

Smart Textiles: IP Landscape Report

Introduction

Smart textiles - also referred to as smart garments, smart clothing, electronic textiles (e-textiles), or smart fabrics - are fabrics that enable digital components and electronics to be embedded in them. They provide the wearer with increased functionality by sensing and reacting to environmental conditions or stimuli, such as those from mechanical, electrical, thermal, chemical, and other sources.^[1]

Smart or e-textiles are different from wearables in that the focus is on the integration of electronic components with the fabric. These fabrics may be employed in non-wearable applications as well.^[1]

In the words of Rebecca Pailles-Friedman of the Pratt Institute,

Smart textiles can be broken into two different categories: Aesthetic and Performance Enhancing. Aesthetic examples include everything from fabrics that light up to fabrics that can change color. Some of these fabrics gather energy from the environment by harnessing vibrations, sound or heat, reacting to this input. Then there are performance enhancing smart textiles, which will have a huge impact on the athletic, extreme sports and military industries. There are fabrics that help regulate body temperature, reduce wind resistance and control muscle vibration – all of which help improve athletic performance. Other fabrics have been developed for protective clothing to guard against extreme environmental hazards like radiation and the effects of space travel. The health and beauty industry is also taking advantage of these innovations, which range from drug-releasing medical textiles, to fabric with moisturizer, perfume, and anti-aging properties.^{[2] [3]}

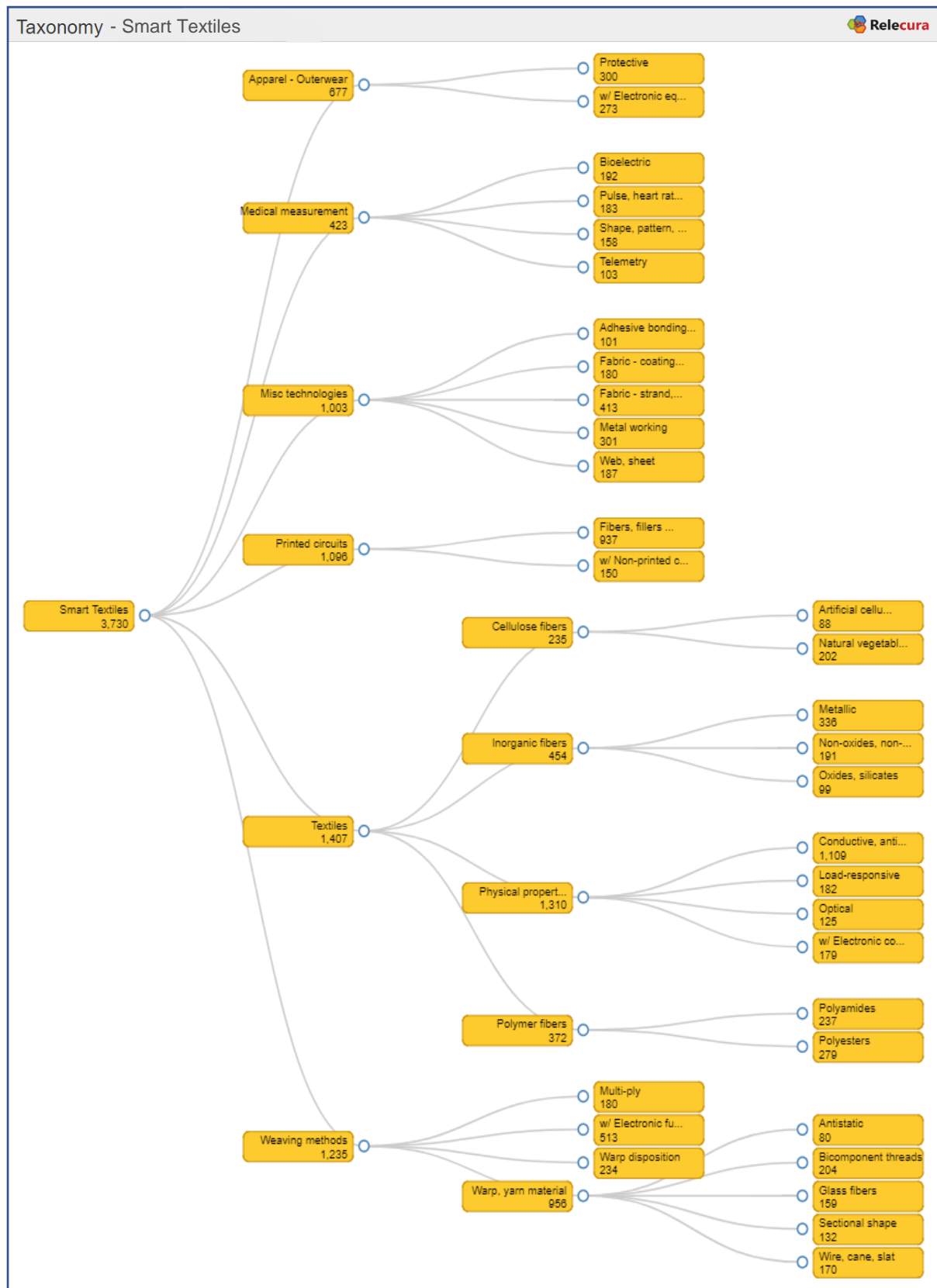
According to a research report by IDTechEx, the market for smart textiles will approach US \$5 billion in product revenue by 2027.^[4] This IP landscape report provides insights into the currently active patents addressing the technologies and applications related to Smart Textiles.

