


**PHARMACEUTICAL
INDUSTRY ANALYSIS,
EXTERNAL ENVIRONMENT,
AND TECHNOLOGICAL ASSESSMENT
FOR THE DEVELOPMENT OF AN
ACQUISITION STRATEGY (NOVAVAX)**

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INDUSTRY MARKET SEGMENT- RESPIRATORY/ ANTI-INFECTIVES

- Market Segments include Cardiovascular, Central Nervous System, Internal Medicine, Oncology, Respiratory/Anti-Infectives, Consumer Products, and Other.
 - Anti-Infectives include Antibiotics, Antivirals and Vaccines, while Respiratory includes drugs that are medicines for conditions and diseases relating to the lungs and/or breathing.
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TOP 5 COMPETITORS (2012)

Johnson & Johnson

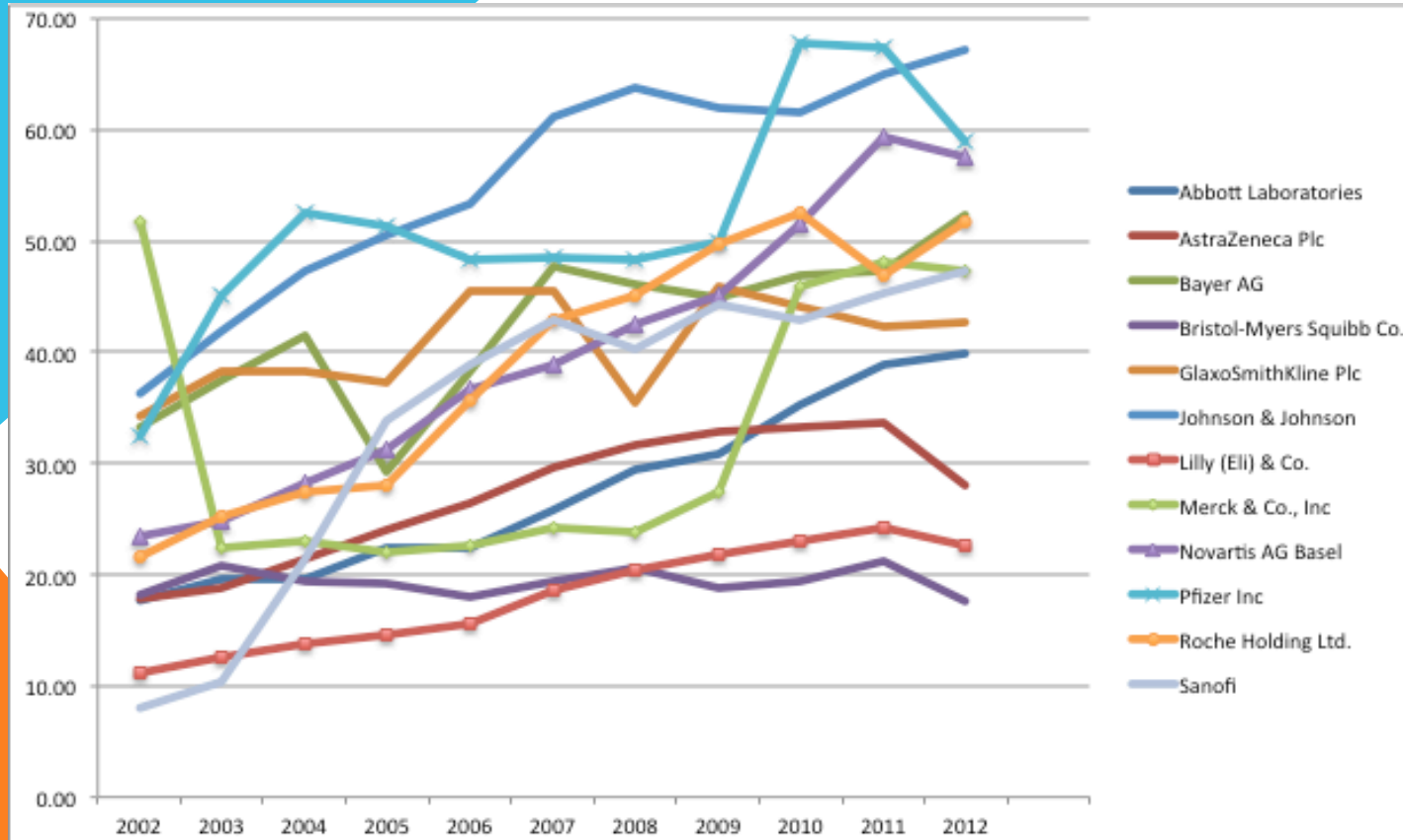


 NOVARTIS



- Johnson & Johnson: Remicade (Rheumatoid Arthritis), Velcade (Multiple Myeloma and Mantle Cell Lymphoma); Risperdal Consta (Schizophrenia)
- Pfizer: Lyrica (Epilepsy), Lipitor (LDL cholesterol reduction), Enbrel (Rheumatoid, Juvenile Rheumatoid and Psoriatic Arthritis)
- Novartis AG: Gleevec (Chronic Myeloid Leukemia) Diovan/Co-Diovan (Hypertension), Lucentis, (Age-related macular degeneration) Sandostatin (Acromegaly)
- Roche: MabThera/Rituxan (non-Hodgkin's Lymphoma), Herceptin (HER2-positive Breast Cancer), Avastin (Colorectal Cancer)
- Bayer AG: Betaferon (Multiple Sclerosis), Kogenate (Hemophilia), Nexavar (Kidney/Liver Cancer)

