Romanian Research Output: IP Analysis

Prepared for: UEFISCDI

Thomson Reuters IP Analytics

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Objectives of this report

This report covers inventions with basic patent year of 2011 onwards and includes ~59,600 inventions from Romania, Poland, Hungary and Czech Republic.

The report covers:

- A general overview of the Romanian publication timeline and geographic trend.
- Top assignees and entities with smaller IP portfolios, describing patenting activity, geographic strategies, technical emphasis, and quality parameters.
- Analysis of top IPC classification codes of the Romanian patent activity.
- Correlation of assignees with the top IPC classification codes.
- Identification of high-strength patents in the collection.
- A comparison of the Romanian patent activity with Poland, Hungary and Czech Republic.

Project Methodology

Romanian Patent Dataset:

- The following search strategies were employed in assembling the Romanian patent collection.
  - Patents filed in Romania
  - Patents from Inventors and Assignees with Romanian addresses
  - Patents from Romanian educational institutes, and government agencies
- Records with basic patent year of 2011 onwards were retained in the collection.
- Final Collection: ~6,000 inventions (counted as Derwent patent families to avoid double-counting of patents filed in multiple geographies).
- Assignees were further cleaned, with subsidiaries rolled-up to parent companies.
- Top 10 technical areas based on the IPC classification codes were identified.
- Range of analytics performed to explore patent filing activity with respect to the overall landscape, assignees, technologies.

Project Methodology – contd.

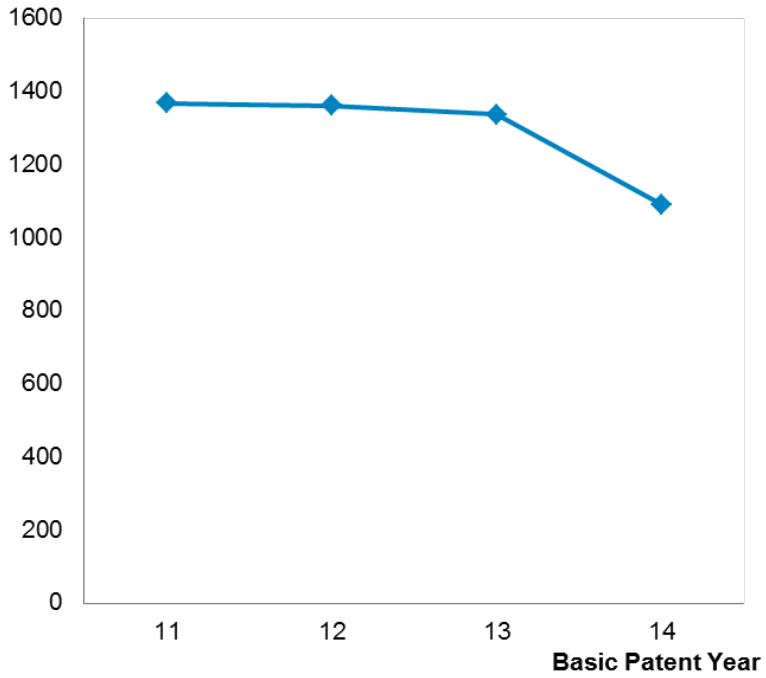
Patent Dataset for Poland, Hungary and Czech Republic:

- The following search strategies were employed in assembling the patent collections for the three countries.
  - Patents filed in Poland, Hungary and Czech Republic
  - Patents from Inventors and Assignees with addresses in the three respective countries
- Records with basic patent year of 2011 onwards were retained in the collection.
- Final Collection: (counted as Derwent patent families to avoid double-counting of patents filed in multiple geographies)
  - Poland: ~32,400 inventions
  - Hungary: ~7,600 inventions
  - Czech Republic: ~13,500 inventions
- Top 10 technical areas based on the IPC classification codes were identified.
- Comparison of the overall and technical patent activity of the three countries with Romanian patent activity performed to explore the difference in technology focus and recent activity.

ROMANIAN PATENT ACTIVITY

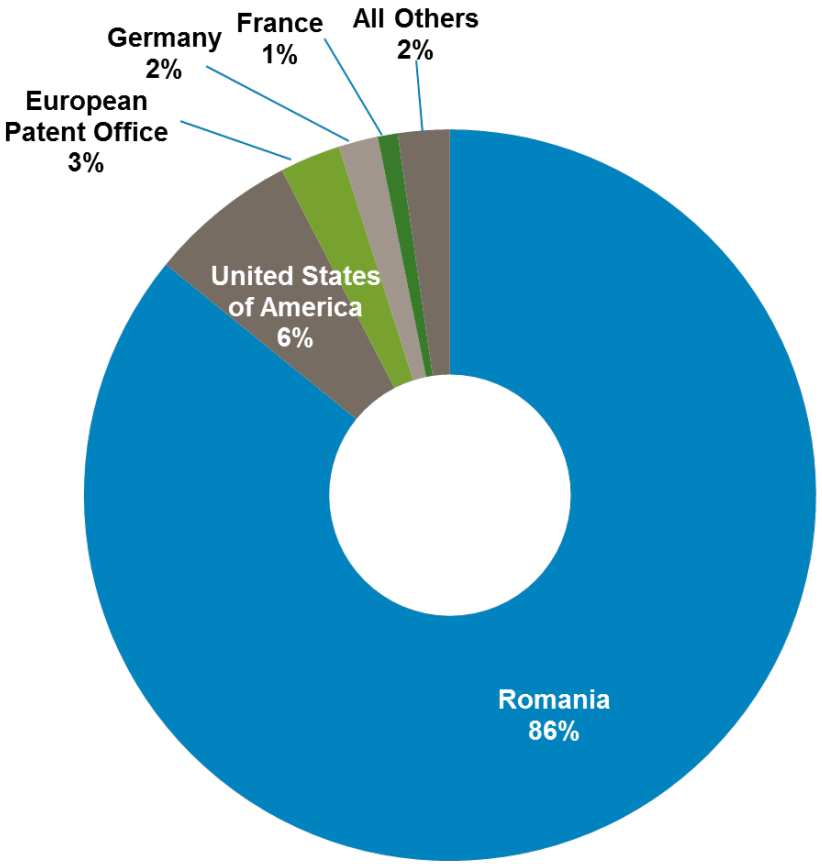
GENERAL TRENDS

Publication Timeline: Total Collection



- The assembled collection was plotted over time showing the publication year of the basic patents of each DWPI patent family.
- Overall trend in publication has exhibited, although small, but a decline over the timeframe.

