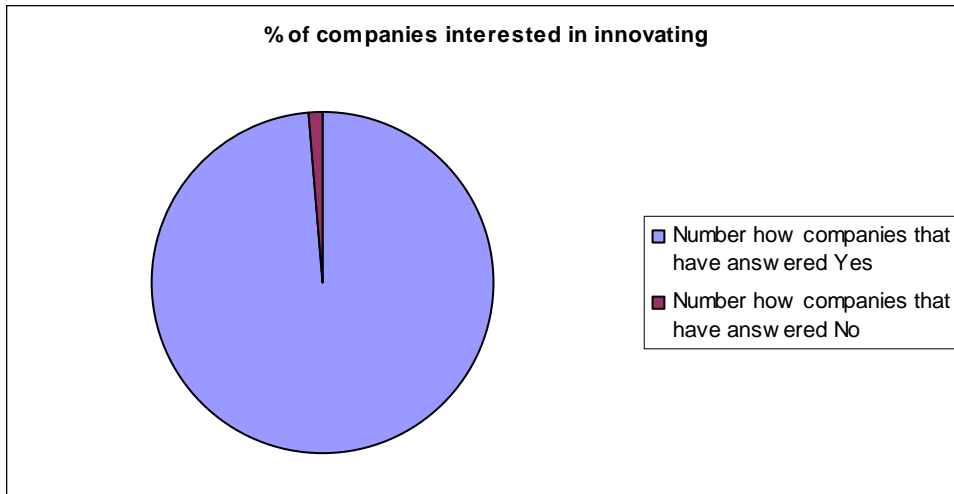
In relation to the **companies that possess concrete ideas and companies interested in innovating**, we can see that:

- ✓ Only 7 companies (10%) have manifested concrete ideas about Smart textiles and are prepared to develop them.

Companies that possess concrete ideas



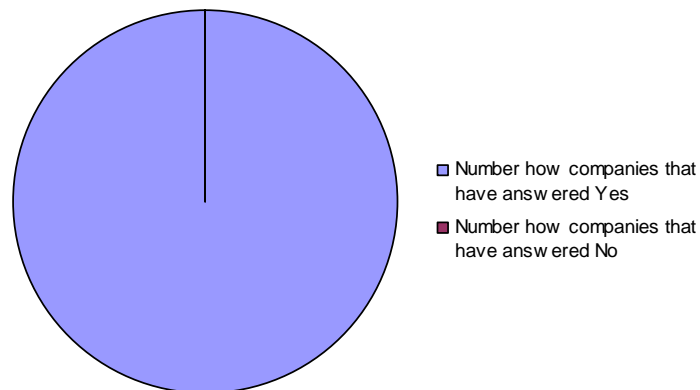
- ✓ Almost all the companies have demonstrated interest in innovating solutions



In reference to the **companies interested in changing their field of competences & companies interested in receiving the catalogue** we find the following information:

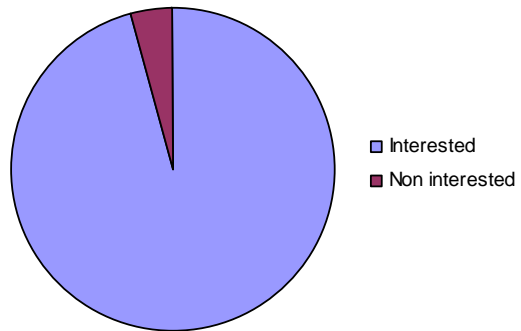
- ✓ Absolutely all the companies have demonstrated interest in increasing their field of competence

**Companies interested in changing their fields of competences**



- ✓ Finally, 69 of the interviewed companies have demonstrated their interest in receiving the catalogue

### Companies interested by the catalogues of TetrinnoSmartex



## 4 Annex I: Questionnaire

### General data of the company:

Number of identification:	(edited by “name of the partner”)
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Name:

Location:

Number of employees:

### Data about the actual resources

Capacity of production:

Main activities:

- |                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Spinning<br><input type="checkbox"/> Preparation for weaving (warping)<br><input type="checkbox"/> Weaving<br><input type="checkbox"/> Knitting<br><input type="checkbox"/> Dyeing<br><input type="checkbox"/> others | <input type="checkbox"/> Printing<br><input type="checkbox"/> Chemical Finishing<br><input type="checkbox"/> Mechanical Finishing<br><input type="checkbox"/> Coating<br><input type="checkbox"/> Garments<br>Please specify: ..... |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Raw materials used:

- |                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> Natural fibres<br><input type="checkbox"/> Synthetic fibres<br><input type="checkbox"/> Artificial fibres<br><br><input type="checkbox"/> Thread<br><input type="checkbox"/> Yarn<br><br><input type="checkbox"/> Woven textiles<br><input type="checkbox"/> Knitted textiles<br><input type="checkbox"/> Non-woven textiles<br><br><input type="checkbox"/> Membranes<br><input type="checkbox"/> others | Please specify: .....<br>Please specify: .....<br>Please specify: .....<br><br><br><input type="checkbox"/> Dyes<br><input type="checkbox"/> Printing inks<br><input type="checkbox"/> Pigments<br><br>Please specify: ..... |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Short description of the type of machinery used:

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**Destination of the production:**

- Regional
  - National
  - International
- Please specify: .....

**What is the field(s) of application of your production:**

- Clothing
  - Automotive
  - Home textile
  - Medical
  - Personal protection
  - Sport
  - Army
  - Geotextile
  - others
- Please specify: .....

**Do you use?**

- Phase changing Materials
- Chromic Materials
- Luminescent Materials
- Solar cells
- Any other Smart Materials Please specify: .....
- Any other Special Materials Please specify: .....
- Electroactive polymers
- Conductive Materials
- Antimicrobial materials
- Electronic textile

In case of positive answer, please specify the type of product realized (with short description):

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**Are you interested in innovative solutions?**

- Yes  No

**Are you interested in increasing your field(s) of competences?**

- Yes  No

**Are you interested in receiving the final catalogue of the project?**

- Yes  No

**Comments and feasible ideas or proposals to develop into the Smart Textile:**

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Name and Signature of the interviewed

The questionnaire must be return to:

Address of the entity

Thank you very much for your attention, we will get back to you about innovative solutions corresponding to your profile as soon as possible.

Best Regards

Name of the responsible