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Benchmarks of the DAX Companies

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Within the European Patent applications Germany is No 2 after the United States and even before China and Japan. Inside Europe Germany is the undefeated No 1, German inventors seem to be very creative within international comparison¹. According to this fact it is expected that the biggest German companies also have the most valuable patents in their certain industry. In order to verify this, the big blue chips companies of the German prime Standard DAX have been analysed. They are supposed to be premium brands, market leaders and/or technology leaders. An analysis of their patent portfolio values of the DAX companies having a technology or natural science focus shows their position from a patent point of view in a global competition. With surprising results.

Methodology

The benchmark analysis was done by comparing the values of the different patent portfolios of all DAX (German stock index) listed companies. Here only those have been analyzed that have a significant patent portfolio: all applications, granted patents and utility models for the 30th September 2016 were taken into account.

The valued patent data have been used in combination with business information, like amount of employees, revenues and total assets. The data are available in the Business database "Orbis" by Bureau von Dijk where these business information as well as aggregated patent valuation data are available within the "innovation strength" module.

The rating methodology that has been used for the IP (Intellectual Property, here: Patents and utility models are meant) is an indicator-based market analogy approach. The principle is not a new one: The value of a used car or of real estate, for example, is determined the same way. In the case of real estate, location, floor area, year of construction, number of rooms etc. are all used as indicators to value the asset as a whole. And without ever needing to see a particular property, a reasonable value range can be attributed. And in order to make such a valuation, in real estate various sources of data are used – including market data and trends. The resulting value is a market value, used by those involved or interested in the transaction as a data point. It does not necessarily correspond with the price that is subsequently paid - the vendor will typically have a higher price expectation than the buyer, so actual price is always a matter of negotiation.

The indicator-based patent valuation approach follows the same principle. It takes a wide set of electronically available data into account and calculates a value. This makes it neutral with respect to a vendor or potential buyer's interest. The value determination is based on empirical data from traded patents. So the value is – as with real estate valuation – a market value.

With the approach all patents worldwide have been valued for 5 different years. The patents of certain companies have been summed up to a complete patent portfolio value. Also the patents of all their subsidiaries have been taken into account.

The following graphics also show different key figures that were used in order to determine "patent quality", these are displayed in bar diagrams over the past 5 years in half-year slides:

Assignee score: The assignee or finally the owner of a patent has a strong influence on the value of his patents: Market access, market influence, general innovation-abilities are company specific.

¹ Source: European Patent Office

Market coverage score: the amount of markets and the sizes of the economies are considered. So the figure reflects a market size that is potentially addressable with the invented technology/formulation with a legal intellectual property protection.

Market attractiveness score: the market attractiveness reflects if a technology/formulation follows a trend. So trend and total technical activity indicators are considered here.

Technical Quality: All indicators that point to the nucleus of the invention itself like i.e. technical coverage,, the differentiation to state of the art or the technical relevance. It reflects the degree of innovation that can be derived from a company's IP.

Legal score: The indicators that are summed up here take the legal aspects into account like the procedural state, the age or claims related aspects. It reflects the legal strength of IP in terms of its degree of protecting effect.

IP relevance: The value of a patent portfolio is in part influenced by the assignees ability and willingness to fully exploit that value. The IP relevant score compares the total assets of the assignees with its patent portfolio value. The higher the patent portfolio value is compared to the total assets, the higher the IP relevance and the greater the importance of the patents in determining the success of this company.

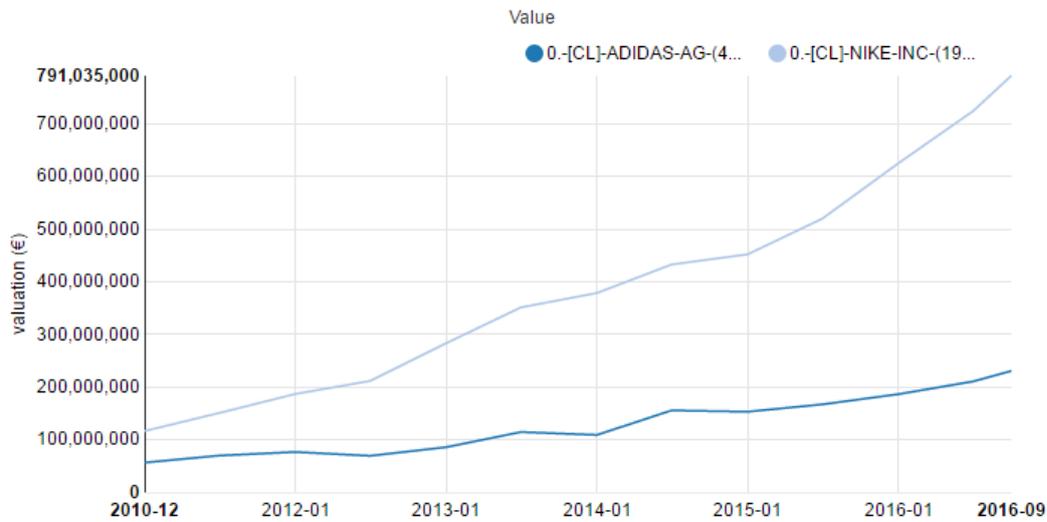
IP efficiency: This figure takes the value-distribution of the IP portfolio into account - are there only few good patents determining the value (low IP efficiency) or are most patents of high value (high IP efficiency). A high IP efficiency so often leads to a higher average patent family value. For better presentability this average value was capped by 500.000 Eur.

With pie charts the **technical distribution** of the patent portfolio is shown by the IPC classes that were in use. The distribution is not done by the amount of patents but the by patent family values, which delivers a more reliable picture of serious business fields, in contrast to just counting patents.

In order to find the benchmarks the value distribution of the different patent portfolios of companies being similar in size have been analysed. As long as the most valuable patents have been filed in similar technical fields and this field had i.e. more than 30% of the total patent portfolio value, companies have been set to be competitors.

In the following analysis each DAX company (having a significant amount of patents) and its strongest competitor (from an IP point of view) is shown.

Adidas AG – benchmark: Nike Inc.

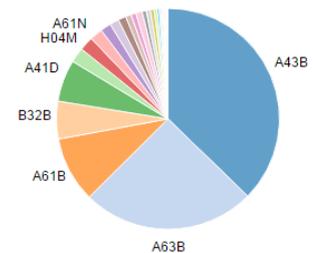


Nike vs. Adidas – what a race: Nike beats Adidas in almost all measured patent-disciplines. In the end it is a photo-finish and Nike beats Adidas in the year 2016 in the total IP quality which assumes all key figures.

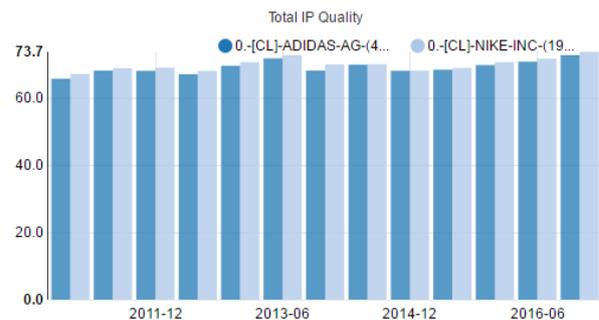
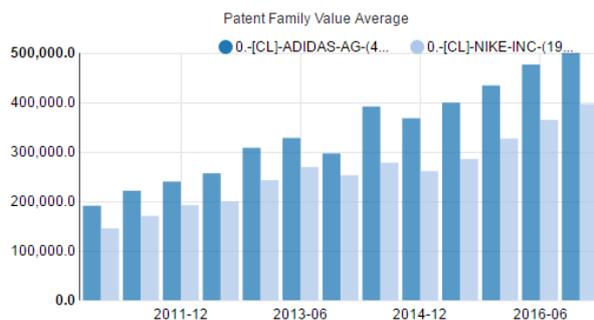
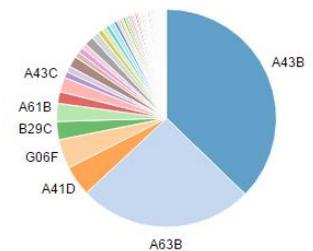
There are only the technical quality of patents and patent efficiency where Adidas patents are clearly better in average. The market attractiveness and the market coverage value are for both very similar, this indicates that they have a quite comparable product portfolio. NIKEs patents are legally better and also NIKEs patent value trend is amazing – the total value of its patent portfolio is more than 7 times higher than in 2010 – a positive trend without interrupt.

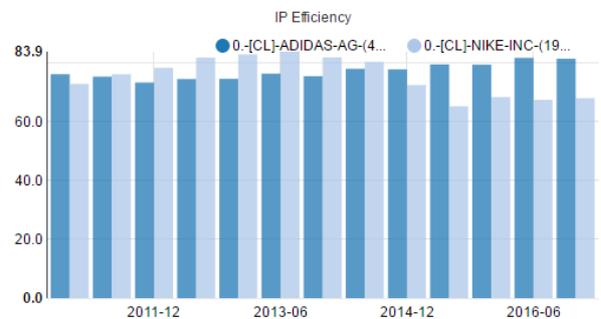
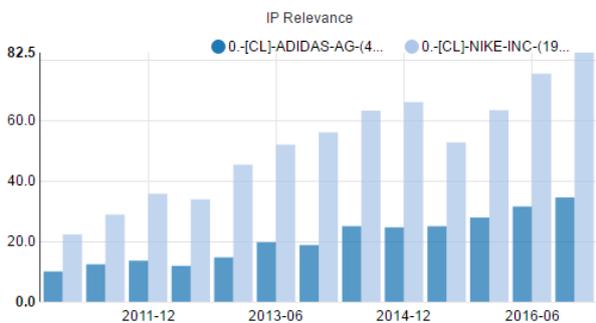
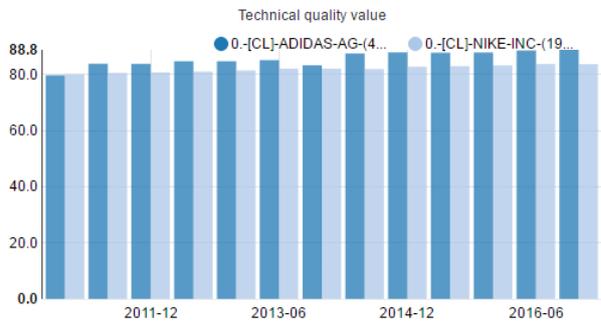
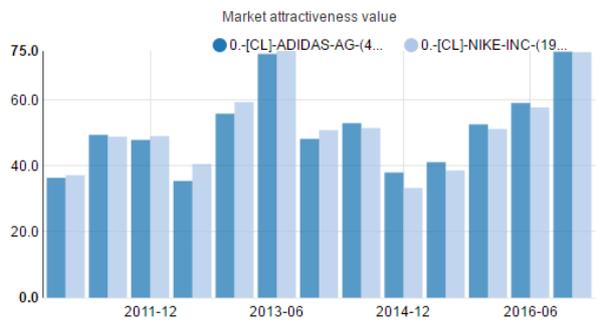
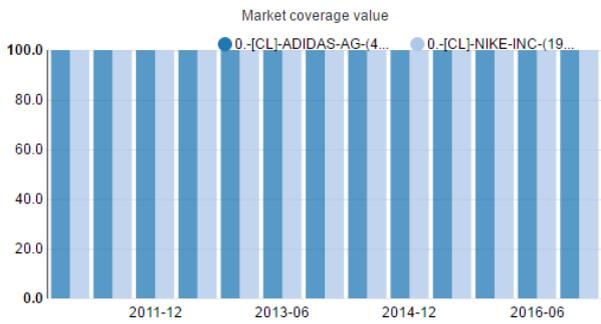
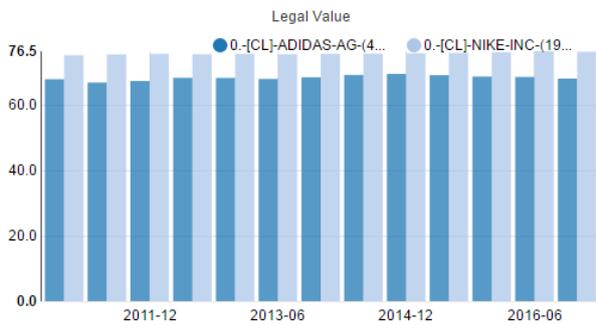
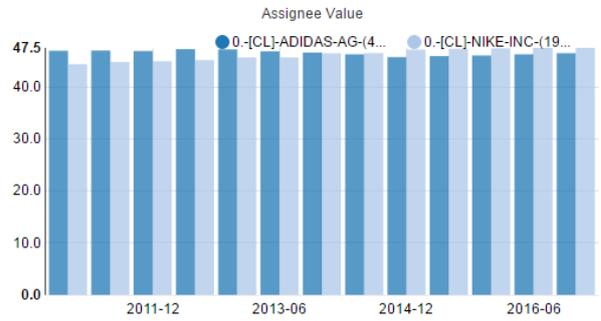
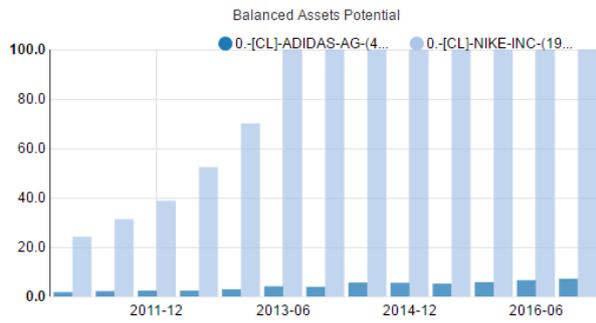
But nevertheless Adidas has the much more valuable patent-families in average. Having a look in the balance sheets of both companies it is amazing that NIKE has almost no intangible fixed assets compared to Adidas – almost all of the NIKEs patent values are “hidden assets”. For NIKE shareholders it may be interesting, that the stock price could be higher if these values were seeable in the balance.

0.-[CL]-ADIDAS-AG-(443) IPC(4) 2016-09-30

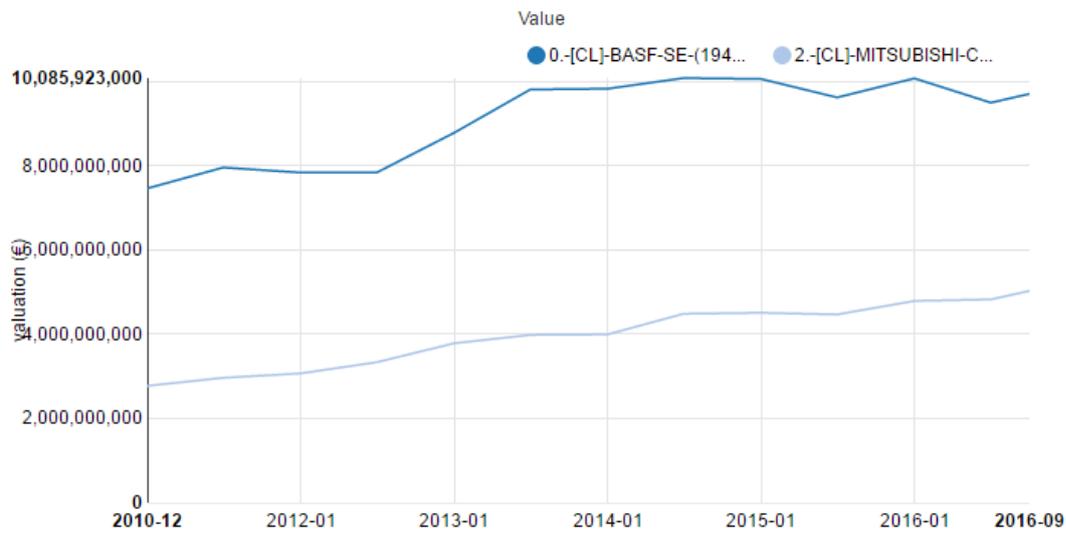


0.-[CL]-NIKE-INC-(1995) IPC(4) 2016-09-30





BASF SE and Mitsubishi Chemical Holdings Corporation

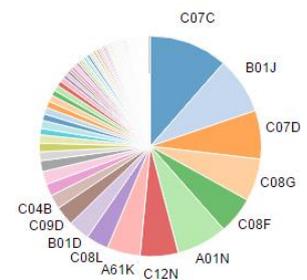


In direct patent value comparison there is Mitsubishi Chemical Holdings Corporation, a subsidiary of Mitsubishi Group a competitor that not everybody might have had on the list. Not in terms of size but in terms of average patent quality (a qualitative analysis).

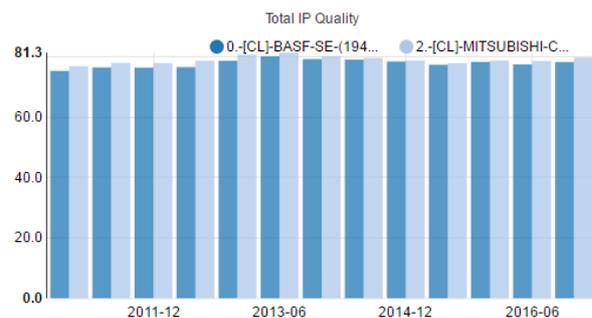
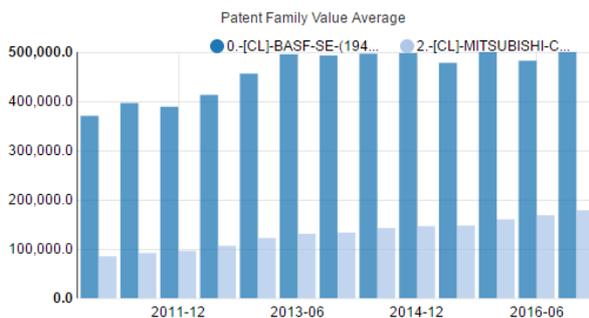
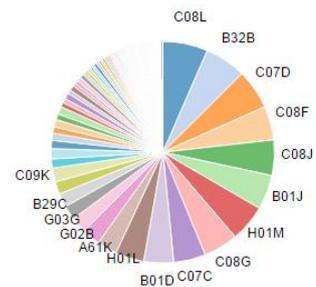
Mitsubishi Chemical Holdings has a slight advantage in most of the qualitative key figures analyzed, but in terms of technical quality BASF patents are better. The analysis also shows the weakness of a qualitative analysis: the average patent family value is much higher for BASF compared to Mitsubishi Chemical, due to its bigger patent family sizes. So on the monetary patent comparison level, BASF is the benchmark. However, both patent portfolios have a huge total value of almost 10bn Euro (BASF) and more than 5bn (Mitsubishi Chemical Holdings).

An enormous value potential considering the fact that these values are not visible inside their balance sheets – for both companies these patent values are hidden assets (70% for BASF and 100% for Mitsubishi). Good news for shareholders of both companies: the value trend of the patent portfolio is increasing during the last five years.

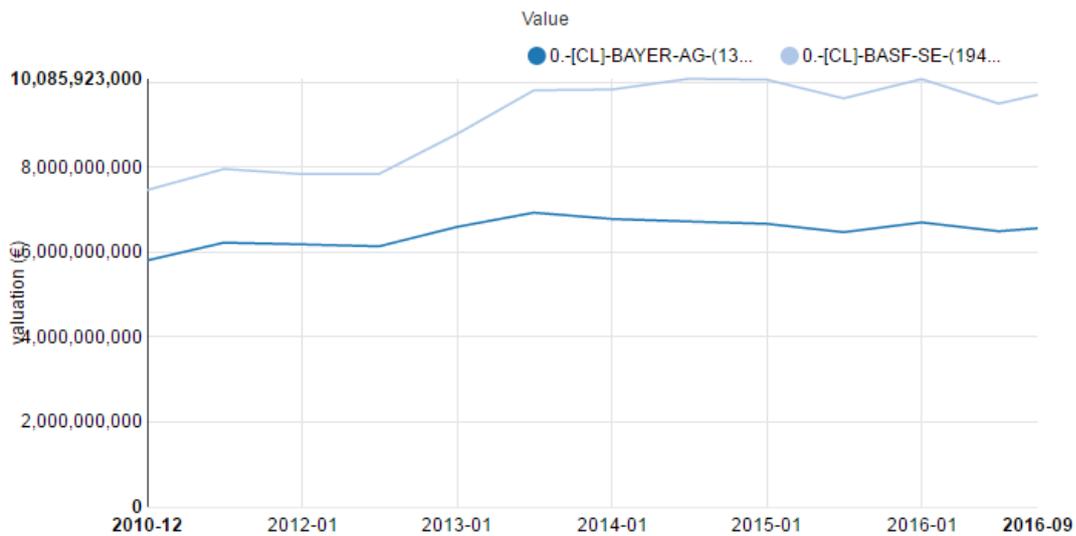
0-[CL]-BASF-SE-(19419) IPC(4) 2016-09-30



2-[CL]-MITSUBISHI-CHEMICAL-HOLDINGS-CORPORATION...-(28148) IPC(4) 2016-09-30



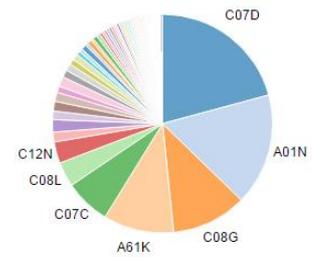
Bayer AG – benchmark: BASF SE



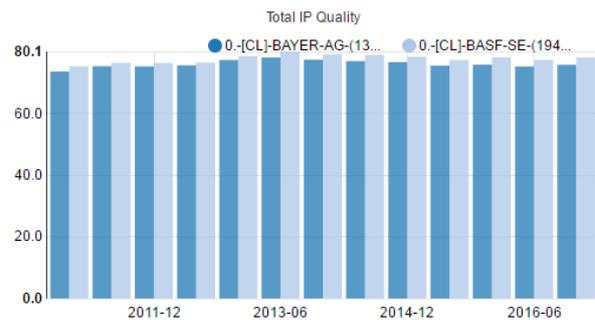
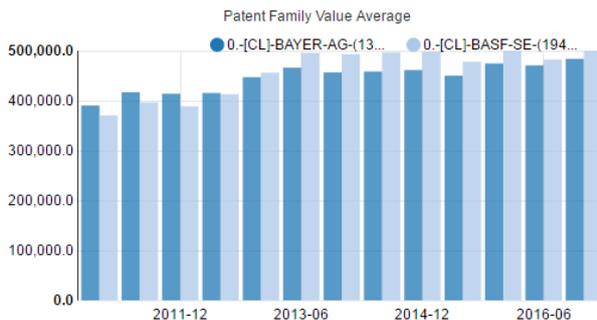
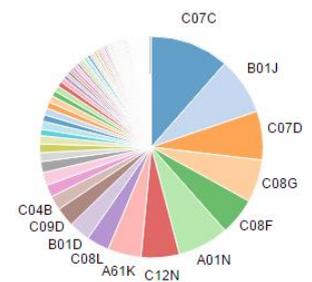
Bayer has the biggest weight within the DAX. And the strongest competitor in terms of their intellectual property (patents & utility models) is another big DAX corporation: BASF AG – as shown before. Even when Bayer is more or less known as a pharmaceutical manufacturer, both are chemical companies. So they are globally similar in terms of their classification of patents and utility models. Bayer and BASF are very interesting cases because both are chasing each other. Even though BASF's IP value trend is negative compared to December 2015, the total quality of their patents is slightly better. This is primarily explained by a better Assignee value (including e.g. the RnD ratio and inventors mentioned within the patents) and a slightly better legal score. But Bayer is obviously addressing the more attractive markets in average; also the technical quality seems to be higher.

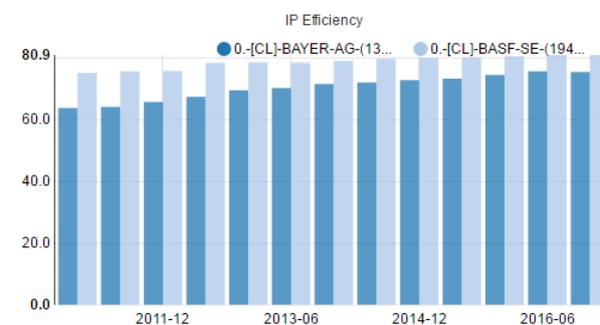
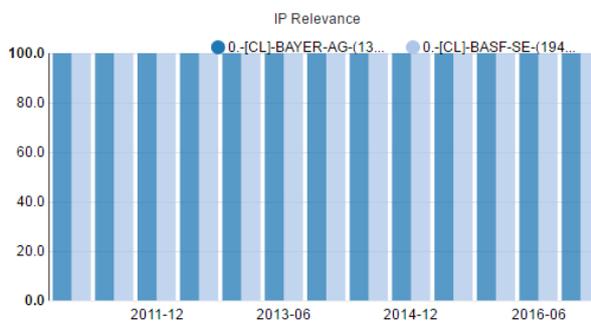
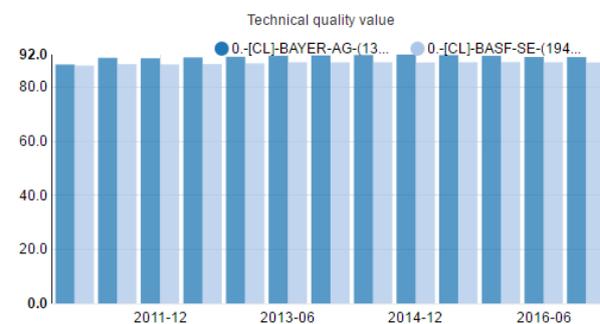
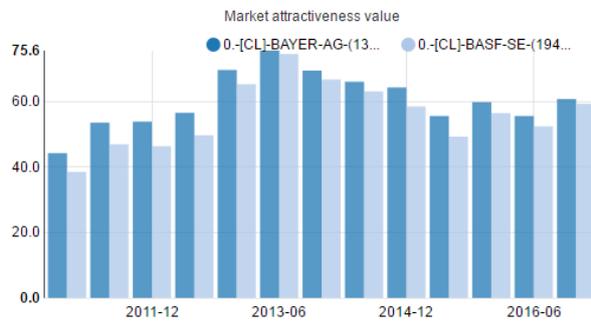
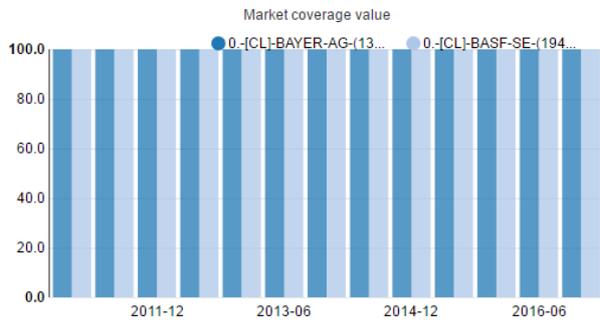
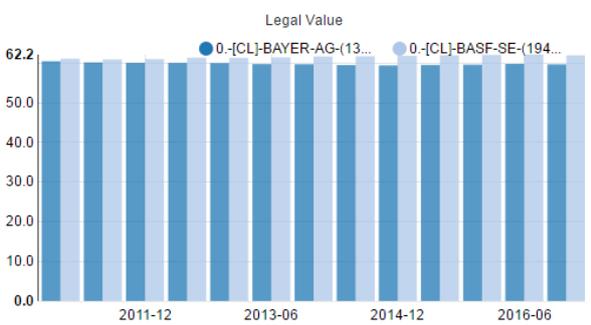
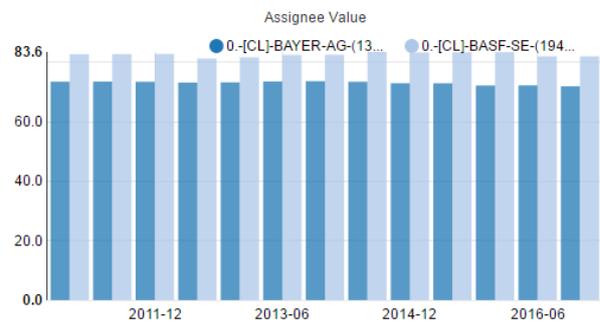
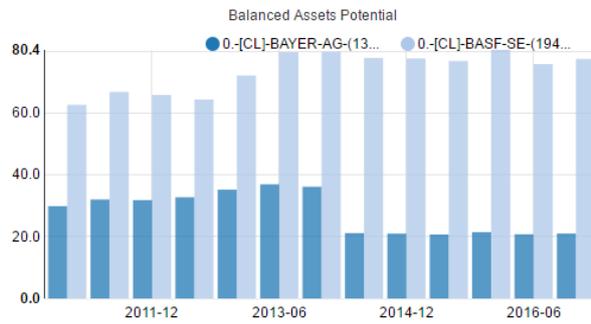
For both companies patents are essential as seen in the "IP relevance" score where both hit the 100%. The balanced assets for Bayer shows that there is still potential: Bayer has intangible assets activated in their balance sheet but the total amount is still below their patent portfolio value.

