

VALUE-BASED R&D PHARMA PRODUCTIVITY 2015: ONCOLOGY AND HEP C DRIVE TOP PERFORMERS

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HAS BIOPHARMA R&D PRODUCTIVITY INCREASED since last year's analysis? (See "Value-Based Pharma R&D Productivity: Is There A Sweet Spot?" — IN VIVO, June 2014.) Who are the new entries into the elite top-five group, and who has dropped out? Is the acceleration in innovation, indicated by the increased number of breakthrough designations and FDA approvals, a direct result of improving R&D productivity in our sample of the 30 largest biopharmas?

Catenion's annual update of value-based R&D productivity provides some fresh and unexpected answers (for a detailed description of the methodology see sidebar, "R&D Productivity Ranking Methodology.")

Key Insights From 2015's Analysis

Gilead Sciences Inc. still towers above the group of elite R&D performers (leading by a large margin over the number two company, **Biogen Inc.**). **Bristol-Myers Squibb Co.** has dropped out of the top five, whereas **Celgene Corp.**, **Novo Nordisk AS** and **Biogen** have defended their spots. (See Exhibits 1 and 2.)

The top five in R&D productivity are still dominated by mid-size players (four out of five). The only large pharma is **Gilead**, which was classified as mid-size in last year's review (<€15 billion [\$16.3 billion] pharma sales). Interestingly, traditional big pharma companies in the top 10 **AbbVie Inc.** (#3) and **BMS** (#8) are mid-size according to our definition, whereas former large biotech **Amgen Inc.** (#7) now counts as "big pharma." These examples illustrate that the traditional segmentation criteria such as big versus mid-size or biopharma versus biotech versus pharma are becoming increasingly blurred and may soon

be meaningless. Therefore, we refer to our top 30 group as "global biopharma."

The company that has improved the most in our ranking is **AbbVie**: it was not even in the top 10 in 2014 (it was #19) but is now ranked third. How did it achieve this in just a year? Essentially there were three drivers:

1. The acquisition of **Pharmacyclics Inc.**, giving it the potential mega blockbuster **ibrutinib**. This seemingly risky acquisition has already paid off on paper through a net increase in value even after allocation of acquisition costs,
2. the launch of **Viekira Pak** and;
3. two pipeline assets, **venetoclax** and **veliparib**, which have dramatically increased in value.

Also **AbbVie's** (and previously **Abbott Laboratories Inc.'s**) R&D spend has historically been well below the large pharma average (this is an important driver in our analysis as it incorporates compounded 10-year spending, with a capital charge of 7%). The strong R&D performance is also gradually translating into better overall business prospects as **AbbVie** has just entered the top 10 in the corporate growth ranking (#10 overall, #6 in forecast future performance rank).

AstraZeneca PLC is another embattled large pharma that shows signs of a comeback that is largely being fueled by its key oncology assets, **durvalumab** and **Tagrisso** (osimertinib). These two assets have appreciated significantly in the last few years, propelling **AZ** from #22 to #8. Although the leading indicators of a comeback are pointing in the right direction, the corporate growth ranking

Exhibit 1

2015 R&D Productivity And Corporate Growth Ranking, Top 10 Companies

(As of September 2015)

By and large, mid-sized companies are the top performers in both R&D and overall company rankings

R&D PRODUCTIVITY				COMPANY PERFORMANCE			
Final NPV Rank	Company	Momentum (Pipeline NPV)	Long-term (All NPV)	Final Corp. Growth Rank	Company	Past Performance	Forecasted Performance
1	Gilead Sciences	1	1	1	Allergan	2	1
2	Biogen	15	2	1	Celgene	1	2
3	AbbVie	4	6	3	Biogen	5	4
3	Novo Nordisk	10	4	3	Shire	4	5
5	Celgene	7	7	5	Novo Nordisk	7	8
6	CSL	2	9	5	CSL	5	10
7	Amgen	19	5	7	Gilead Sciences	3	16
8	AstraZeneca	5	10	8	Bayer	9	13
9	Bristol Myers Squibb	26	3	8	UCB	15	7
10	Roche	6	12	10	AbbVie	17	6

TOP 5

■ Big Pharma (>€15 billion 2014 pharmaceutical sales)

has not changed considerably, as AZ is still in the bottom tercile (#24). It usually takes a few years before strong R&D performance has a visible impact on the overall corporate performance, especially in the case of an unfavorable starting position. However, most companies never give R&D performance sufficient time to recuperate and the next mega-merger or strategic refocusing typically disrupts fragile R&D comebacks.

