IT Market in Romania

National Comparative Analysis

2017

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Developed by
ARIES Transilvania

Cluj-Napoca, host city of the
European Commission's conference:
Open Innovation 2.0, 2017

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PRIMĂRIA ȘI CONSILIUL LOCAL
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Route Reconfiguration:
In what direction is the Romanian IT going?

Romanian IT is concentrated in ten cities in the country and has reached a cumulative turnover of 4.8 billion Euros, as well as industry players have estimated last year. At the same time, we have exceeded 100,000 specialists in the field, and although half of them are located in Bucharest, centers such as Cluj and Iasi have experienced spectacular growth in recent years. Software development services are still predominant, with Cluj surpassing even Bucharest in this chapter: 63.1% of the Cluj companies have the 6201 CAEN code, compared to 37.2% in the capital. If we add to this information that only 4% of companies generate 78% of total turnover, the big frame becomes clearer.

Obviously, IT has become one of the country's strategic sectors, outpacing key industries such as agriculture and construction as a share of GDP. Corroborated, however, with the global market trends, these figures, presented in the ARIES Transilvania study, reveal a reality that should make us think. While global industry is moving towards product and solution development that will reconfigure the world we live in and we will have to learn how to control technology so it cannot be used against humanity, Romania remains an attractive destination especially for outsourcing. The best indicator in this direction is the contribution of local IT companies with a turnover of maximum 250,000 RON at the cumulated value of the industry. This study shows that 72% of these companies generate only 4% of the total turnover reported at the industry level, which means that despite the fact that in recent years the number of startups has increased, they are still unsustainable and face the problem of finding clients for their projects. In this context, we, as a professional organization, have to support the start-ups, with which Romania can migrate towards product development.

Our industry optimism has made more and more young people to choose to pursue a career in this field; this is how we managed to reach over 100,000 IT professionals able to support projects of extraordinary technical diversity. However, IT companies face the problem of human resource shortages, and Romania as a country is at the queue of ranking among the EU Member States in terms of innovation performance. This is evident not only from the research of specialized entities but also from the information presented in this study. The legitimate question that comes from these realities is how long we need to make industry-specific decisions that stimulate migration from outsourcing to innovation and when could we change the mindset of IT staff without which this pass will not it be possible? The fact is that it is vital that all the entities in the ecosystem (clusters, professional organizations, IT companies of all sizes, accelerators and universities) unite and shake hands for the future of the IT industry.

VOICU **OPREAN**

President ARIES Transilvania

ARIES Transilvania and iTech Transilvania Cluster
Our contribution

Through its efforts during time, ARIES Transilvania and iTech Transilvania Cluster by ARIES Transilvania, focused its activites on developing the IT&C sector in Cluj-Napoca and Transilvania, supporting the creation and the development of an innovative and collaborative ecosystem.

Even though ARIES Transilvania has a history of 13 years, the last 5 were the most intense because we wanted to answer the challenges from the IT & C industry, by promoting companies, startups and catalyst on the international market and by increasing their visibility. ARIES T was always involved in the companies' development by offering them trainings for their employees, in order to increase their staff performance.

Our intention was always to promote and support innovations from IT&C industry having at the same time an active involvement by placing ourselves as a digital innovation hub in South-Eastern Europe.

ARIES Transilvania was a co-organizer this summer together with Clusters Consortium from Northern Transilvania and Cluj-Napoca Municipality for the European Commission's conference: Open Innovation 2.0. This important event put Cluj on the European map of innovation. Through this event, we wanted to increase the number of Romanian SMEs and startups that manage to access innovation funds straight from Brussels. As a due diligence, we succeeded to enlarge international exposure and uplift the business competitiveness level of the region.

ARIES Transilvania wanted to develop this Study in order to offer to all stakeholders quality information about the "engine" industry in Cluj-Napoca.

The IT industry has begun to reconfigure the city in terms of demography, but also socially and economically, so our mission, as a professional organization and cluster, is to help the main players in this area to choose the right path to innovation. Despite the innovative projects developed for the foreign markets and clients, Romania is a country where the true entrepreneurship mentality is just being born. And we strongly believe that innovation is born there, and only there, where young people see each other as entrepreneurs from the earliest of ages.

This study helps us to understand the challenges of the sector and to take part at the development of an innovative and collaborative ecosystem between stakeholders of IT&C industry and not only.

We don't want to dream about the future, we want to bring it closer to reality.

Let's work together! For the best IT community!

BIANCA **MUNTEAN**

Executive Director
ARIES Transilvania
iTech Transilvania Cluster

ARIES
TRANSILVANIA

ARIES Transilvania (Transilvania Branch of the Romanian Association for Electronic Industry and Software) is based in Cluj-Napoca and is currently composed of 70 members (industry, public administration, universities, catalysers), the represented companies having more than employees and a turnover of more than 200 million euros.

Keywords: **entrepreneurship, innovation, collaboration, clustering, open communication.**

ARIES T is the initiator of the **Transilvania Digital Innovation Hub (DIH), a bottom-up approach of the regional stakeholders** which aims to position Cluj and Transilvania, based on its competences on the map of EU network of DIH. Also we are members in the European Digital Skills and Jobs Coalition.

During June 2017, ARIES Transilvania was one of the main organizers of Open Innovation 2.0 Conference in Cluj-Napoca;

This high-level international event was a great opportunity for international and cross-sectoral collaboration between clusters.

The main goal of the Open Innovation 2.0 2017 Conference was to showcase the success stories and to support collaboration projects between different stakeholders from the regional and local innovation ecosystem.

Innovative Projects:

- iTech Transilvania Cluster by ARIES Transilvania
- Bisnet Transylvania - Enterprise Europe Network
- Earth Observation ClimLab (EO ClimLab)
- ROCK - Regeneration and Optimization of Cultural heritage in creative and Knowledge cities
- Interconnectivity solutions on an European Level - eDelivery AccessPoint
- Regional contact point for SMEs in Horizon 2020
- Copernicus Relay

We strongly believe that innovation is possible only when companies and clusters from different fields and areas of expertise join hands and get involved in the life of the community.

ARIES T is interested in promoting its members, to meet new potential clients for its members and to find new and innovative projects and opportunities.

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iTech Transilvania Cluster was created in 2013 by ARIES Transilvania in order to support the creation of the regional IT innovation ecosystem. The first joint activities for its members (companies, public administration, universities, start-ups) were providing technical and soft-skills trainings for their employees and the creation of a knowledge database and trainers for the implementation of collaborative projects in the human resources field. Currently, the cluster offers support services for innovative projects, networking activities and international representation of the Transilvanian IT sector.

iTech Transilvania has partnerships with similar clusters all over the world and is open to international collaborations. Our cluster is also a founding member of the Northern Transylvanian Clusters' Consortium, where we strongly support cross-sectoral activities for our members. iTech Transilvania Cluster was awarded with the Silver Certificate by the European Secretariat for Cluster Analysis in recognition of its efforts to create a collaborative environment between member companies and the quality of activities provided.

iTech is currently actively involved in the working group for designing Cluj Smart City Strategy.

We follow Quadruple Helix model and provide support for open innovation in the regional eco-system "as a service", together with local and regional actors, public authorities, universities, research institutes and others.

Main activities:

- Supporting innovation and the entrepreneurship: we try to identify collaborative innovative projects for our members;
- Organization of workshops on SME Instrument and coaching sessions with evaluators from the European Commission for our innovative companies;
- Matchmaking sessions for our member companies and participation at B2B sessions during which we try to develop trans-sectorial innovative projects;
- Participation in national and international fairs;
- We search and indicate various funding programs for innovative companies;
- We support start-ups and partners from Transylvania business eco-system;
- Resource center to facilitate the access of companies to new and better training programs, cost effectiveness and advanced training of personnel.

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National IT Industry.
Evolutions between 2011 and 2016

The perception of the image of Cluj-Napoca seems to have been going through an important change over the last years. Therefore, in addition to being tagged as "university city", Cluj-Napoca has also won the title of "programming and software production center", a pole of development of IT activities. This title was swiftly instilled in the Cluj citizens and, in fact, the entire population so that it probably is the most visible element on the city's visiting card.

Therefore, there has been a pressing need for a study that should offer people extra clarity and accuracy, made by both the IT industry—whose interest is to know better its competitors, dynamics and potential—and other stakeholders (academia, public administration, business environment, public opinion) interested in knowing and anticipating the impact of the development of IT sector in Cluj-Napoca in particular and Romania, in general.

The present study has adopted a complex methodology consisting of a quantitative approach designed to analyse the economic and financial indicators of companies in the market as well as other factual elements collected via an opinion poll, and a qualitative approach aimed at expressing the opinion of some entrepreneurs, IT managers and academics, how they understand and perceive the facts in the IT field as well as their forecasts about future developments.

The first part of the study contains a comparative analysis of the balance sheets of IT companies. The data presented are obtained from official sources (Ministry of Public Finance, Trade Register Office, Open Data) and represent information from the balance sheets of active IT companies between 2011 and 2016.

The IT field was defined by selecting the NACE codes specifying computer science and IT-based activities but leaving aside communication technologies in order to better highlight software production and IT-related activities. More precisely, the analysis included companies whose main activity is:

5821 - Publishing of computer games;

5829 - Other software publishing;

6201 – Custom software development/made-to-order software (client-oriented software);

6202 - Computer consultancy activities;

6203 - Computer facilities management activities (management and exploitation);

6209 - Other information technology and computer service activities;

6311 - Data processing, hosting and related activities;

6312 - Web portals;

6399 - Other information service activities n.e.c.

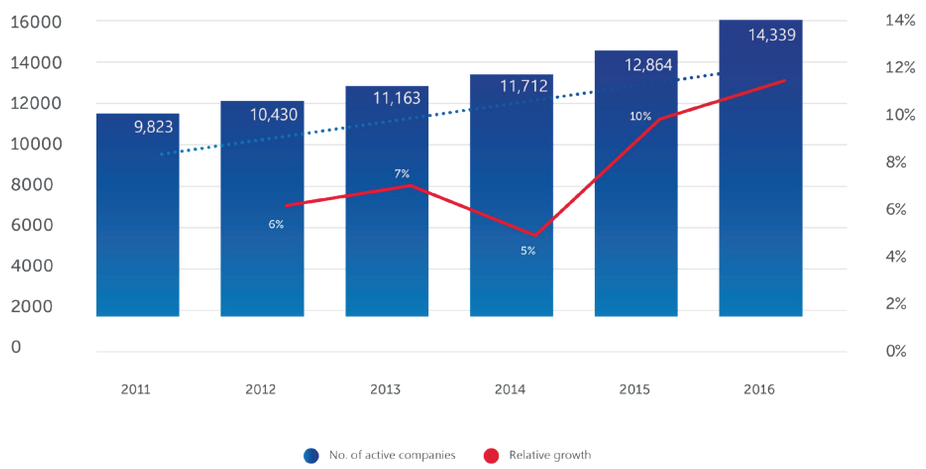
Overall, the analysis covered 21,345 companies operating in one of the above-mentioned fields between 2011 and 2016. For reasons of management and presentation of balance sheet data as well for reasons of information completeness, we allow a maximum 0.5% margin of error of the values presented below.