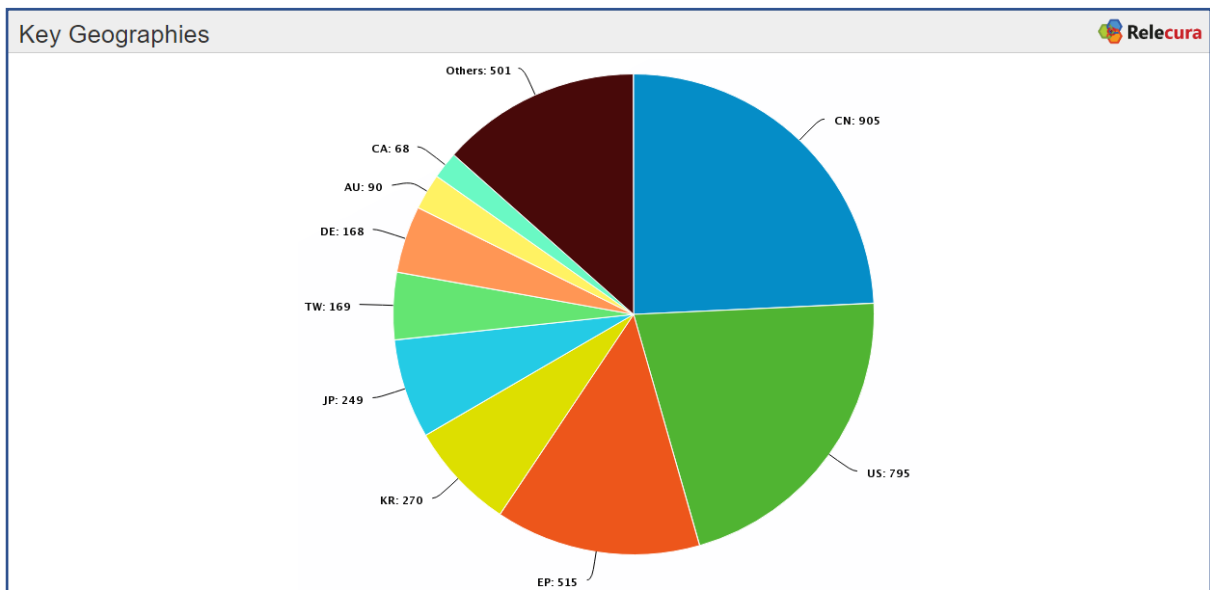
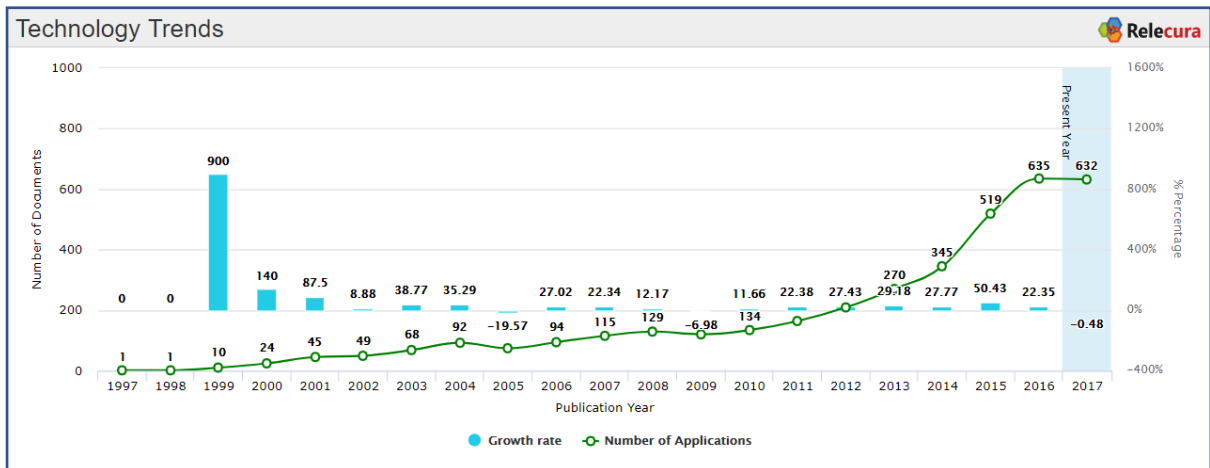
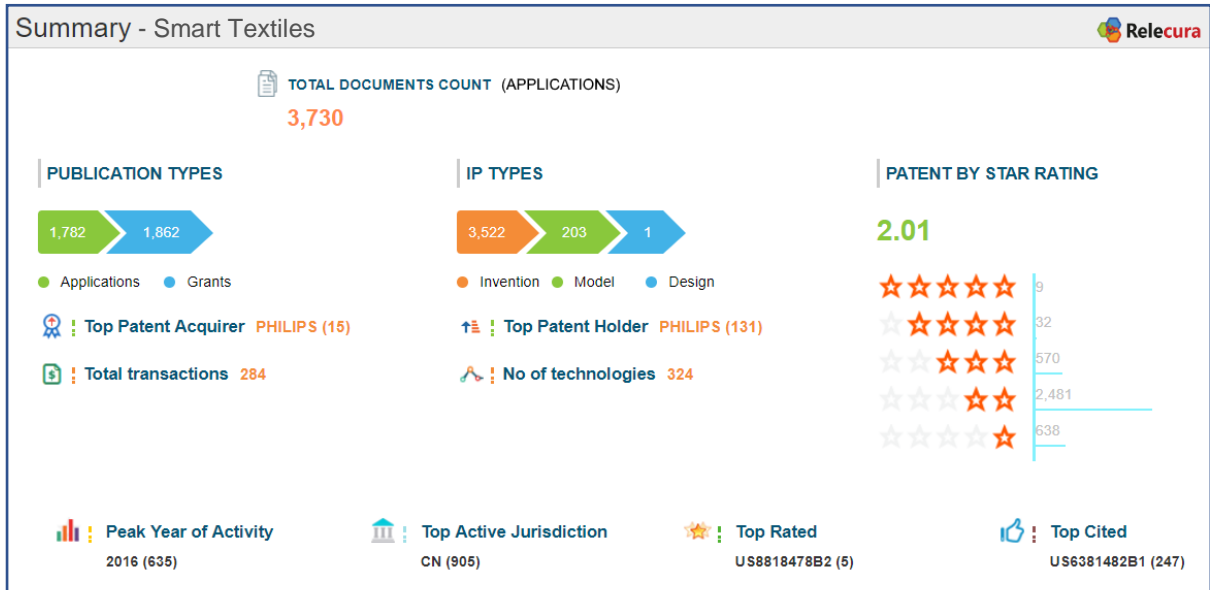
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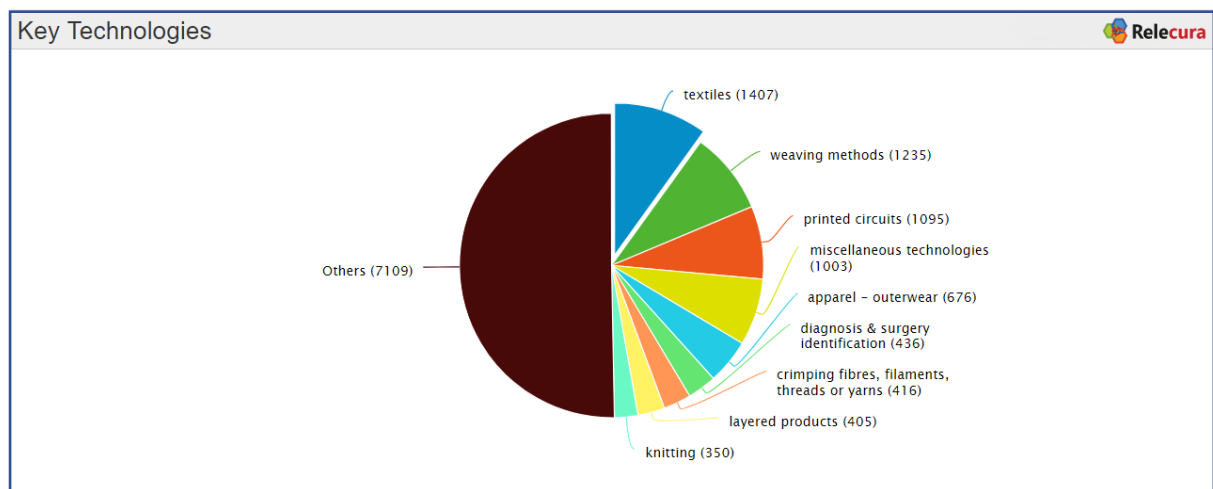
- [1. Smart Textiles \(Wikipedia\)](#)
- [2. What is the future of Fabric? These Smart Textiles will blow your mind. \(Forbes\)](#)
- [3. Smart Textiles for Designers: Inventing the Future of Fabrics \(Amazon\)](#)
- [4. E-Textiles 2017-2027 \(IDTechEx\)](#)