BMS has lost its top-five spot and dropped to #8 mainly because it has launched checkpoint inhibitor *Opdivo* (nivolumab), which is the company's main value driver. Nothing has replaced it in the pipeline, thus causing a significant drop in the momentum (= pipeline) ranking, which wasn't offset by the increase in the long-term ranking as it was

already reasonably high. The BMS corporate growth ranking has increased substantially (from #22 to #12 overall and to #3 in forecast future performance), demonstrating the translation of strong R&D performance into top- and bottom-line impact.

At the top of the ranking, superior R&D productivity correlates nicely with superior corporate growth (sales, EBIT, market cap), where six companies share a top-10 spot in both rankings, but it is much easier to achieve for mid-size players (eight out of 10) than for big pharma.

Overall, we have seen an improvement in R&D productivity as both productivity metrics across the top-30 companies have increased (average weighted by company size) – for example, the long-term ranking,

which includes products launched in the last five years and the pipeline, has increased by 20% versus 2014.

The two therapeutic areas that are mostly responsible for the overall increase in pipeline value (and thus the rise in the overall metrics) are oncology (39% of the value increase), followed by anti-infectives (mostly hep C, 20%). Cardiovascular is responsible for 11% (e.g., PCSK-9s), whereas central nervous system and endocrine account for only 7% each.

Of course, the overall increase can be due to genuine improvements in pipeline value (e.g., projects advancing and resolving risk, improvements in clinical profiles, etc.), but it can also be due to a more bullish attitude in general by analysts. If one reviews the aver-

Exhibit 2

Rank Movement Driver Analysis, 2014 vs. 2015

(As of September 2015)

Detailed rationales for companies that have moved >3 places in the rankings since the last analysis

R&D PRODUCTIVITY						
Final NPV Rank	Company	Momentum (Pipeline NPV)	Long-term (All NPV)	2014 Rank	Final Rank Movement	Major Driver Of The Movement (Indicated for companies moving >3 in rank)
1	Gilead Sciences	1	1	1	0	—
2	Biogen	15	2	2	0	—
3	AbbVie	4	6	19*	16	Includes Abbott data up until the split (2012 inc). Change driven by an increase in total NPV from ~€14 bn to ~€44 bn increasing the long-term rank from 22nd to 5th and the momentum rank from 4th to 3rd. This large increase was driven by three main factors noted in text.
3	Novo Nordisk	10	4	5	1	—
5	Celgene	7	7	3	-2	—
6	CSL	2	9	7	1	—
7	Amgen	19	5	11	4	Pipeline NPV is broadly similar, however momentum ranking decreased to 19th from 14th due to others moving. By contrast, marketed NPV has more than doubled from ~€21bn to ~€50 bn, which is mostly due to the launch of Evolocumab (NPV of ~€22 bn).
8	AstraZeneca	5	10	22	14	Pipeline NPV increased from €7 bn to €27 bn (marketed NPV is similar) driving the momentum ranking up to 5th from 12th and the long-term ranking from 24th to 10th, driven mainly by Durvalumab and AZD9291. Their combined NPV is now ~€14 bn and was <€1 bn.
8	Bristol Myers Squibb	26	3	4	-4	Total NPV has increased to ~€81 bn from ~€52 bn this has caused the long-term ranking to increase to 3rd from 7th. However, the momentum ranking has decreased from 1st to 26th. This is due to Nivolumab being marketed and the NPV being revaluated to ~€54 bn from ~€18 bn, thus pipeline NPV dropped from €20 bn to €4 bn.
10	Roche	6	12	13	3	—

age analyst peak sales for top-30 companies' pipelines over the last 10 years (data not shown), one can see a tendency of bullish and bearish forecasting following the overall economic climate. In the last few years, however, there seems to be an increase that

is genuinely driven by scientific and clinical advancements (the rise in number of FDA approvals and breakthrough designations bolster this interpretation).

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SOURCE FOR ALL EXHIBITS: Catenion

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R&D PRODUCTIVITY RANKING METHODOLOGY

To evaluate the R&D productivity of the world's 30 largest public pharmaceutical companies, as judged by total pharmaceutical sales, the Catenion methodology takes an approach that focuses on value. We compared the total R&D spending from 2005–2014, including costs from M&A (see below) and a 7% cost of capital with the total net present value (eNPV) today of compounds marketed in the last five years and all pipeline products.

Using these data, two distinct rankings were calculated – a “momentum” and a “long-term” ranking. The momentum ranking aims to capture the value a company is forecasted to generate by taking the current NPV of its entire pipeline and dividing by the firm's R&D and M&A costs, both adjusted for cost of capital, as described above. By contrast, the long-term ranking focuses on the value a company has already generated in the recent past; specifically, the eNPV of products marketed in the last five years are added to the pipeline NPV before being divided by the total cost as per the momentum rank.

The overall R&D productivity rank was then generated by weighting the momentum rank ¼ versus ¾ for the long-term rank.