Economic indicators of the **IT national market**

Number of Active Companies on the IT Market from Romania between 2011 and 2016

The highest growth in the number of IT start-ups over the last 6 years was recorded in 2016: 11%

Chart 1. Number of active companies, as well as its relative increase compared to the previous year, 2011-2016



The evolution of the number of companies on the IT market, as defined in the study methodology, was a general upward trend in the period under investigation: overall upward in the period under investigation

Over the last 6 years, the share of IT companies in Bucharest of the total number at national level decreased by 2.1% while the share of Cluj IT companies increased by 1.9%.

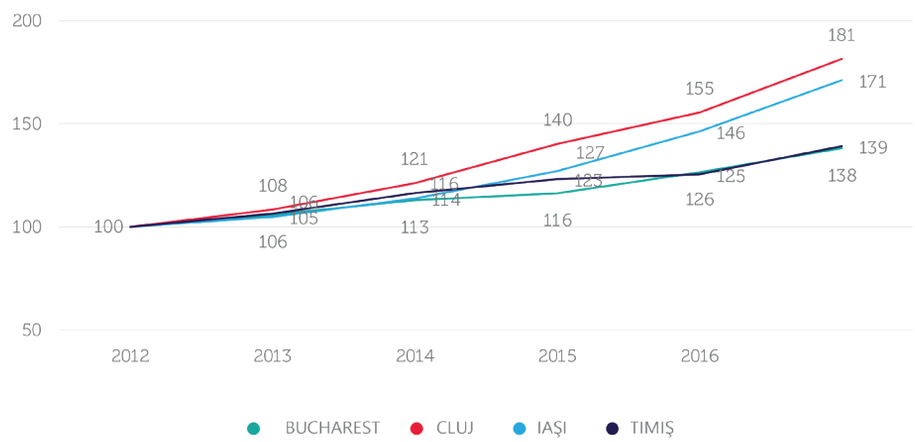
Table 1. Number of active companies in each county and their percentage of the total, 2011-2016

	2011		2012		2013		2014		2015		2016	
	N	% of total	N	% of total	N	% of total	N	% of total	N	% of total	N	% of total
București	3.881	39.5%	4.106	39.4%	4.384	39.3%	4.511	38.5%	4.906	38.1%	5.359	37.4%
Cluj	794	8.1%	860	8.2%	962	8.6%	1.113	9.5%	1.235	9.6%	1.439	10.0%
Timiș	496	5.0%	528	5.1%	577	5.2%	611	5.2%	622	4.8%	690	4.8%
Iași	370	3.8%	388	3.7%	421	3.8%	470	4.0%	541	4.2%	633	4.4%
Brașov	452	4.6%	477	4.6%	501	4.5%	522	4.5%	555	4.3%	591	4.1%
Ilfov	251	2.6%	297	2.8%	358	3.2%	397	3.4%	491	3.8%	591	4.1%
Bihor	260	2.6%	257	2.5%	278	2.5%	307	2.6%	341	2.7%	372	2.6%
Prahova	261	2.7%	298	2.9%	291	2.6%	308	2.6%	333	2.6%	354	2.5%
Constanța	236	2.4%	242	2.3%	265	2.4%	283	2.4%	292	2.3%	321	2.2%
Dolj	219	2.2%	233	2.2%	241	2.2%	254	2.2%	273	2.1%	305	2.1%
Total	**7.220**	**73.5%**	**7.686**	**73.7%**	**8.278**	**74.2%**	**8.776**	**74.9%**	**9.588**	**74.5%**	**10.655**	**74.3%**

Therefore, almost 40% of IT companies were and still are located in Bucharest, about 10% are located in Cluj County while Timiș, Iași, Ilfov and Brașov Counties host about 4%-5% of the total number of companies.

Chart 2.2011-2016 relative growth in the main counties (Bucharest, Cluj, Timiș and Iași)

Cluj County has the highest growth in the number of IT start-ups in Romania: 81%



In fact, two dynamics of increase were discernable, one represented by Cluj and Iași counties where the number of companies increased steadily, and another one represented by Bucharest and Timiș County where the growth rate was slower.

Table 2. Number of active companies by territorial and administrative unit, 2011-2016

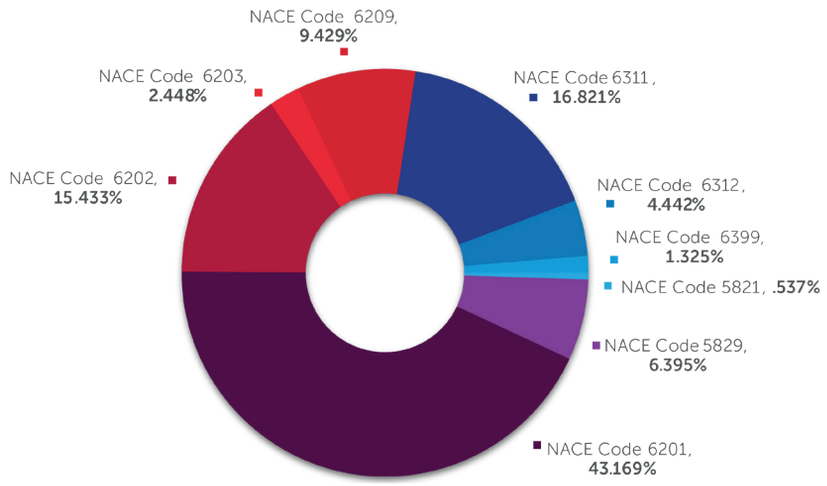
Over the last 6 years, the share of IT companies in Bucharest of the total number at national level decreased by 2.1% while the share of Cluj IT companies increased by 1.9%.

	2011	2012	2013	2014	2015	2016
Cluj-Napoca	705	764	840	968	1.070	1.235
București District 1	825	859	907	949	1.003	1.109
București District 3	758	812	889	900	986	1.079
București District 2	788	823	850	866	933	1.023
București District 6	709	766	815	826	865	955
București District 4	476	492	522	558	667	716
Timișoara	408	437	473	494	507	565
Iași	332	347	376	415	470	549
București District 5	325	354	401	412	451	476
Brașov	364	385	401	417	430	456
Total	5.690	6.039	6.474	6.805	7.382	8.162
% din national total	58%	58%	58%	58%	57%	57%

In fact, two dynamics of increase were discernable, one represented by Cluj and Iași counties where the number of companies increased steadily, and another one represented by Bucharest and Timiș County where the growth rate was slower.

Chart 3. Percentage of IT companies (2016) according to NACE Code

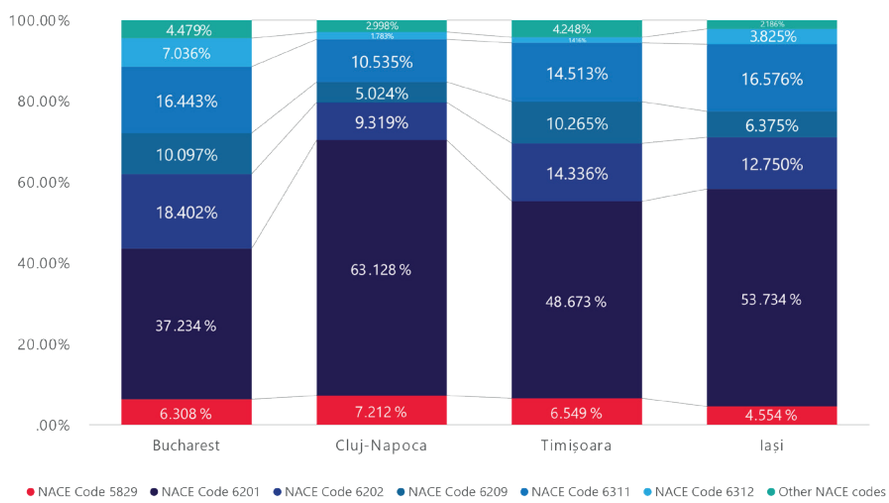
In 2016, 43.2% of the active IT companies had the NACE code 6201—made-to-order software.



The next are the data processing and web administration companies (NACE code 6311), with a 16.8% share, and computer consultancy companies (NACE code 6202) with a 15.4% share of the total number of companies.

Chart 4.Share of IT companies (2016) by NACE code, in the main cities (Bucharest, Cluj-Napoca, Timișoara and Iași)

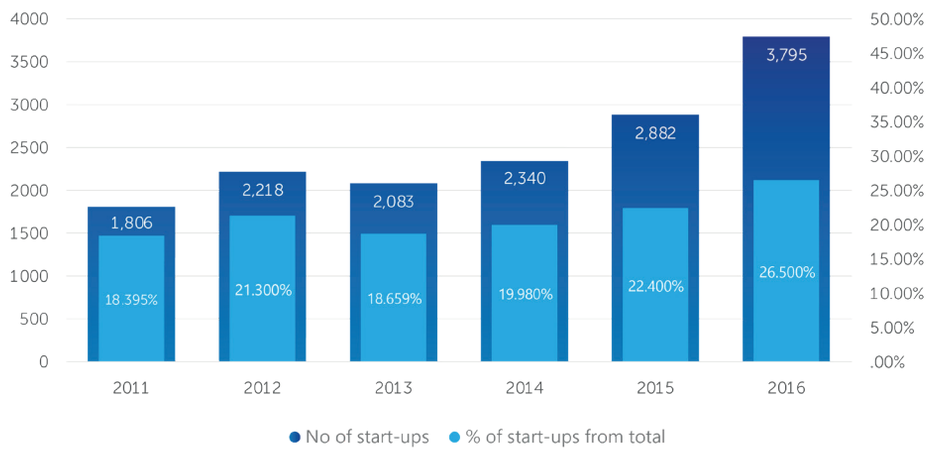
63.1% of the IT companies in Cluj-Napoca have the NACE code 6201, compared to only 37.2% in Bucharest.



Therefore, in the IT industry, Cluj-Napoca is notable for the manner in which it concentrates a greater share of software development companies so that the tag "city of programmers" is quite justified.

Chart 5. Number of start-ups and their share of the total number of companies, 2011-2016

The number of IT start-ups has doubled over the last 6 years. 3,795 start-ups were set up at national level.

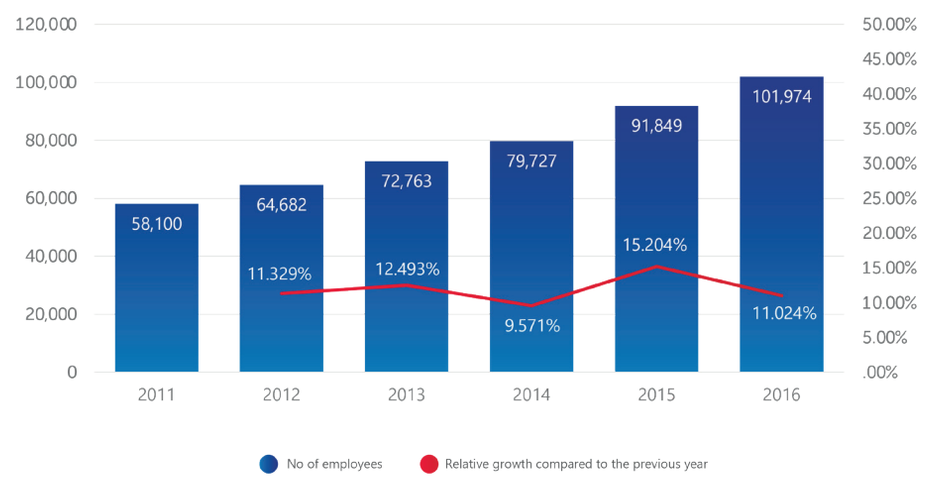


Start-ups, a business model increasingly visible in the global and, recently, the national IT market, are a benchmark of IT innovation, from a technological and entrepreneurial viewpoint.