MERCK COMPETITOR, PHARMACEUTICAL INDUSTRY TOTAL SALES (\$B) (2012)



Source: "Abbott Laboratories: Income Statement - All Available Years." Mergent Online. Web 6 July 2013.
 "AstraZeneca Plc: Income Statement - All Available Years." Mergent Online. Web 6 July 2013.
 "Bayer AG: Income Statement - All Available Years." Mergent Online. Web 6 July 2013.
 "Bristol-Myers Squibb Co.: Income Statement - All Available Years." Mergent Online. Web 6 July 2013.
 "GlaxoSmithKline Plc: Income Statement - All Available Years." Mergent Online. Web 6 July 2013.
 "Johnson & Johnson: Income Statement - All Available Years." Mergent Online. Web 6 July 2013.
 "Lilly (Eli) & Co: Income Statement - All Available Years." Mergent Online. Web 6 July 2013.
 "Novartis AG Basel: Income Statement - All Available Years." Mergent Online. Web 6 July 2013.
 "Merck & Co., Inc.: Income Statement - All Available Years." Mergent Online. Web 6 July 2013.
 "Pfizer Inc: Income Statement - All Available Years." Mergent Online. Web 6 July 2013.
 "Roche Holding Ltd.: Income Statement - All Available Years." Mergent Online. Web 6 July 2013.
 "Sanofi: Income Statement - All Available Years." Mergent Online. Web 6 July 2013.

ANALYSIS OF INDUSTRY ATTRACTIVENESS AND COMPETITIVE ENVIRONMENT ANALYSIS

Industry Attractiveness uses 15 different criteria to determine whether investment in an Industry is wise.¹

- The best-case scenario is to have a total score of 150 as it suggest that a company can handle all of the difficult forces.²
- Pharmaceutical Industry scored a 89.
- Biotechnology Industry scored a 103.
- Respiratory/Anti-Infectives Segment scored a 104.

¹Mann, and Seshan- Strategy for the 21st Century, p.101-103, IBT Global, Edition 6 2012

²Mann, and Seshan- Strategy for the 21st Century, p.101-103, IBT Global, Edition 6 2012

ENVIRONMENTAL THREATS AND OPPORTUNITIES PROFILE: MERCK & CO, INC. RESPIRATORY/ANTI-INFECTIVES SEGMENT (2013)



Most Impactful Threats:

- Competition
- Spirit/Ethics

Most Impactful Opportunities

- Technology
- Social

ENVIRONMENTAL THREATS AND OPPORTUNITIES PROFILE (ETOP): MERCK, RESPIRATORY/ANTI-INFECTIVES SEGMENT (2013)

Factors	Impact of Factor	Importance of Factor	Environmental Threat/Opportunity	Rank
Competition	-3	6	-18	1
Spirit / Ethics	-4	4	-16	2
Politics	-1	3	-3	3
Ecology	2	2	4	4
Energy	1	7	7	5
Economics	3	6	18	6
International	4	7	28	7
Social	4	8	32	8
Technology	5	10	50	9
Total ETOP Score =			102	

Impact is ranked from -5 (strongly negative) to +5 (strongly positive).
Importance is ranked from 1 (unimportant) to 10 (very important).

Comments: The Respiratory/Anti-Infective Market Segment is growing based on new applications of Technology to create innovative products addressing anti-biotic resistant diseases. The rise in elderly patients and access to emerging country markets as Social Factors open new opportunities for market expansion. Issues relating to FDA approval and ethical concerns over drug trials and applications of stem cell research present possible road blocks in the development of the Segment. The dilution of the Competition in the Market Segment mitigates the impact of that factor. Ultimately innovative uses of Technology to address issues raised by Social and International Factors will put companies like Merck ahead in the Market Segment.