Inventive Activity by Country



- The chart shows the country of origin of the Romanian patent activity.
- 86% of the total collection has been first filed in Romania.

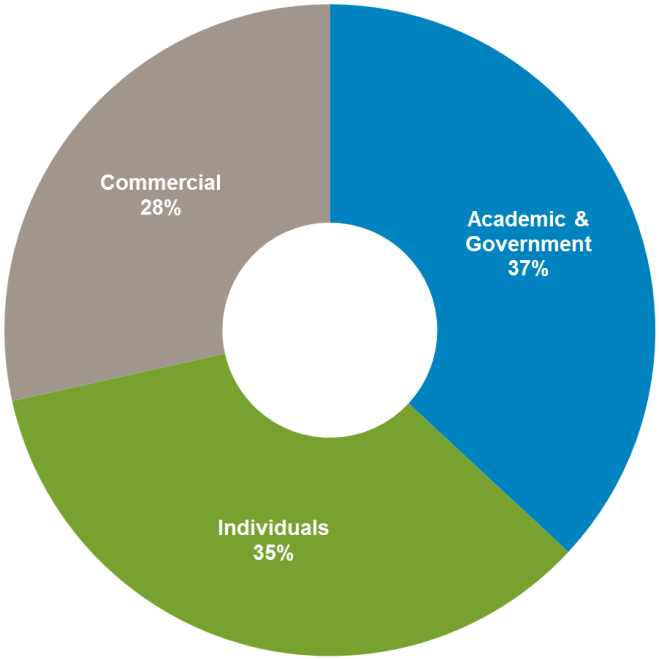
Invention Activity by Country (1)

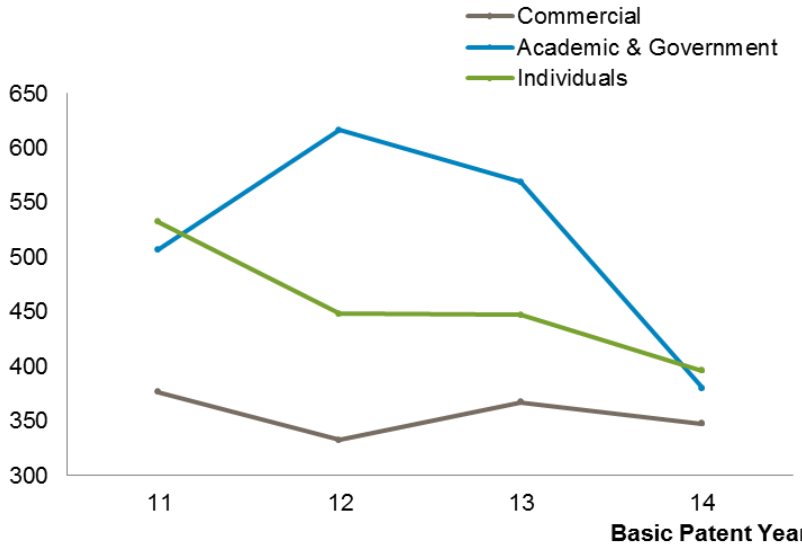
Priority Countries	Pre '11	11	12	13	14	15	Total Inventions	% Filed since 2013
Romania	2013	1177	845	772	316	58	5181	22%
United States of America	148	75	70	76	26		395	26%
European Patent Office	29	32	32	56	13		162	43%
Germany	16	25	29	30	5		105	33%
France	3	6	18	17	9		53	49%
United Kingdom	5	5	3	5	1		19	32%
Czech Republic	6	4	2				12	0%
Hungary	4	4	1				9	0%
Slovakia	1	3		2			6	33%
Italy	0	1	1		2		4	50%

- Further insight into geographic activity is obtained through analysis of time trends for priority filings.
- The table shows the trend of patent families originating from the countries against the earliest priority years.
- 'Pre '11' is a collective number for all families that were published from 2011 onwards, but filed prior to 2011.
- Since the project includes data for first publications from 2011 onwards, the 'Pre '11' data does not completely represent the entire activity before 2011.
- Outside Romania, first filings at the USPTO and EPO show an increase in the recent years.
- No first filings from Romanian entities in Hungary and Czech Republic are observed in recent years.