Number of IT Employees between 2011-2016

Chart 6. Number of IT employees and the relative growth compared to the previous year, 2011-2016

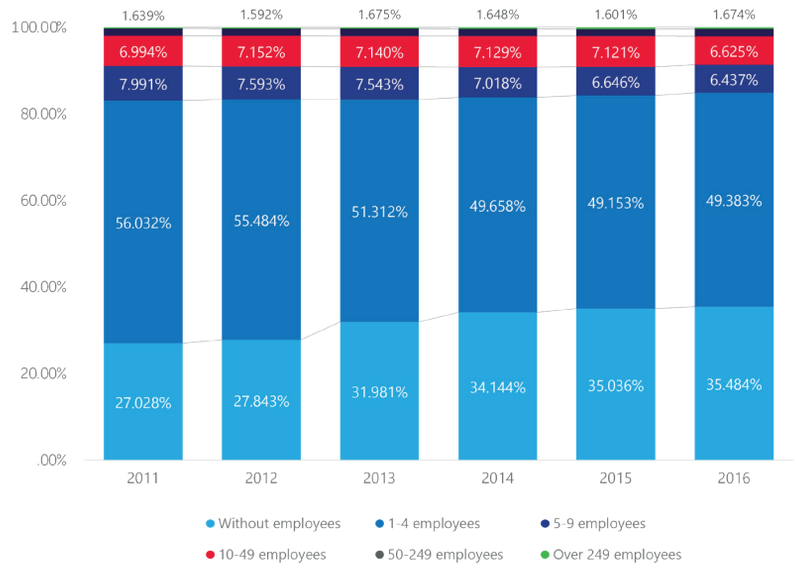
The number of IT employees increased by 75% to more than 101,000 employees over the last 6 years.



This indicator was obtained from the balance sheets of companies. It does not include other working arrangements such as sole trader (self-employed person) or micro-enterprises (micro-businesses) which, according to IT professionals, have lately become more and more numerous.

Chart 7. Share of employees in relation to the total number of IT companies , 2011-2016

The share of companies with no employees increased from 27% to 35.5% while the share of companies with one to four employees decreased from 56% to 49.4%.

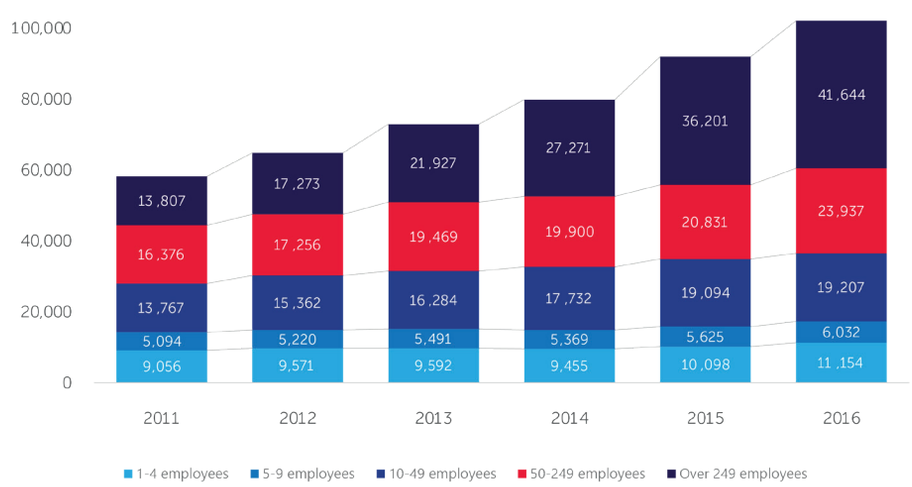


As a matter of fact, during the 6 years concerned, the number of IT employees increased by about 73% to more than 100,000. Consequently, the breakdown of companies by the number of their employees shows that the share of companies with no employees increased from 27% to 35.5.

Chart 8.Breakdown of the number of IT employees by company size, 2011-2016

There is an increase in the number of companies with no employees from 27% in 2016 to 35.5% in 2017.

There is a decrease in the number of IT companies with 1-4 employees from 56% in 2016 to 49.4% in 2017.



On the other hand, as regards the number of employees and their breakdown by categories of companies ranked according to staff size, it should be noticed that more and more employees are attracted by large companies with over 250 employees while the percentage of employees working in small companies with no more than 10 employees has decreased.

Table 3. Number of employees at county level and their share of the national total number, 2011-2016

In 2016, 14,601 workers were officially registered as IT employees in Cluj-Napoca, up by 14.3% as compared to 2015.

	2011		2012		2013		2014		2015		2016	
	N	% of total	N	% of total	N	% of total	N	% of total	N	% of total	N	% of total
București	30.450	52.4%	33.540	51.9%	36.742	50.5%	38.903	48.8%	45.607	49.7%	51.032	50.0%
Cluj	6.256	10.8%	7.878	12.2%	9.153	12.6%	10.688	13.4%	12.646	13.8%	14.601	14.3%
Timiș	2.614	4.5%	2.922	4.5%	3.455	4.7%	4.351	5.5%	5.169	5.6%	5.527	5.4%
Iași	3.072	5.3%	3.044	4.7%	4.012	5.5%	4.282	5.4%	5.157	5.6%	5.500	5.4%
Brașov	1.506	2.6%	1.880	2.9%	2.383	3.3%	3.229	4.1%	3.312	3.6%	4.302	4.2%
Ilfov	2.303	4.0%	2.530	3.9%	2.839	3.9%	3.197	4.0%	3.718	4.0%	3.758	3.7%
Bihor	1.479	2.5%	1.802	2.8%	2.090	2.9%	2.411	3.0%	2.555	2.8%	2.946	2.9%
Prahova	1.041	1.8%	1.103	1.7%	1.107	1.5%	1.266	1.6%	1.572	1.7%	1.836	1.8%
Constanța	1.360	2.3%	1.454	2.2%	1.581	2.2%	1.806	2.3%	1.654	1.8%	1.769	1.7%
Dolj	921	1.6%	1.073	1.7%	1.228	1.7%	1.033	1.3%	1.430	1.6%	1.579	1.5%
Total	**51.002**	**87.8%**	**57.226**	**88.5%**	**64.590**	**88.8%**	**71.166**	**89.3%**	**82.820**	**90.2%**	**92.850**	**91.1%**

Half of IT employees are concentrated in Bucharest (50% in 2016), followed by Cluj (14.3%), Iași and Timiș (54% each) and Dolj (4.2%), respectively. The other 5 counties have shares between 3.7% and 1.5%.

Chart 9. Breakdown of IT employees by NACE codes, 2011-2016

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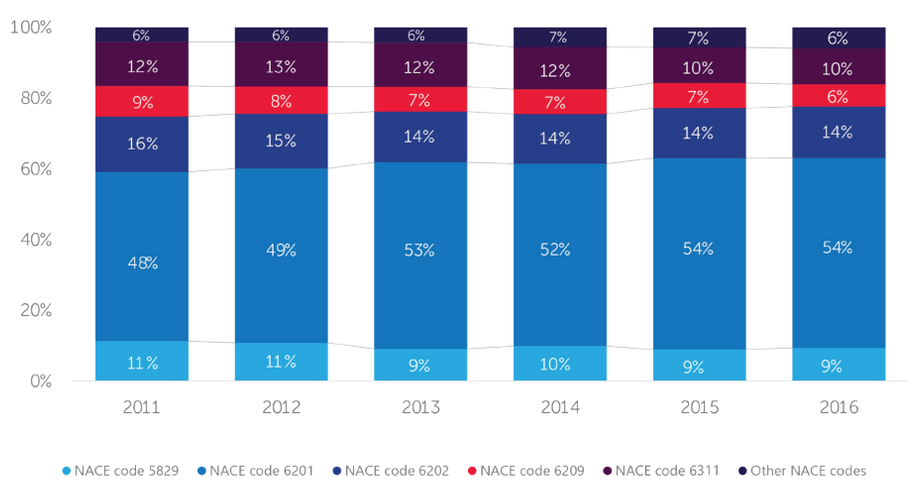


On the other hand, as regards the number of employees and their breakdown by categories of companies ranked according to staff size, it should be noticed that more and more employees are attracted by large companies with over 250 employees while the percentage of employees working in small companies with no more than 10 employees has decreased.

Turnover of IT Companies between 2011-2016

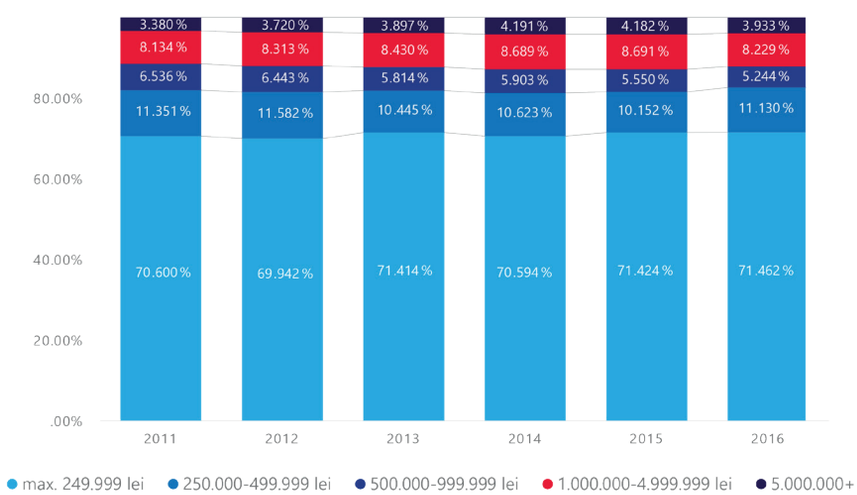
The aggregate turnover of IT companies doubled in the last 6 years. The IT sector alone generates 3% of GDP while IT&C exceeds 6%.Over the last 2 years, the turnover of IT companies experienced a relative fall by 8% compared to the period 2013-2014.

Chart 10. Aggregate turnover of the IT sector and its relative growth on the previous year, 2011-2016

The data show that the aggregate turnover of the IT companies actually doubled during the 6 years concerned.

4% of IT companies generate 78% of total revenues. At the opposite end, 72% of IT companies only generate 4% of total revenues.

Chart 11. Breakdown of IT companies by amount of turnover, 2011-2016



In 2016, the total amount of turnover reached RON 21,500 billion, the equivalent of about € 4,810 billion. The relative annual growth was faster between 2014 and 2015 but less spectacular in 2016 when it lessened slightly to 8%.