0-[CL]-BAYER-AG-(13569) IPC(4) 2016-09-30

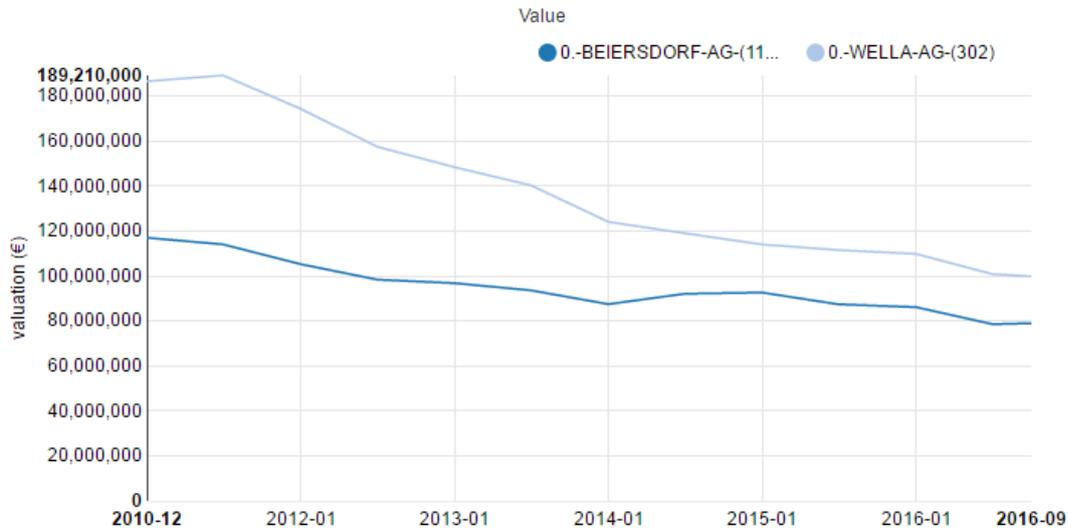


0-[CL]-BASF-SE-(19419) IPC(4) 2016-09-30



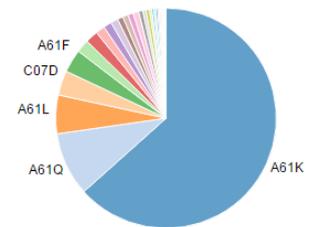


Beiersdorf AG – benchmark: Wella AG

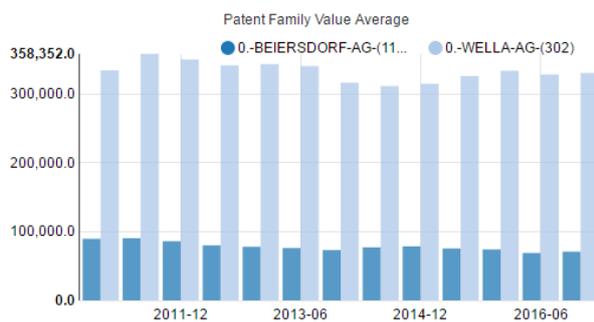
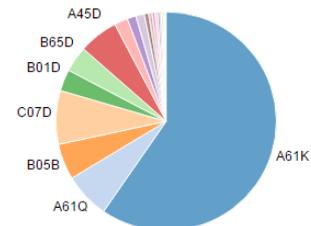


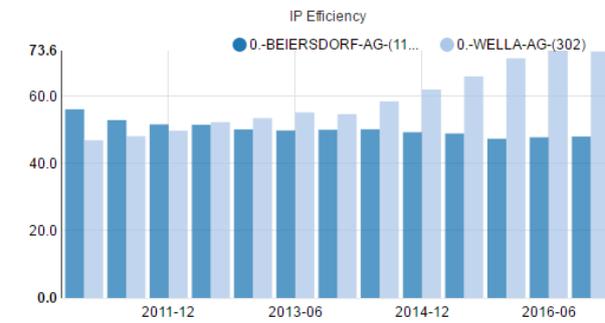
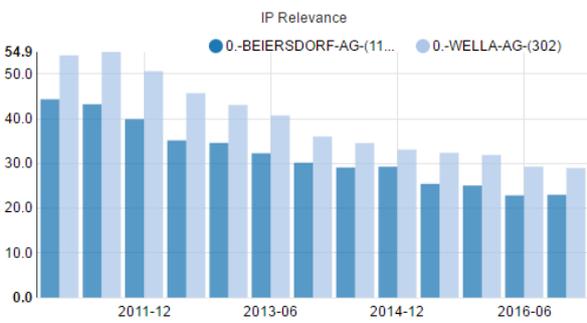
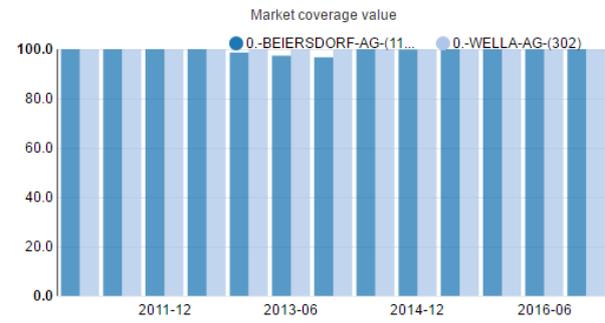
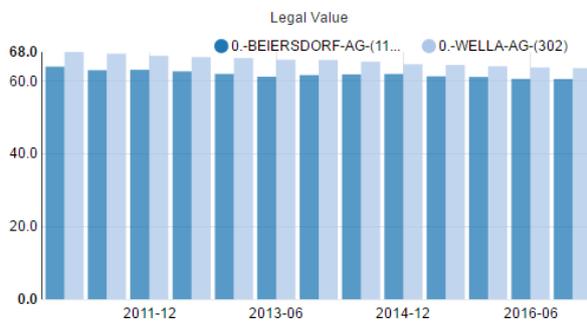
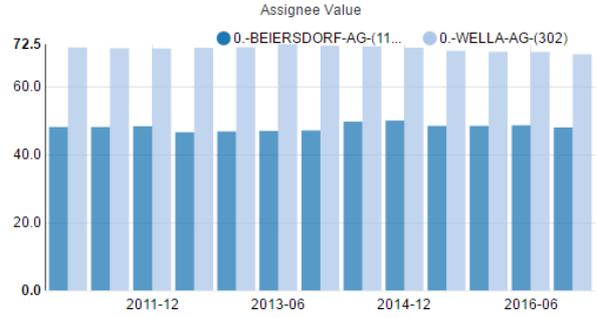
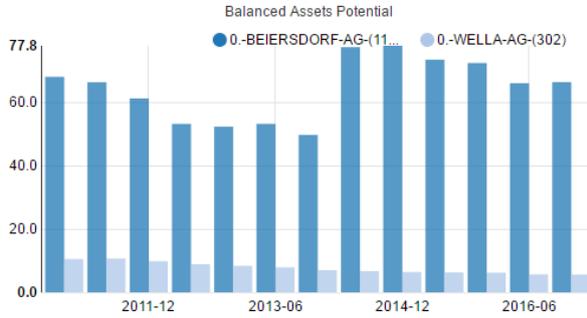
Beiersdorf is a well-known pharmaceutical and chemical producer – this is stated by their Patent portfolio also: 2/3 of its value is determined by the pharma patent class “Preparations for medical, Dental or Toilet Purposes” (A61K). Within this class also the cosmetic formulations and applications are applied. That is why the worldwide benchmark in terms of patent quality is Wella AG who also has almost 1/3 of its patent values in the typical pharma sector A61K. The IP-Value of the both companies is decreasing during the last five years and in September 2016 there is just about 10 m Euro difference between IP-Value Levels due to a stronger decrease at Wella: in the end of 2010 there were about 70 m Euro difference. Even though Beiersdorf AG has three times more patents in their portfolio, Wella AG has a higher total IP-Value and surpasses Beiersdorf in almost all the key figures that were taken into account: Wella AG has a much better assignee value, technically and legally better patents. But: Beiersdorf seems to address more attractive markets. Good news again for investors and shareholders: there is a huge asset potential in terms of their balance sheet, no intangible fixed assets so far. More than 66% of the IP values are hidden assets, in comparison to Wella AG, where only 6 % of the IP-values are not in the balance sheet. But the negative value trend for both companies especially for Wella (a loss of 45% within the past 6 years) indicates a negative innovation potential.

0.-BEIERSDORF-AG-(1114) IPC(4) 2016-09-30

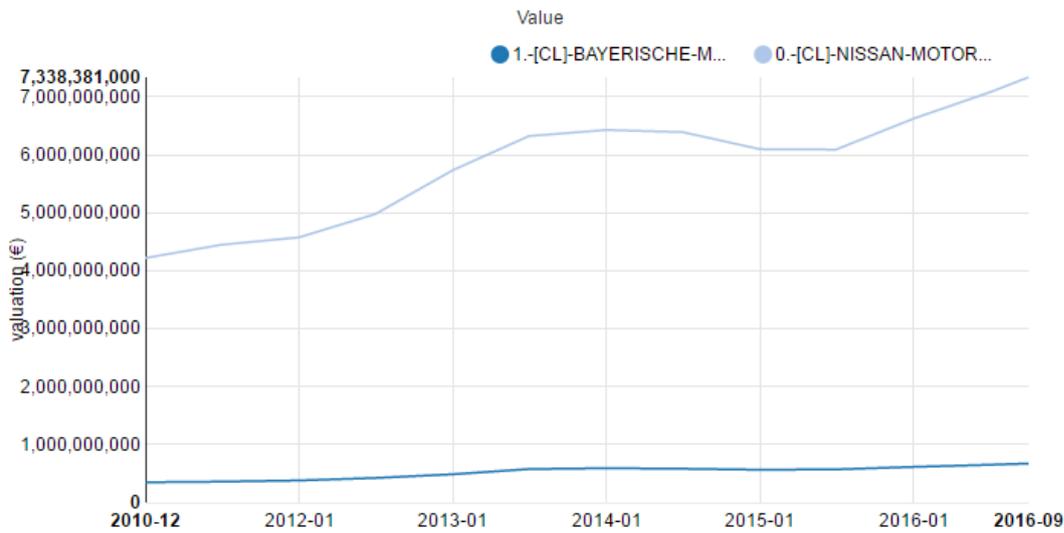


0.-WELLA-AG-(302) IPC(4) 2016-09-30



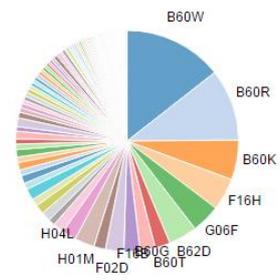


BMW AG - benchmark: Nissan Motos Co. Ltd.



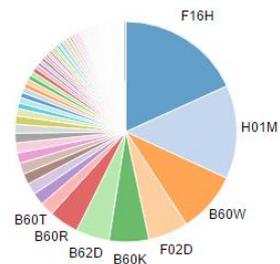
When benchmarking a premium brand like BMW you wouldn't have a Japanese mass manufacturer on the list to have qualitatively better patents. Both companies are car manufacturers. A large part of both IP portfolios contain patents from the sections "Conjoint Control of Vehicle Sub-Units of Different Type or Different Function" (B60W), "Vehicles, Vehicle Fittings or Vehicle Parts NOT Otherwise Provided for" (B60R), "Electric Digital Data Processing" (G06F) and "Arrangement or Mounting of Propulsion Units or of Transmissions in Vehicles" (B60K).

1-[CL]-BAYERISCHE-MOTOREN-WERKE-AG-(9263) IPC(4) 2016-09-30

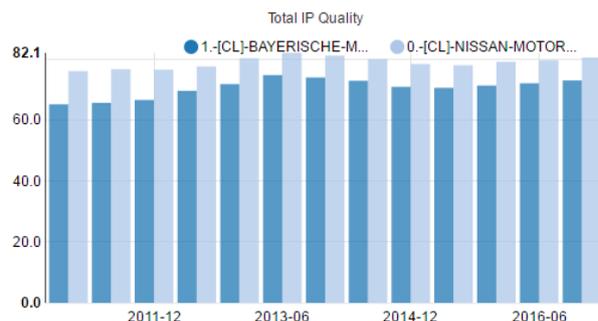
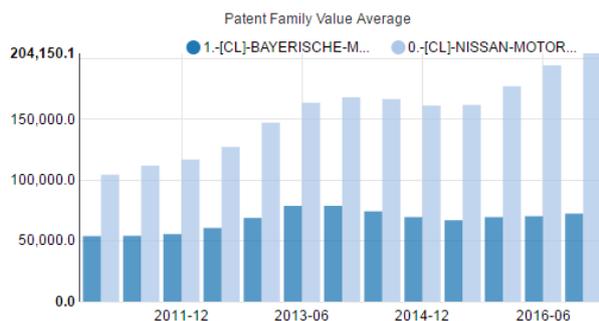


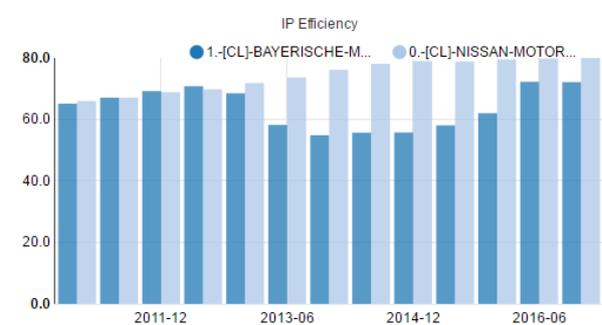
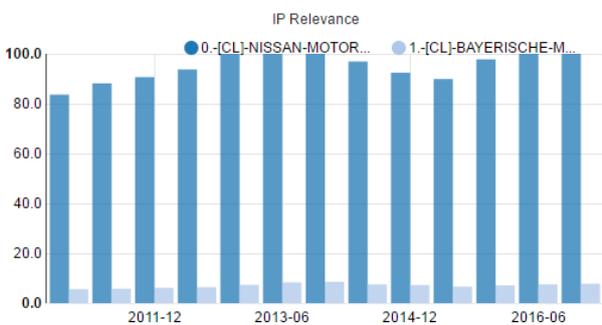
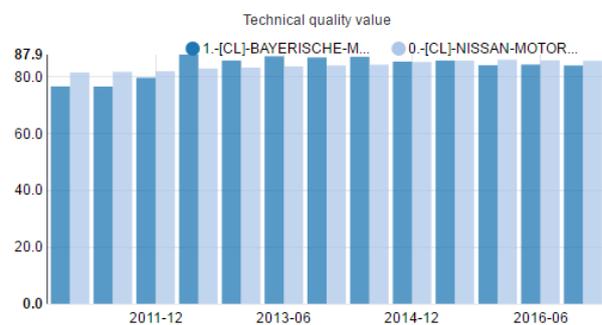
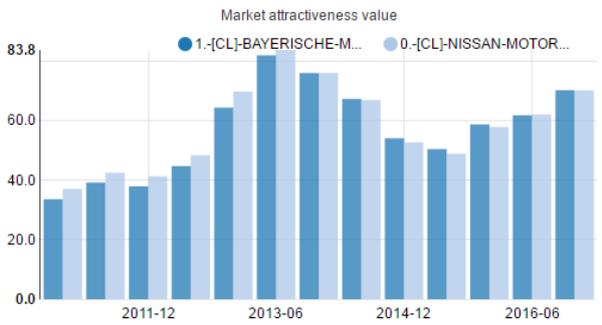
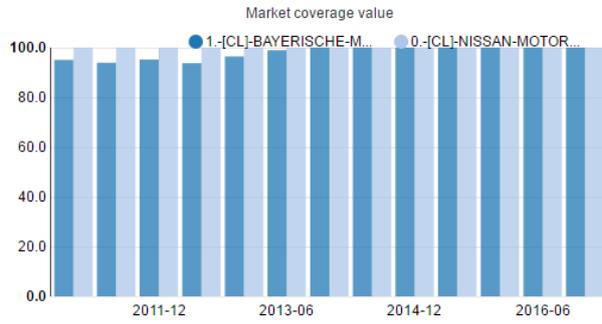
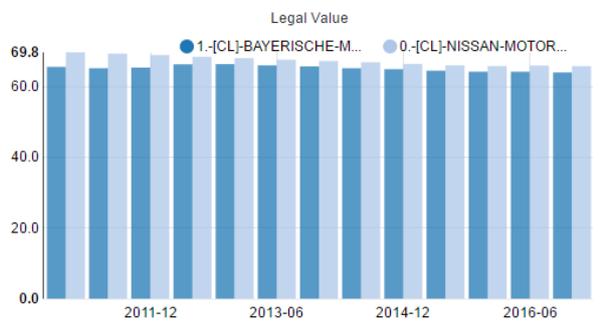
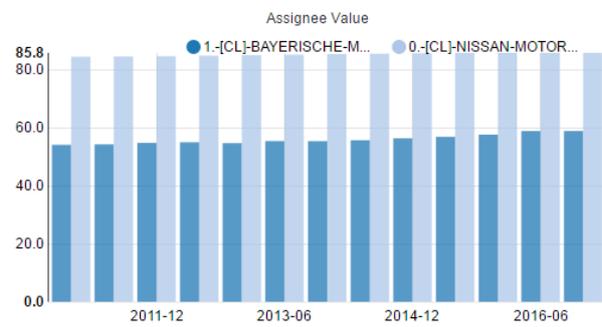
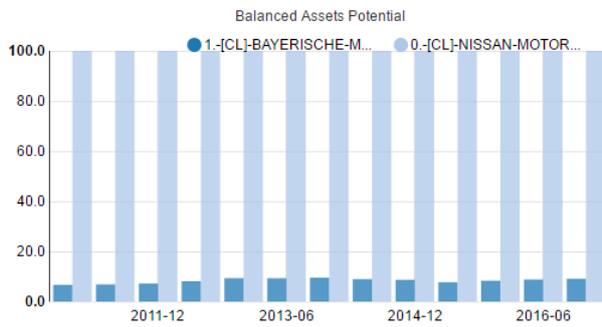
Nissan Motor is superior to BMW AG in almost all key figures that have been analyzed here; this is also confirmed from their great difference in terms of total and average IP-Value. In the end Nissan Motors Patent portfolio value is more than 8 times higher than the BMW portfolio. What is more: For Nissan none of the IP assets are mentioned in the balance sheet. Nissan shareholders should be aware that the company has more value than mentioned in their books.

0-[CL]-NISSAN-MOTOR-CO-LTD-(35946) IPC(4) 2016-09-30

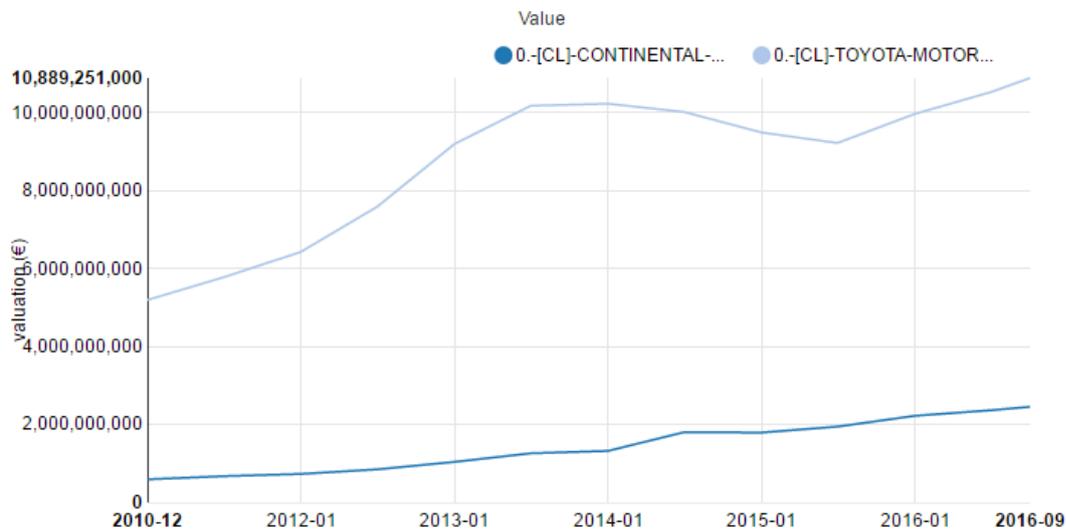


There only the Market Attractiveness Quality BMW seems to address markets that are of rising interest in the last year.



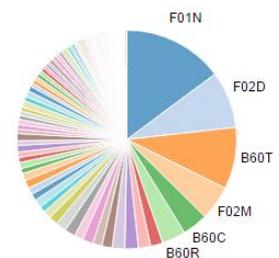


Continental AG is benchmark

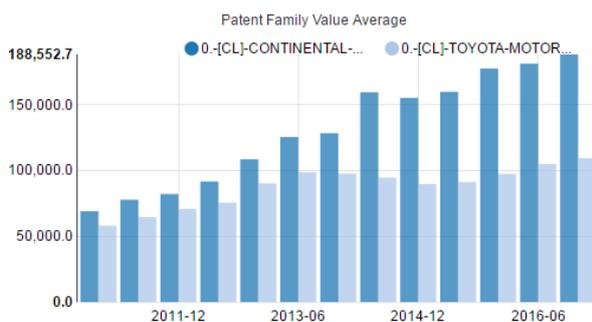
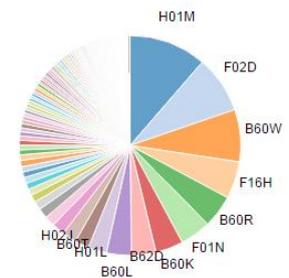


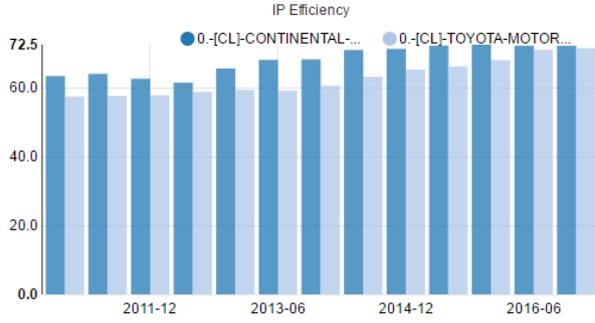
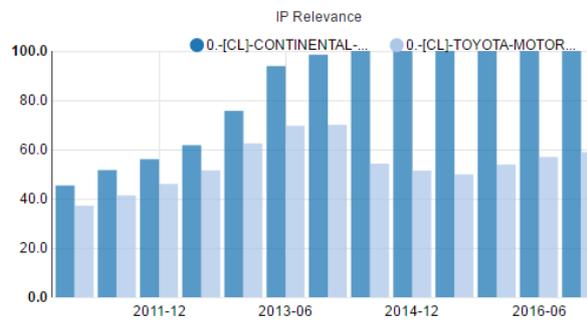
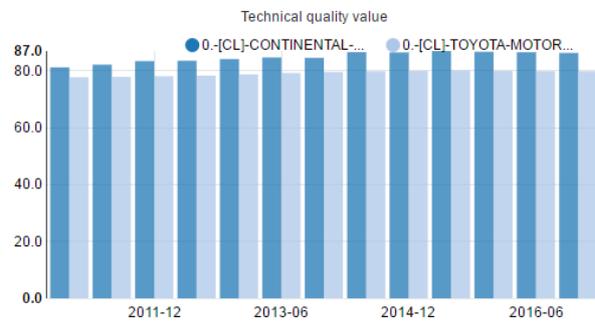
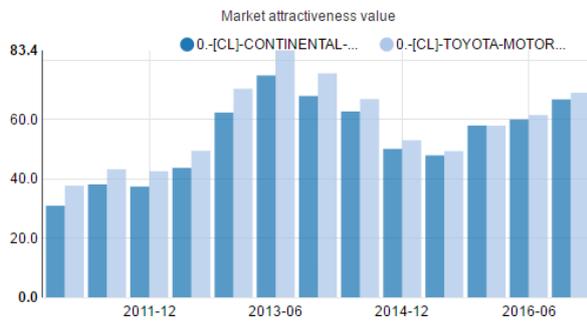
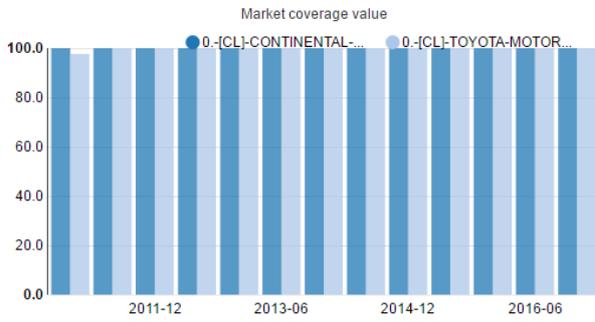
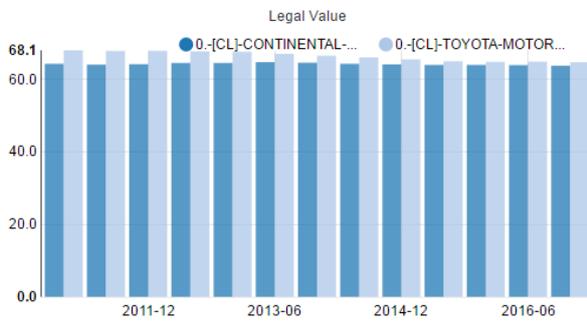
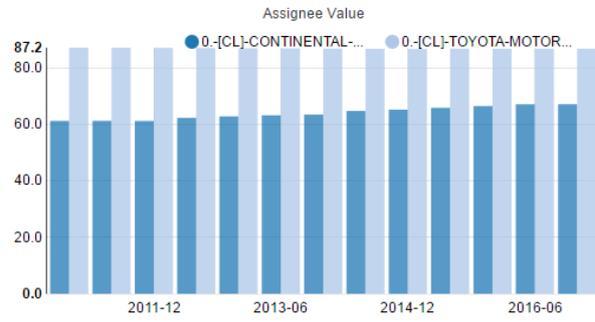
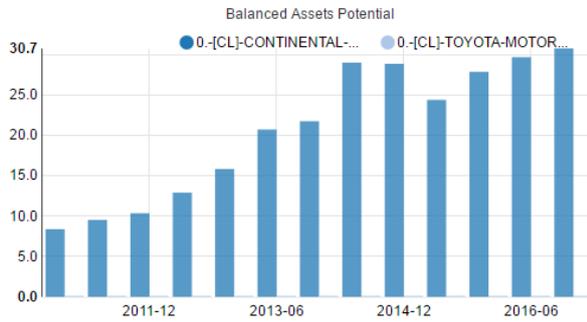
Continental has a very impressive patent portfolio and its value is rising amazingly. We compared it with Toyota because there are similarities, even though it seems as David vs Goliath; Continental is a car supplier and Toyota is a car manufacturer, maybe even a customer of continental. Toyota's IP portfolio value is 4 times bigger than the one of Continental. The comparison is interesting on the second sight: Toyota is the bigger and more powerful corporation. That is one reason for a higher Assignee Value. But Continental's patents are technically better. This finally leads to an almost double average family value compared to Toyota. The very similar scheme for market attractiveness over the years state that both are in very similar markets, Toyota a bit more diversified compared to Continental which leads to a slightly better picture for Toyota here. Nevertheless Continental is undefeated benchmark from an IP perspective.