ENTITY ANALYSIS

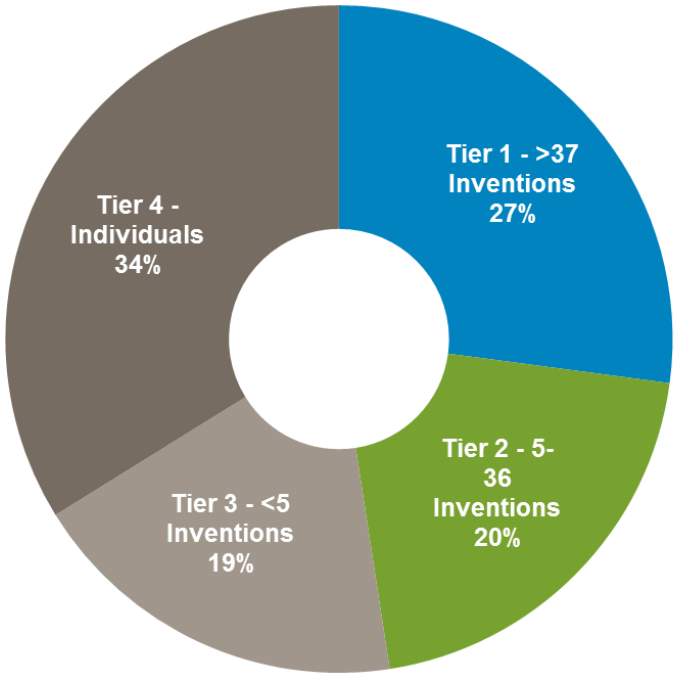
Distribution by Sector

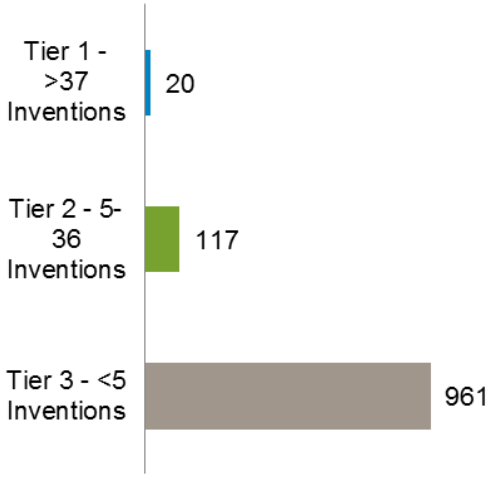




- The entities were categorized into Corporate, Academic & Government, and Individual Inventor sectors to assess the fraction of corporate vs. non-corporate entities in this field.
- Approximately 37% of the inventions are owned by Academic & Government entities.
- The commercial sector activity is considerably lower at 28%.
- Individual inventors own a sizeable share of the activity.

Distribution by Tier





- The assignees were also divided into tiers by volume of inventions (granted patents or patent applications) in the collection to reveal more information about the distribution of portfolio sizes. The pie chart on the left shows the breakdown of the overall landscape with respect to portfolio size, while the bar chart on the right indicates the number of assignees in each tier.
- The top 20 entities in Tier 1, each with 37 or more inventions hold only 27% of the share. The largest share is held by individual inventors.

Top Tier 1 Entities

Tier 1 Entities	Total Inventions
UNIV SUCEAVA STEFAN CEL MARE	328
UNIV BRASOV TRANSILVANIA	141
INST NAT CERC DEZVOLTARE ELECTROCHIMIE	111
CONTINENTAL TEVES & CO OHG AG	110
UNIV IASI TEHNICA ASACHI GHEORGHE	110
INST NAT CERC DEZVOLTARE MASINI INSTALAT	107
UNIV CLUJ-NAPOCA TEHNICA	100
UNIV POLITEHNICA DIN BUCURESTI	99
INST NAT CERC DEZVOLTARE FIZICA TEHNICA	92
INST NAT CERC DEZVOLTARE CHIM FARM	88
INOE 2000 INST NAT CERC DEZVOLTARE OPTOE	83
INST NAT CERC-DEZVOLTARE TEXTILE PIELARI	56
DIGITALOPTICS CORP EURO LTD	50
RENAULT SAS	47
INST CERC DEZVOLTARE PROTECTIA PLANTELOR	41
INST NAT CERC-DEZVOLTARE TEHNOLOGII CRIO	39
FREESCALE SEMICONDUCTOR INC	38
UNIV PETRU MAIOR DIN TARGU MURES	38
ADOBE SYSTEMS INC	37
INST NAT CERC DEZVOLTARE MICROTEHNOLOGIE	37

- The Tier 1 table shows the 20 leading entities within Romanian patent activity, all 37 or more inventions.
- **University of Suceava Stefan Cel Mare** is the dominant player with 328 inventions, followed by **University of Brasov Transilvania** (141).
- The tier 1 entity list although dominated by Romanian entities, does include non-Romanian entities with Continental Teves in the top 5 entities.

Top Government & Academic Entities*

Academic & Government Entities	Total Inventions
UNIV SUCEAVA STEFAN CEL MARE	328
UNIV BRASOV TRANSILVANIA	141
INST NAT CERC DEZVOLTARE ELECTROCHIMIE	111
UNIV IASI TEHNICA ASACHI GHEORGHE	110
INST NAT CERC DEZVOLTARE MASINI INSTALAT	107
UNIV CLUJ-NAPOCA TEHNICA	100
UNIV POLITEHNICA DIN BUCURESTI	99
INST NAT CERC DEZVOLTARE FIZICA TEHNICA	92
INST NAT CERC DEZVOLTARE CHIM FARM	88
INOE 2000 INST NAT CERC DEZVOLTARE OPTOE	83
INST NAT CERC-DEZVOLTARE TEXTILE PIELARI	56
INST CERC DEZVOLTARE PROTECTIA PLANTELOR	41
INST NAT CERC-DEZVOLTARE TEHNOLOGII CRIO	39
UNIV PETRU MAIOR DIN TARGU MURES	38
INST NAT CERC DEZVOLTARE MICROTEHNOLOGIE	37
INST NAT CERC DEZVOLTARE IN SUDURA SI IN	36
UNIV GALATI DUNAREA JOS	36
INST NAT CERC-DEZVOLTARE STIINTE BIOLOGI	35
UNIV CLUJ-NAPOCA BABES-BOLYAI	35
INOE 2000 INST CERC HIDRAULICA PNEUMATIC	33

- This table shows the top 20 Academic and Government entities.
- A number of these entities also appear in the tier 1 list.
- There are no non-Romanian entities in the top 20 list.

* Partial list; complete list available in Excel file.