Key Patent Holders					
Patent Holder	Share of patents	#Grants	#Applications	Grants to Applicaiton Ratio	Average Star Rating
PHILIPS	3.52%	69	62	1.12	1.77
INTEL	1.85%	40	28	1.43	1.98
PANASONIC	1.67%	40	17	2.36	1.82
ALBANY INTERNATIONAL	1.32%	41	8	5.13	1.57
PPG	1.24%	2	44	0.05	1.09
SAMSUNG	1.16%	15	28	0.54	1.84
FUJITSU	1.13%	33	9	3.67	1.95
ROLLS-ROYCE	0.89%	13	20	0.65	2.11
SUMITOMO	0.86%	23	9	2.56	1.79
HEALTHWATCH LTD	0.84%	3	28	0.11	1.65

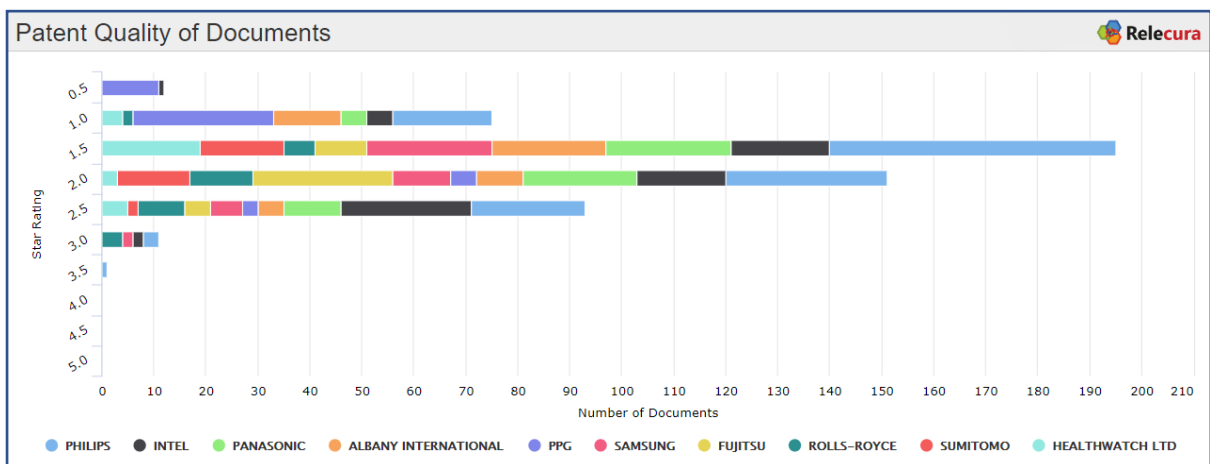
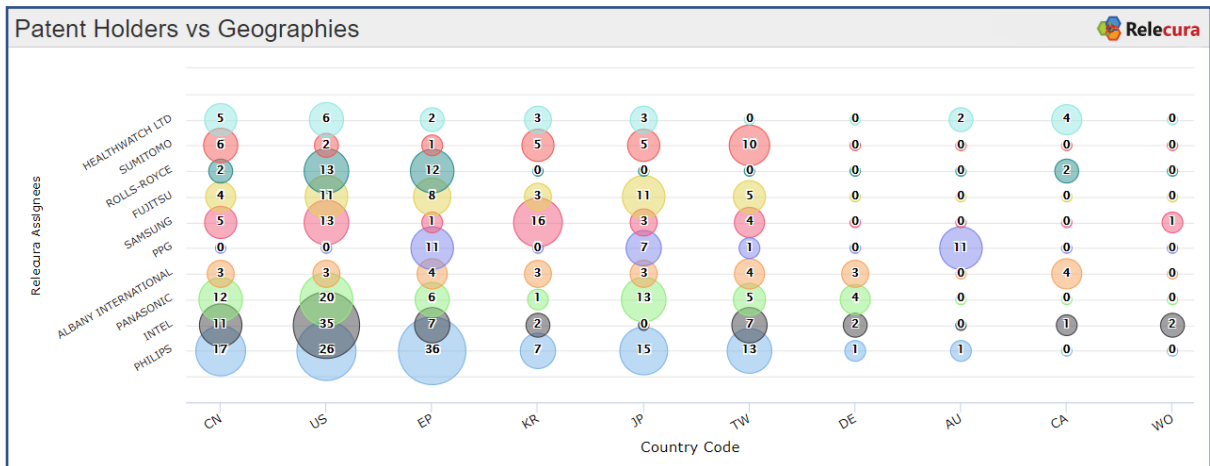
Analysis of Top Patent Holders					
Patent Holders	Applications	Grants	Technologies	Sub Technologies	Geographies
PHILIPS	62	69	printed circuits (73) , textiles (49) , miscellaneous technologies (47) , apparel - outerwear (44) , weaving methods (44)	details of pcb's (72) , physical properties of fabrics (49) , garments (37) , manufacturing pcb's (37) , woven fabrics designed to make specified articles (37)	EP (36) , US (26) , CN (17) , JP (15) , TW (13)
INTEL	28	40	printed circuits (45) , miscellaneous technologies (31) , weaving methods (16) , textiles (12) , electric elements - semiconductor devices (11)	details of pcb's (45) , manufacturing pcb's (29) , metal working (25) , stock material or miscellaneous articles (21) , woven fabrics designed to make specified articles (15)	US (35) , CN (11) , EP (7) , TW (7) , DE (2)