0-[CL]-CONTINENTAL-AG-(13005) IPC(4) 2016-09-30

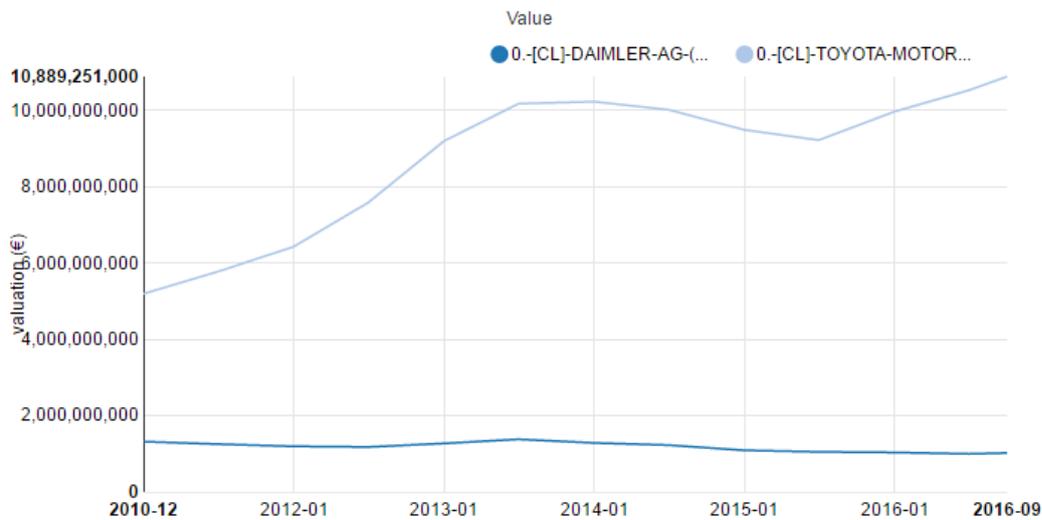


0-[CL]-TOYOTA-MOTOR-CORPORATION-(99379) IPC(4) 2016-09-30



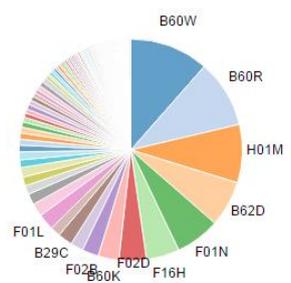


Daimler AG - benchmark: Toyota Motor Corporation

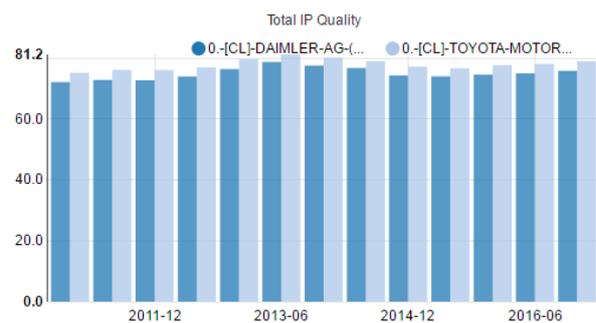
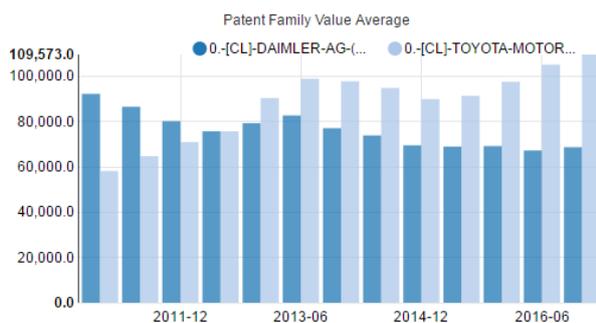
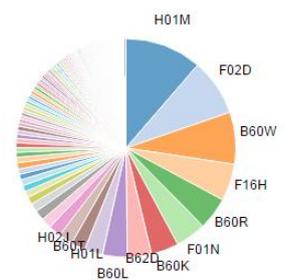


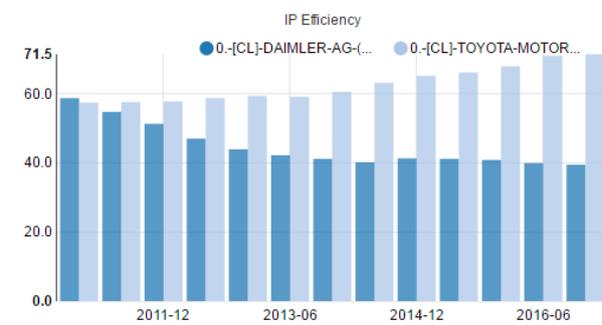
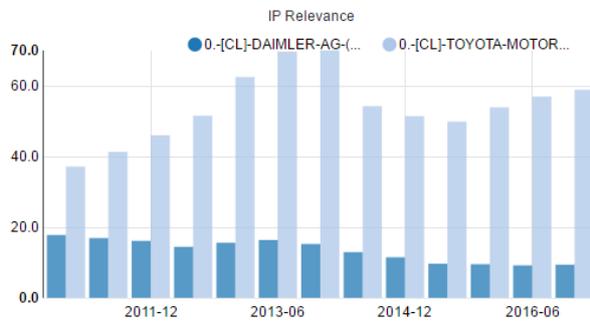
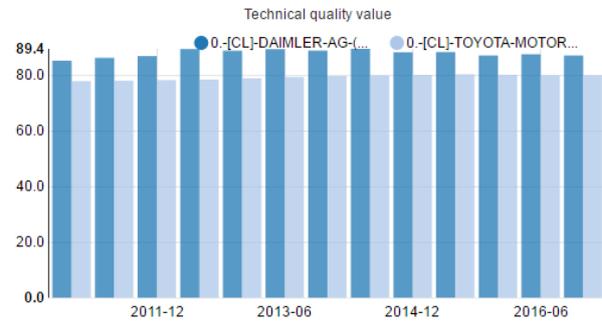
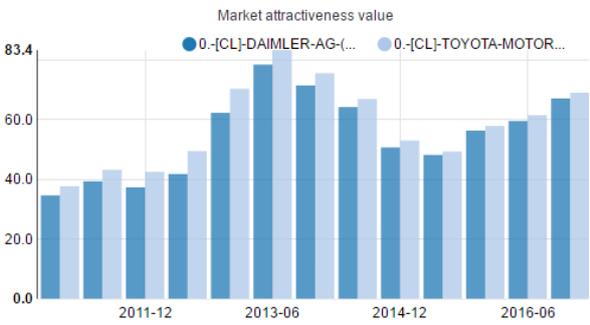
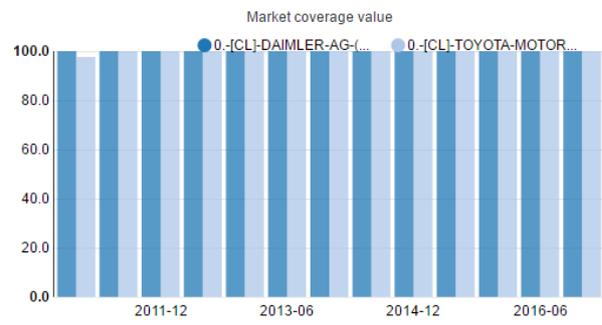
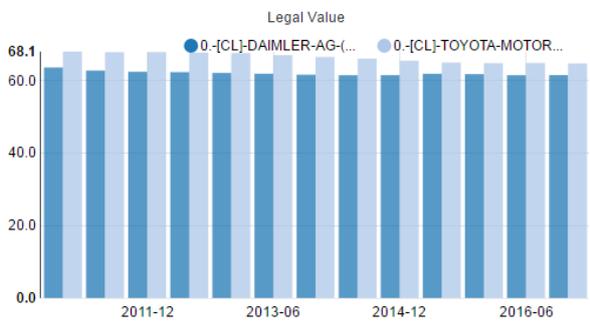
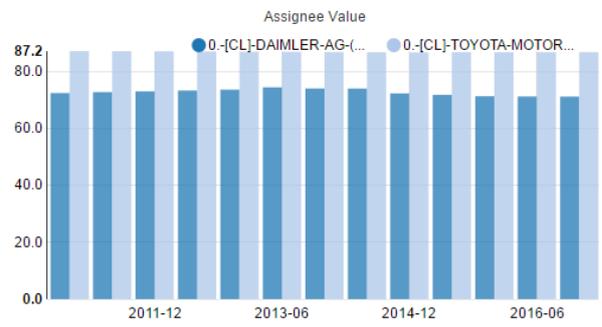
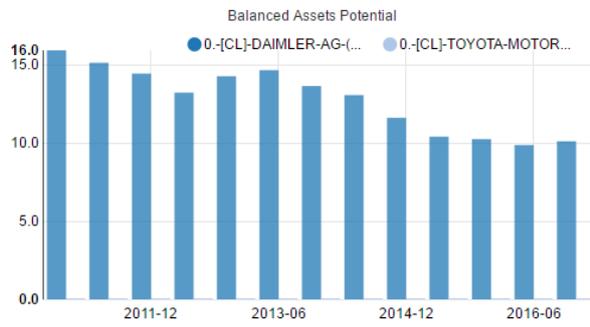
Also the patent portfolio of Daimler is similar to the one of the Japanese automotive manufacturer Toyota. The patent portfolio of Toyota is amazing 10 times higher in value than the one of Daimler, having 6 times more patents. Compared to the total assets that Daimler has in its balance, the patents seem not to play an important role. Toyota beats Daimler in almost all available Key figures, except the technical quality. Compared to Daimler also the IP efficiency is rising constantly, this means that the values within the patent portfolio are better distributed than those of Daimler which links to an efficient IP management. Also the legal, assignee and market attractiveness levels of Toyota are higher. An interesting thing to mention is that Toyota has all of its 10bn € patent assets visible in the balance sheet – very transparent to shareholders.

0.-[CL]-DAIMLER-AG-(14852) IPC(4) 2016-09-30

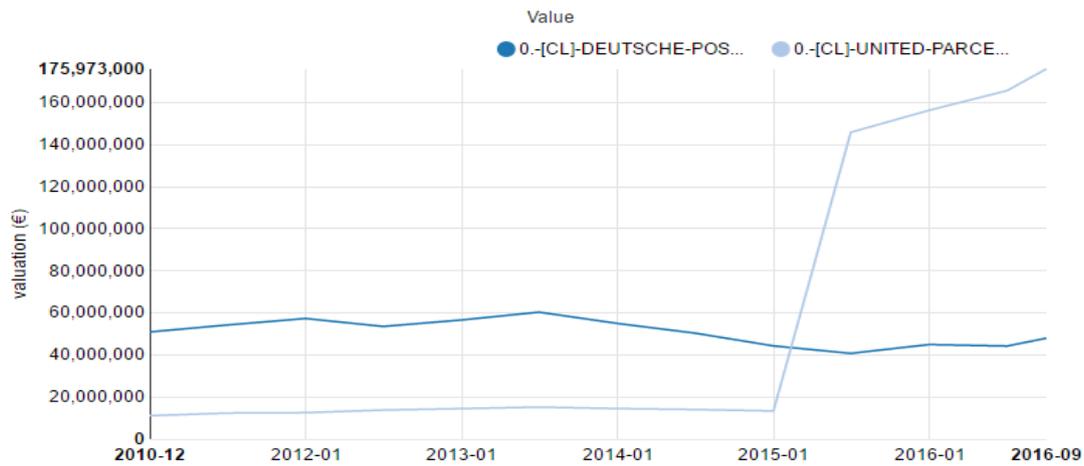


0.-[CL]-TOYOTA-MOTOR-CORPORATION-(99379) IPC(4) 2016-09-30



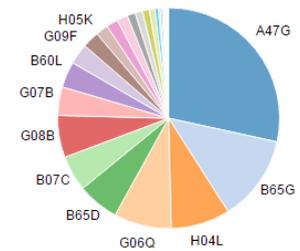


Deutsche Post AG is benchmark



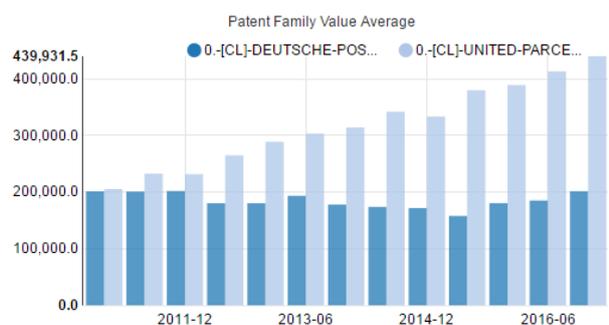
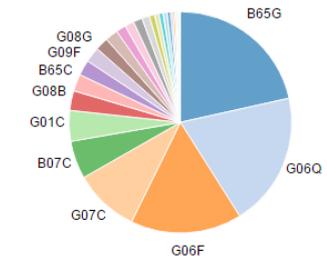
Deutsche Post is benchmark in its IP field's direct competition with the best total IP Quality in average. So how is Deutsche Post in comparison to its international competitor from an IP perspective? The comparison with UPS (United Parcel Service) shows some really interesting phenomenon: UPS has been speeding up in the last year: Their patent portfolio value has increased enormously compared to the year before. This may be due to acquisitions that have been performed in that year, i.e. by the 100% acquisition of Coyote Logistics LLC In 2015, but it is also interesting to see that the average patent family value seems to increase over the past 5 years, while the patent portfolio of Deutsche Post seems to remain stable.

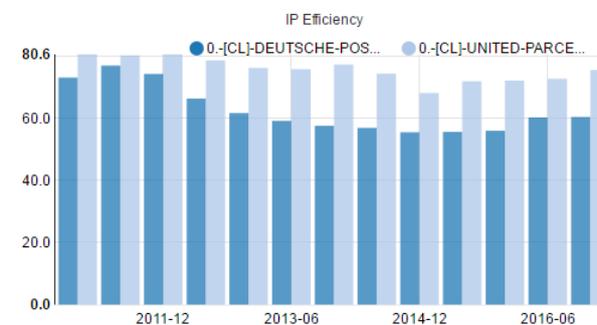
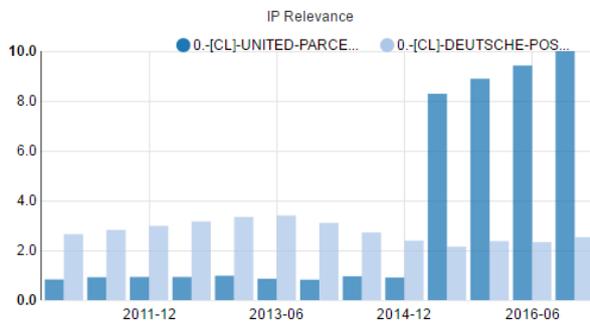
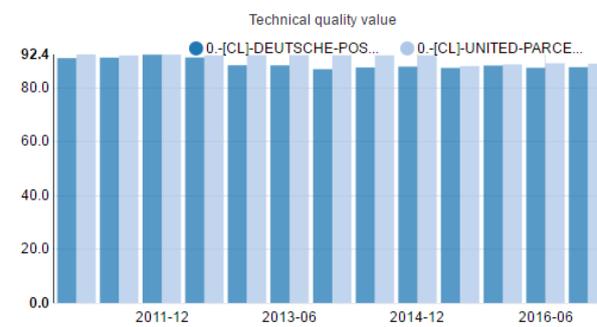
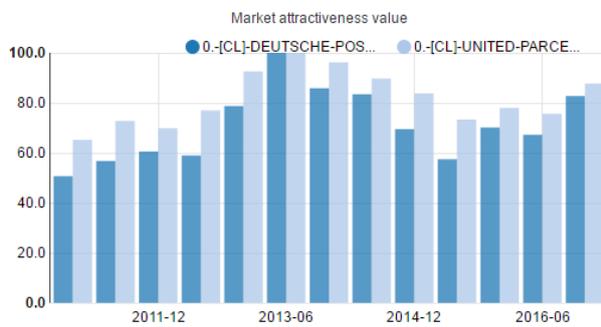
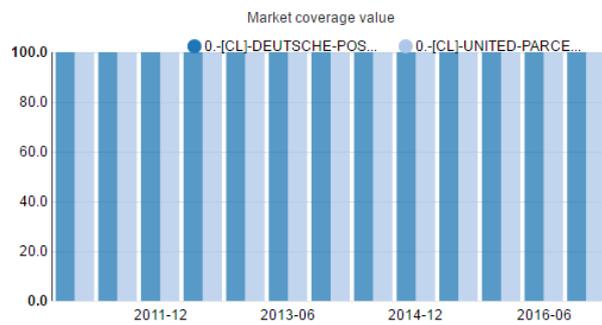
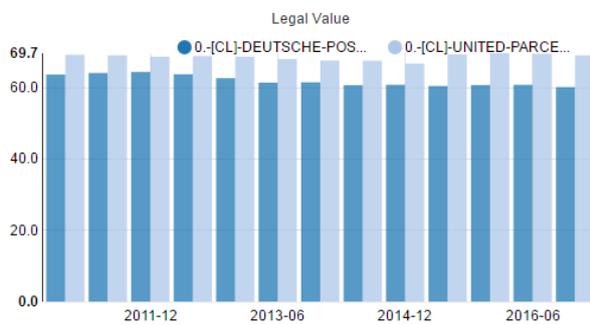
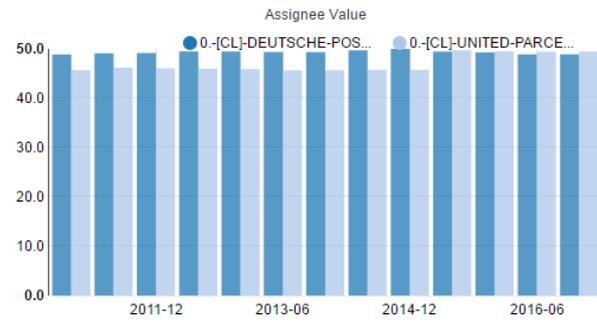
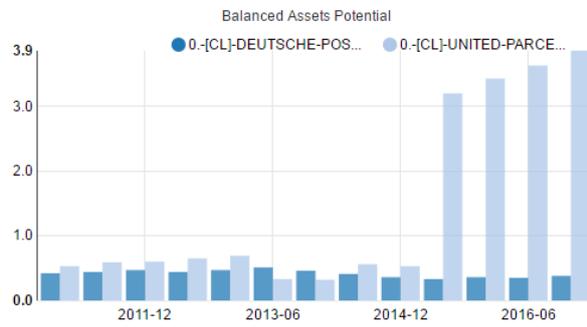
0-[CL]-DEUTSCHE-POST-AG-(238) IPC(4) 2016-09-30



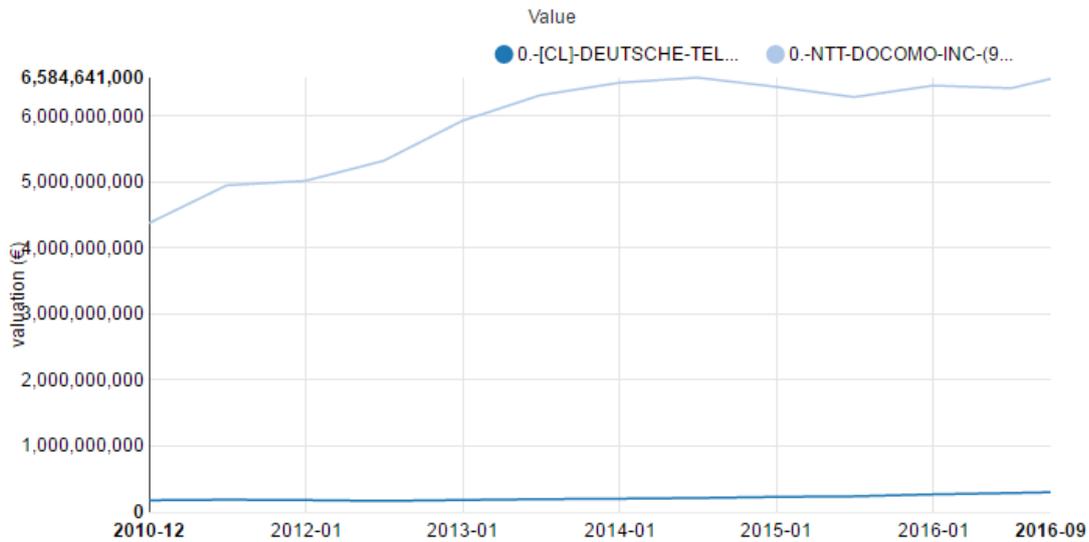
Both companies are active in the logistics sector. Both yield IP-portfolios with patent classes from the sections "Data Processing Systems or Methods" (G06Q), "Electric Digital Data Processing" (G06F), "Transport or Storage Devices" (B65G) and "Signaling or Calling Systems, Order Telegraphs, Alarm Systems" (G08B).

0-[CL]-UNITED-PARCEL-SERVICE-INC-(400) IPC(4) 2016-09-30



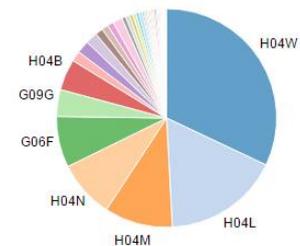


Deutsche Telekom AG – benchmark: NTT DOCOMO



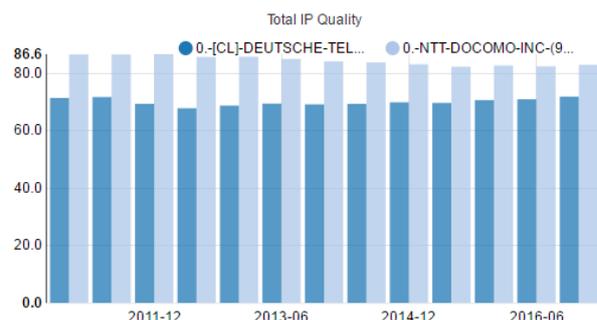
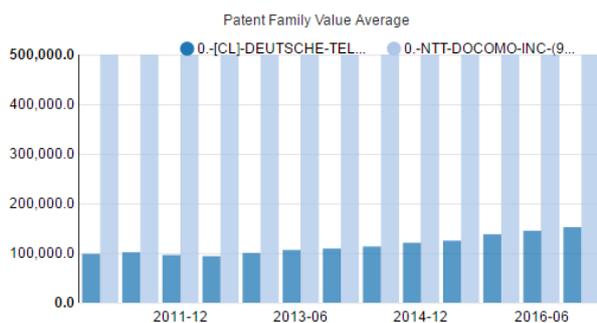
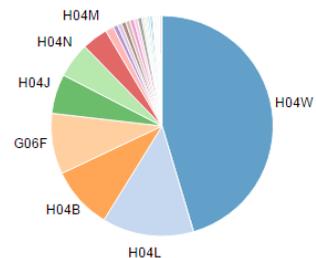
While looking for the benchmark of Deutsche Telekom it is interesting not to find a competitive brand and it is also interesting to see that Deutsche Telekom has comparably few patents (in relation to its size). In the direct comparison with the benchmark NTT DOCOMO it is even hard to discover the curve of Deutsche Telekom in the Diagram above, because the values of NTT DOCOMO are so high: It is more than 10 times higher than the Telekom Patent-Portfolio. Do they also have 10 times more patent families? No, they don't. Their average patent family value is more than three times higher.