Tier 1 Entity Timelines

Tier 1 Entities	11	12	13	14	15	Total Inventions	% Activity since 2013
UNIV SUCEAVA STEFAN CEL MARE	77	124	77	28	22	328	39%
UNIV BRASOV TRANSILVANIA	36	28	40	25	12	141	55%
INST NAT CERC DEZVOLTARE ELECTROCHIMIE	26	32	37	12	4	111	48%
CONTINENTAL TEVES & CO OHG AG	10	9	29	27	35	110	83%
UNIV IASI TEHNICA ASACHI GHEORGHE	25	32	35	12	6	110	48%
INST NAT CERC DEZVOLTARE MASINI INSTALAT	30	16	25	24	12	107	57%
UNIV CLUJ-NAPOCA TEHNICA	11	35	16	18	20	100	54%
UNIV POLITEHNICA DIN BUCURESTI	20	32	18	22	7	99	47%
INST NAT CERC DEZVOLTARE FIZICA TEHNICA	21	30	16	14	11	92	45%
INST NAT CERC DEZVOLTARE CHIM FARM	18	15	35	5	15	88	63%
INOE 2000 INST NAT CERC DEZVOLTARE OPTOE	9	24	21	16	13	83	60%
INST NAT CERC-DEZVOLTARE TEXTILE PIELARI	4	19	15	11	7	56	59%
DIGITALOPTICS CORP EURO LTD	15	18	12	5		50	34%
RENAULT SAS		3	6	18	20	47	94%
INST CERC DEZVOLTARE PROTECTIA	11	19	4	6	1	41	27%
INST NAT CERC-DEZVOLTARE TEHNOLOGII CRIO	7	9	11	6	6	39	59%
FREESCALE SEMICONDUCTOR INC	6	4	7	8	13	38	74%
UNIV PETRU MAIOR DIN TARGU MURES	1	3	2	23	9	38	89%
ADOBE SYSTEMS INC	3	3	17	9	5	37	84%
INST NAT CERC DEZVOLTARE	10	6	10	7	4	37	57%

- This heat map shows the publication timeline of the Tier 1 entities.
- Continental Teves also shows increase in recent publications possibly indicating expansion of its business in Romania.
- Renault also has a considerable recent activity in Romania.

Tier 2* Entity Timelines

Tier 2 Entities	11	12	13	14	15	Total Inventions	% Filed since 2013
SCHAEFFLER TECHNOLOGIES AG & CO KG		3	5	2	12	22	86%
RICOH KK		2	1	3	6	12	83%
BITDEFENDER IPR MANAGEMENT LTD	2	4	7	9	7	29	79%
INFINEON TECHNOLOGIES AG	1	2	1	8	2	14	79%
UNIV IASI CUZA ALEXANDRU IOAN	2	2	3	5	6	18	78%
ICMET INST NAT CERC DEZVOLTARE INCERCARI	3		7	3		13	77%
INST NAT CERC DEZVOLTARE MECATRONICA TEH	1	4	13	2	1	21	76%
UNIV LUCIAN BLAGA DIN SIBIU	1	6	2	18	2	29	76%
INST NAT CERC DEZVOLTARE BIORESURSE ALIM		5	9	4	1	19	74%
INCDO INOE 2000 FIL INST CERC INSTRUMENT	1	7	12	3	3	26	69%
ICPMRR INST NAT CERC-DEZVOLTARE METALE	4	6	14	4	4	32	69%
HONEYWELL ROMANIA SRL	5	2	5	3	7	22	68%
UNIV PLOIESTI PETROL-GAZE	4	1	6	3	1	15	67%
MICROCHIP TECHNOLOGY INC	2	2	2	5	1	12	67%
UNIV PITESTI	5	1	3	7	1	17	65%
ACAD ROMANA INST CHIM MACROMOLECULARA PE	2	2	2	4	1	11	64%
UNIV MEDICINA SI FARM DAVILA CAROL	6	3	9	4	2	24	63%
CEPROCIM SA	1	5	8		2	16	63%
UNIV STIINTE AGRONOMICE SI MEDICINA VETE	3	6	11	3		23	61%

- The above table shows a snapshot of selected tier 2 entities which have more than 60% of their portfolio published since 2013 and having more than 10 inventions.
- A number of non-Romanian entities show a growth in their contribution in Romanian activity in recent years.

*Partial Tier 2 list (Complete list provided in the Excel file)

Tier 1 Geographic Filing Activity

Tier 1 Entities	Romania	USA	WIPO (PCT)	EPO	Germany	China	France	Japan	Korea	India	United Kingdom	Italy
UNIV SUCEAVA STEFAN CEL MARE	328											
UNIV BRASOV TRANSILVANIA	141											
INST NAT CERC DEZVOLTARE ELECTROCHIMIE	111											
CONTINENTAL TEVES & CO OHG AG		17	31	53	67	12		5	7			
UNIV IASI TEHNICA ASACHI GHEORGHE	108											
INST NAT CERC DEZVOLTARE MASINI INSTALAT	107											
UNIV CLUJ-NAPOCA TEHNICA	96			3								
UNIV POLITEHNICA DIN BUCURESTI	97											
INST NAT CERC DEZVOLTARE FIZICA TEHNICA	92		1									
INST NAT CERC DEZVOLTARE CHIM FARM	85		5	5								
INOE 2000 INST NAT CERC DEZVOLTARE OPTOE	83											
INST NAT CERC-DEZVOLTARE TEXTILE PIELARI	56			1								
DIGITALOPTICS CORP EURO LTD		49	7	4		2		3	2			
RENAULT SAS	3	1	15	9		2	44		2	2		1
INST CERC DEZVOLTARE PROTECTIA PLANTELOR	41											
INST NAT CERC-DEZVOLTARE TEHNOLOGII CRIO	39											
FREESCALE SEMICONDUCTOR INC		29	32	8		7		1				
UNIV PETRU MAIOR DIN TARGU MURES	38											
ADOBE SYSTEMS INC	9	29		1	1	1					1	
INST NAT CERC DEZVOLTARE MICROTEHNOLOGIE	37		2	1								

- The table shows geographic spread of tier 1 entities' portfolios associated with Romanian patent activity.
- All Romanian entities have geographically restricted portfolios with only a small number of inventions being filed at the EPO and the WIPO.
- All non-Romanian entities have geographically wide-spread portfolios.