PANASONIC	17	40	printed circuits (60) , miscellaneous technologies (41) , layered products (31) , treating macromolecular compounds (23) , macromolecular compound compositions (12)	details of pcb's (60) , manufacturing pcb's (54) , stock material or miscellaneous articles (31) , layered products comprising metal (30) , manufacture of articles or shaped materials containing macromolecular substances (23)	US (20) , JP (13) , CN (12) , EP (6) , TW (5)
ALBANY INTERNATIONAL	8	41	miscellaneous technologies (49) , textiles (49) , weaving methods (49) , paper making - machines (18) , fabrics (17)	physical properties of fabrics (49) , woven fabrics characterised by material of yarn, warp elements used (49) , inorganic fibers based fabrics (33) , fibres made from polymers otherwise than by involving carbon-to-carbon unsaturated bonds (32) , other double or multi-ply fabrics (19)	CA (4) , EP (4) , TW (4) , AT (3) , CN (3)
PPG	44	2	glass composition (46) , printed circuits (46) , treating macromolecular compounds (33) , plastic preparation (21) , layered products (18)	details of pcb's (46) , surface treatment of glass fibers or filaments (46) , manufacturing pcb's (45) , manufacture of articles or shaped materials containing macromolecular substances (33) , other methods of pretreatment of plastic material to be shaped (21)	AU (11) , EP (11) , MX (10) , JP (7) , HU (1)