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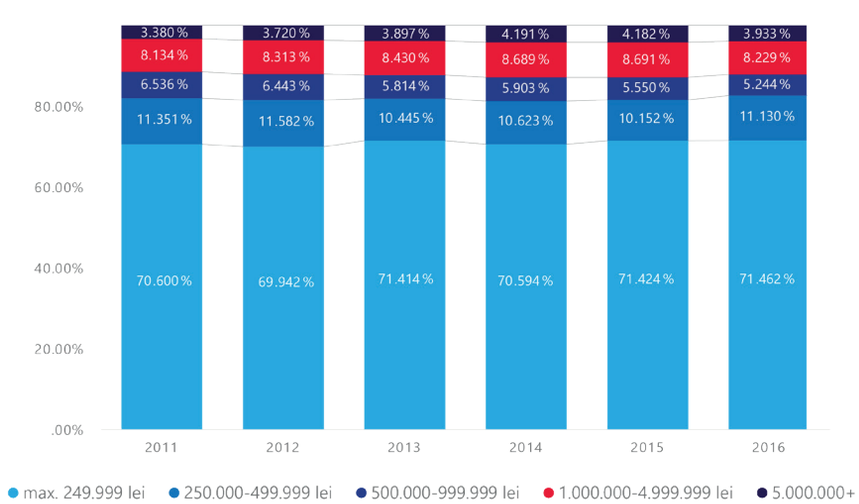

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Chart 12. Share of aggregate turnover according to company size, 2011-2016

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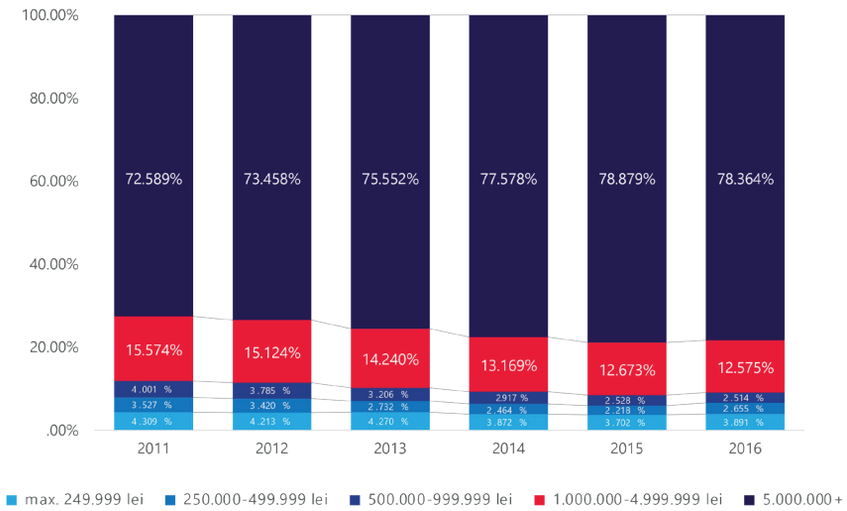


As the chart above shows, the breakdown of companies by turnover categories is relatively stable during the 6 years.

Table 4. Aggregate turnover at county level and its share in the national total turnover, 2011-2016

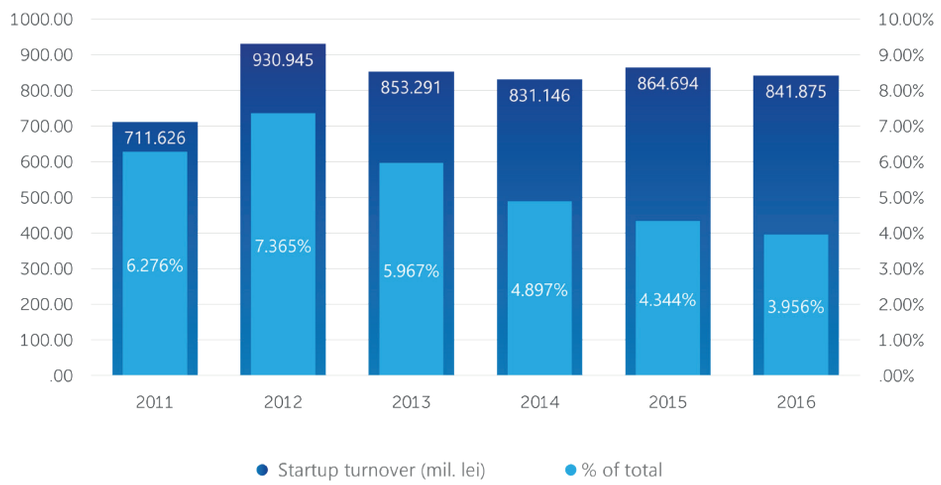
94% of the total IT turnover is generated in the first 10 counties.

	2011		2012		2013		2014		2015		2016	
	CA (mil.RON)	% of total	CA (mil.RON)	% of total	CA (mil.RON)	% of total	CA (mil.RON)	% of total	CA (mil.RON)	% of total	CA (mil.RON)	% of total
București	7476.5	65.9%	7960.1	63.0%	8833.5	61.8%	10410.2	61.3%	12181.7	61.2%	13337.3	62.0%
Cluj	783.2	6.9%	1067.7	8.4%	1353.9	9.5%	1687.6	9.9%	2179.5	10.9%	2752.4	12.8%
Iași	352.5	3.1%	390.8	3.1%	468.9	3.3%	612.2	3.6%	781.1	3.9%	882.3	4.1%
Timiș	360.9	3.2%	423.7	3.4%	496.9	3.5%	612.5	3.6%	752.5	3.8%	870.8	4.1%
Brașov	294.1	2.6%	392.5	3.1%	412.0	2.9%	481.4	2.8%	611.7	3.1%	668.0	3.1%
Ilfov	414.2	3.7%	447.8	3.5%	436.9	3.1%	497.2	2.9%	671.9	3.4%	603.8	2.8%
Dolj	140.1	1.2%	172.7	1.4%	208.9	1.5%	272.5	1.6%	336.1	1.7%	391.0	1.8%
Sibiu	188.8	1.7%	240.4	1.9%	248.1	1.7%	321.4	1.9%	261.3	1.3%	290.4	1.4%
Bihor	150.3	1.3%	130.9	1.0%	137.5	1.0%	165.6	1.0%	184.1	0.9%	213.5	1.0%
Prahova	378.5	3.3%	525.7	4.2%	827.5	5.8%	927.7	5.5%	697.0	3.5%	192.8	0.9%
Total	**10539.0**	**92.9%**	**11752.3**	**93.0%**	**13424.1**	**93.9%**	**15988.3**	**94.2%**	**18656.9**	**93.7%**	**20202.1**	**94.0%**

Bucharest holds over 60% of the national total turnover, followed by Cluj with almost 12%, Iași and Timiș, each with 4%, and the rest of counties with shares ranging from 0.9% to 2.8%.

Chart 13. Aggregate turnover of startups and their share in the national total turnover, 2011-2016

Startups have a 8%-9% contribution to the national total turnover, following a downward trend since 2012.



What percentage of the total turnover is generated by startups? The data show an increase for the 2011-2012 period, followed by a steady drop in subsequent years with the result that the total turnover of startups settled at around RON 850 million and did not keep pace with the market.

Evolution of IT Sector in its Secondary Centers

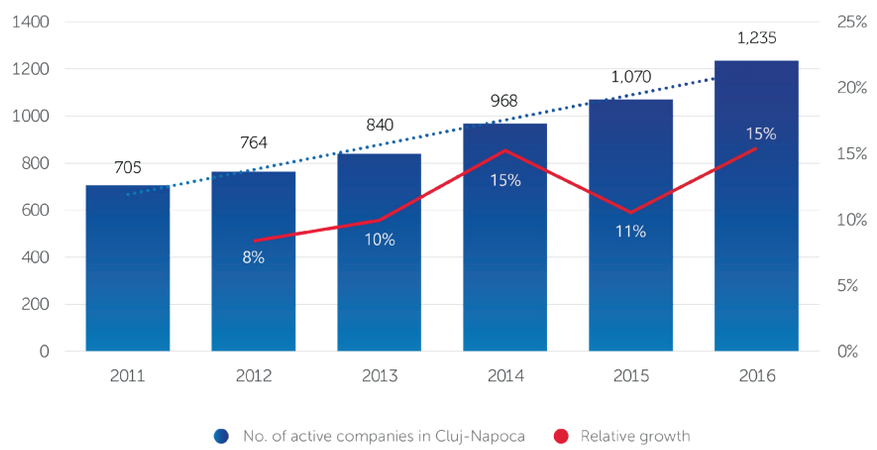
	2011			2012			2013		
	Comp. No.	CA (mil RON)	Empl. No.	Comp. No.	CA (mil RON)	Empl. No.	Comp. No.	CA (mil RON)	Empl. No.
Brașov	364	243.3	2103	385	343.3	2324	401	360.9	2584
Constanța	188	52.3	398	190	65.2	435	216	59.9	436
Craiova	195	127.0	1435	205	159.4	1812	213	196.4	2313
Oradea	218	116.3	900	218	93.7	901	230	102.5	860
Sibiu	174	154.0	1001	185	209.6	1102	188	213.2	1219
Total	**1139**	**693.0**	**5837**	**1183**	**871.2**	**6574**	**1248**	**932.9**	**7412**
% Of Total National (Comp. No.)	**11.6%**			**11.3%**			**11.2%**		
% Of Total National (Ca)		**6.1%**			**6.9%**			**6.5%**	
% Of Total National (Empl. No.)			**10.0%**			**10.2%**			**10.2%**

	2014			2015			2016		
	Comp. No.	CA (mil RON)	Empl. No.	Comp. No.	CA (mil RON)	Empl. No.	Comp. No.	CA (mil RON)	Empl. No.
Brașov	417	443.3	2919	430	558.9	3365	456	600.3	3355
Constanța	222	59.1	615	231	74.6	419	246	69.9	467
Craiova	222	260.0	3164	234	321.1	3237	255	364.1	4201
Oradea	250	120.5	1033	276	140.7	1305	297	167.4	1519
Sibiu	192	252.8	1320	204	232.0	1412	216	249.3	1539
Total	**1303**	**1135.8**	**9051**	**1375**	**1327.2**	**9738**	**1470**	**1451.0**	**11081**
% Of Total National (Comp. No.)	**11.1%**			**10.7%**			**10.3%**		
% Of Total National (Ca)		**6.7%**			**6.7%**			**6.7%**	
% Of Total National (Empl. No.)			**11.4%**			**10.6%**			**10.9%**

Evolution in the Number of Companies

Chart 14. Number of active IT companies inCluj-Napoca, as well as its relative growth compared to the previous year, 2011-2016

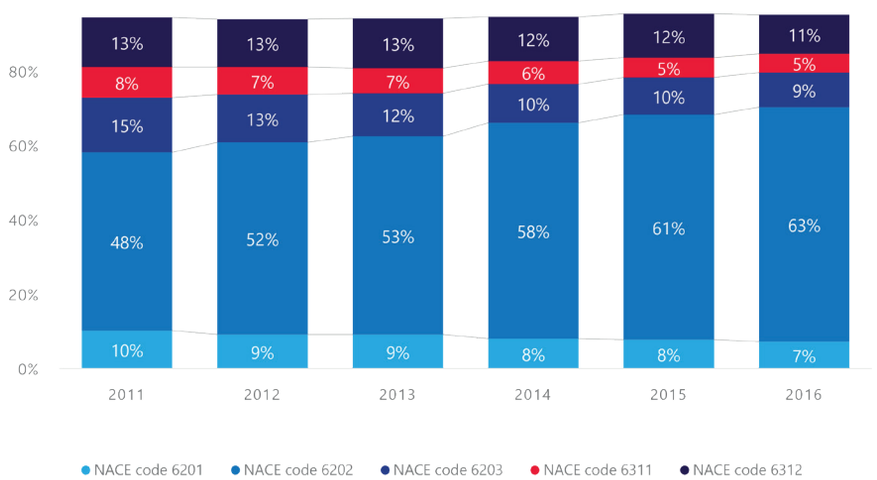
The annual relative growth rate of IT companies in Cluj-Napoca increased from 8%-10% (2011-2013) to 11%-15% (2015-2016).