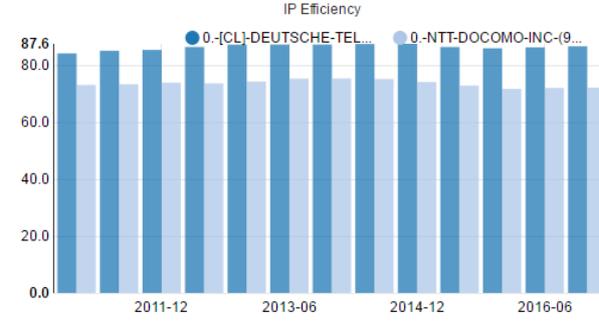
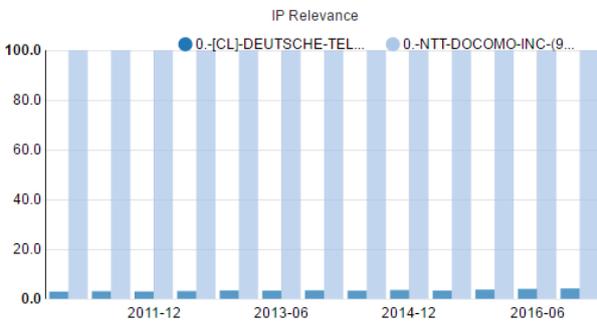
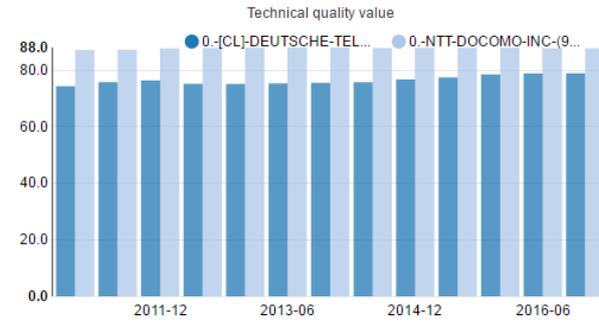
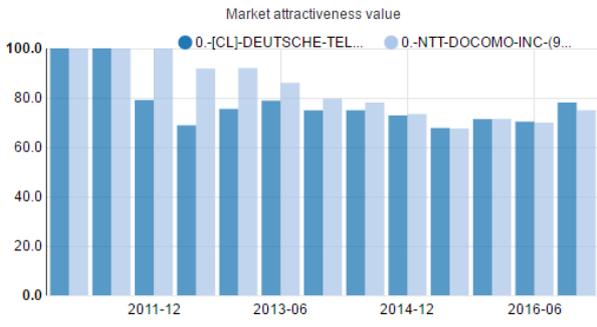
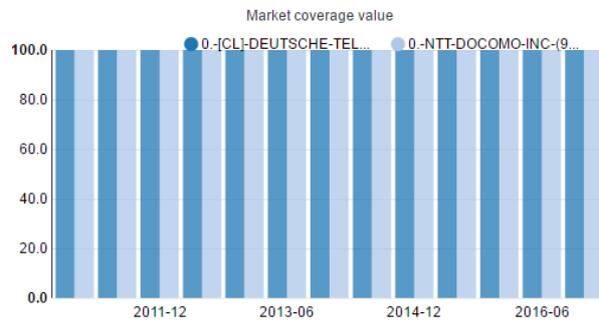
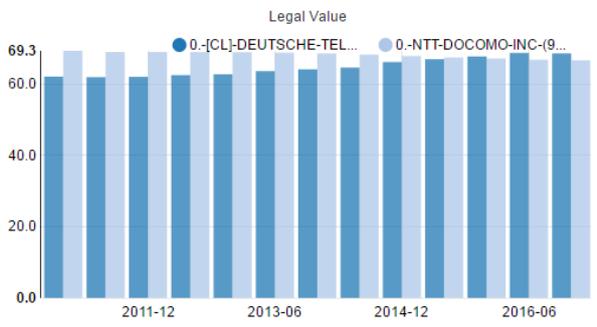
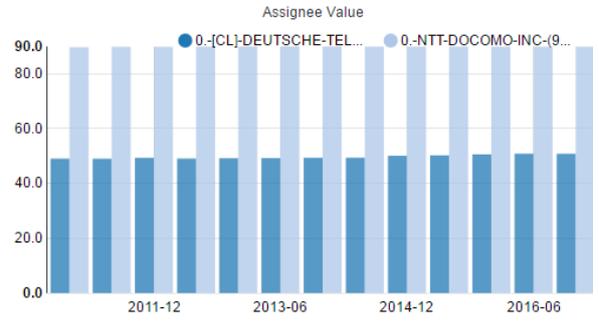
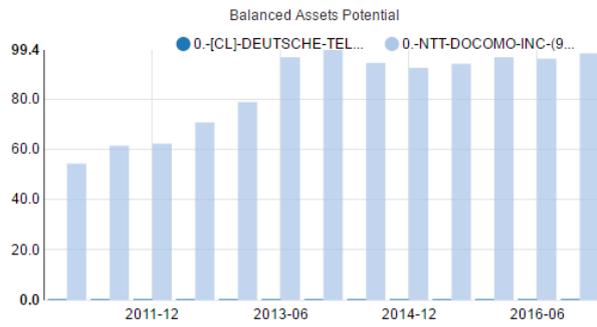
0.-[CL]-DEUTSCHE-TELEKOM-AG-(1965) IPC(4) 2016-09-30



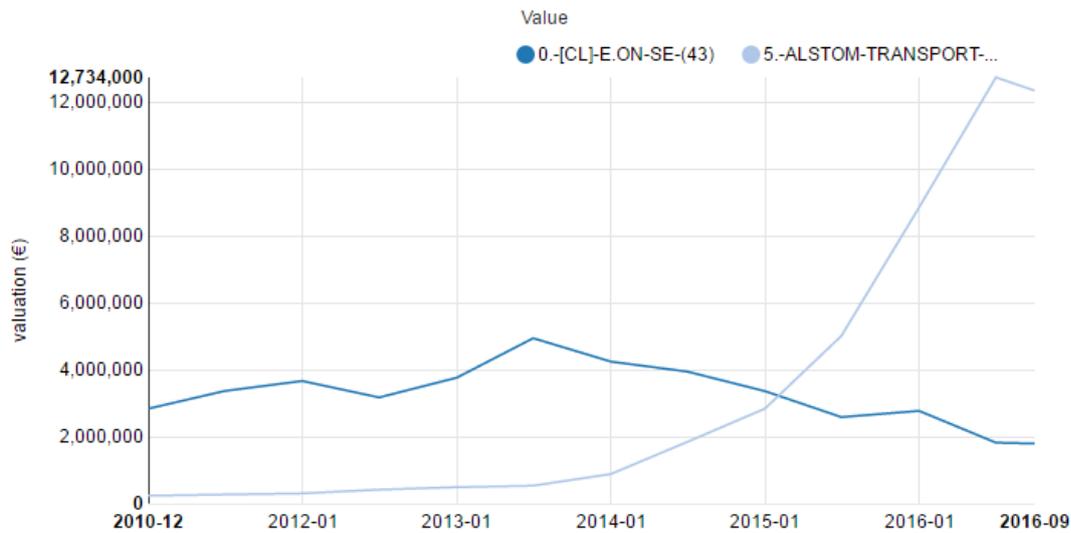
There are just two figures where Deutsche Telekom delivers a better result: The IP efficiency and the market attractiveness. But all other key figures are dominated by NTT DOCOMO significantly. The IP relevance shows in comparison that for the Deutsche Telekom patents don't play that important role compared to NTT DOCOMO. Another interesting aspect is what the balance sheets of both companies show: NTT DOCOMO has no intangible fixed assets in its balance sheet: All the almost 10bn Euro of IP assets are not seeable anywhere – a huge hidden asset for NTT DOCOMO.

0.-NTT-DOCOMO-INC-(9539) IPC(4) 2016-09-30



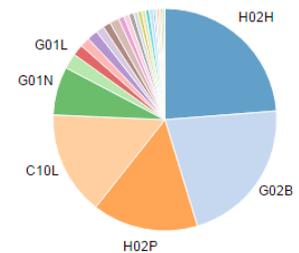


E.ON SE – benchmark: Alstom Transport Technologies



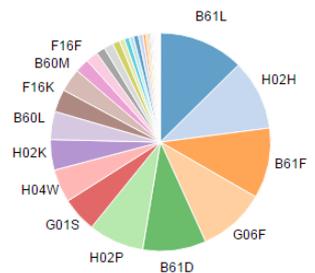
0-[CL]-E.ON-SE-(43) IPC(4) 2016-09-30

E.ON is an Energy supplier and it’s not surprising that the Patent portfolio with 53 alive patent families is really small for a company of this size. Despite the fact that Alstom Transport Technologies and E.ON seem to be different in their markets, as E.ON AG is an energy utility company, whereas Alstom Transport Technologies is a manufacturer of rail transport, Alstom Transport Technologies could be seen as benchmark of E.ON due to the fact that both companies yield patents, which are related to the sections “Control or Regulation of Electric Motors, Electric Generators or Dynamo-Electric Converters” (H02P) and “Emergency Protective Circuit Arrangements” (H02H).

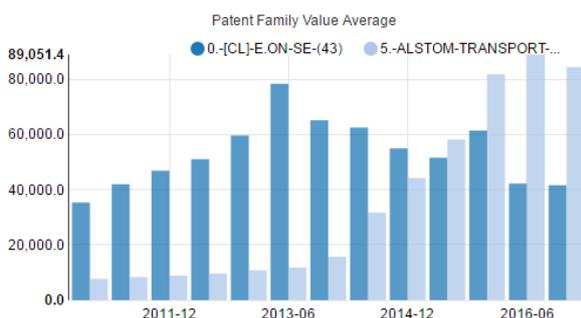


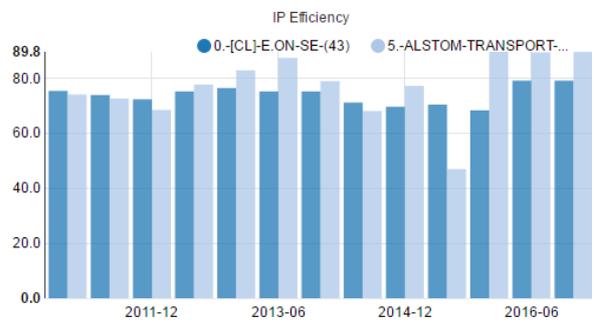
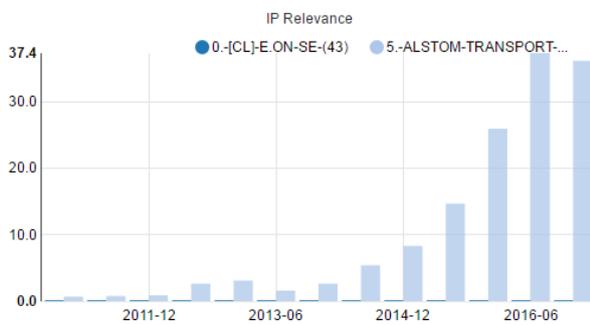
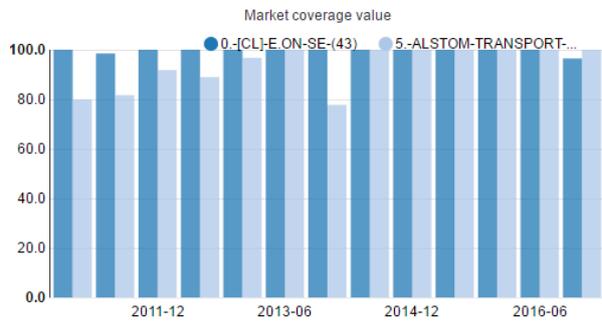
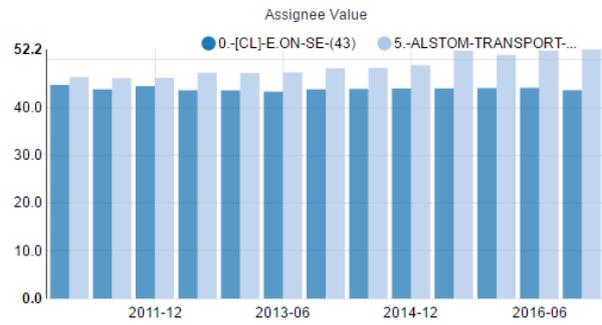
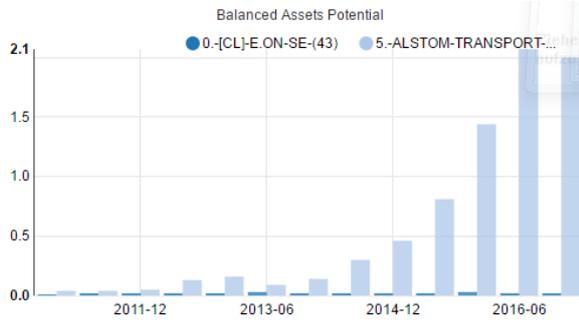
5.-ALSTOM-TRANSPORT-TECHNOLOGIES-(146) IPC(4) 2016-09-30

So the high qualitative value of the total quality of E.ONs small patent portfolio is due to the fact that the legal value and the technical quality as well as the market coverage is comparably good. But in the end this does not lead to a remarkable patent portfolio value. Also the average IP value is compared to Alstom Transport Technologies less than a half in size.

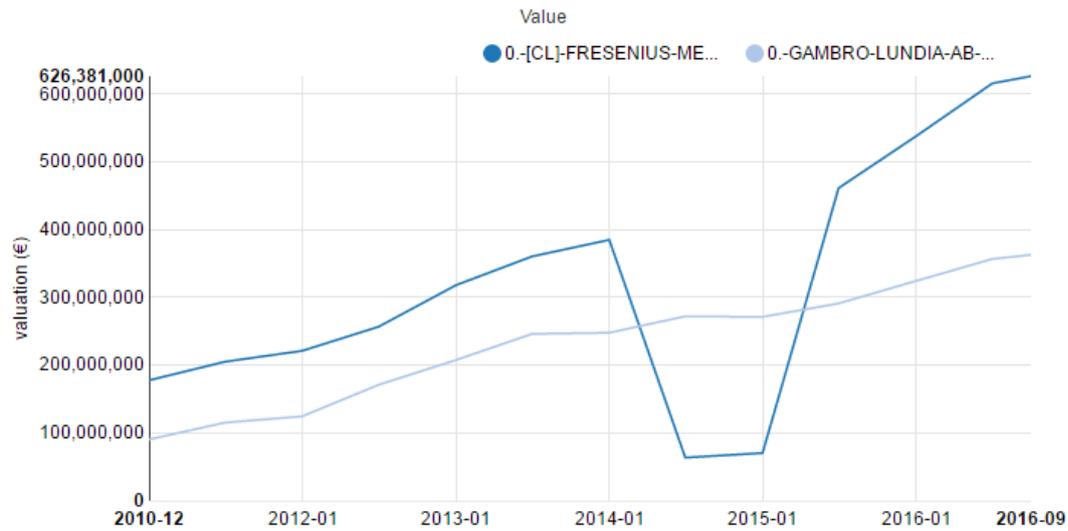


Alstom Transport Technologies beats E.ON in almost all indicators. Also in terms of IP Value, which shows an extreme increase since 2014.



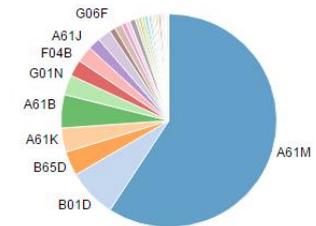


Fresenius Medical Care AG – benchmark: Gambro Lundia AB



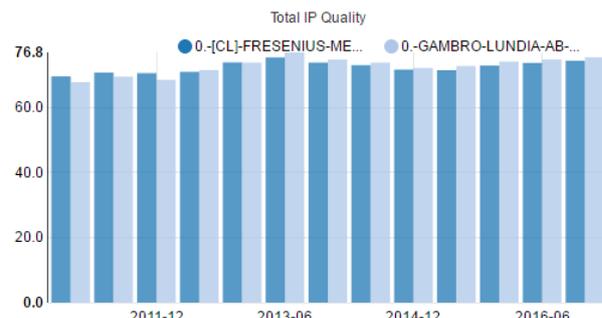
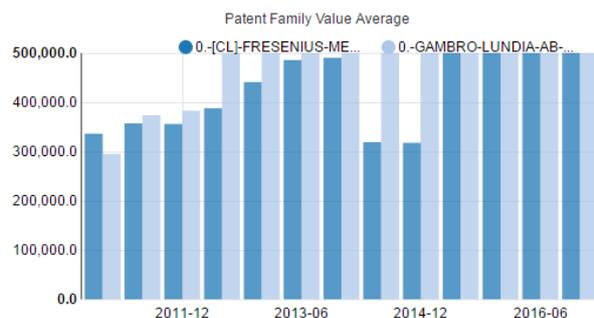
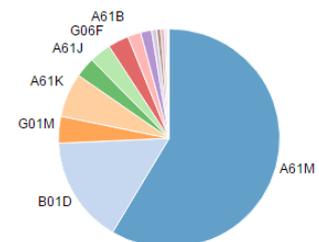
0.-[CL]-FRESENIUS-MEDICAL-CARE-AG-&-CO.-KGAA...(956) IPC(4) 2016-09-30

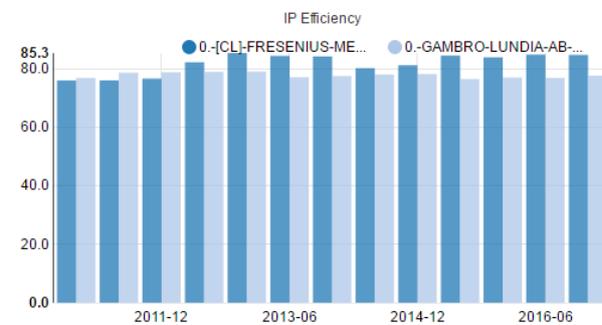
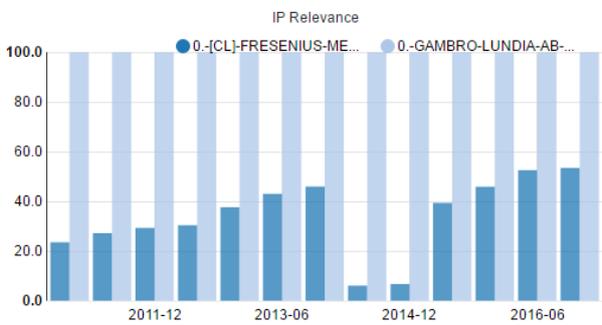
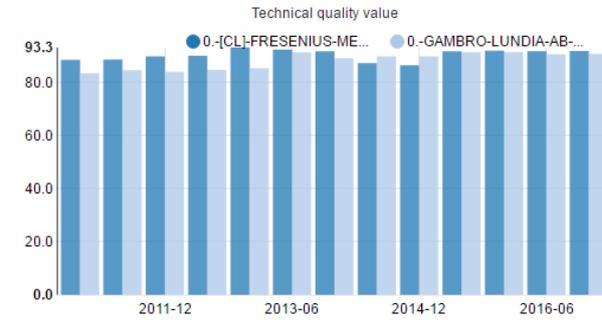
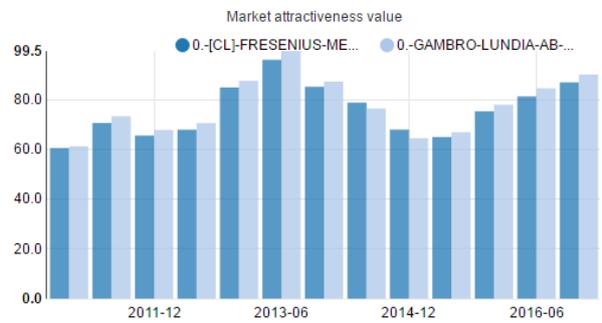
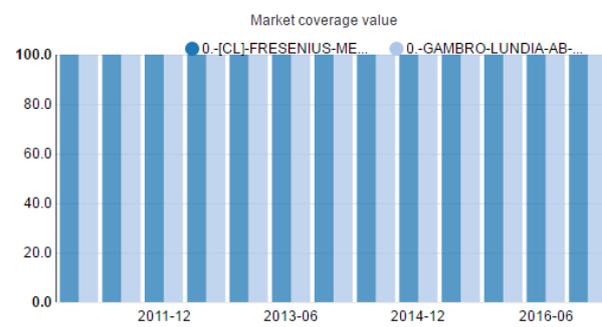
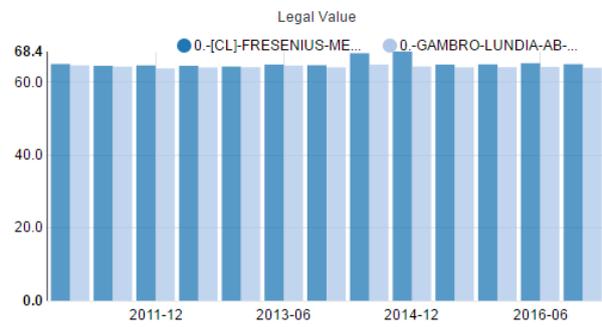
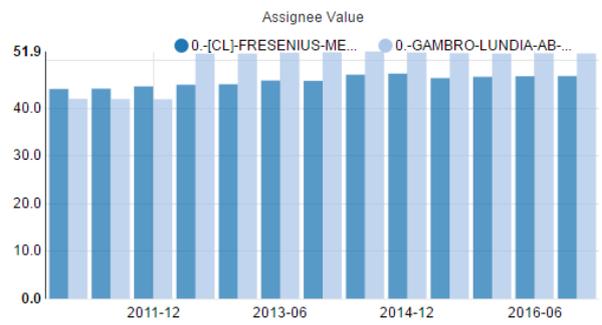
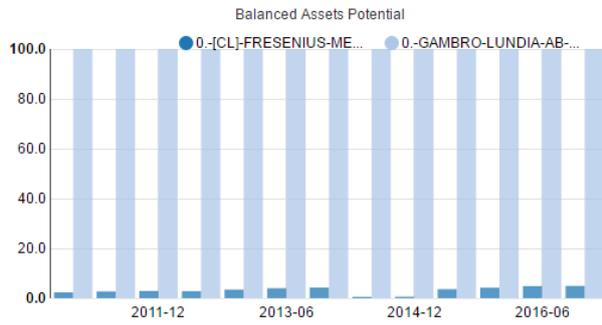
Gambro Lundia AB is a medical technology business, very similar to Fresenius in terms of their patent portfolio distribution: Their biggest parts are the sections “Devices for Introducing Media into, or onto the Body” (A61M), “Separation” (B01D) and “Preparation for medical, dental or toilet purposes” (A61K) and “Diagnosis, surgery, identification” (A61B).



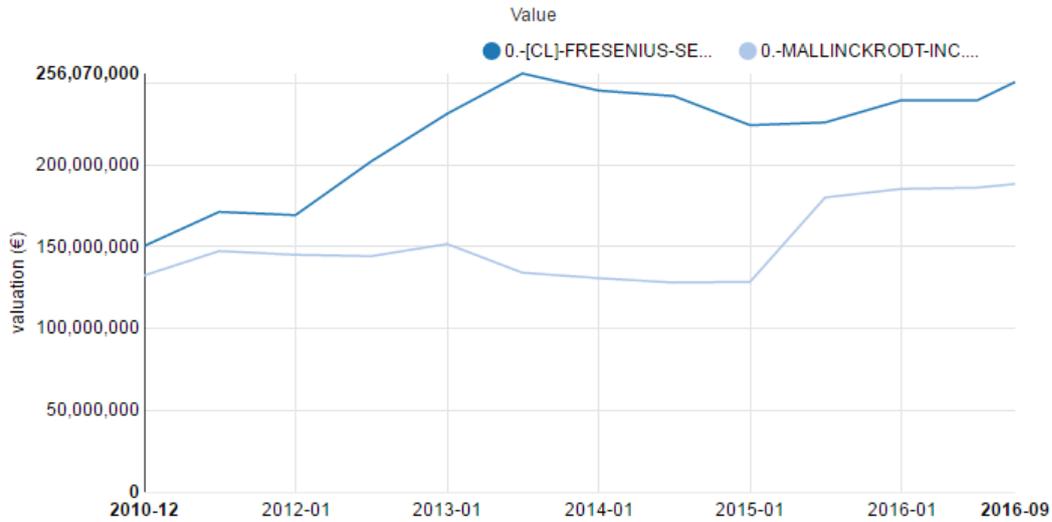
Comparing the two companies regarding their patent quality, they are very close. Fresenius seems to have a slight advantage in legal value, technical quality and IP efficiency. It also has the bigger patent portfolio in value and the values are increasing constantly. At the same time Gambro Lundia is more attractive on the market, has a permanent higher assignee value. 100 % of its patent-values are hidden assets.

0.-GAMBRO-LUNDIA-AB-(417) IPC(4) 2016-09-30



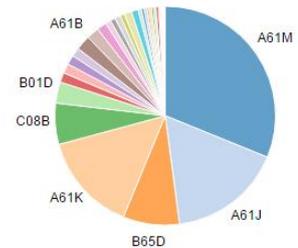


Fresenius SE & CO. AG – benchmark: Mallinckrodt Inc.