Tier 1 Trilateral/Quadlateral Filings

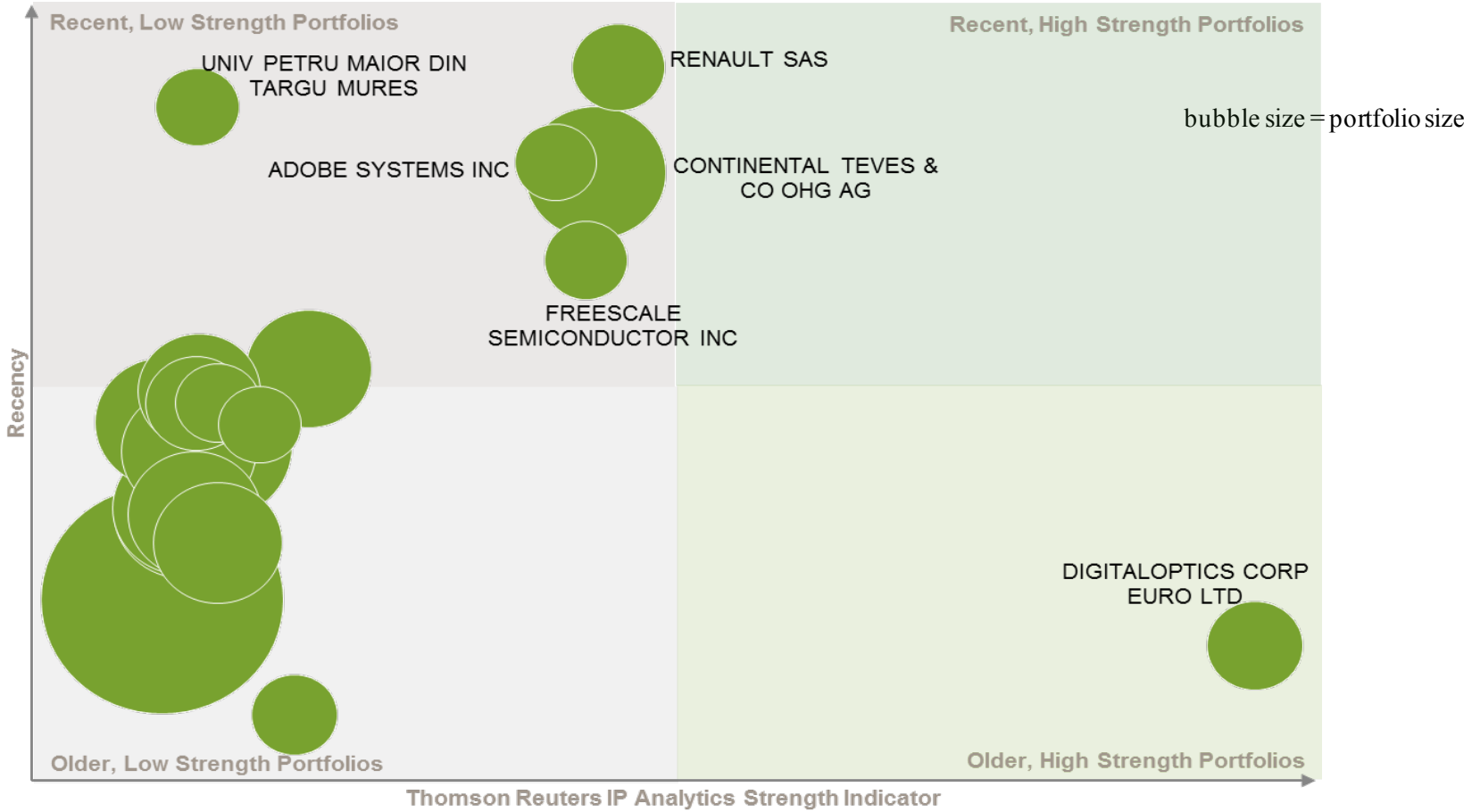
Tier 1 Entities	Trilateral Filings	Quadlateral Filings	Total
CONTINENTAL TEVES & CO OHG AG	4	2	110
DIGITALOPTICS CORP EURO LTD	2	2	50
FREESCALE SEMICONDUCTOR INC	1	1	38
UNIV SUCEAVA STEFAN CEL MARE			328
UNIV BRASOV TRANSILVANIA			141
INST NAT CERC DEZVOLTARE ELECTROCHIMIE			111
UNIV IASI TEHNICA ASACHI GHEORGHE			110
INST NAT CERC DEZVOLTARE MASINI INSTALAT			107
UNIV CLUJ-NAPOCA TEHNICA			100
UNIV POLITEHNICA DIN BUCURESTI			99
INST NAT CERC DEZVOLTARE FIZICA TEHNICA			92
INST NAT CERC DEZVOLTARE CHIM FARM			88
INOE 2000 INST NAT CERC DEZVOLTARE OPTOE			83
INST NAT CERC-DEZVOLTARE TEXTILE PIELARI			56
RENAULT SAS			47
INST CERC DEZVOLTARE PROTECTIA PLANTELOR			41
INST NAT CERC-DEZVOLTARE TEHNOLOGII CRIO			39
UNIV PETRU MAIOR DIN TARGU MURES			38
ADOBE SYSTEMS INC			37
INST NAT CERC DEZVOLTARE MICROTEHNOLOGIE			37

- Another indicator of commercialization intent is the number of filings in the major world economies reflected in the Trilateral patenting authorities of US, EPO and Japan, and the Quadlateral authorities, which include the addition of China.
- None of the Romanian entities have filed in the Trilateral or Quadlateral jurisdictions.