In 2016, about 1,235 companies operated in the Cluj-Napoca IT market, accounting for 8.6% of the total number of companies at national level.

Chart 15. Percentage of Cluj-Napoca IT companies by NACE codes, 2011-2016

The percentage of Cluj-Napoca IT companies with the NACE code 6201 increased over the last 6 years, from 48% in 2011 to 63% in 2016.

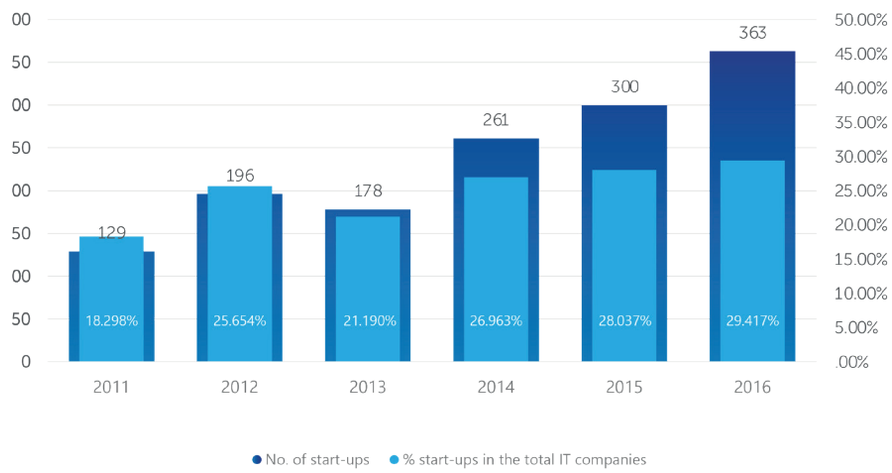


As the number of IT companies set up via de minimis funding programs (e.g. Start-Up Nation) has increased considerably, the number of Cluj IT companies is expected to exceed 1,800 in the upcoming period while the evolution of their breakdown by NACE code is expected to follow the same trend.

Number of IT Startups in Cluj-Napoca

The number of IT startups in Cluj-Napoca has reached 29% of the total number of local IT companies.

Chart 16. Number of IT startups in Cluj-Napoca, as well as their share in the total number of IT companies, 2011-2016

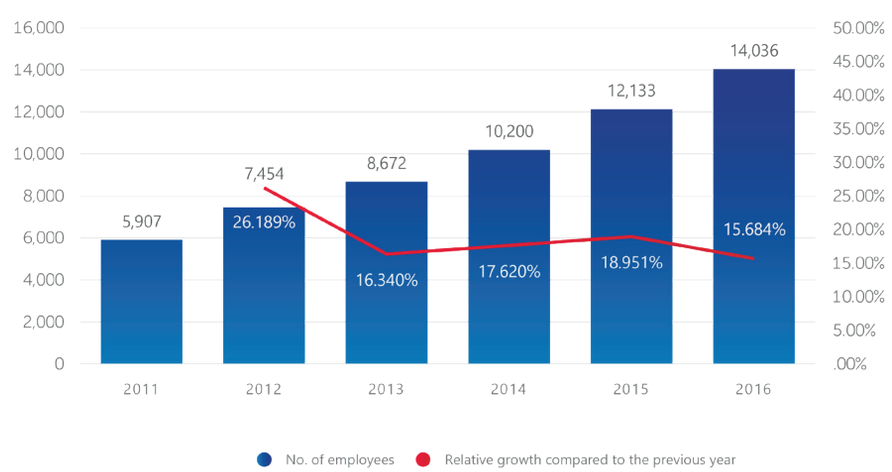


The number of startups is both an indicator of market dynamism and a gauge of the sector's evolution for the years to come. As in the case of the number of companies, the number of startups witnessed a steady increase, from 129 startups in 2011 to 363 in 2016.

Number of Employees in the Cluj-Napoca IT Market

Out of the total number of employees working in Cluj-Napoca (161,610), 14,036, accounting for 8%, work in the IT sector. However, in reality one out of eleven Cluj citizens works in IT if one also takes into account the other forms of IT collaboration.

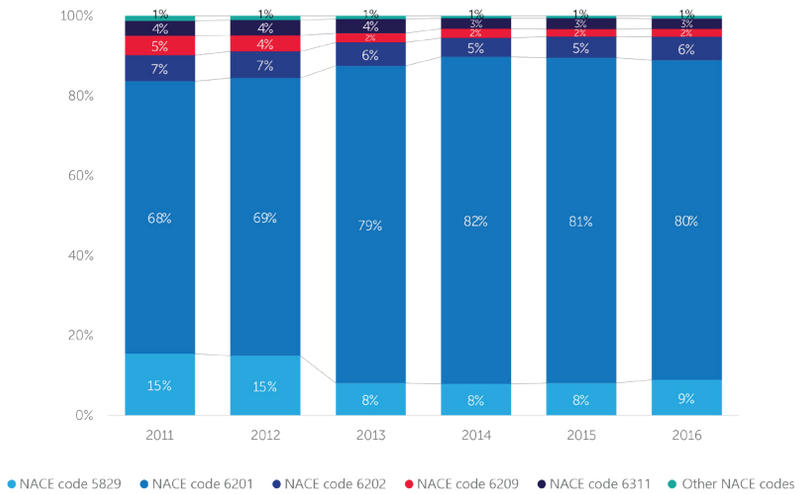
Chart 17. Number of IT employees in Cluj-Napoca, as well as its annual relative growth, 2011-2016



Naturally, there are many factors that might cause this growth rate to fluctuate in the future: limited pool of human resources, some workers' changing their employment status from employee to collaborator, self-employed person or microenterprise.

Chart 18. Share of IT employees in Cluj-Napoca according to NACE codes, 2011-2016

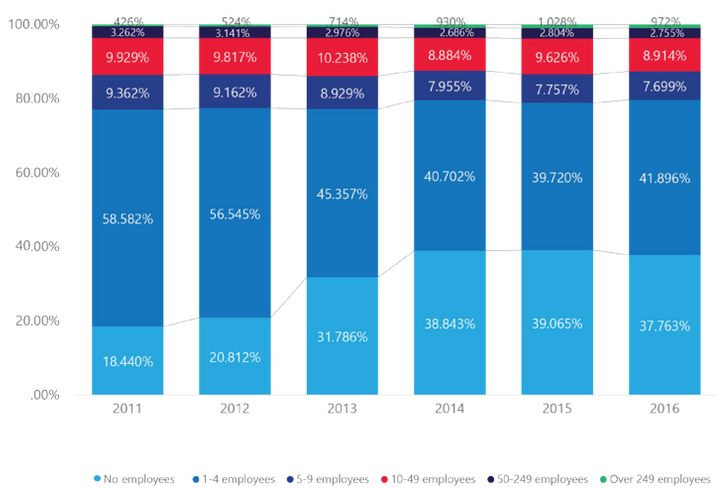
Over 80% of Cluj IT employees work in made-to-order software companies, NACE code 6201.



In actuality, over 80% of Cluj-Napoca IT employees work in software development companies. The largest drop in the number of employees was recorded in the case of subfield 5829—other software publishing—where the share of employees almost halved in the last 6 years.

Chart 19. Share of IT companies in Cluj-Napoca by number of employees, 2011-2016

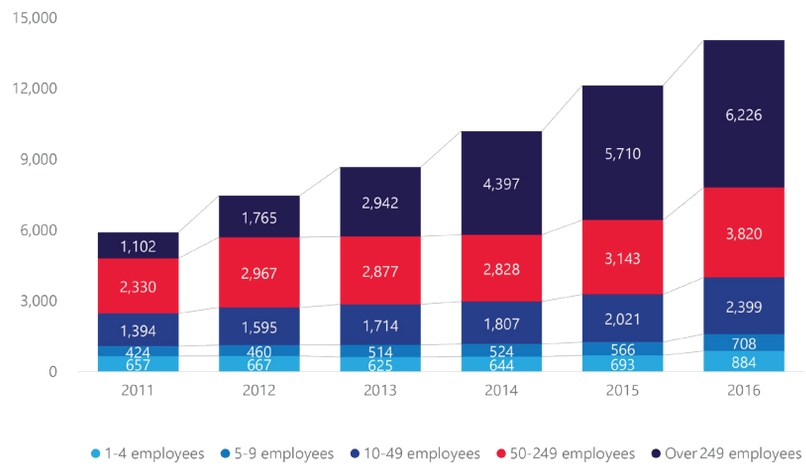
Large Cluj IT companies with over 249 employees started in 2011 to concentrate human resources by recruiting employees from medium-sized and small companies, this HR concentration increasing from 18.7% in 2011 to almost 45% in 2016.



As regards company size by number of employees, the data indicate a gradual drop in the share of companies with 1-4 employees and those with 5-9 employees.

Chart 20.Breakdown of the number IT employees in Cluj-Napoca by company size, 2011-2016

In percentage terms, the number of employees of companies with 50-249 employees decreased, as a share in the total number Cluj IT employees, from 39% to 27%.

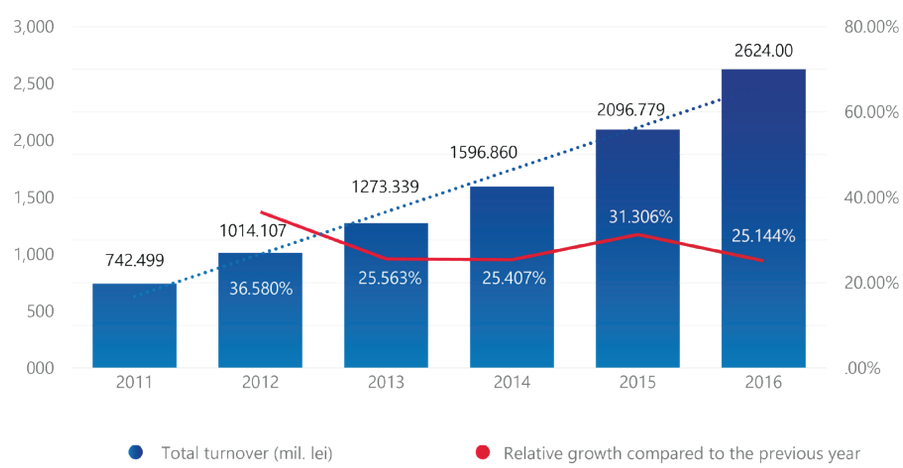


However, the analysis of the concentration of employees by company size reveals that, as of 2011, large companies with over 249 employees started to concentrate human resources, their HR concentration rising from 18.7% in 2011 to almost 45% in 2016.