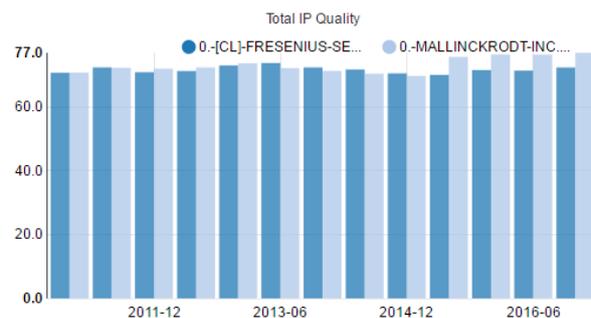
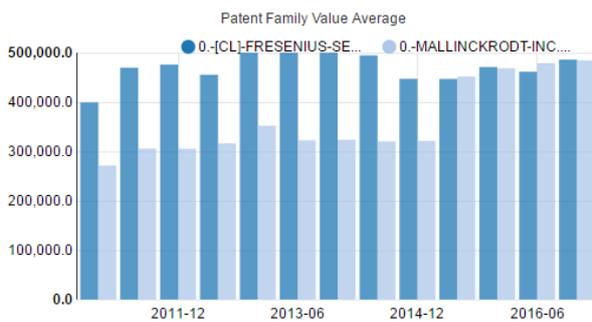
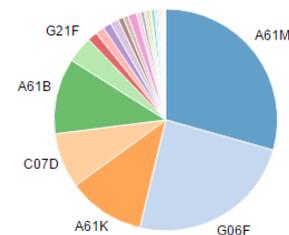
0.-[CL]-FRESENIUS-SE-&-CO.-KGAA-(516) IPC(4) 2016-09-30

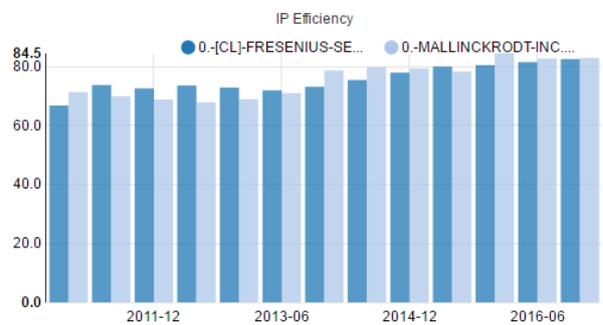
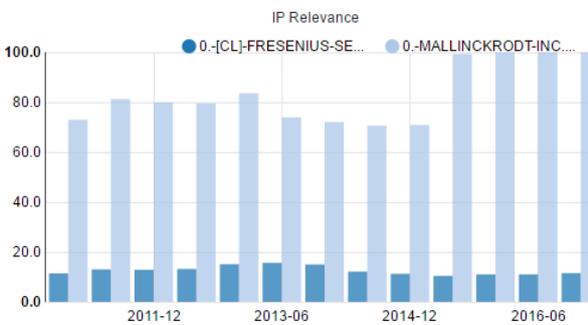
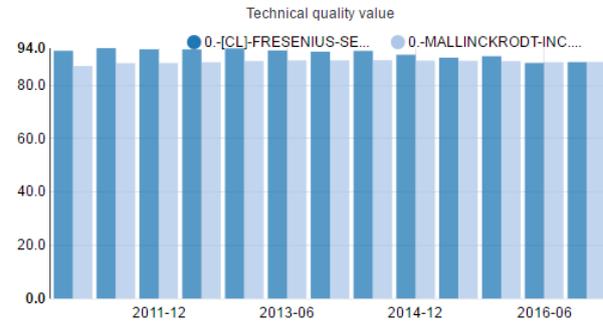
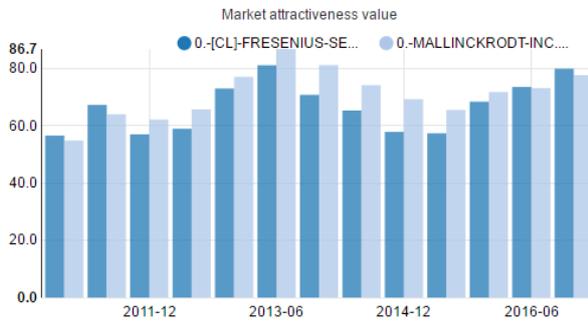
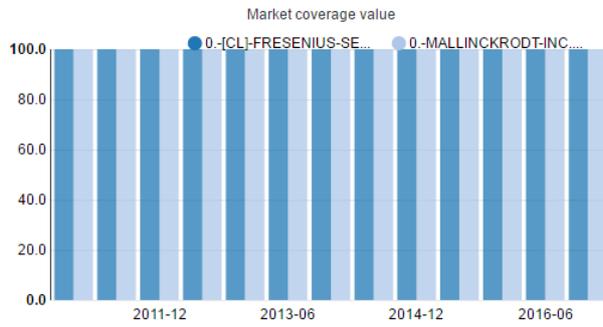
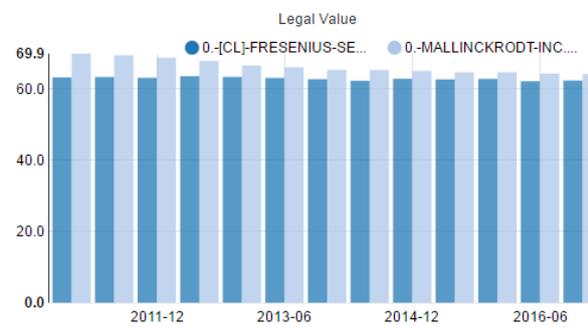
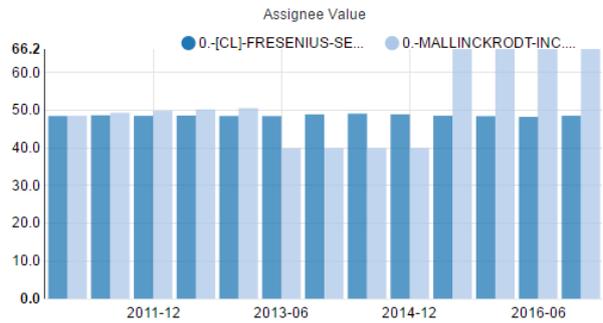
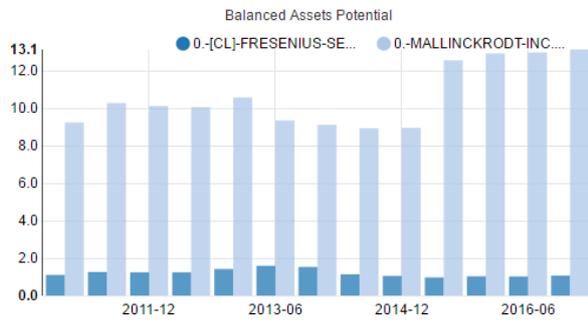
Both companies are active in the health care industry. Their patent portfolios have many similarities as they both yield patents from the sections: “Devices for Introducing Media into or onto the Body” (A61M), “Preparations for Medical, Dental or Toilet Purposes” (A61K) and “Diagnosis, Surgery, Identification” (A61B).



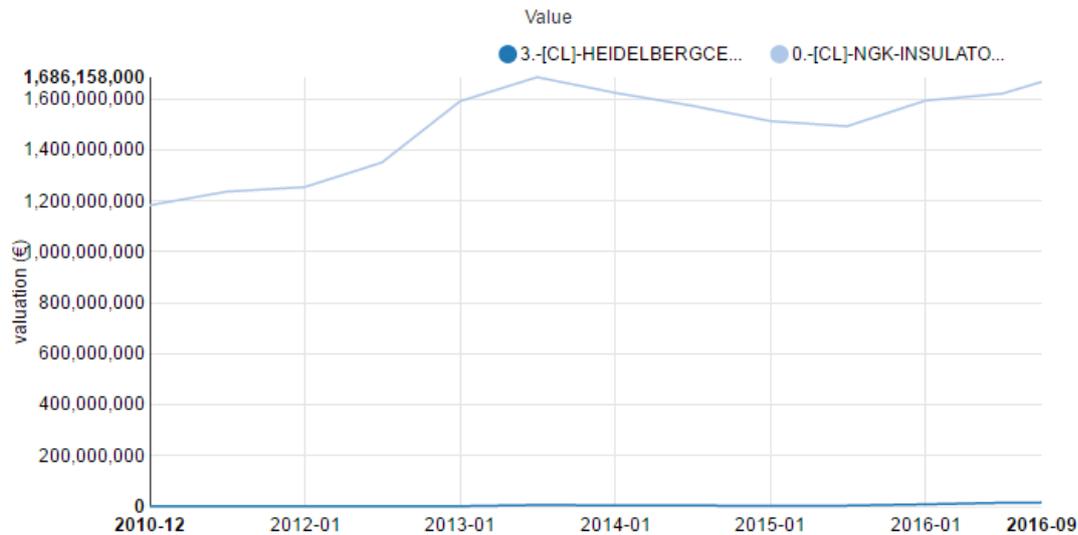
The two companies are very close to each other in terms of total IP quality, Fresenius has a very small advantage only in the market attractiveness key figures here: Fresenius seems to be a bit better diversified in growing markets. On the other hand Mallinckrodt has higher assignee and legal values. For Mallinckrodt patents seem to play a more important role: the ratio IP assets /total assets are much higher compared to Fresenius.

0.-MALLINCKRODT-INC.-(389) IPC(4) 2016-09-30



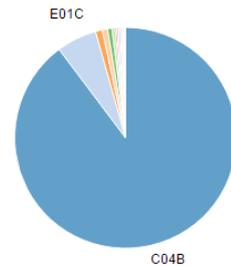


HeidelbergCement AG is benchmark



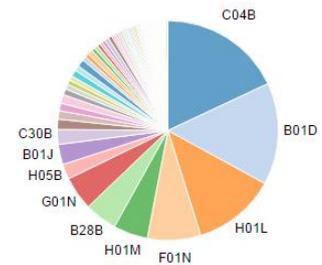
3.-[CL]-HEIDELBERGCEMENT-AG-(74) IPC(4) 2016-09-30

While HeidelbergCement is benchmark from an IP perspective, who is to compare with? There is the Japanese company NGK Insulators, which is specialized on ceramic production. Even though the significantly bigger and more diversified patent portfolio of NGK, there are key figures, where HeidelbergCement AG shows better results.

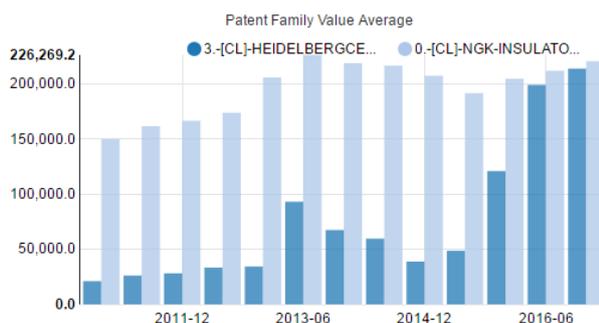


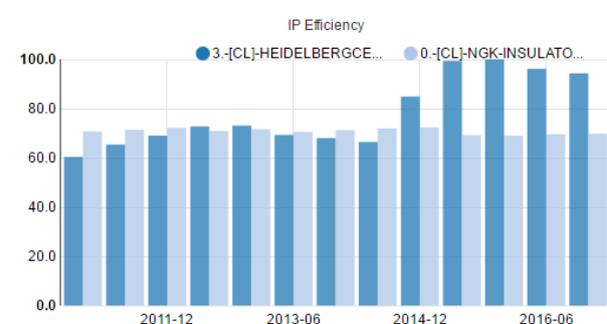
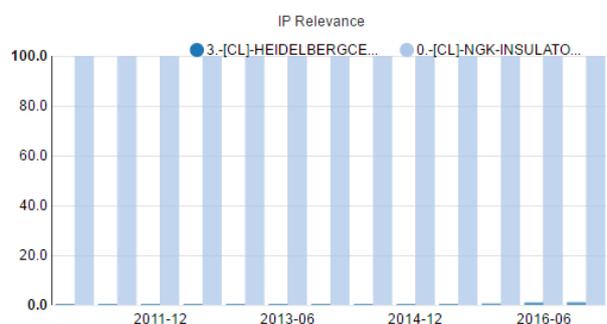
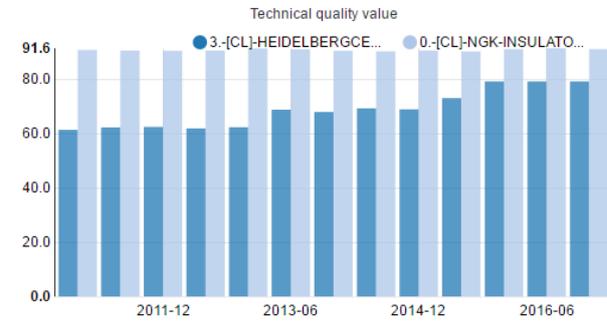
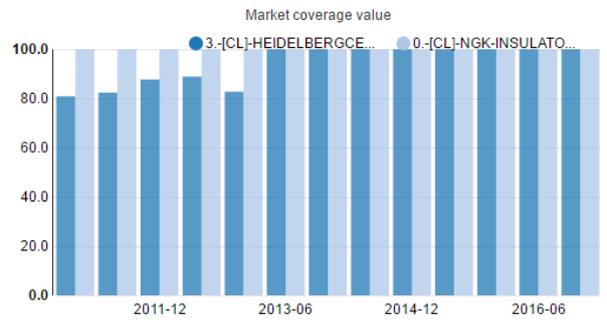
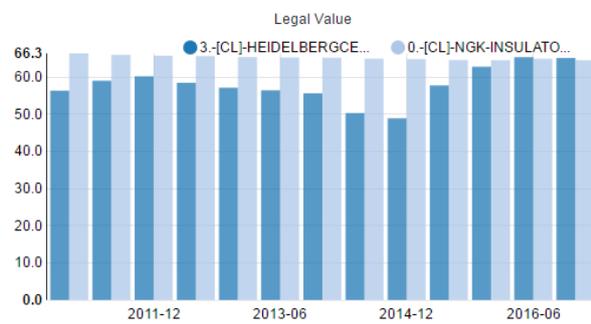
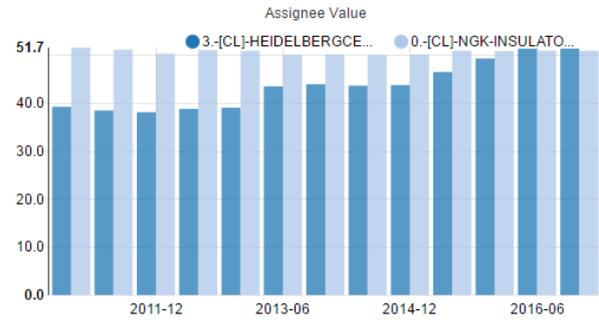
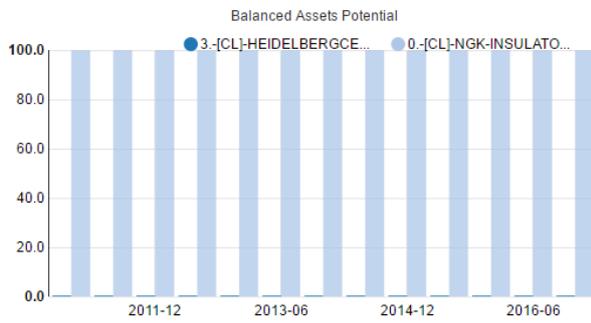
0.-[CL]-NGK-INSULATORS-LTD.-(7563) IPC(4) 2016-09-30

HeidelbergCement AG has legally better patents, the market attractiveness value and the assignee value are slightly better. It is also remarkable, that the average patent family value of HeidelbergCement AG has been strongly increasing during the last years and reaches 2016 almost the same level as the same indicator of NGK Insulators.

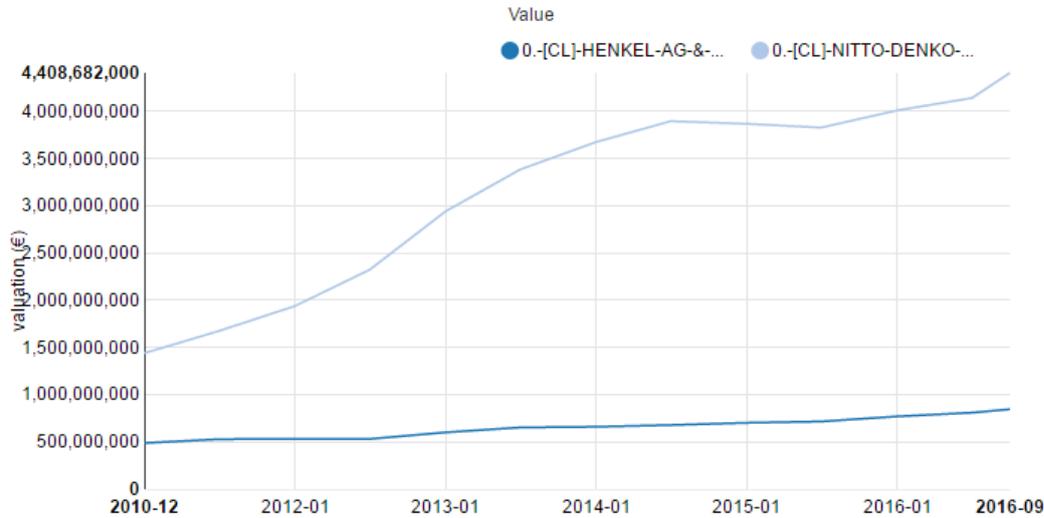


While HeidelbergCement has almost 100% of its patent value covered in the balance sheet within intangible fixed assets, the analysis of NGK Insulators's portfolio shows about 1,6bn Euro hidden assets.



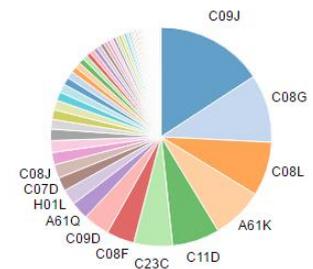


Henkel AG & Co. KGaA is benchmark qualitatively, Nitto Denko Corporation is the quantitative benchmark



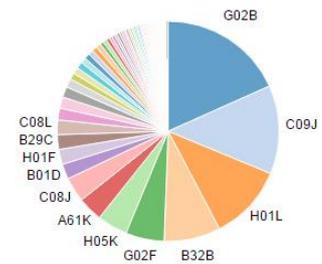
Henkel is a company, operating in three main businesses: laundry and home care, beauty care and adhesive technologies. Within its IP-portfolio and diversification it is the qualitative benchmark. But we found an interesting competitor to have a close look at being extremely strong in Henkel's most relevant business unit (from an IP value perspective): Nitto Denko is specialized on production for pharmaceutical, medical, electric and other technologies. Their second biggest unit in their IP portfolio is the section Adhesives, Henkel's most valuable IP sector (C09J).

0-[CL]-HENKEL-AG-&-CO.-KGAA-(5004) IPC(4) 2016-09-30

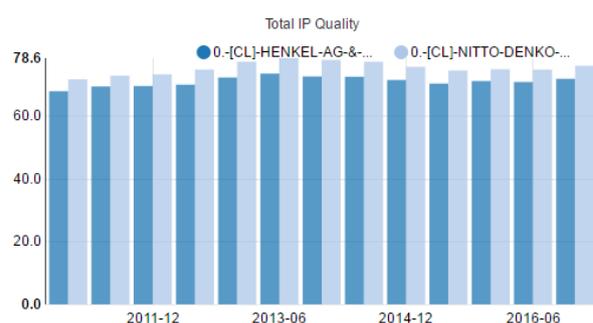
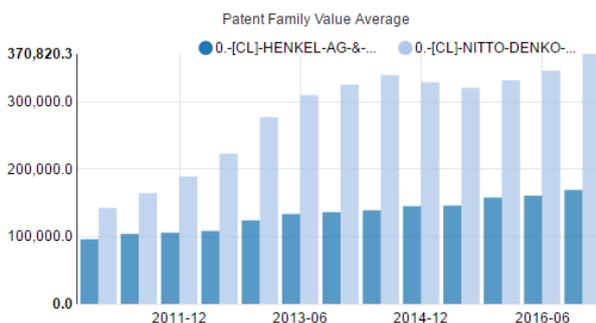


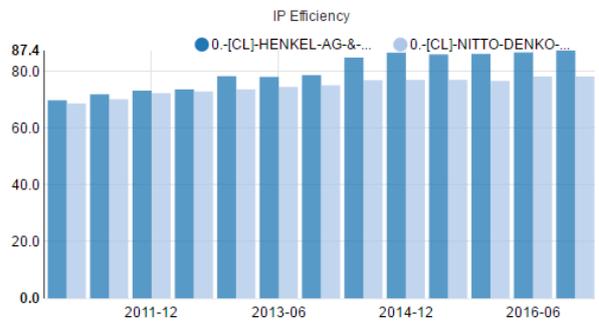
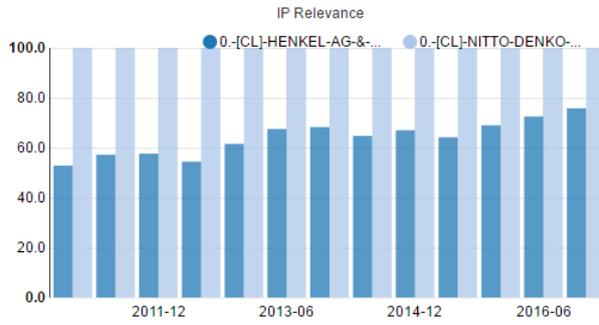
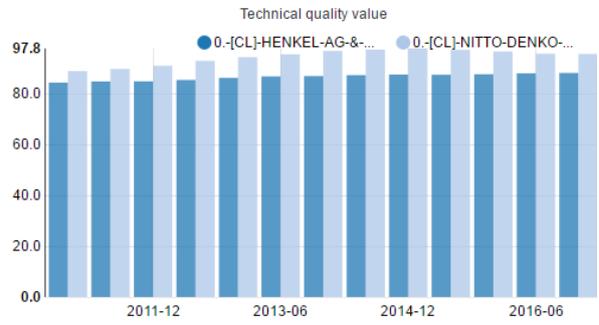
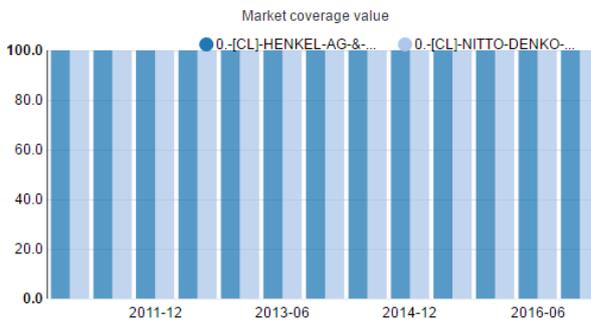
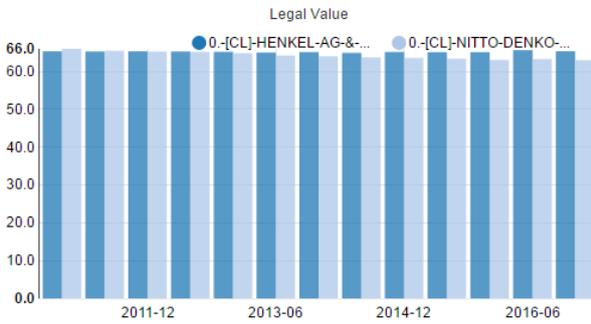
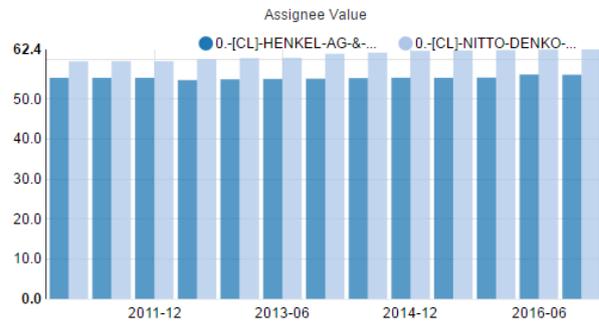
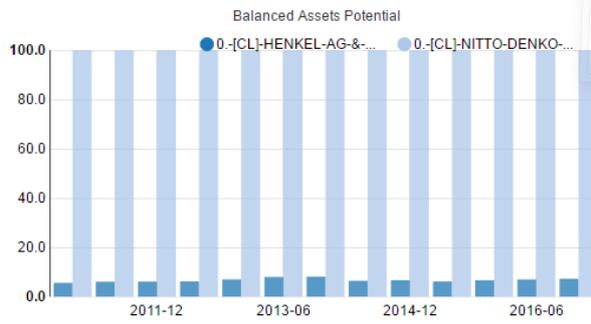
On a second sight there are even two further sections remarkable for both: "Compositions of macromolecular compounds (C08L), "Preparations for Medical, Dental, or Toilet Purposes" (A61K). The sections seem not to play an important role for Nitto Denko but in fact the IP value within these classes is even higher than Henkel's.

0-[CL]-NITTO-DENKO-CORPORATION-(11889) IPC(4) 2016-09-30

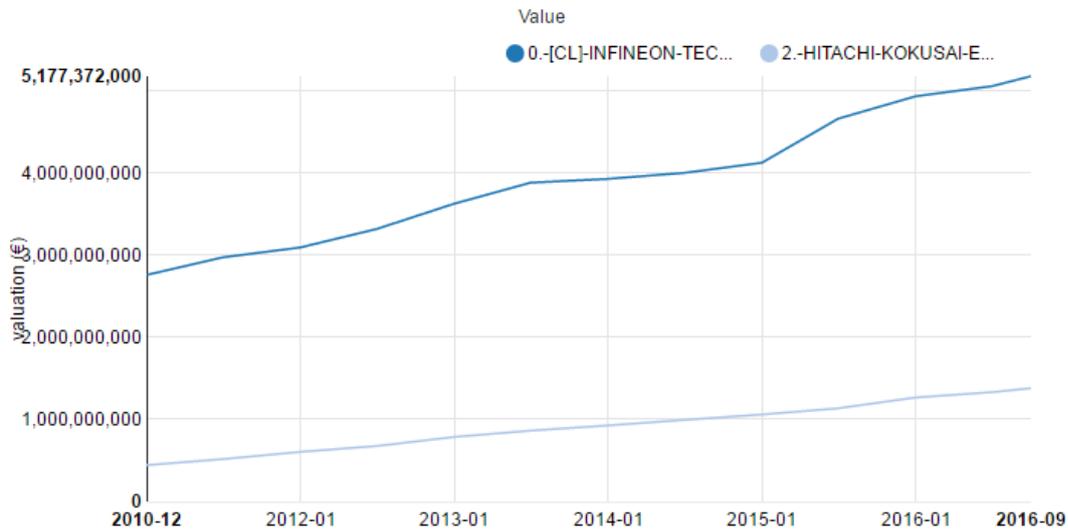


The total IP Portfolio value of Nitto Denko is approximately 5 times higher than the Henkel portfolio. Nitto Denko has also higher level by almost all patent quality indicators excepting the legal one. It is to mention that the IP efficiency is better for Henkel, this leads to a better/more efficient IP Management. But in the end the average patent value is for Nitto Denko almost double in size compared to Henkel. From a quantitative/monetary perspective, Nitto Denko is benchmark here.