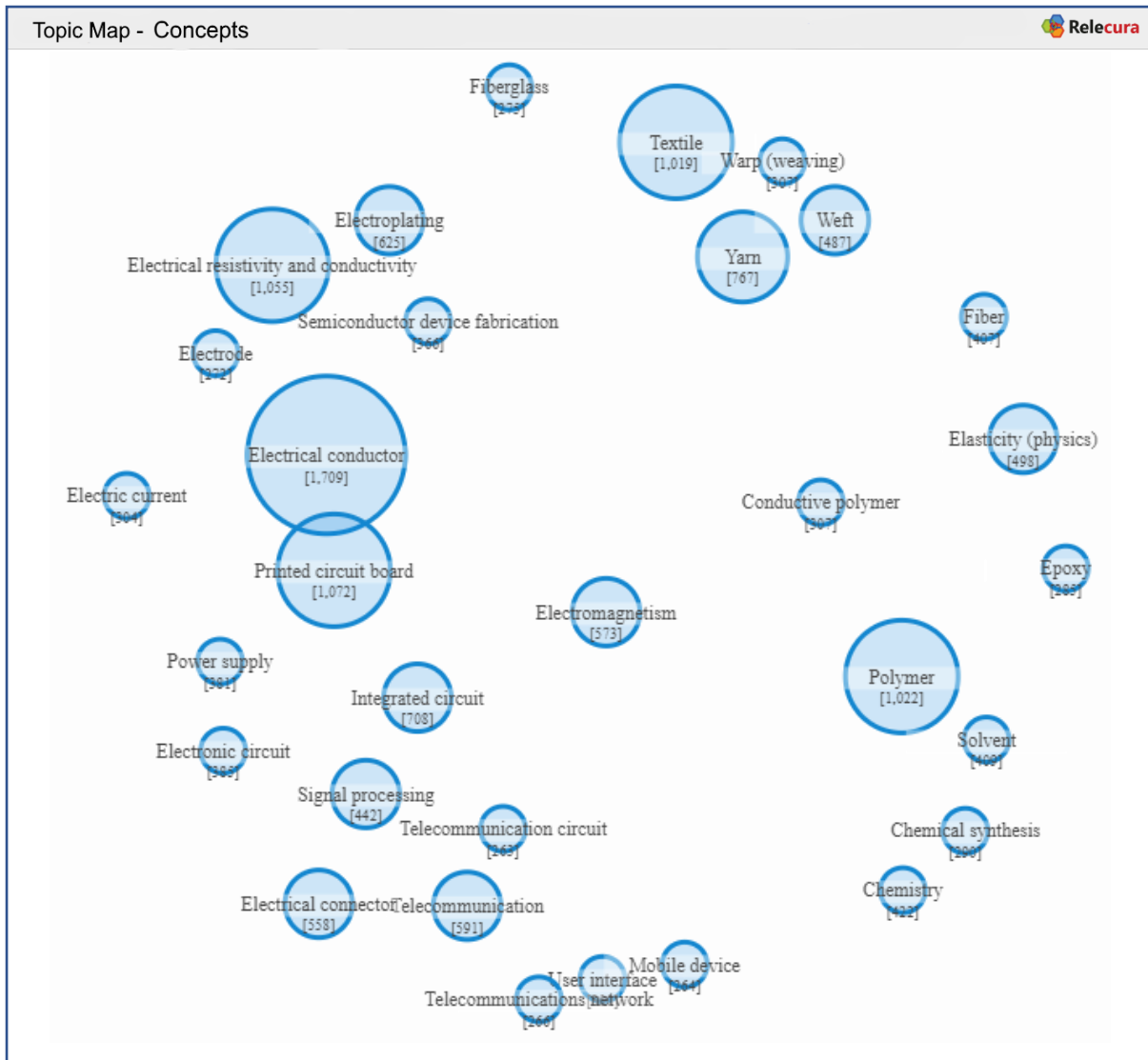


Analysis of Key Technologies					
Technologies	Applications	Grants	Patent Holders	Sub Technologies	Geographies
textiles	711	645	ALBANY INTERNATIONAL (49) , PHILIPS (49) , FEDERAL-MOGUL (30) , FRENCH ALTERNATIVE ENERGIES AND ATOMIC ENERGY COMMISSION(CEA) (21) , LUMINEX S P A (18)	physical properties of fabrics (1310) , woven fabrics characterised by material of yarn, warp elements used (838) , woven fabrics designed to make specified articles (605) , inorganic fibers based fabrics (454) , yarns or threads, processes or apparatus for production (379)	CN (282) , US (246) , EP (234) , DE (106) , KR (95)
weaving methods	573	615	ALBANY INTERNATIONAL (49) , PHILIPS (44) , FEDERAL-MOGUL (30) , ASAHI KASEI (22) , FRESENIUS MEDICAL CARE (18)	woven fabrics characterised by material of yarn, warp elements used (956) , physical properties of fabrics (931) , woven fabrics designed to make specified articles (746) , inorganic fibers based fabrics (402) , fibres made from polymers otherwise than by involving carbon-to-carbon unsaturated bonds (304)	CN (223) , US (222) , EP (213) , DE (99) , JP (90)
printed circuits	466	603	PHILIPS (73) , PANASONIC (60) , PPG (46) , INTEL (45) , FUJITSU (42)	details of pcb's (1018) , manufacturing pcb's (671) , stock material or miscellaneous articles (245) , metal working (222) , woven fabrics characterised by material of yarn, warp elements used (215)	US (292) , EP (169) , CN (135) , JP (122) , TW (100)