Portfolio Strength Rankings – Methodology

- Using quality factor comparators, an indication of the strength of a portfolio has been calculated for all records in this collection.
- Quality Factors used in this Thomson Reuters Patent Strength Index™ are:
  - Filing Breadth
  - Grant Locations
    - (US, EP, JP grants and Quadlateral filings score higher than other locations)
  - Citation Frequency
  - Technical Breadth
- Citations (references) are quantitative measurements of patent impact – documents that have been highly cited generally represent more fundamental technologies.
- To compensate for the fact that older documents have had more opportunity to be cited, age-weighted frequencies are calculated.

Tier 1 Rankings: Recency vs Strength



- Even more attractive than high strength portfolios are those portfolios that are both high strength and recent, i.e., have longer in-force life.
- None of the Romanian entities, except Univ Petru Maior Din Targu Mures have either higher strength or recent portfolios.
- Digital Optics Corp. has the highest strength portfolio, however, its recent publications have been on a decline compared to earlier years.

TECHNOLOGY ANALYSIS

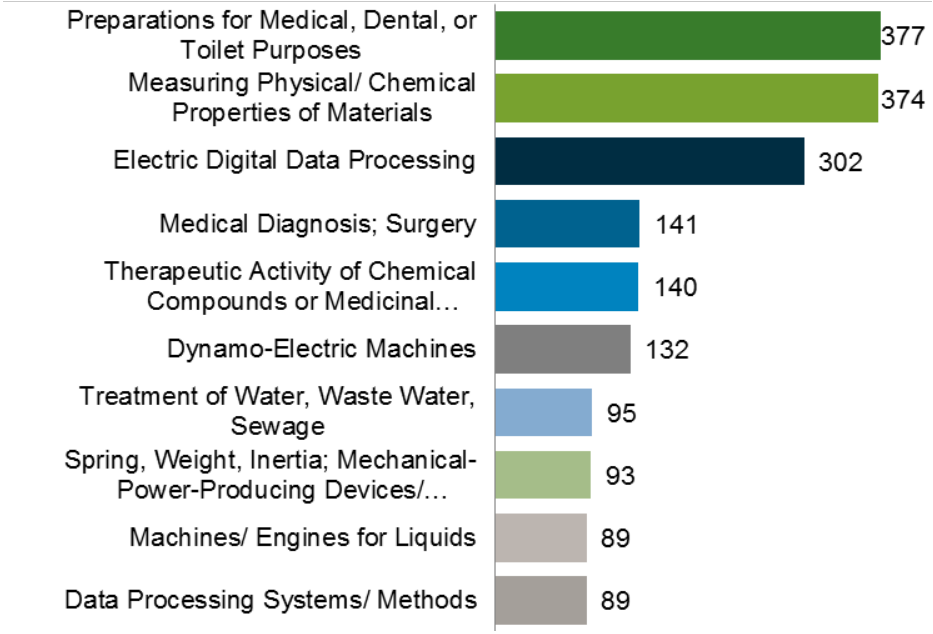
ThemeScape®

- ThemeScape® is a powerful tool that provides a qualitative and visual overview of the main subject matter presented in the data collection.
- It employs algorithms that analyze the content (here Title, Abstract, Novelty and Use fields of the DWPI abstracts) and places patent records into different locations based on their technical similarity to each other.
- Within the map, each dot represents an invention. Inventions with similar contents are enclosed in a contour. The distances between inventions are determined by similarity or dissimilarity in their technical content: the closer in location, the more similar.
- The map coloration corresponds to record density: white for highly populated, green for moderately populated, and blue for open space.

ThemeScape® for Total Collection – Romanian Patent Activity

Technology Segments and Categories

IPC Codes	Definition	Inventions
A61K	Preparations for Medical, Dental, or Toilet Purposes	377
G01N	Measuring Physical/ Chemical Properties of Materials	374
G06F	Electric Digital Data Processing	302
A61B	Medical Diagnosis; Surgery	141
A61P	Therapeutic Activity of Chemical Compounds or Medicinal Preparations	140
H02K	Dynamo-Electric Machines	132
C02F	Treatment of Water, Waste Water, Sewage	95
F03G	Spring, Weight, Inertia; Mechanical-Power-Producing Devices/ Mechanisms	93
F03B	Machines/ Engines for Liquids	89
G06Q	Data Processing Systems/ Methods	89



- Top 10 IPC classification codes from the Romanian patent activity were identified and analyzed.
- One patent invention can fit into multiple IPC codes.
- The following slides provide the volumes and timeline trends found for each of the top 10 IPC codes, as well as an analysis of the technical focus of Tier 1 entities.
- The above table and chart present the number of inventions for the top IPC codes.

Category – Assignee Analyses

- The following slides illustrate the IPC-wise technical emphasis for each Tier 1 assignee.
- The category emphasis slide shows the number of inventions in each category for each assignee. Row-wise reading highlights category leaders among the assignee group, and column-wise reading illustrates company emphasis.
- Many top assignees have limited number of filings within the top 10 IPC codes. Their portfolios seem to be distributed in other IPC codes that rank lower in the list of overall top IPC codes.
- Notably, Digital Optics Corp. does not have any of its filings in the top 10 IPC codes.