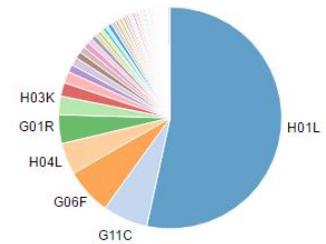


Infineon Technologies AG and Hitachi Kokusai Electric Inc. quantitative vs qualitative benchmark



0-[CL]-INFINEON-TECHNOLOGIES-AG-(16492) IPC(4) 2016-09-30

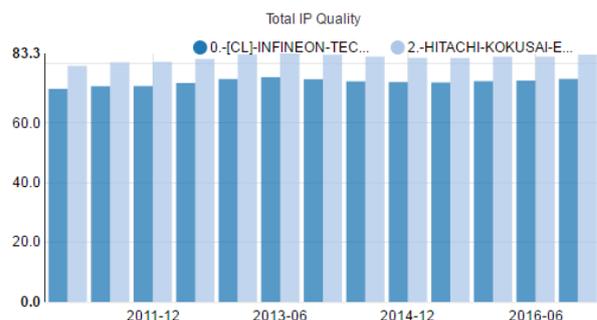
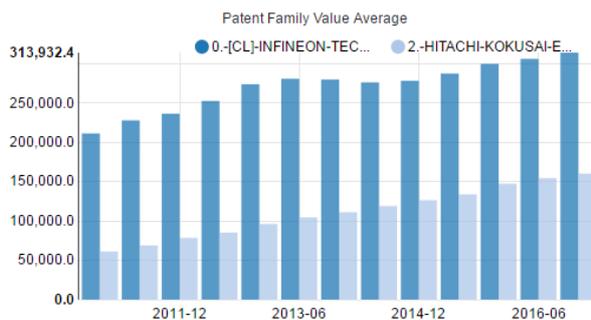
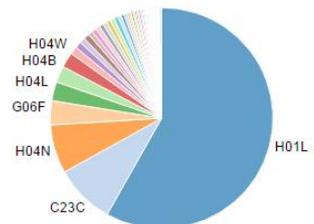
Infineon's benchmark in terms of Patents is also a well-known Japanese company. It is the Hitachi subsidiary Hitachi Kokusai Electric. Both are semiconductor manufacturers: the biggest share in both their patent portfolio structures is "Semiconductors Devices, Electric Solid State Devices not Otherwise Provided for" (H01L).

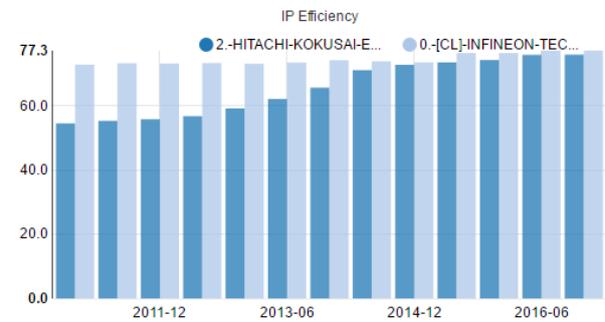
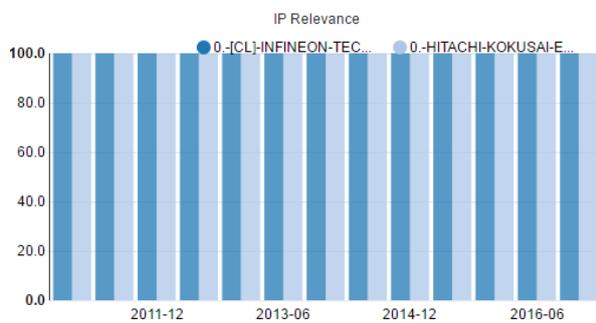
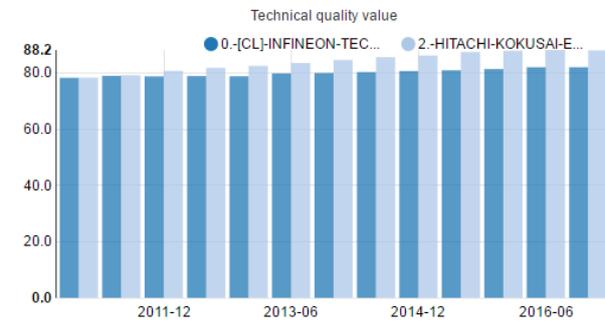
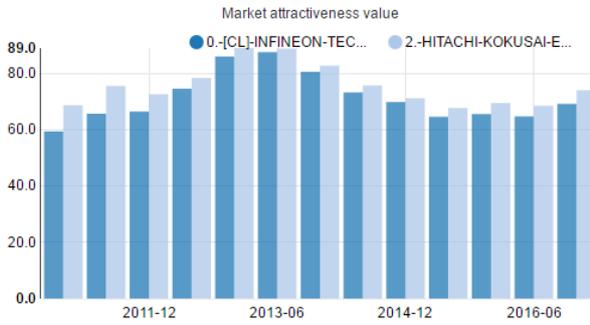
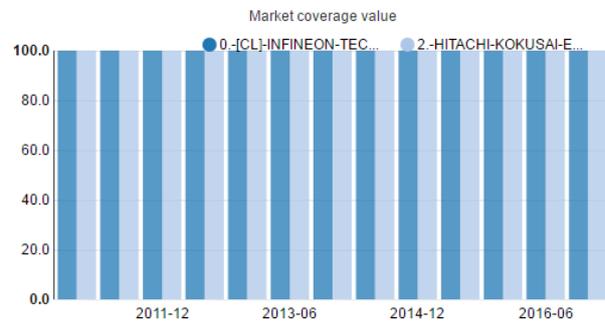
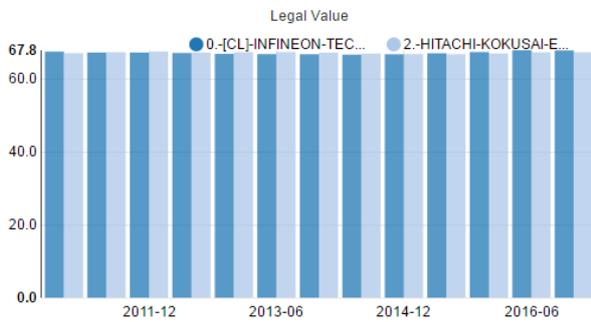
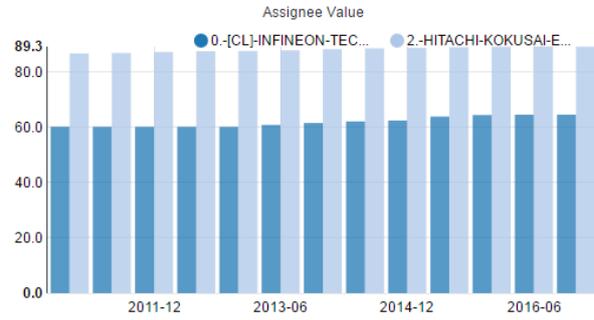
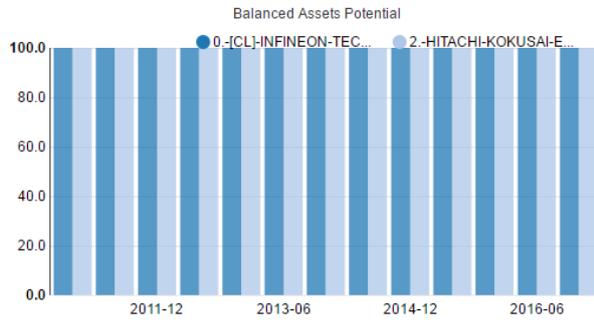


2.-HITACHI-KOKUSAI-ELECTRIC-INC.-(8607) IPC(4) 2016-09-30

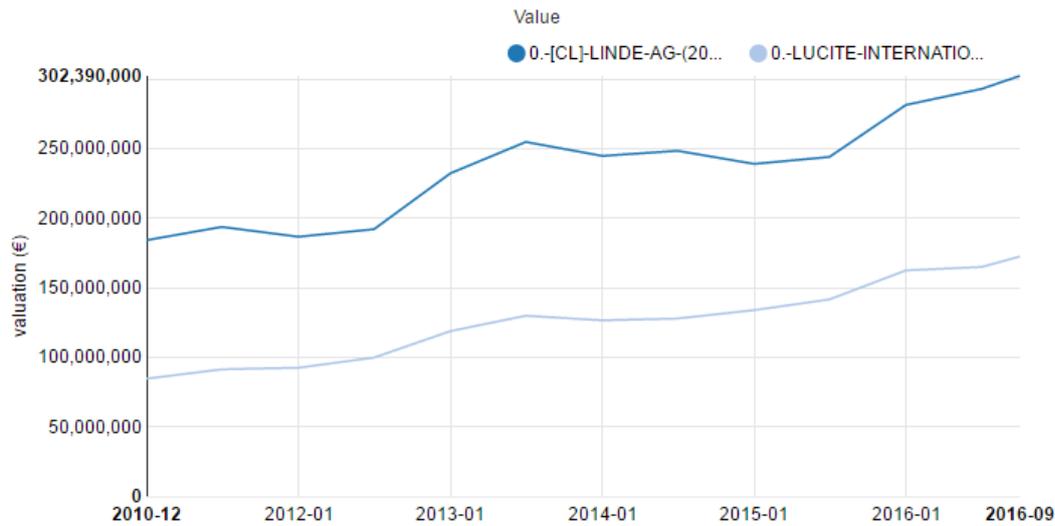
But the benchmark is only qualitative: Infineon Technologies has a four times higher IP value than Hitachi Kokusai Electric, due to the bigger patent portfolio, of course (it has the double amount of alive patent families) but also due to a double as high average patent family value compared to the Hitachi-subsiary.

Interesting information for investors: the Infineon IP value is at around 5.1 bn Euro in value and there are no intangible fixed assets in the balance. So the value of Infineon is approximately 5.1 bn higher than documented in the balance sheet. The same for Hitachi Kokusai Electric, by the way – there are no intangible fixed assets so far in the balance.





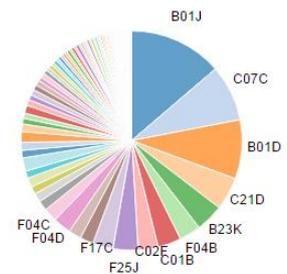
Linde AG – benchmark: Lucite International UK Limited



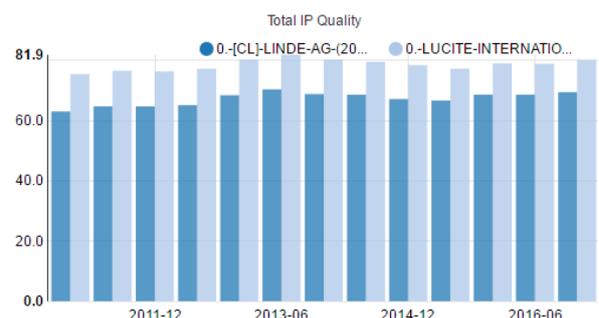
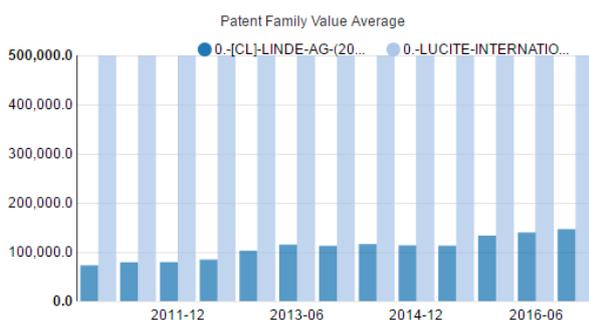
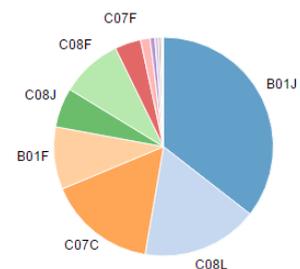
Linde AG is a known supplier for industrial gases. While benchmarking their IP Portfolio in an international competition the British Lucite International UK Ltd showed up – a much smaller in size company. Both companies are active in the chemical industry. They yield patents from the sections “Chemical or Physical Processes, Catalysis, Colloid Chemistry, Their Relevant Apparatus” (B01J) and “Acyclic or Carbocyclic Compounds” (C07C).

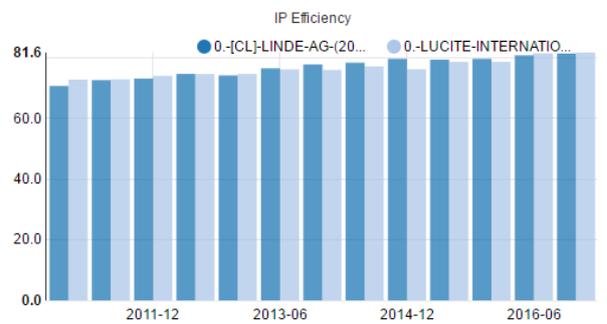
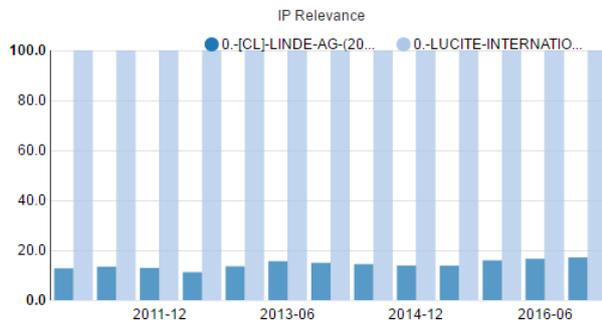
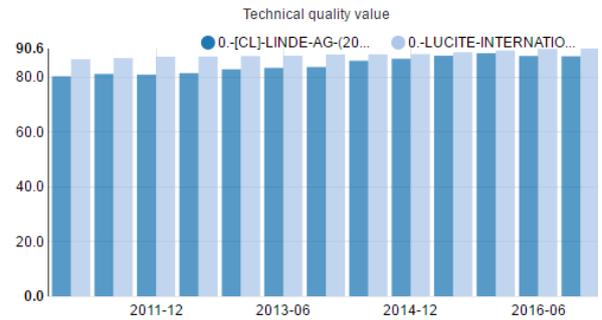
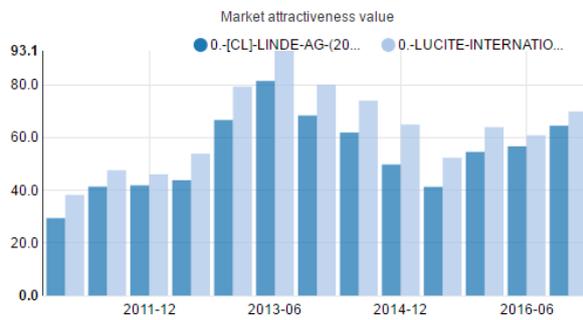
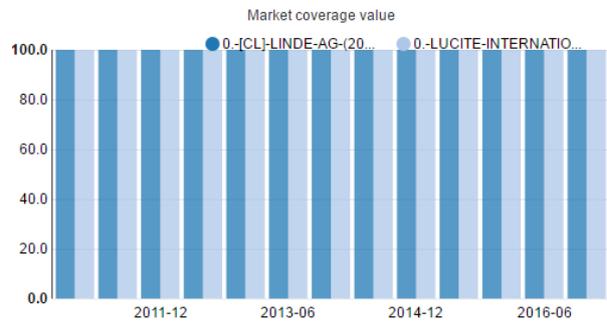
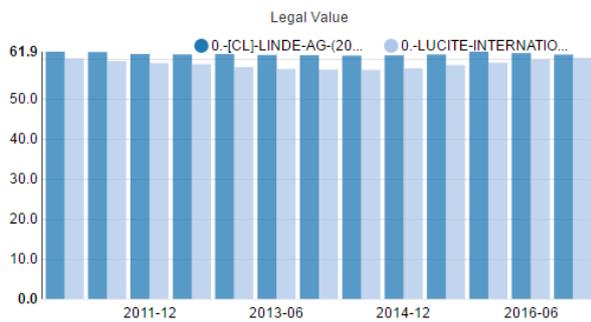
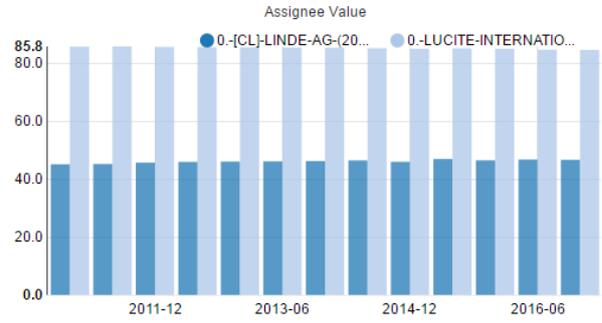
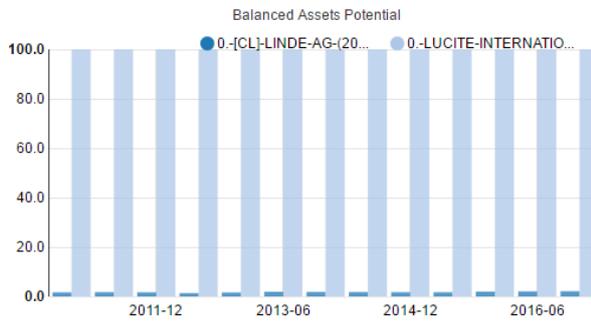
Lucite International UK Ltd and Linde AG are well comparable in terms of IP. Aside their identical strongest IPC classes both are in a similar value range of patents, Linde with a total IP portfolio of approx. 300 m€, Lucite with approx. 170 m€ –both companies are showing the similar tendency of the IP-value development during the last 5 years. Quite amazing is the strong difference in the amount of patents: Lindes portfolio is 20 times bigger in size of patents compared to Lucite. This means that Lucite has an enormous high average patent family value of 1.7 m€ compared to 147,000 € of Linde. This average value is more than 10 times higher! In almost all investigated key figures Lucite International is slightly better than Linde – except the legal value. Compared to the total assets, for Linde patents seem to have a minor meaning – in contrast to Lucite International, where the patents seem to play a significant role.

0.-[CL]-LINDE-AG-(2064) IPC(4) 2016-09-30

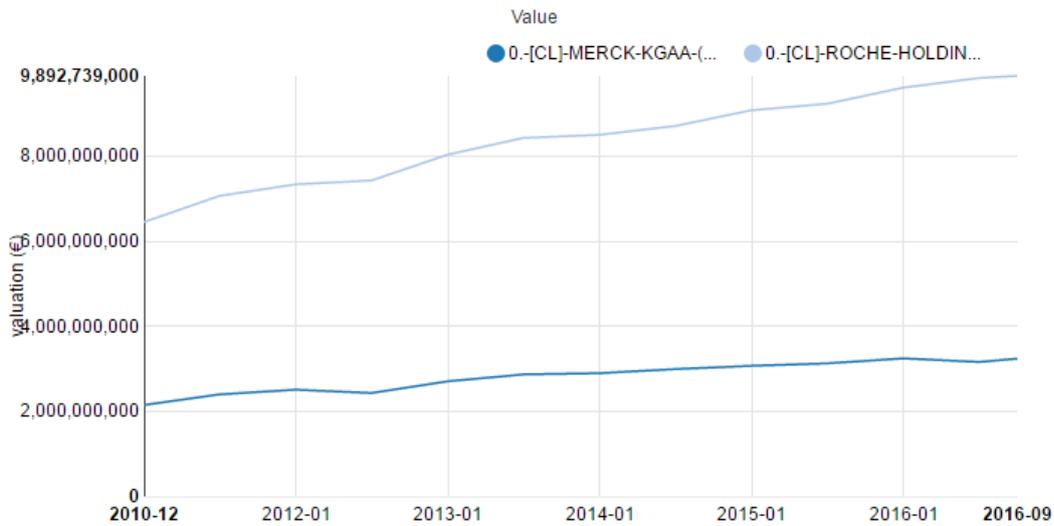


0.-LUCITE-INTERNATIONAL-UK-LIMITED-(100) IPC(4) 2016-09-30





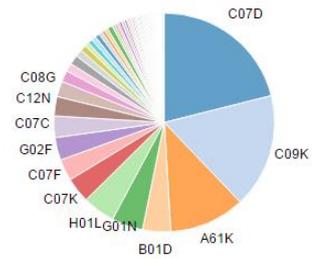
Merck KGaA - benchmark: Roche Holdings AG



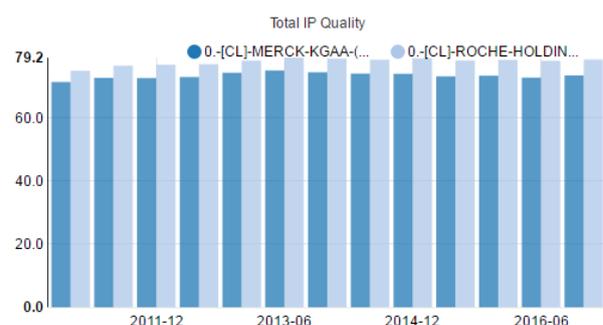
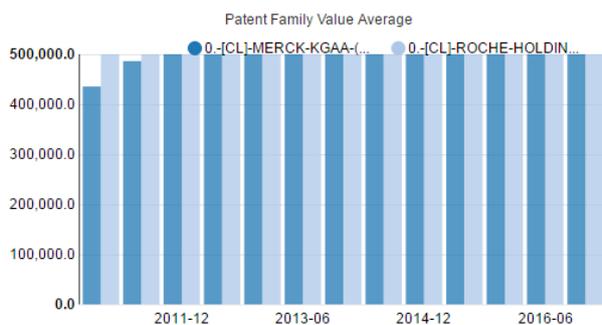
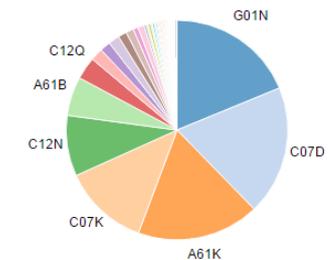
Merck KGaA as well as Roche AG are pharmaceutical companies. Typical for this industry is the big size of patent families and due to this the maximum size of market coverage key figure.

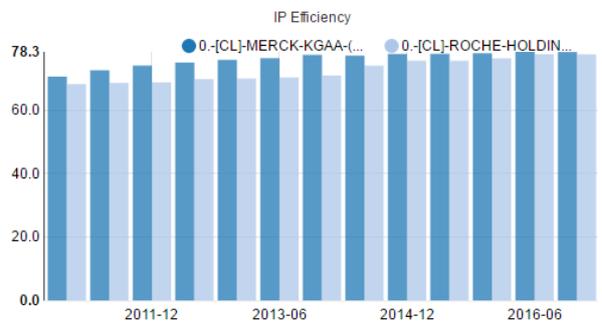
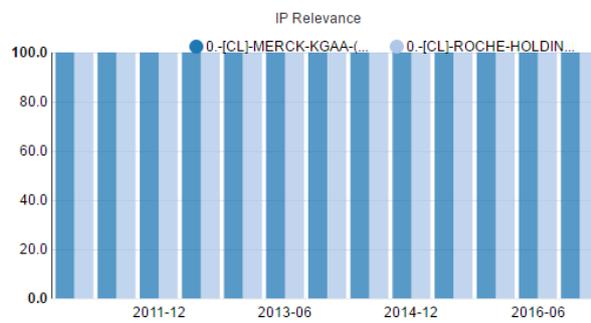
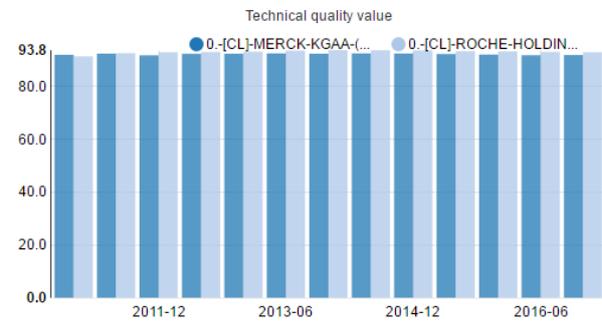
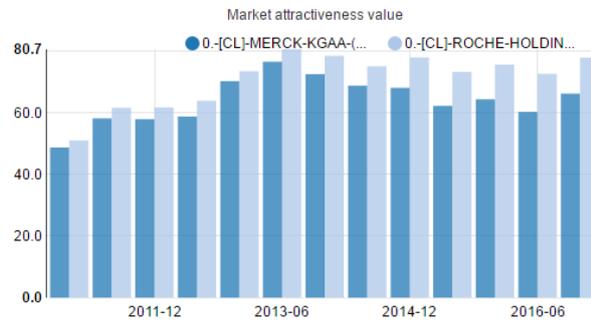
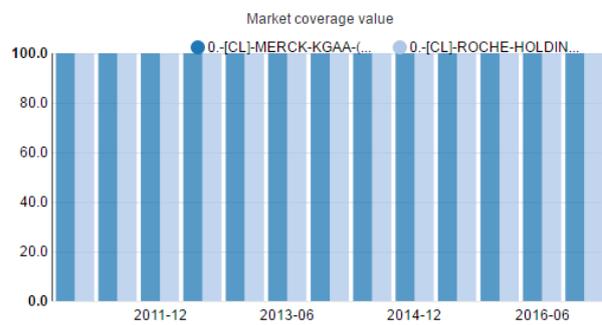
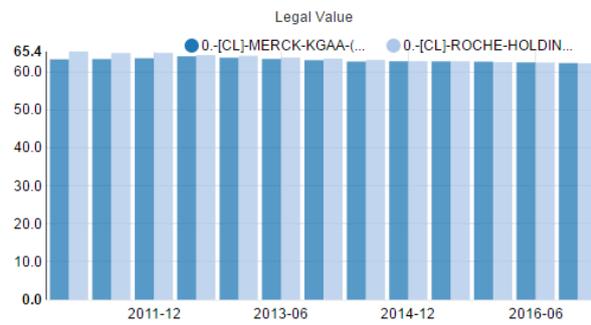
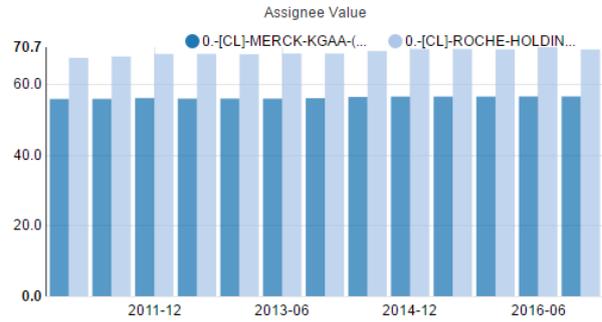
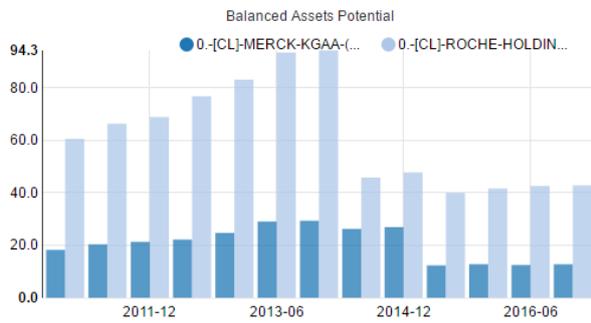
Roche with more than double as much patent families than Merck and a three times bigger total IP Portfolio in value is the bigger partner in this comparison. This may also lead to a much better Assignee value. But both have almost the same technical quality and IP efficiency and are qualitatively well comparable. Both companies have a positive value trend the total IP portfolio value grew within the past 6 years of more than 50%.