Incorporating The Costs Of M&A

To fairly allocate M&A costs to the R&D costs, each deal was defined by its primary driver. If the acquired firm had pharma sales greater than €1 billion, then it was said to be commercially focused and thus 25% of the total deal value was added to the R&D costs for that year. By contrast, a deal involving a firm with no marketed products is, by definition, a pipeline-driven deal, thus 80% of the deal costs were taken. Finally, if a firm had pharma sales less than €1 billion, then it was considered a hybrid of the two deals and thus 50% of the M&A cost was allocated.

Corporate Growth Ranking

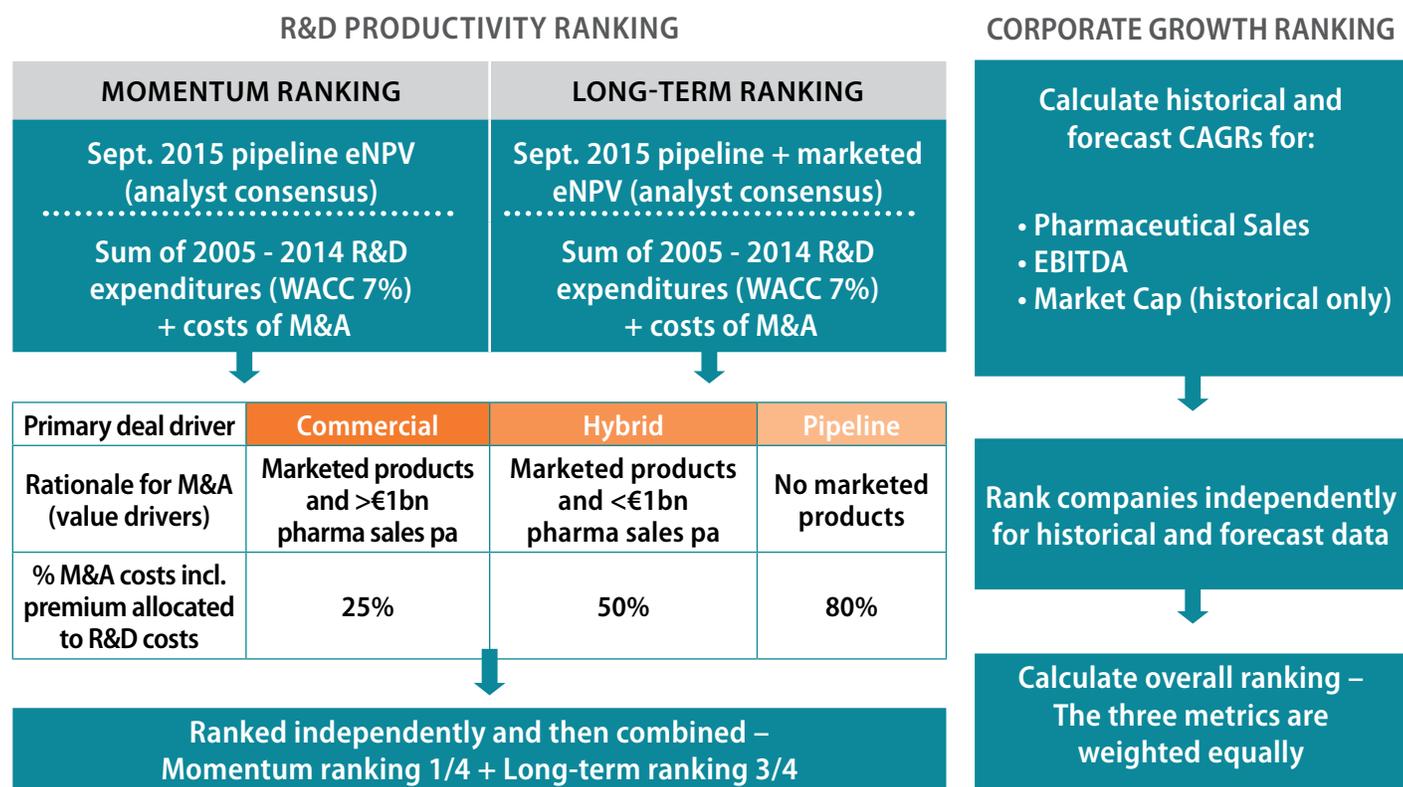
To evaluate the corporate performance of each firm, the historical and forecasted CAGR for pharmaceutical sales, EBITDA and market cap (historical only) was calculated. Each company was ranked independently on each of the five metrics before they were combined with equal weighting to generate the overall corporate growth ranking.

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Exhibit 3

Method Used to Calculate R&D Productivity

High-level overview of the ranking methodology. Two-value based metrics, adjusted for M&A, were used for the R&D ranking. Pharma sales, EBITDA and market cap made up the corporate ranking



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