Tier 1 Category Emphasis

Top IPC Definitions	UNIV SUCEAVA STEFAN CEL MARE	UNIV BRASOV TRANSILVANIA	INST NAT CERC DEZVOLTARE ELECTROCHIMIE	CONTINENTAL TEVES & CO OHG AG	UNIV IASI TEHNICA ASACHI GHEORGHE	INST NAT CERC DEZVOLTARE MASINI INSTALAT	UNIV CLUJ-NAPOCA TEHNICA	UNIV POLITEHNICA DIN BUCURESTI	INST NAT CERC DEZVOLTARE FIZICA TEHNICA	INOE 2000 INST NAT CERC DEZVOLTARE CHIM FARM	INST NAT CERC-DEZVOLTARE TEXTILE PIELARI	RENAULT SAS	INST CERC DEZVOLTARE PROTECTIA PLANTELOR	INST NAT CERC-DEZVOLTARE TEHNOLOGII CRIO	FREESCALE SEMICONDUCTOR INC	UNIV PETRU MAIOR DIN TARGU MURES	ADOBE SYSTEMS INC	INST NAT CERC DEZVOLTARE MICROTEHNOLOGIE	DIGITALOPTICS CORP EURO LTD
Preparations for Medical, Dental, or Toilet Purposes	1		5		3		1	15	6	18		4		2	6				
Measuring Physical/ Chemical Properties of Materials	90	8	11		13	4	3	2	18	2	15	5		1	9		3		9
Electric Digital Data Processing	5	2	1	5	1		9	8	1		1		1		1	25	1	21	
Medical Diagnosis; Surgery	1	1			3		9	1			4								
Therapeutic Activity of Chemical Compounds or Medicinal Preparations			2		1					7		1							
Dynamo-Electric Machines	43	1	5	3			6	1	1										
Treatment of Water, Waste Water, Sewage		1	7		5			5	3	8		2							
Spring, Weight, Inertia; Mechanical-Power-Producing Devices/ Mechanisms	38	1					1	1			1								
Machines/ Engines for Liquids		1	1																
Data Processing Systems/ Methods	1	2			1		3							1				5	

Categories Timeline

Technical Categories	11	12	13	14	15	Total Inventions	% Activity since 2013
Preparations for Medical; Dental or Toilet Purposes	113	95	79	33	57	377	45%
Measuring Physical/ Chemical Properties of Materials	80	104	75	68	47	374	51%
Electric Digital Data Processing	47	65	78	57	55	302	63%
Medical Diagnosis; Surgery	30	27	27	26	31	141	60%
Therapeutic Activity of Chemical Compounds or Medicinal Preparations	53	34	36	7	10	140	38%
Dynamo-Electric Machines	33	36	29	19	15	132	48%
Treatment of Water; Waste Water; Sewage	24	22	20	18	11	95	52%
Spring; Weight; Inertia; Mechanical-Power-Producing Devices/ Mechanisms	22	20	29	7	15	93	55%
Machines/ Engines for Liquids	19	23	20	14	13	89	53%
Data Processing Systems/ Methods	9	26	27	16	11	89	61%

- This timeline map of patenting activity for each category suggests that several categories appear to be increasingly active (>50% publications since 2013).
- Highest increase in publications in recent years has been seen in the Electric Digital Data Processing category.

HIGH STRENGTH PATENTS

Patent Strength Rankings – Total Collection*

High Scoring Inventions	Thomson Reuters IP Analytics Strength Index™
WO2014129918A1 **BITDEFENDER IPR MANAGEMENT LTD** 2014 Host system for protecting computer systems from e.g. virus has protection priming module that changes memory allocation of target object when object satisfies selection criterion, and allocation ensures page is reserved for object	**182.0**
US20120120283A1 **DIGITALOPTICS CORP EURO LTD; FOTONATION LTD; TESSERA TECHNOLOGIES IRELAND LTD** 2012 Object-based auto-focus method of digital image acquisition device, involves combining image and applying object recognition program to combined image to edit and display corrected object image	**180.1**
WO2012110894A1 **DIGITALOPTICS CORP EURO LTD; FOTONATION LTD** 2012 Digital image acquisition device e.g. miniature or full-size digital camera, has processor alpha-blending safe digital image and digital image based on bunt pixel map to create output image	**179.5**
EP2662556A1 **CONTINENTAL TEVES & CO OHG AG** 2013 Mixing valve for internal combustion engine of motor vehicle, has flap poritons whose closing movements are formed in particularly free manner with single actuating motor	**173.4**
US20120051234A1 **Individuals** 2012 Method for testing communications network e.g. local area network, involves aggregating accumulated traffic statistics for some of set of packet group identifier to generate aggregated traffic statistics	**173.2**

- The inventions were ranked based on the Thomson Reuters Patent Strength Index™ scoring system as described in earlier slide and the above table presents the top 5 high scoring inventions along with their bibliographic details.
- The complete list is provided in the accompanying Excel file.

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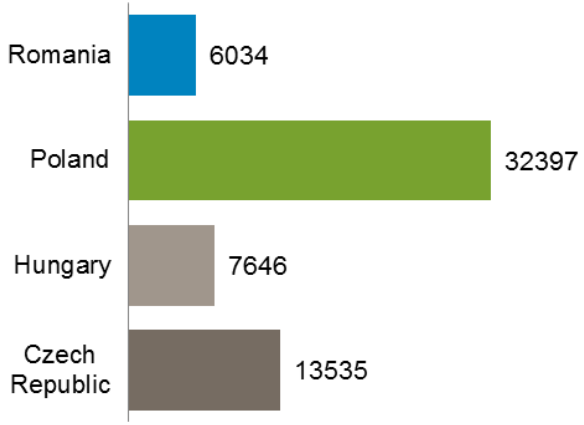
*Partial list (Complete list provided in the excel file)

COMPARISON OF ROMANIAN PATENT ACTIVITY

Overall Volumes



Country	Total Inventions
Romania	6034
Poland	32397
Hungary	7646
Czech Republic	13535

- The chart and table above present a comparison of the overall patent activity for the 4 countries respectively.
- Poland has the highest activity since 2011 followed by Czech Republic.