0-[CL]-MERCK-KGAA-(5195) IPC(4) 2016-09-30

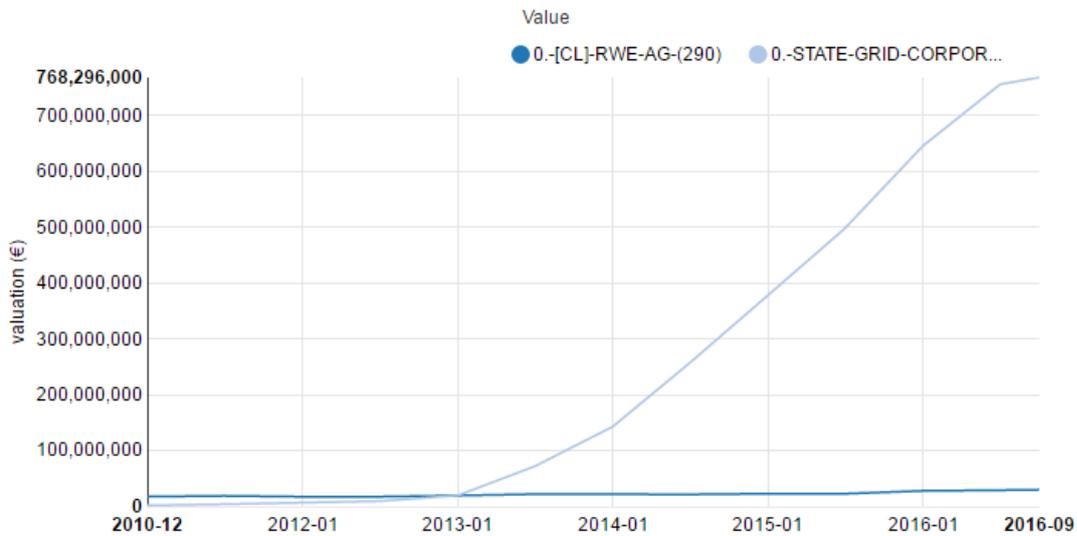


0-[CL]-ROCHE-HOLDING-AG-(13830) IPC(4) 2016-09-30



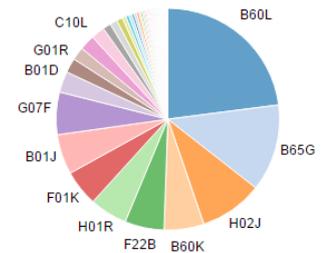


RWE AG - benchmark: RWE AG



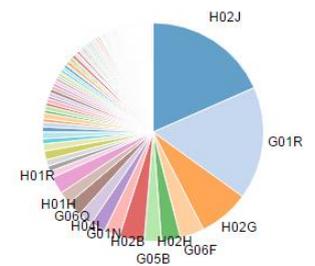
0-[CL]-RWE-AG-(290) IPC(4) 2016-09-30

RWE and State Grid Corporation of China are both electric utility companies. They possess patents from the sections: “Circuit Arrangements or Systems for Supplying or Distributing Electric Power” (H02J), “Measuring Electric Variables, Measuring Magnetic Variables” (G01R) and “Electrically-Conductive Connections, Structural Associations of a Plurality of Mutually-Insulated Electrical Connecting Elements, Coupling Devices, Current Collectors”(H01R).

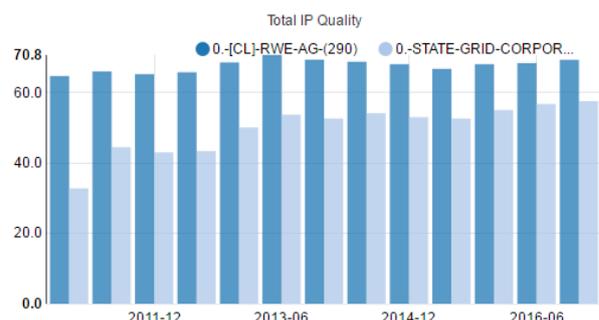
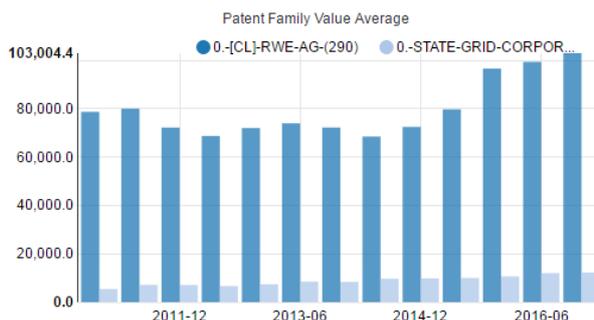


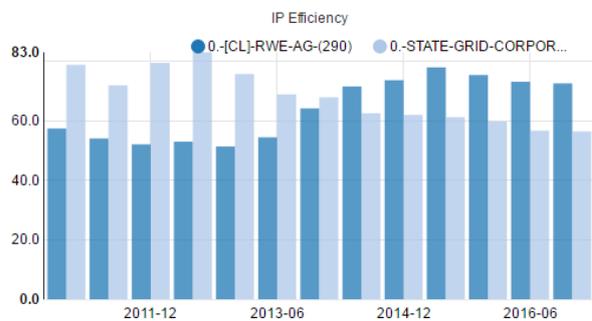
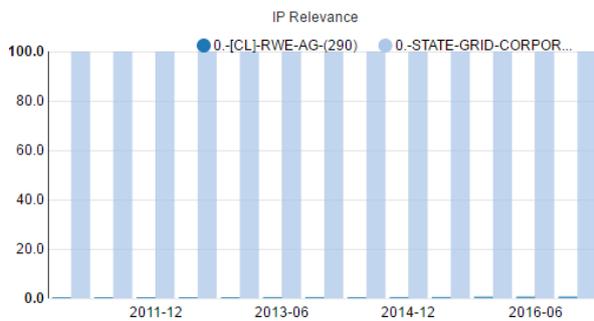
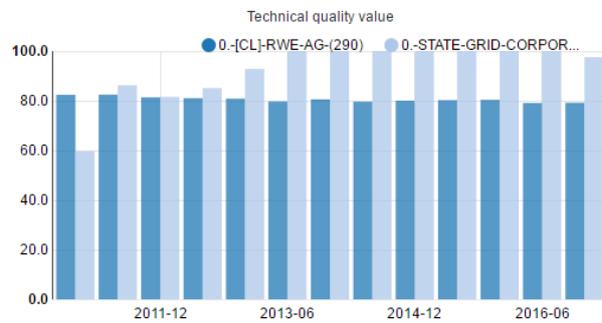
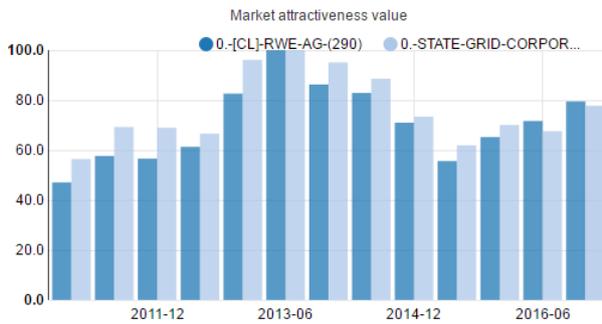
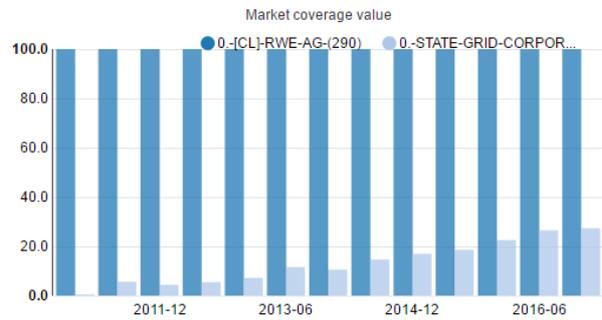
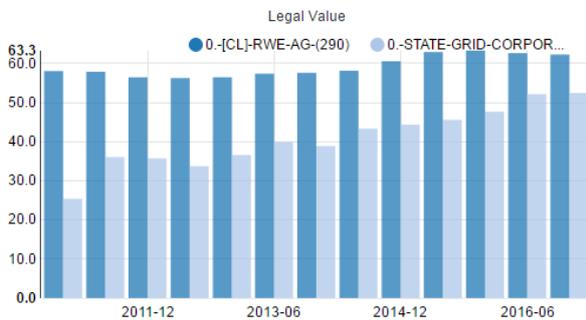
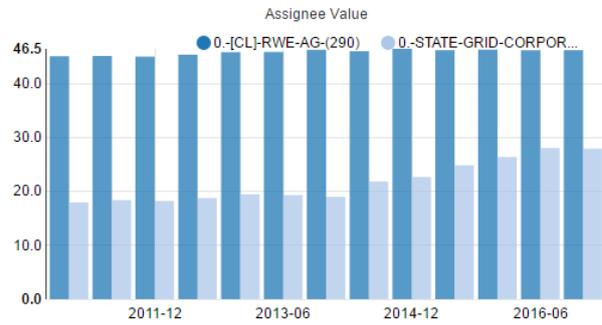
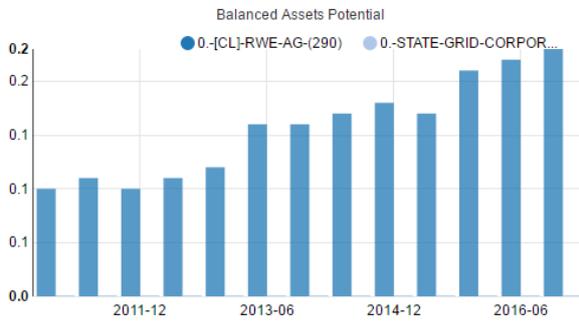
Even though the value of State Grid Corporation of China’s patents is obviously higher, the quantitative indicators excluding technical quality are clearly better by RWE. RWE has better market coverage and attractiveness value, legally stronger patents and higher assignee value. All these indicators play a part in increasing the total IP quality of the observed DAX-company.

0-STATE-GRID-CORPORATION-of-CHINA-NORTHWEST...(62855) I

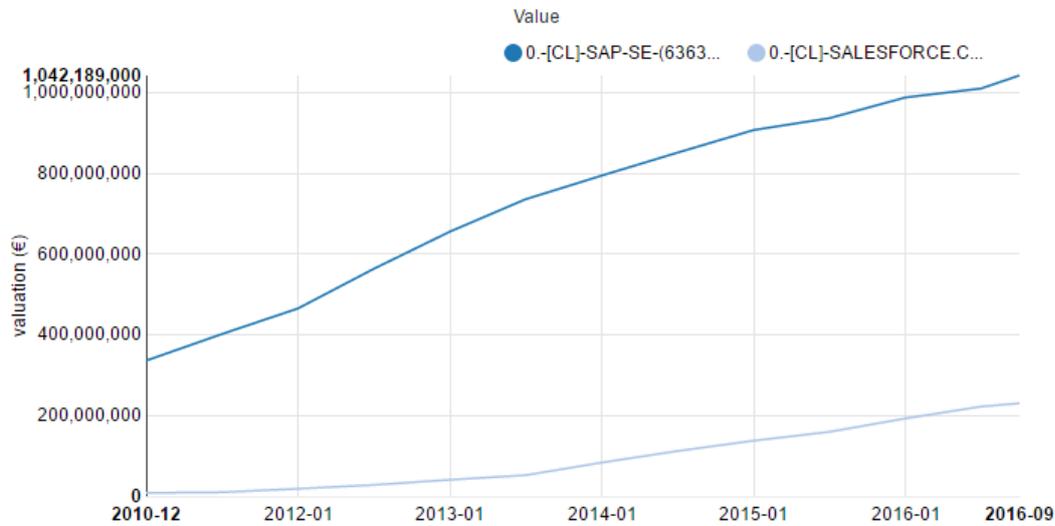


Also the average patent family value of RWE is about 8 times higher compared with the Chinese company. Obviously the Chinese company was applying a lot of single patents in the past. The average of approx. 10.000 Euro is indeed an extremely low value and represents a “mass, not class” strategy.

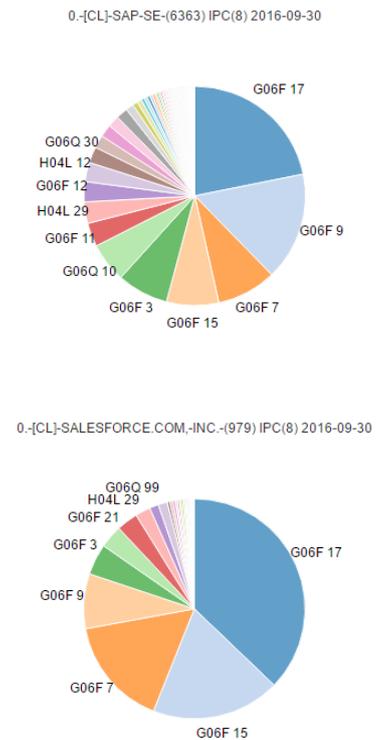




SAP AG – benchmark: Salesforce.com

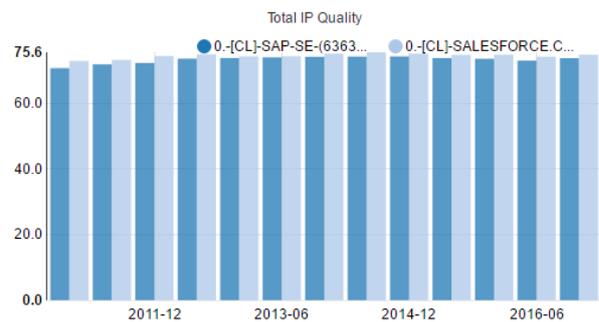
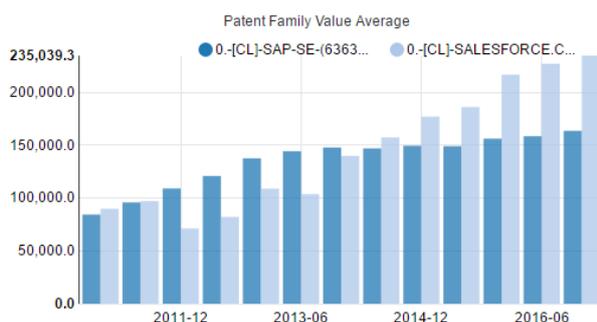


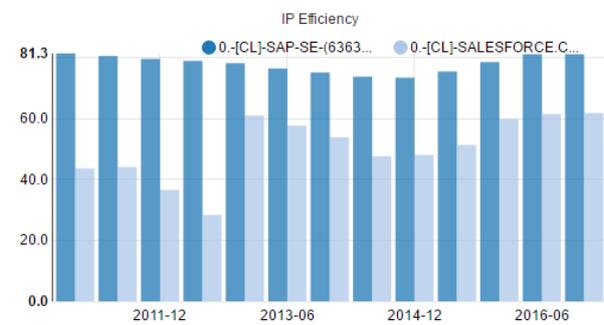
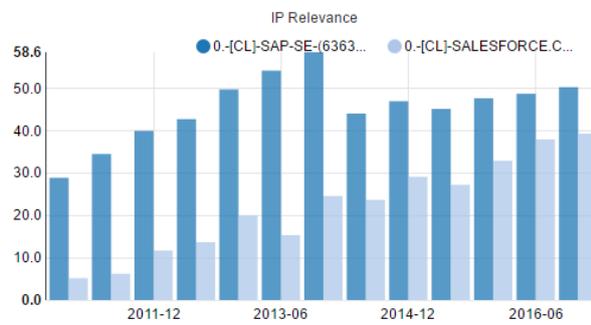
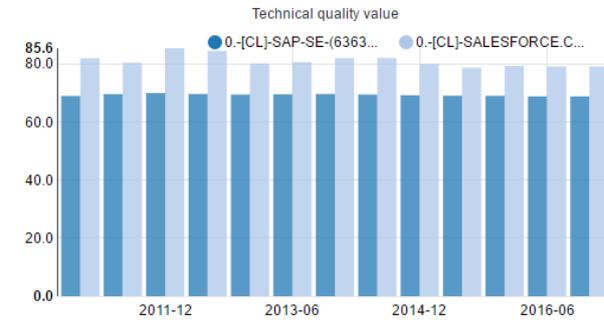
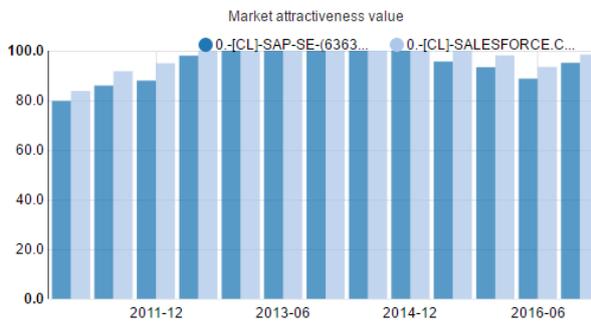
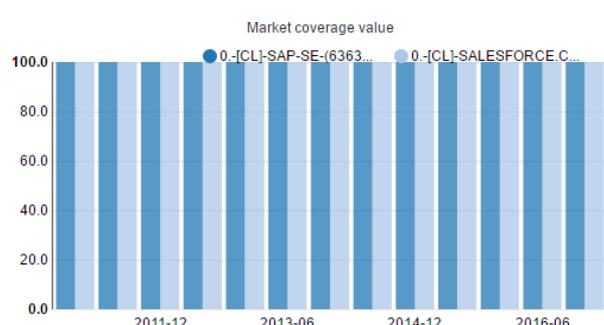
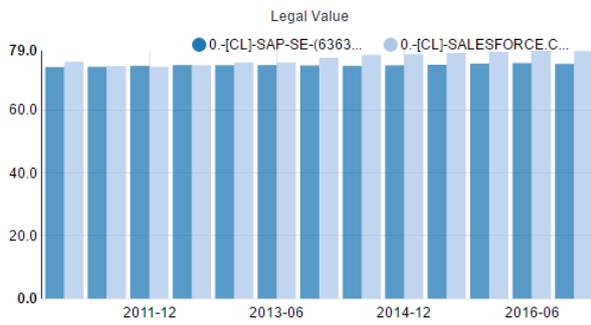
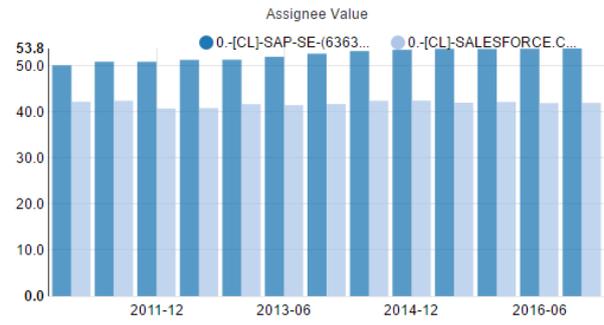
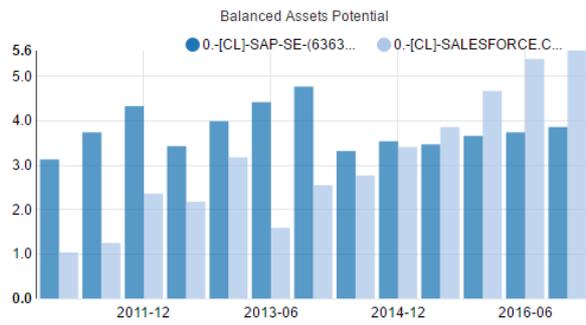
SAP is the only German IT-DAX Company. SAP target groups are medium to big sized business customers worldwide. Looking at their patent portfolio, the major assets are in the fields of “Electric Digital Data Processing” (G06F), “Transmission of Digital Information, Telegraphic Communication” (H04L), “Data Processing Systems or Methods” (G06Q), and “Control or Regulating Systems in General” (G05B). Since the IPC classes are quite general on this level and it is difficult to differentiate, we have investigated one deeper level and found many similarities in the portfolios. G06F 17 (Digital computing or data processing equipment or methods specially adapted for specific functions) is the most valuable section for both, G06F 15 (Digital computers in general), the second biggest of Salesforce is the 4th biggest for SAP and second biggest of SAP is the 4th biggest of Salesforce: G06F) – Arrangements for program control, e.g. control unit.



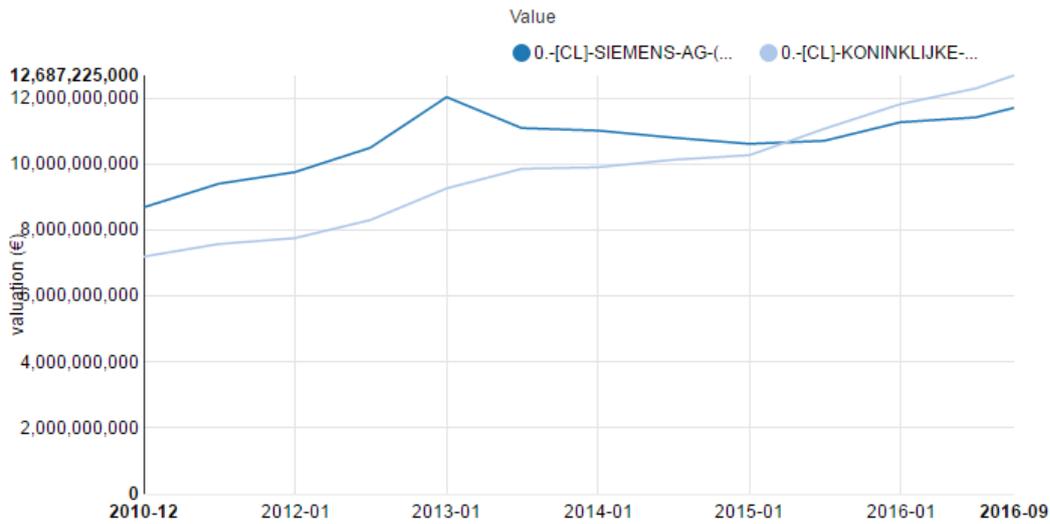
Salesforce is the qualitative benchmark in this comparison. Even though it is smaller and the patent portfolio is also smaller in size, the patents are qualitatively (technical, legal, market attractiveness) better and also in terms of its average value.

Also remarkable: the perfect trend and growth both companies show within their patent portfolio-size and -value. Within the last 6 years SAP’s portfolio grew 210%, Salesforce grew by factor 28.



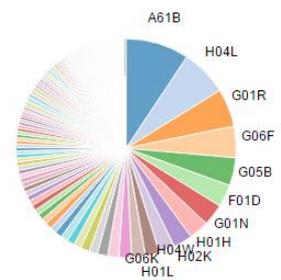


Siemens AG – benchmark, qualitatively. Koninklijke Philips N.V. is benchmark quantitatively



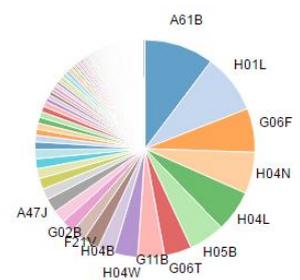
Siemens AG is one of the biggest German patent applicants in Europe². The product range is huge - household articles, train technology, automation technology, energy plants, there is or was almost no engineering field where Siemens technology was not appropriate for. Looking at its patent portfolio and its value, it is hard to find a direct competitor being similar to Siemens. The most similar patent portfolio belongs to the Dutch Company Philips, which also has a very mixed technology corporation. At least their patent portfolios tell so. In 2015 Philips was the No 1 patent applicant in Europe².

0.-[CL]-SIEMENS-AG-(39956) IPC(4) 2016-09-30

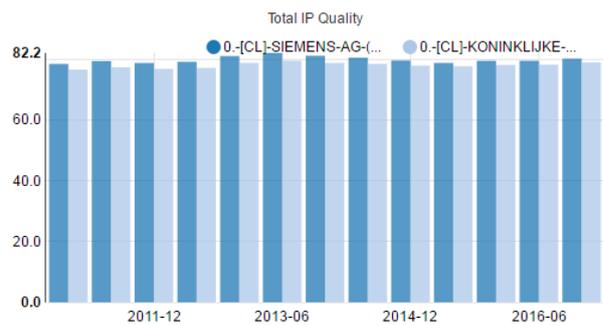
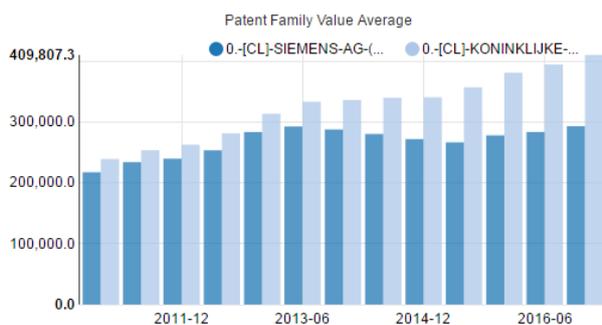


Siemens has about 10k more patent families than Philips, but the average patent family value of Philips has been permanent growing during the last years in contrast to Siemens where it remained stable the past 4 years. In the meantime from a quantitative point of view, Philips is having the more valuable patent families.