miscellaneous technologies	324	648	ALBANY INTERNATIONAL (49) , PHILIPS (47) , PANASONIC (41) , INTEL (31) , ROLLS-ROYCE (31)	details of pcb's (506) , stock material or miscellaneous articles (462) , physical properties of fabrics (446) , woven fabrics characterised by material of yarn, warp elements used (426) , manufacturing pcb's (324)	US (274) , EP (174) , CN (112) , JP (106) , TW (58)
apparel - outerwear	338	319	PHILIPS (44) , HEALTHWATCH LTD (29) , GOOGLE (18) , MMI IPOCO LLC (17) , SMART SOLUTIONS TECHNOLOGIES S L (17)	garments (416) , professional, industrial, or sporting protective garments (300) , physical properties of fabrics (277) , selection of special materials for outerwear (211) , details of garments, their making (193)	US (168) , CN (161) , EP (95) , KR (45) , JP (35)

Key Patents in the technology							
Publication No.	Title	Inventor	Assignee	Filing Date	Star Rating	#Fwd Citations	
US8818478B2	Sensor garment	Kim Scheffler, Melanie M. Maslany	Adidas	2011-03-31	5.0	85	
US9737261B2	Wearable athletic activity monitoring systems	Aurel Coza, Christian Dibenedetto, Ian Michael Munson	Adidas	2013-03-12	4.5	38	
US7559902B2	Physiological monitoring garment	Joseph Ting, Brian Farrell, Jeremy Bowman	Foster-Miller	2004-08-20	4.5	203	
US9282893B2	Wearable communication platform	Gianluigi Longinotti-Buitoni, Andrea Aliverti	L I F E CORPORATION S A	2013-09-11	4.5	95	
US8925392B2	Sensors, interfaces and sensor systems for data collection and integrated remote monitoring of conditions at or near body surfaces	Mario Esposito, Maurizio Macagno, Davide Giancarlo Viganò	SENSORIA INC	2013-01-29	4.5	51	