Number of Employees in the Cluj-Napoca IT Market

Chart 21. Total turnover of the IT companies in Cluj-Napoca and its relative growth, 2011-2016

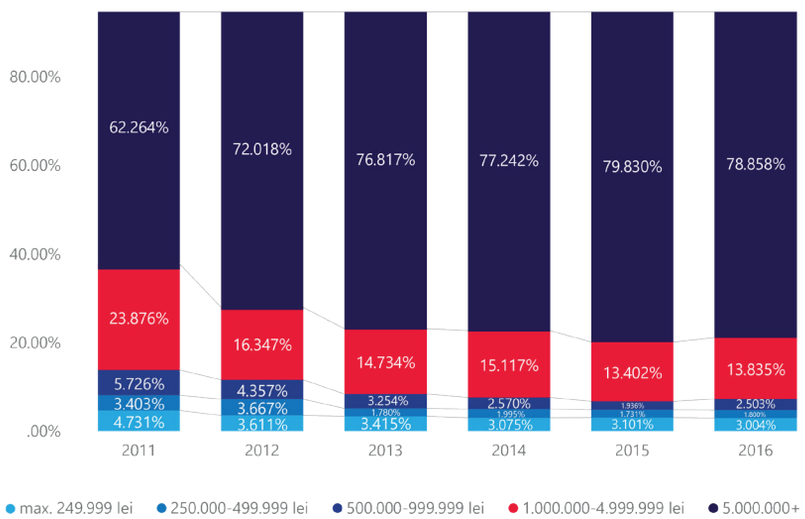
Turnover of IT companies in Cluj-Napoca increased at a faster pace than the average turnover of IT market, following an upward linear trend, with about RON 340 million being added every year



Growth rate of turnover in 2016 decreased to 25.1%, from 31.3% in 2015

Chart 22. Share of aggregate turnover of the IT companies in Cluj-Napoca according to company size, 2011-2016

Two-thirds of Cluj IT companies have a turnover of no more than RON 250,000, about 28% of companies boast a turnover between RON 250,000 and 4,999,999 while only 5% of companies have a turnover exceeding RON 5 million.



However, the analysis of the aggregate turnover of each company category shows that large companies recorded an increase in aggregate turnover of over 16% in the last 6 years.

Evolution of the Main IT Companies in Cluj-Napoca

	2011			2012			2013		
	CA (mil RON)	Rank CA.	Empl. No.	CA (mil RON)	Rank CA.	Empl. CA	(mil RON) Rank	Rank CA.	Empl. No.
Endava	38.6	3	314	64.6	3	527	113.4	1	780
Softvision	22.5	6	523	28.1	8	666	34.8	8	841
EBS / NTT Data	20.0	8	101	49.2	5	240	79.5	3	394
Tse / betfair	37.3	4	140	56.7	4	208	64.6	5	223
Iquest	50.9	2	265	74.4	1	295	83.9	2	319
NET Brinel	55.8	1	69	68.0	2	79	72.3	4	85
Fortech	18.3	9	160	31.3	7	239	45.7	6	301
Arobs	33.6	5	219	38.6	6	277	45.0	7	307
3Pillar Global	2.7	52	84	15.7	13	135	31.6	11	203
Property Shark	12.4	12	127	18.6	10	189	32.1	10	0
Yonder	21.0	7	180	26.9	9	215	34.6	9	249
Total top ca	313.2			472.0			637.5		
% Top of local total (ca)	42.2%			46.5%			50.1%		
Total top empl.			2182			3070			3702
% Top of local total (Empl. No.)			**36.9%**			**41.2%**			**42.7%**

	2014			2015			2016		
	CA (mil RON)	Rank CA.	Empl. No.	CA (mil RON)	Rank CA.	Empl. CA	(mil RON) Rank	Rank CA.	Empl. No.
Endava	165.6	1	1142	217.6	1	1381	217.6a	1a	1381a
Softvision	44.5	8	1036	117.9	2	1104	181.9	2	1036
EBS / NTT Data	97.7	2	386	110.6	3	438	163.1	3	386
Tse / betfair	70.8	5	242	93.0	6	306	126.2	4	242
Iquest	84.2	3	370	98.8	5	432	123.0	5	370
NET Brinel	79.4	4	82	106.6	4	90	121.8	6	82
Fortech	49.5	7	345	81.6	7	468	100.7	7	345
Arobs	51.9	6	319	71.5	8	388	85.8	8	319
3Pillar Global	41.2	9	250	50.8	9	304	58.0	9	250
Property Shark	36.6	11	238	43.5	10	271	55.1	10	238
Yonder	40.1 1	0	266	40.6	11	263	52.0	11	266
Total top ca	761.4			1032.4			1285.2		
% Top of local total (ca)	47.7%			49.2%			49.0%		
Total top empl.			4676			5445			4915
% Top of local total (Empl. No.)			45.8%			44.9%			35.0%

*At the time of collecting the data above, data about the 2016 balance sheet of ENDAVA ROMANIA SRL were not available. Therefore, data about the company's 2015 staff and turnover were used for 2016 so as not to impair the general data structure.

Summary of the Economic and Financial Indicators for the IT Companies in Cluj-Napoca

	2011	2012	2013	2014	2015	2016
No. of IT companies in Cluj-Napoca	705	764	840	968	1.070	1.235
% number of Cluj-Napoca IT companies out of the total number of IT companies in Romania	7.2%	7.3%	7.5%	8.3%	8.3%	8.6%
Turnover (TO) of IT companies in Cluj-Napoca (billion RON)	742.5	1,014.1	1,273.3	1,596.9	2,096.8	2,624.0
% TO of IT companies in Cluj-Napoca of the total TO of IT companies in Romania	8.0%	8.9%	9.4%	10.5%	12.2%	14.1%
No. of IT employeesin Cluj-Napoca (self-employed/micro-enterprises excluded)	5,907	7,454	8,672	10,200	12,133	14,036
% no. of IT employees in Cluj-Napoca out of the total IT employees in Romania	10.2%	11.5%	11.9%	12.8%	13.2%	13.8%
No. of IT start-ups in Cluj-Napoca	129	196	178	261	300	363
% no. of IT start-ups in Cluj-Napoca out of the total number of IT companies in Cluj-Napoca	18.3%	25.7%	21.2%	27.0%	28.0%	29.4%
% no. of IT start-ups in Cluj-Napoca out of the total number of IT start-ups in Romania	7.1%	8.8%	8.5%	11.1%	10.4%	9.6%
Turnover (TO) of IT start-ups in Cluj-Napoca (billion RON)	38.0	69.4	41.4	101.0	119.6	137.1
% TO of IT start-ups in Cluj-Napocaout of the total TO of IT companies in Cluj-Napoca	5.1%	6.8%	3.3%	6.3%	5.7%	5.2%
% TO of IT start-ups in Cluj-Napoca out of the total TO of IT start-ups in Romania	5.1%	6.9%	4.6%	10.8%	12.1%	14.0%

Survey among the
IT Companies in Cluj-Napoca

A. Challenges for the IT Industry

Chart 23.What are the main challenges your company is currently facing? (open question, multiple answers, N=120)

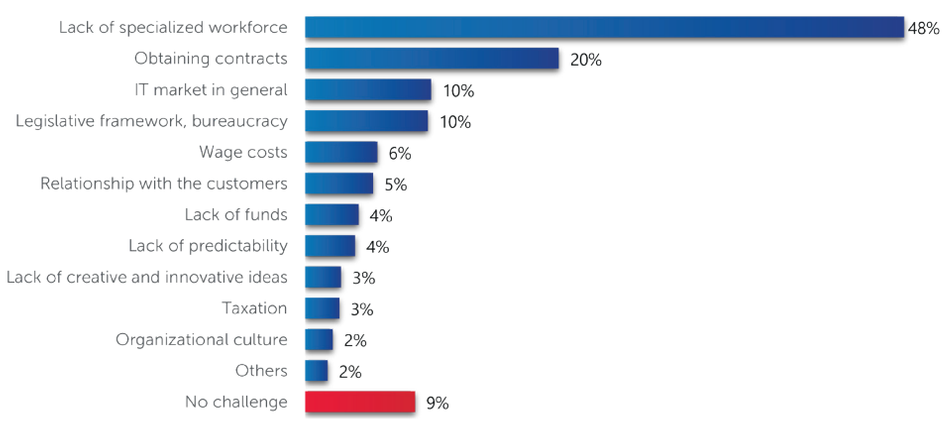
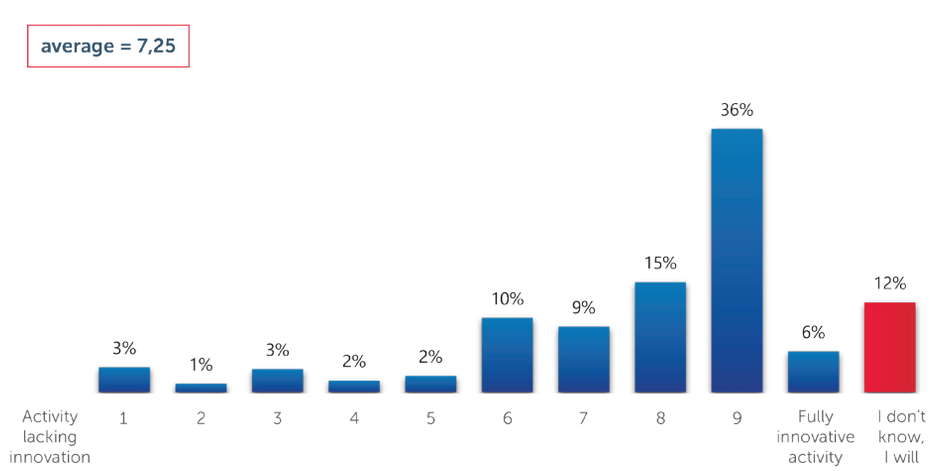


Chart 24.If you were to assess your company's current production activity, to what extent it is (or is not) innovative? (N=120)



B. Main Products of the Cluj IT Market

Chart 25. In what fields do you sell the most successful products of your company? (multiple answers, N=120, data weighted in relation to turnover)

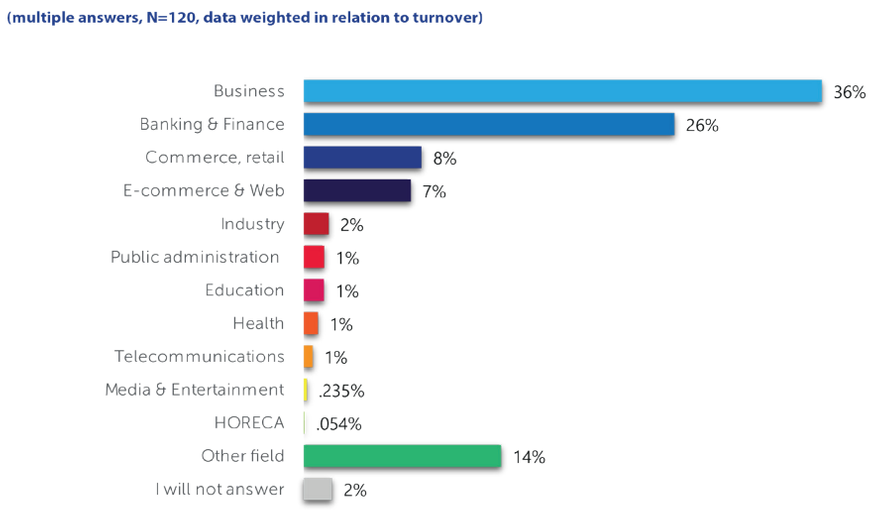


Chart 26.Which of the following categories of solutions are included in your company's solutions portfolio? (N=120)