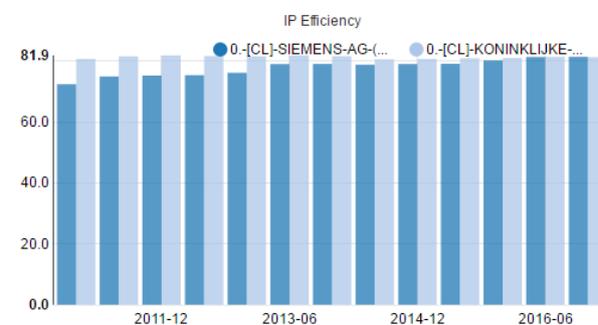
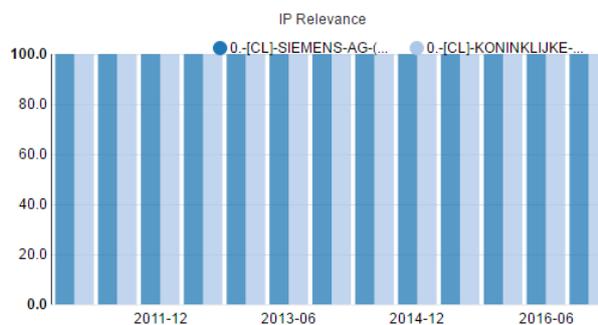
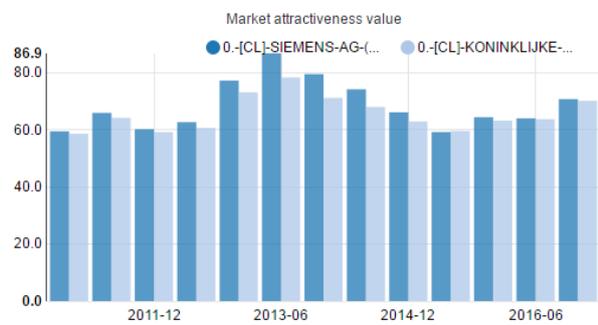
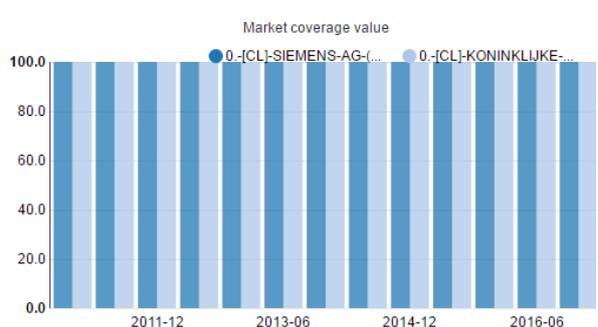
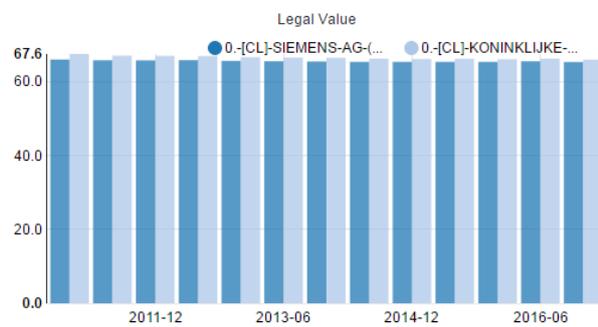
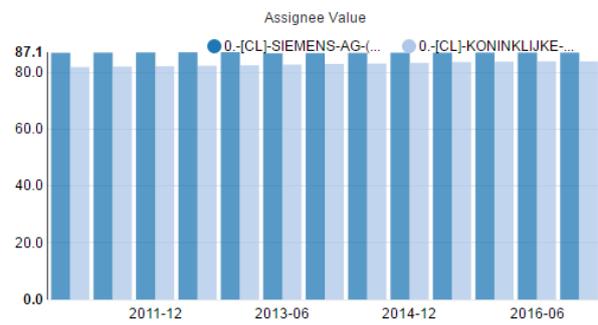
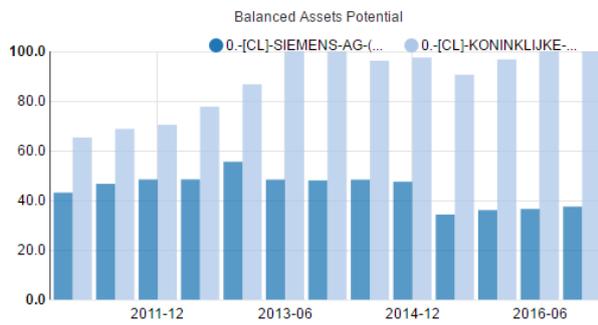
0.-[CL]-KONINKLIJKE-PHILIPS-N.V.-(30959) IPC(4) 2016-09-30



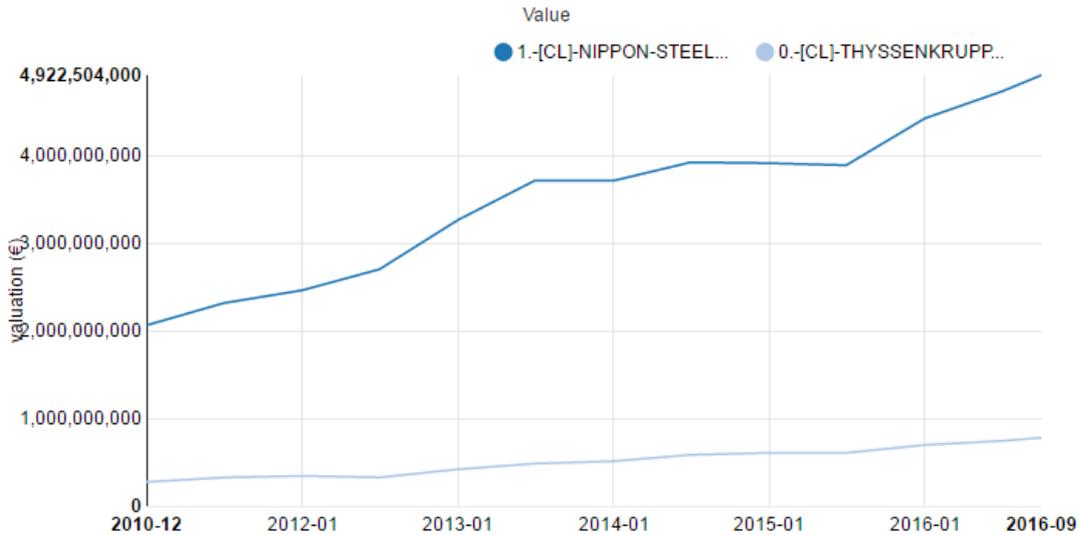
Qualitatively, both companies are very close to each other in terms of their total IP quality. Siemens is just a very small percentage better in almost all key figures except the Legal score.



² EPO News Mar 2016

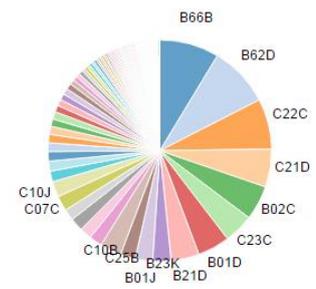


ThyssenKrupp AG – benchmark Nippon Steel & Sumitomo Metal Corporation but only in qualitative comparison



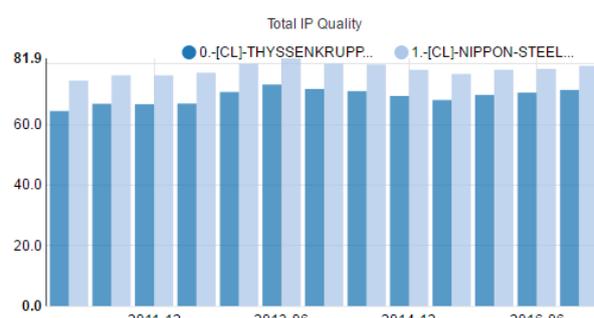
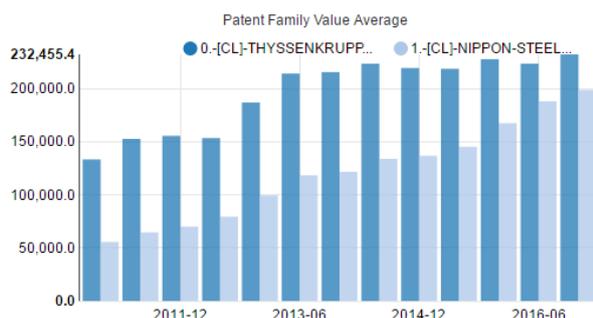
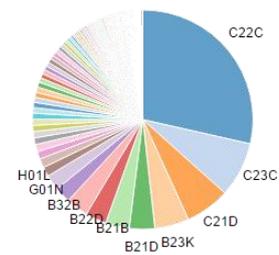
ThyssenKrupp AG is a steel manufacturer – well known for its elevator sector. It is also strong in the defense area (submarines and military ships). Having a look into their patents the most relevant technology fields in terms of generated IP values are the sections “Elevators, Escalators or Moving Walkaways” (B66B), “Motor Vehicles, Trailers” (B62D), “Alloys” (C22C) and “Modifying the Physical Structure of Ferrous Metals, General Devices for Heat Treatment of Ferrous or Non-Ferrous Metals or Alloys” (C21D)

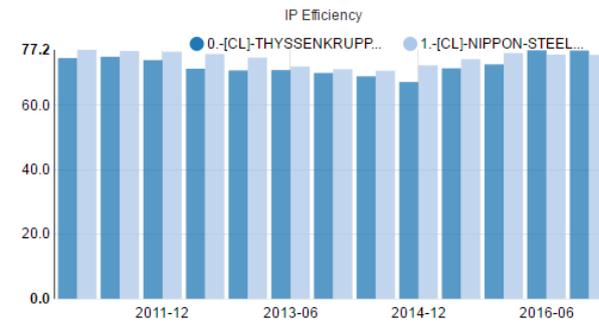
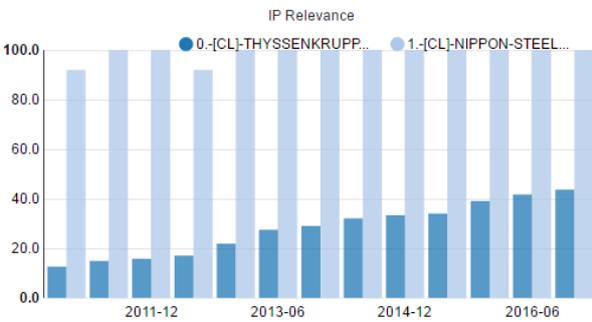
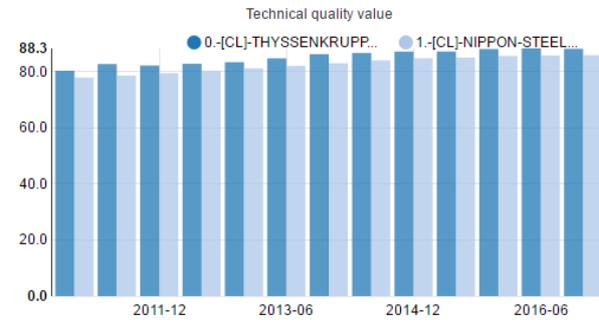
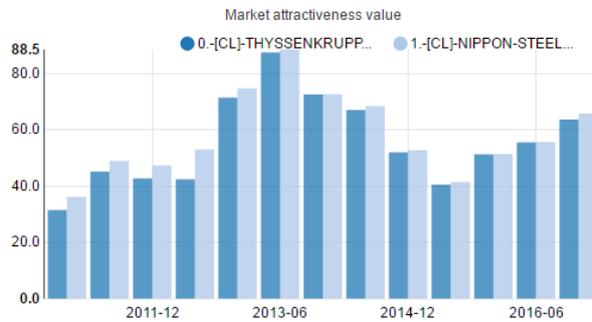
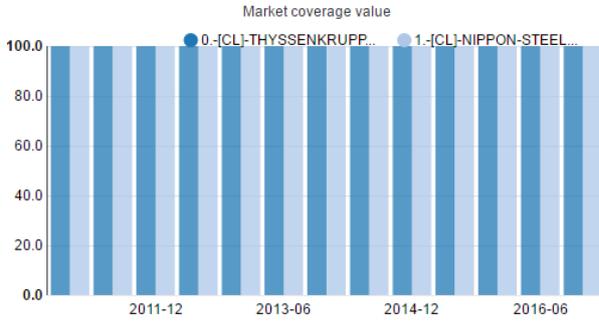
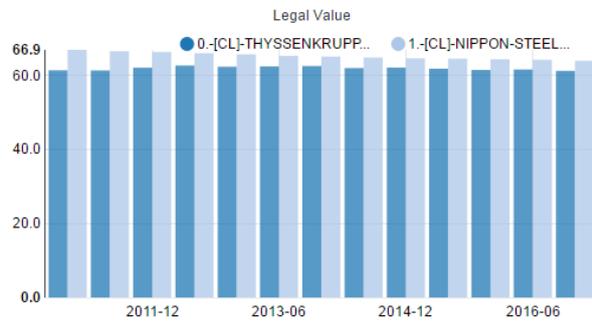
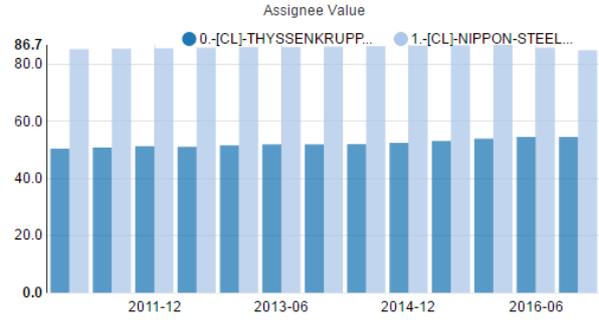
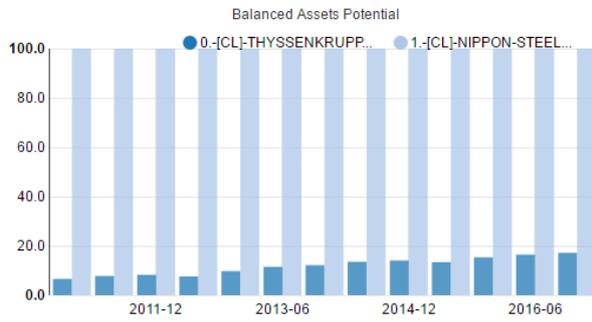
0.-[CL]-THYSSENKRUPP-AG-(3353) IPC(4) 2016-09-30



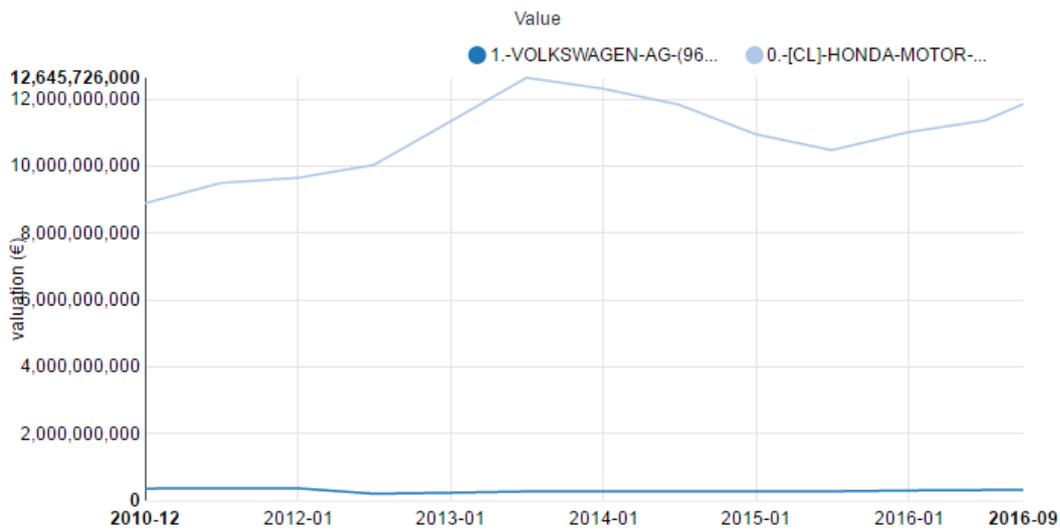
The Japanese Nippon Steel has almost five times more alive patent families and an amazing 4.9bn € total IP value in terms of patents and utility models. In comparison to this total IP value of ThyssenKrupp is comparably small with 0,7bn€. But compared to the huge amount of patents the Japanese Nippon Steel has, this total value becomes relative: the average value is with 198,000 € not as huge as ThyssenKrupp’s (232,000 €). So ThyssenKrupp is the quantitative benchmark in terms of patents – but the Japanese are catching up: the trend towards a higher average IP value is very obvious. The qualitative better portfolio is most obviously due to a way better Assignee value. Also the Legal Value as well as the Market Attractiveness is better. But the technical quality is better on ThyssenKrupp site.

1.-[CL]-NIPPON-STEEL-&SUMITOMO-METAL-CORPORATION...-(24750) IPC(4) 2016-09-30

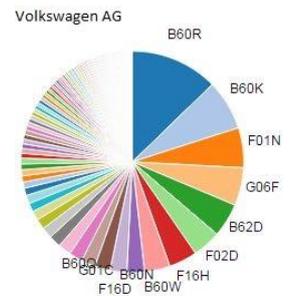




Volkswagen AG – benchmark: Honda Motors Co. Ltd.



Volkswagen is the biggest European car manufacturer. Volkswagen and Honda both address the same market segment with a slightly different regional focus (Europe vs. Asia). So it is not surprising that Honda has a great amount of patent in the same IPC classes like “Vehicles” (B60R), “Arrangement or mounting of propulsion units” (B60K), “Electric digital data processing” (G06F), “Motor vehicles” (B62D), “Controlling combustion engines” (F02D) and “Gearing” (F16H).

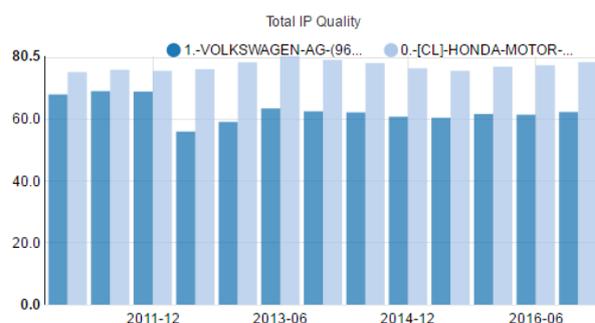
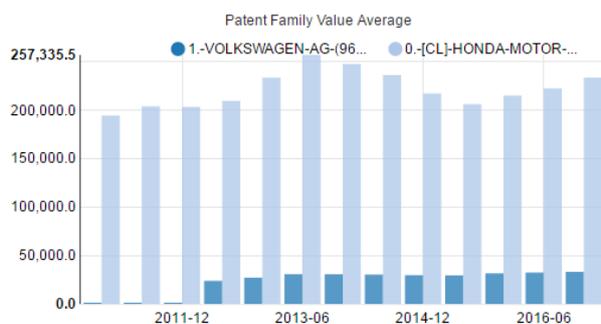


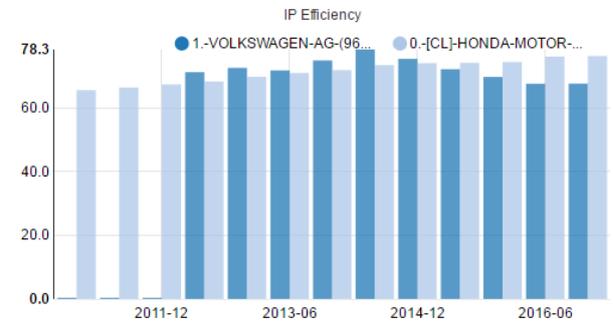
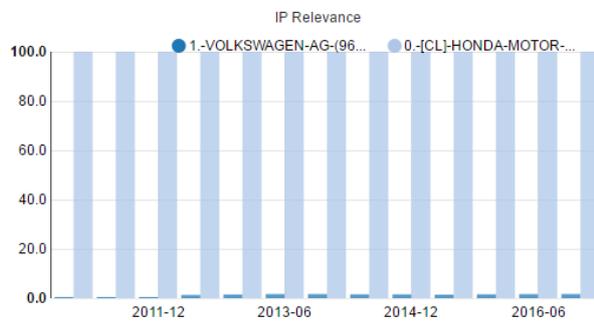
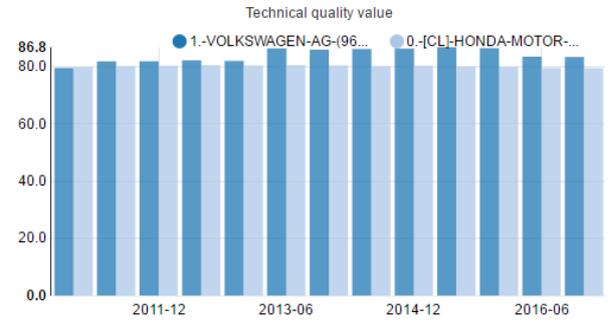
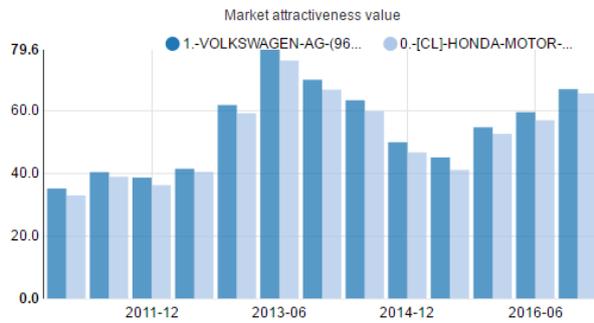
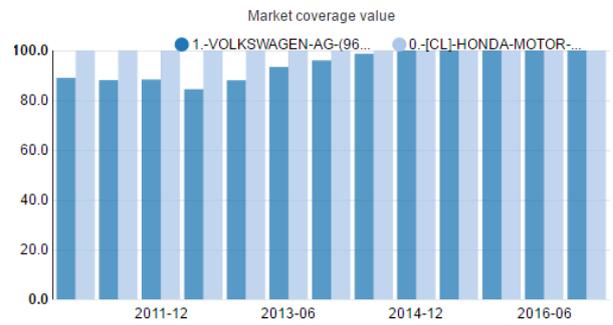
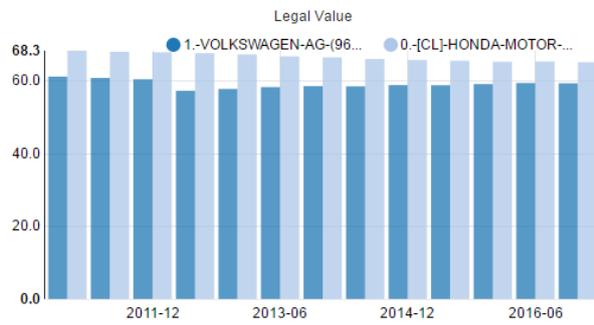
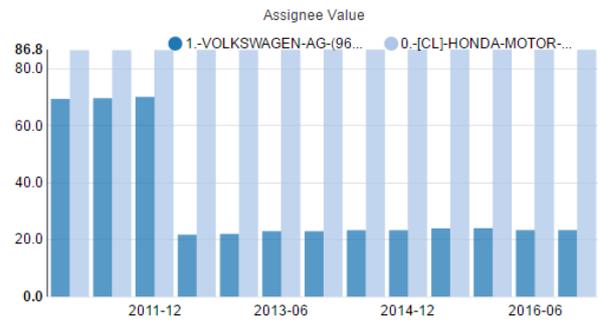
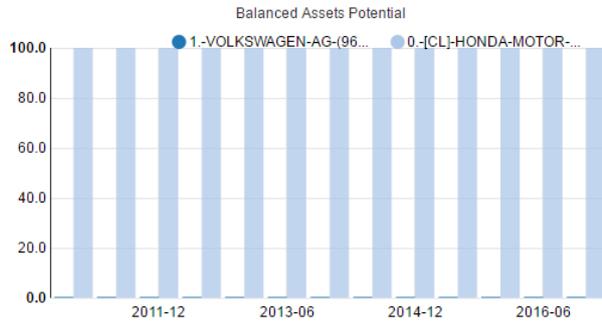
In almost all the investigated fields the Honda patents have a better qualitative value, except the technical quality and the market attractiveness. Here the Volkswagen patents are in average better than the Honda patents.



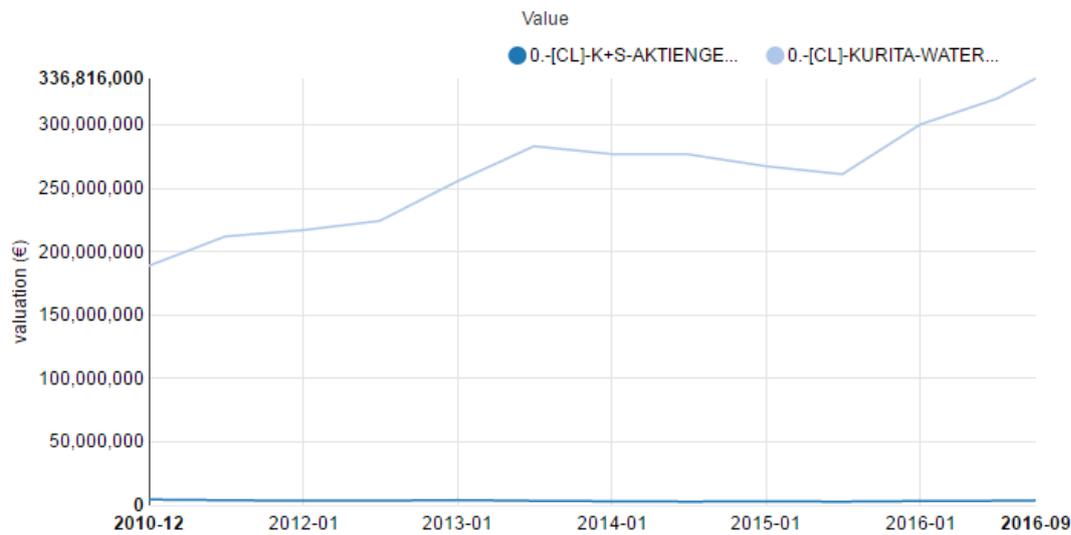
The amount of patents of Honda is about 6 times higher than by its German competitor. Honda Motors has also much higher average patent family value (approx. 230.000€) than Volkswagen (approx. 33.000€). So Honda is also the quantitative Benchmark.

In contrast to Volkswagen there are no intangible fixed assets in the Honda balance.



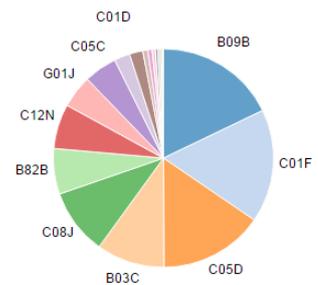


K + S AG – benchmark: Kurita Water Industries Ltd.



K+S AG is the Europe’s largest supplier of potash for fertilizers. Kurita Water Industries on the other hand is a manufacturer that provides water treatment chemicals and facilities as well as process treatment chemicals. Not directly competitors on the first sight, but these two companies have similar patent portfolios in parts, as they both yield patents from the sections: “Micro-organisms or enzymes” (C12N), “Compounds of the metals beryllium (C01F) and “Disposal of Solid Waste” (B09B).

0-[CL]-K+S-AKTIENGESELLSCHAFT-(44) IPC(4) 2016-09-30



K&S has a surprisingly small patent portfolio so its IP has no significant influence on the business. That is why the following analysis has not the same impact as for a technology driven company. This becomes more obvious when comparing it to Kurita Water who has 50 times more patents. This also implies that patents don’t play a significant role for K&S. So this analysis is not of strategic importance for K&S, who indeed have better assignee value than Kurita Water. The average patent family values are on the same level. In the end it is a difficult comparison due to the extremely different portfolio sizes.

0-[CL]-KURITA-WATER-INDUSTRIES-LTD-(3941) IPC(4) 2016-09-30