Technology-wise Company Ranking										
Rank	Textiles	Weaving methods	Printed circuits	Miscellaneous technologies	Apparel - outerwear	Diagnosis & surgery identification	Crimping fibres, filaments, threads or yarns	Layered products	Knitting	Electric elements - semiconductor devices
1	ALBANY INTERNATIONAL	ALBANY INTERNATIONAL	PHILIPS	ALBANY INTERNATIONAL	PHILIPS	HEALTHWATCH LTD	LUMINEX S P A	PANASONIC	MMI IPOCO LLC	FRENCH ALTERNATIVE ENERGIES AND ATOMIC ENERGY COMMISSION(CEA)
2	PHILIPS	PHILIPS	PANASONIC	PHILIPS	HEALTHWATCH LTD	FRESENIUS MEDICAL CARE	ALBANY INTERNATIONAL	MITSUBISHI GAS CHEMICAL	MALDEN MILLS IND INC	SHIKKO ELECTRIC
3	FEDERAL-MOGUL	FEDERAL-MOGUL	PPG	PANASONIC	GOOGLE	SMART SOLUTIONS TECHNOLOGIES S L	INVISTA	SUMITOMO	PHILIPS	FEDERAL-MOGUL
4	FRENCH ALTERNATIVE ENERGIES AND ATOMIC ENERGY COMMISSION(CEA)	ASAHI KASEI	INTEL	INTEL	MMI IPOCO LLC	GEORGIA TECH RESEARCH INSTITUTE	DOW	PPG	GEORGIA TECH RESEARCH INSTITUTE	RENESAS
5	LUMINEX S P A	FRESENIUS MEDICAL CARE	FUJITSU	ROLLS-ROYCE	SMART SOLUTIONS TECHNOLOGIES S L	ADIDAS	FRENCH ALTERNATIVE ENERGIES AND ATOMIC ENERGY COMMISSION(CEA)	HITACHI	KUPFNER TEXTIL GMBH	IBIDEN
6	MMI IPOCO LLC	LUMINEX S P A	ROLLS-ROYCE	ASAHI KASEI	TSINGHUA UNIVERSITY	SENSORIA INC	NOTTINGHAM TRENT UNIV	SAMSUNG	FEDERAL-MOGUL POWERTRAIN LLC	SEMICONDUCTOR ENERGY LABORATORY (SEL)
7	FEDERAL-MOGUL POWERTRAIN LLC	TOYOTA	SUMITOMO	FUJITSU	FOXCONN	PHILIPS	PHILIPS	ISOLA USA CORP	FRENCH ALTERNATIVE ENERGIES AND ATOMIC ENERGY COMMISSION(CEA)	FUJITSU
8	GOOGLE	INTEL	MITSUBISHI GAS CHEMICAL	IBM	MALDEN MILLS IND INC	SMARTLIFE TECHNOLOGY LTD	KOREA INSTITUTE OF INDUSTRIAL TECHNOLOGY	MITSUBISHI	LGL ELECTRONICS SPA	INTEL
9	SILVERAY CO LTD	SILVERAY CO LTD	SAMSUNG	MITSUBISHI GAS CHEMICAL	ADIDAS	KINGS METAL FIBER TECHNOLOGIES	LEONARD PHILIP NOEL	INTEL	SMARTLIFE TECHNOLOGY LTD	NEDERLANDSE ORGANISATIE VOOR TOEGEPAST-NATUURWETE
10	FERRARI S TISSAGE & ENDUCT SA	FERRARI S TISSAGE & ENDUCT SA	IBM	ISOLA USA CORP	GEORGIA TECH RESEARCH INSTITUTE	SMART SOLUTIONS TECH S L	HEALTHWATCH LTD	XYLECO	HEALTHWATCH LTD	SAMSUNG





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