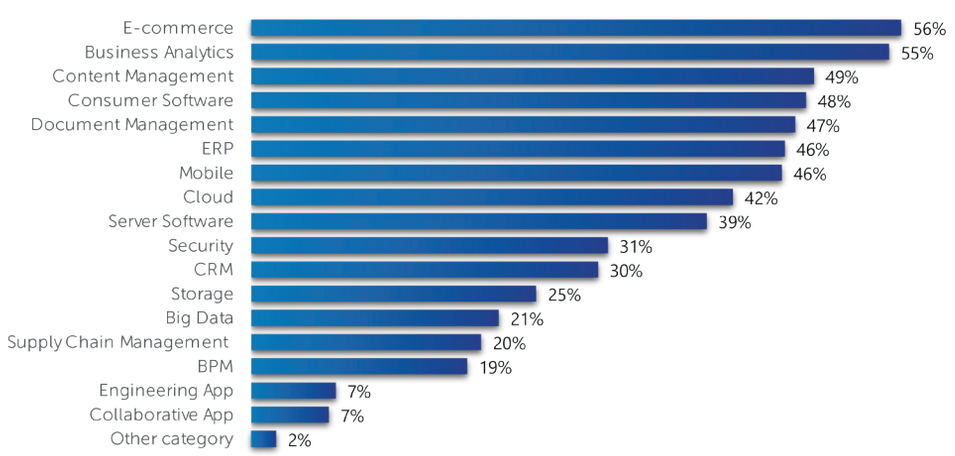
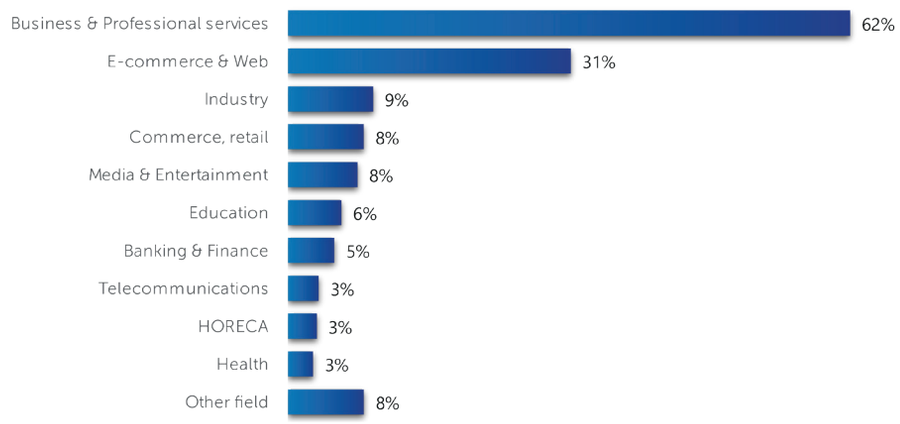


Chart 27. For what fields does your company offer products/ services? (N=120)



C. Technologies in use

Chart 28. What new technologies did your company use in 2016? (open question, multiple answers, N=120)

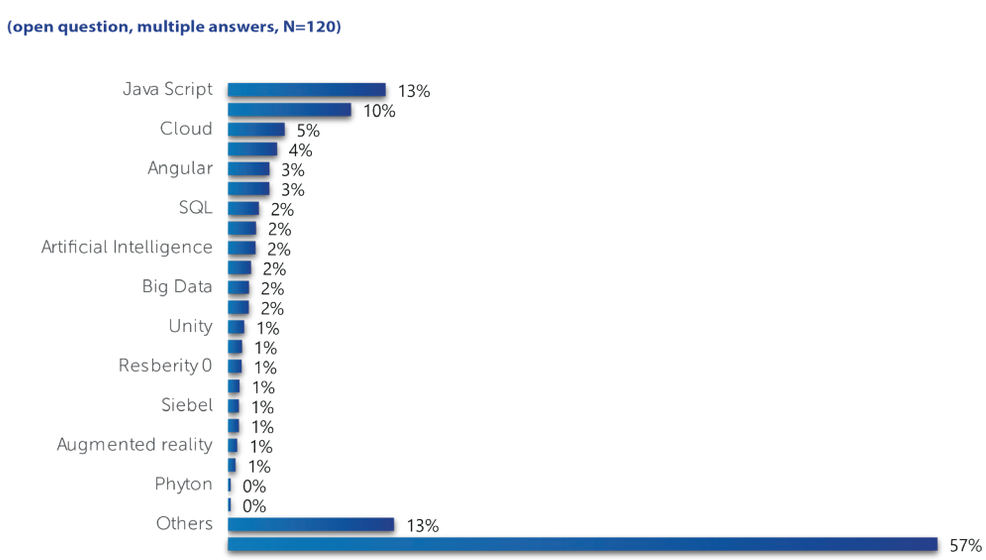
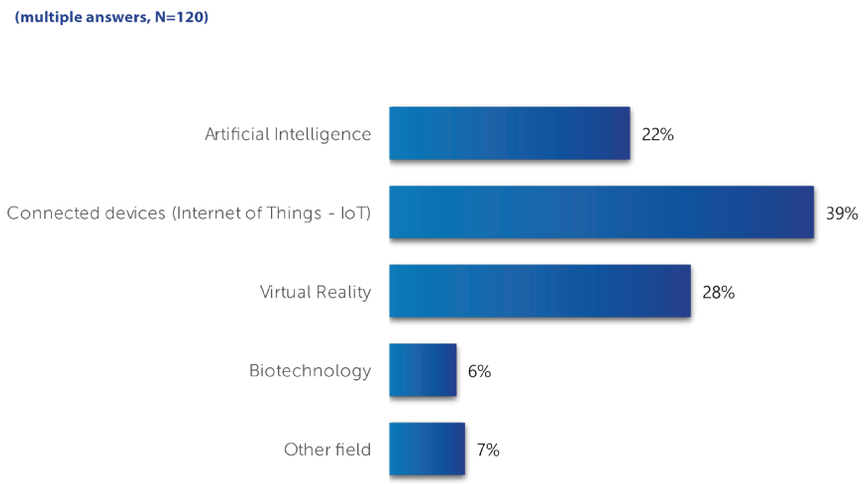


Chart 29. If you were to look to the future, in what fields would you like to develop products/services? (multiple answers, N=120)



D. Socio-demographic Structure of the Employees of IT Companies

Chart 30. Out of the total number of people currently working in your company, either employees (with employment contract), or collaborators (self-employed, micro-enterprises), how many are ...?

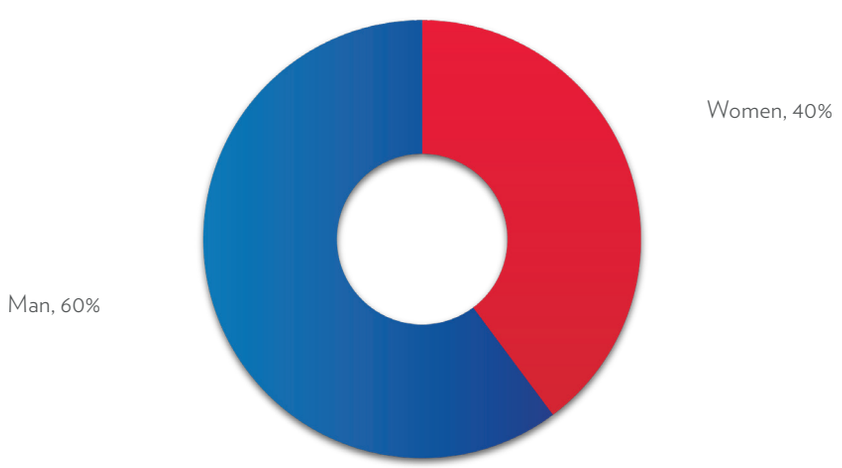


Chart 31. Out of the total number of people currently working in your company, either employees (with employment contract), or collaborators (self-employed, micro-enterprises), how many are ...? (N=120)

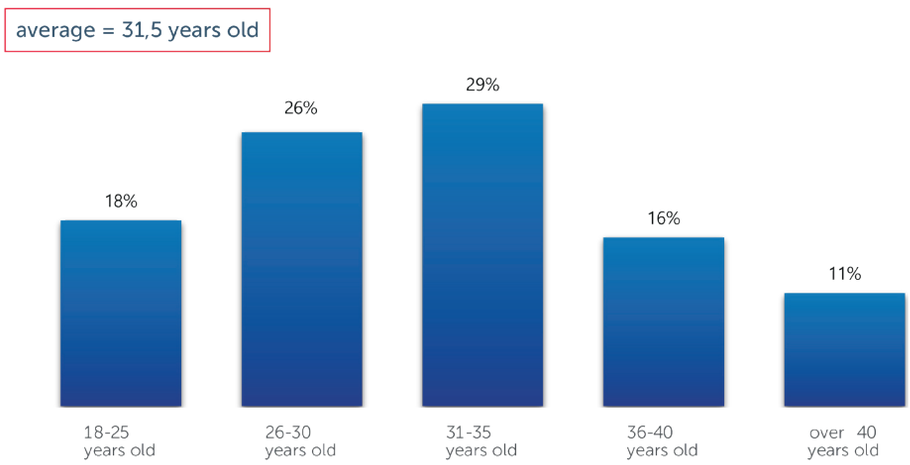
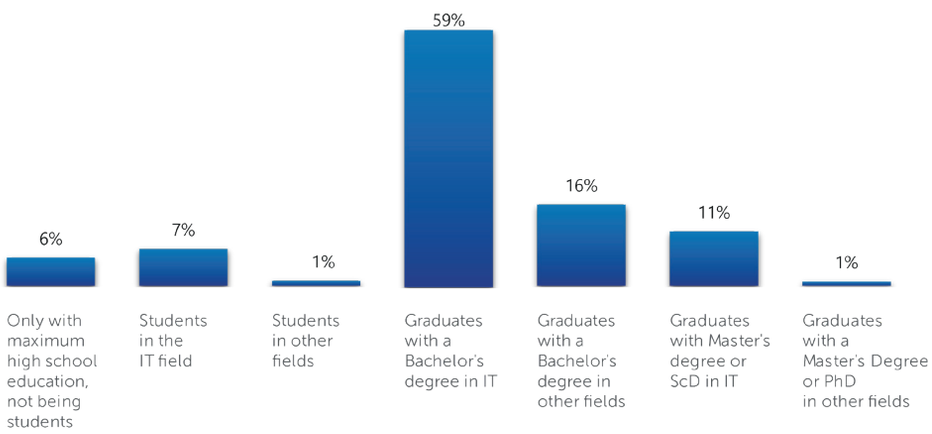