Publication Timelines

Country	11	12	13	14	15	Total Inventions	% Activity since 2013
Romania	1368	1361	1337	1090	878	6034	55%
Poland	6141	8857	6712	6340	4347	32397	54%
Hungary	1789	1816	1644	1379	1018	7646	53%
Czech Republic	2749	2822	2881	2733	2350	13535	59%

- This timeline map of patenting activity for each country presents a year-by-year comparison.
- Czech Republic shows the highest increase in publications in recent years.

Romanian Technology Focus Comparison

IPC Codes	Technical Categories	Romania	Poland	Hungary	Czech Republic
A61K	Preparations for Medical, Dental, or Toilet Purposes	377	1250	688	483
G01N	Measuring Physical/ Chemical Properties of Materials	374	1320	137	760
G06F	Electric Digital Data Processing	302	629	219	533
A61B	Medical Diagnosis; Surgery	141	465	135	197
A61P	Therapeutic Activity of Chemical Compounds or Medicinal Preparations	140	844	444	207
H02K	Dynamo-Electric Machines	132	241	89	63
C02F	Treatment of Water, Waste Water, Sewage	95	409	88	186
F03G	Spring, Weight, Inertia; Mechanical-Power-Producing Devices/ Mechanisms	93	69	23	22
F03B	Machines/ Engines for Liquids	89	116	33	42
G06Q	Data Processing Systems/ Methods	89	200	79	250

- The table presents the top 10 IPC codes derived from the Romanian patent activity and compares the activity of other countries in these areas.
- The table when read row-wise provides the leading country for each of the 10 technology areas.
- In the category F03G: Mechanical-Power-Producing Mechanisms, Romanian patent activity is the highest amongst these countries.

Technology Focus – Collective Analysis

IPC Codes	Technical Categories	Romania	Poland	Hungary	Czech Republic
A61K	Preparations for Medical, Dental, or Toilet Purposes	377	1250	688	483
G01N	Measuring Physical/ Chemical Properties of Materials	374	1320	137	760
G06F	Electric Digital Data Processing	302	629	219	533
A61B	Medical Diagnosis; Surgery	141	465	135	197
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F03B	Machines/ Engines for Liquids	89	116	33	42
G06Q	Data Processing Systems/ Methods	89	200	79	250
C07D	Organic Chemistry; Heterocyclic Compounds	19	1020	301	218
C07C	Organic Chemistry; Acyclic Or Carbocyclic Compounds	43	800	96	82
B65D	Containers for Storage or Transport of Articles; E.g. Bottles, Cartons etc.	51	755	128	287
E06B	Fixed or Movable Closures for Buildings; Vehicles etc.	16	654	28	167
E04B	General Building Constructions; Walls	75	636	91	311
B01D	Physical/ Chemical Separation Processes/ Apparatus	60	528	90	218
H04L	Transmission Of Digital Information	83	331	269	167
H04W	Wireless Communication Networks	21	276	246	107
C12N	Micro-Organisms/ Enzymes: Composition, Preservation, Genetic Engineering	59	422	152	203
A23L	Preservation of Foods	53	407	98	243

- The table presents a comparative picture of top 10 IPC codes for each of the countries and presents a collective analysis.
- Each country's activity across these technical areas has been color coded to show the maximum focus areas for the respective country.

KEY FINDINGS

Key Findings

- A collection of ~6,000 inventions associated with Romanian patent activity since 2011 was assembled.
- A collection of Poland (~32,400 inventions), Hungary (~7,600 inventions) and Czech Republic (~13,500 inventions) was also assembled for comparison.
- There is a slow decline in the recent Romanian patenting activity.
- First filings of Romanian entities seems to have increased at the USPTO and EPO in recent years since 2013.
- The overall Romanian patenting activity seems to be fragmented across a number of smaller entities.
- University of Suceava Stefan Cel Mare is the dominant player with 328 inventions, followed by University of Brasov Transilvania (141).
- Continental Teves ranks amongst the top 5 entities in Romanian patent activity with increase in its recent filings.

Key Findings

- Digital Optics Corp. has the highest strength portfolio, however, its recent publications have been on a decline compared to earlier years.
- None of the Romanian entities, except Univ Petru Maior Din Targu Mures have either higher strength or recent portfolios.
- 'Preparations for Medical, Dental, or Toilet Purposes' seems to be the technology area with most focus in Romanian entities followed by 'Measuring Physical/ Chemical Properties of Materials'.
- The 'Electric Digital Data Processing' category shows the highest increase in publications in recent years.
- Comparing technical focus of the Romanian patenting activity with Poland, Hungary and Czech Republic, Romania is the leader in the 'Mechanical-Power-Producing Mechanisms' category.

APPENDIX: METHODOLOGY AND CONVENTIONS

Patent Counting Conventions

- The DWPI database is structured around patent families.
- Each related patent application and granted patent is added to the DWPI family record as it is published. Unless otherwise noted, all counts of records in this report refer to patent families (inventions), and not to individual patent documents.
- The family approach provides a more accurate measure of the level and timing of inventive activity from a company within the technical space, and a truer picture of the overall level of innovation across the field as a whole.
- A patent family includes all the filings made on the invention in multiple countries, and family counts thus prevent counting the same invention more than once. DWPI families aim to exclude new matter.

Timeline and Date Conventions

- Because each family record potentially contains several individual publication events, this report uses the earliest known publication year (Basic Patent Year) to create family timelines.
- The tables and charts included in the report use this basic patent year unless otherwise noted.
- The first application for a particular invention filed at any patent office becomes the “priority application”, with the date of this event defining the priority date. The patent office location of the first filing is defined as the priority country. The priority date is closest to the date of actual invention and the basic patent year is the closest to when it was first published.

Data de-duplication and assignee cleaning

- After screening by relevance and de-duplication by patent families, families were retained and used for the landscape analysis presented in this report.
- Entity names were cleaned and unified to the extent possible so that known subsidiaries and merger and acquisition entities were grouped under a single company name for a more accurate view of company holdings.