Chart 32. I will ask you to focus only on people carrying out a DIRECTLY PRODUCTIVE ACTIVITY, either employees or collaborators. How many are ...? (N=120)



E. Human Resources Management

Chart 33. What was the number of the NEW SALARIED EMPLOYEES in the last three years (2015, 2016 and 2017)? (N=120)

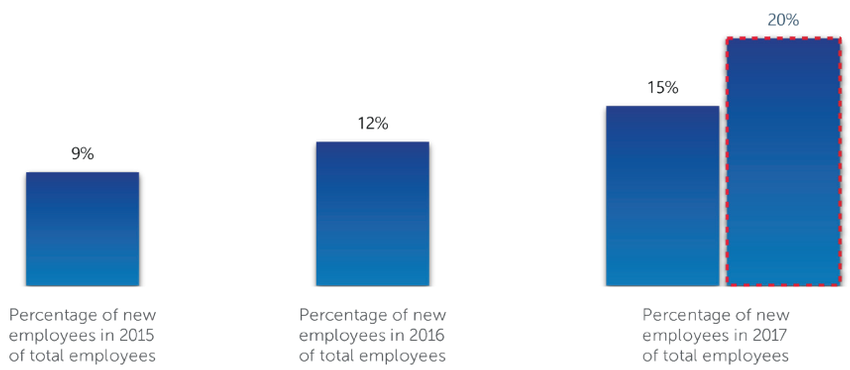


Chart 34. Roughly how long is the average integration period of a new employee? (N=120)

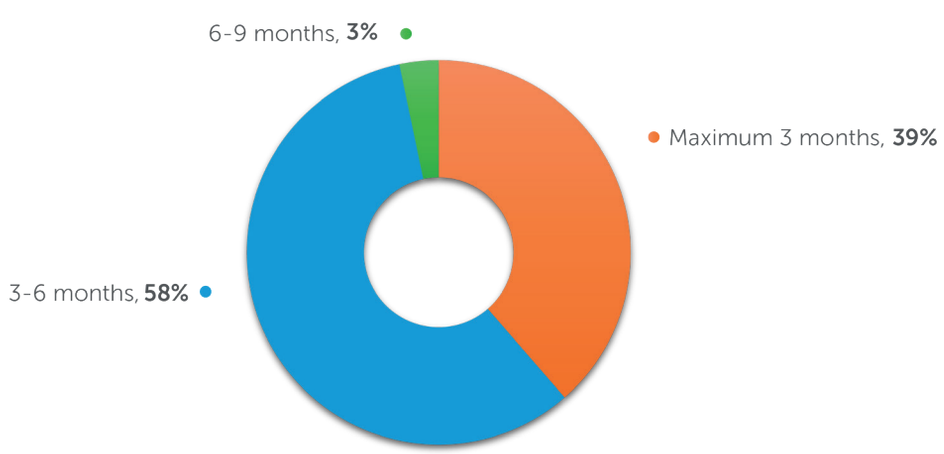
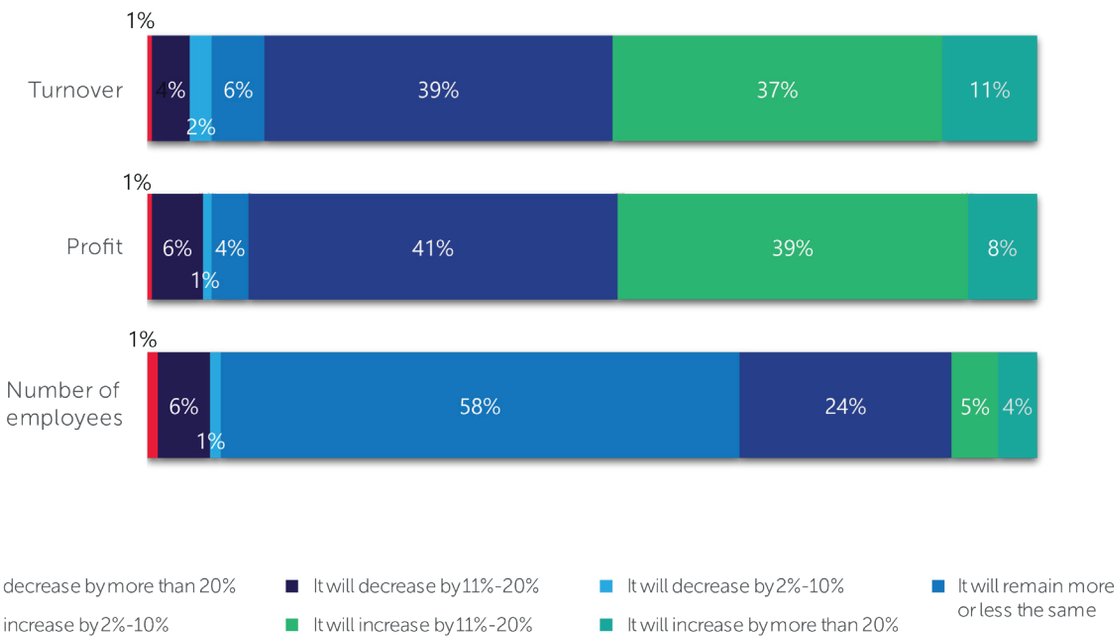


Chart 35. What are the main challenges faced by the HR staff of your your company? (open question, multiple answers, N=120)

Chart 36. What do you think are the main skills and abilities insufficiently developed by the IT graduates? (open question, multiple answers, N=120)

Forecasts for 2018



Conclusions

At national level, the IT segment is one of the most dynamic sectors, with an increasing share in the national economy, thus exceeding, along with the communication technology sector, 6% of the GDP. Therefore, Romania is gradually joining the select group of countries whose economy is to a greater extent marked by innovation, creativity and technological breakthrough.

Looking at the data in retrospect, one can notice that the dynamics of this sector is brought home by the fast growth in the number of companies, in the period 2011-2016 alone the number of IT companies increasing by almost 50%. Moreover, the programs supporting new technologies will surely lead to a doubling of the number of IT companies in the next three years. Even the growth in the number of IT companies in rural areas, which are less appealing to this market, is an indication of the expansion of the IT field, with more and more entrepreneurs being lured to these areas.

The growth in the share of startups in the overall market (their number doubled in the six years concerned) signals the emergence of young entrepreneurs, promoters of new ideas, new solutions and a new business attitude, thus complementing the experienced companies whose number constantly increased in the last years. The capacity of these startups to withstand strong competition is one of stakes of the IT market, a stake that stirs up the interest of all experts, and is one of the conditions for a successful development of this sector.

The business capacity developed by IT companies is also highlighted by the total turnover in the last 6 years. A market of almost €5 billion is, as we have said, an important segment in any forecast calculations. On the other hand, the trend towards market polarization, felt in the increasing input of large companies, must be slowly balanced by the new entrants and medium-sized companies, in order to develop a healthy competition environment where the creative and innovative capacity may offset financial strength.

Following the pattern set by the aforementioned data and facts that define the IT sector, the number of IT employees has also grown to more than 101,000, representing over 2% of the entire salaried personnel at national level. As we have no precise data on the number of collaborators with a status different from that of employee, we can estimate that IT programmers and specialists represent 3% of the total number of Romanian salaried employees.

All this information creates the picture of an expanding market, strongly connected to global business flows and delivering products and services to all developed countries in the world. Domestic software and the creativity of Romanian programmers have long been the central ingredients of any presentation of Romanian economic performance.

What is Cluj's position in this picture and what stamp does it bear? If we view this study as a motion picture of a fast-growing sector, Cluj-Napoca is the main driver of market dynamics. For a while, Cluj-Napoca evolved in pace with the other secondary IT development hubs (Iași, Timișoara).

Conclusions

In the last years, however, Cluj has managed to "take off" and gain "height", reaching the level where it holds the position of a main IT business hub, after Bucharest.

The number of IT companies increased in Cluj-Napoca by 75% compared to 2011, well above the national average. And if we take into account the new companies created as a result of the implementation of government programs such as "Start-Up Nation", we can state that the number is now twice as large. Another feature typical of this IT hub is the much greater share of made-to-order software companies (NACE code 6201) by comparison with the national average. The percentage of Cluj start-ups is higher than the national average, showing the input of novelty and related assets which Cluj-Napoca contributes to this field.

From a financial standpoint, the Cluj IT sector recorded an almost fourfold increase of the aggregate turnover in the period 2011-2016. This had a significant impact on the community by the major contribution of this field to supporting directly and indirectly the development of the city.

Likewise, the rise in the number of IT employees is another indication that Cluj-Napoca is above the national average. Basically, one out of eight working-age Cluj citizens works in the IT sector. This is not merely a professional category but a community of programmers, with an active presence in both the virtual and the real world, in which they make known their competence, creativity and civic engagement.

Cluj IT companies target a general market, with products and services covering economic fields. There are, however, less explored fields (e.g. HORECA, Media & Entertainment) that may, in time, turn into significant markets. There is also a major expansion towards international markets as most IT companies export abroad. The analysis reveals the low percentage of products designed for the local community, an aspect that the entire community should be concerned with: how can we better integrate a successful sector with the life of the community, thus yielding mutual benefits?

Working in a sector which sees itself as innovative, Cluj IT experts' future concerns are directed towards fields such as artificial intelligence, virtual reality or IoTs, actually being in line with global IT trends.

Who are the Cluj IT workers? Behind the figures we find a young community with an even gender distribution, in which the share of "allogenous" employees, that is, those with an educational background other than IT, is quite significant, reaching almost 20%. Their onboarding period is in most cases between 3 and 6 months and the average employment period in a company is about 4 years. The reasons behind employee migration to other companies have to do with both wages and the need for new challenges or the appearance of new opportunities.

However, beyond this optimistic scenario there are some challenges on the horizon, typical of a rapid and large-scale development of this sector in a medium-sized city, according to global standards. The gap between the pace of IT companies' development and the number of potential employees produced by universities will only exacerbate the shortage of qualified labour force. As a matter of fact, the survey data point to this very aspect as the main challenge for the IT field.

Given that large companies lure an increasingly greater share of IT workers, the high employment fluctuation, caused by the imbalance between the demand for specialists and the capacity to train specialists, can turn into an obstacle to the development of a corporate culture. The share of new employees represents 20% of the total.

Certainly, companies may come up with solutions, such as retraining—companies also take on the job of training programmers—or a generous remuneration package of wages and bonuses for employees. However, the business pressures may lead to decisions to relocate some activity segments to other cities with a larger pool of specialists.

Perhaps one of the questions IT managers frequently ask themselves concerns the potential that Cluj-Napoca can offer to this field. Although they take into account a growth in turnover and profit by about 10%-20%, their forecasts for the next year shows that they are not quite optimistic about the rise in the number of employees, most of them estimating a number similar to the current number of employees.

Therefore, we may conclude that, although numerically Cluj-Napoca is not on a par with the country's capital, the former is the most dynamic IT hub in an ever-increasing market, fully deserving the image with which it has been associated—"city of programmers". However, looking beyond the immediate reality, the IT business community, along with academia and local community must anticipate the potential of resources that the IT sector can find in Cluj-Napoca, and identify solutions allowing the exploitation of this potential.

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