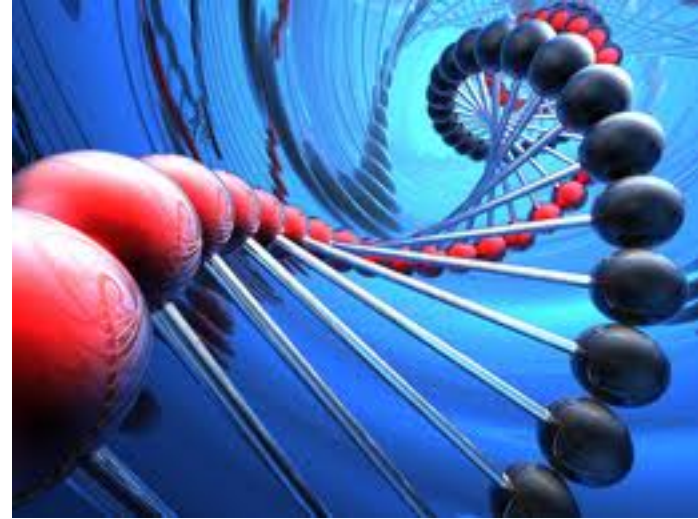
Source: Rowe, Alan, J., Mason, Richard O., Dickel, Karl E., Mann, Richard B., Mockler, Robert J., *Strategic Management- A Methodological Approach*. 4th Ed. 1999, Reading, MA: Addison - Wesley. p.115.
Mann and Seshan, *Strategy for the 21st Century*. IBT Global, Edition 6, 2012. p.75-81

TECHNOLOGY IN THE PHARMACEUTICAL INDUSTRY

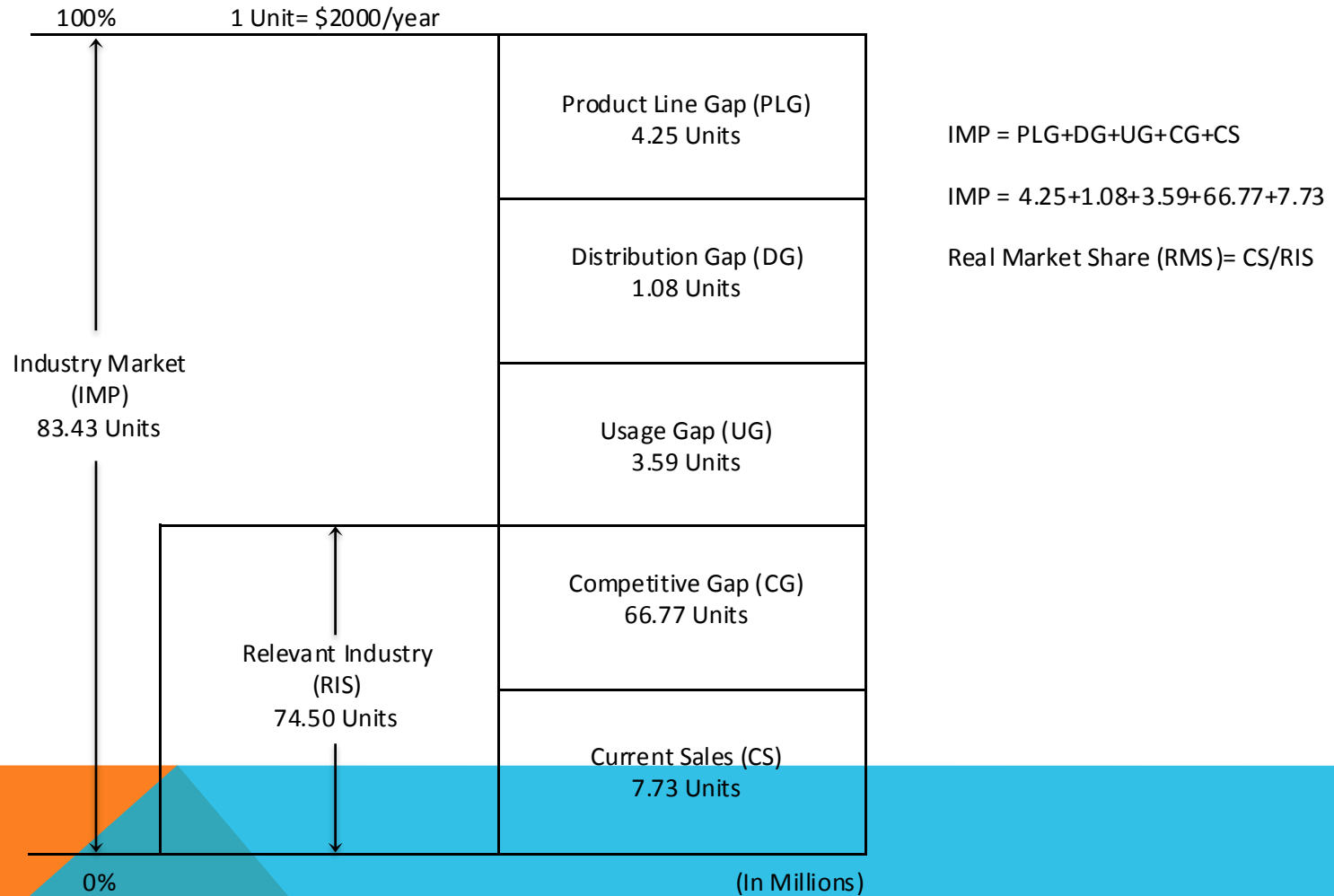
- Genomics
- Biotechnology
- Biomarkers

Merck's Focus:

- Anti-Inflammatory agents
- Biomarkers
- Vaccines

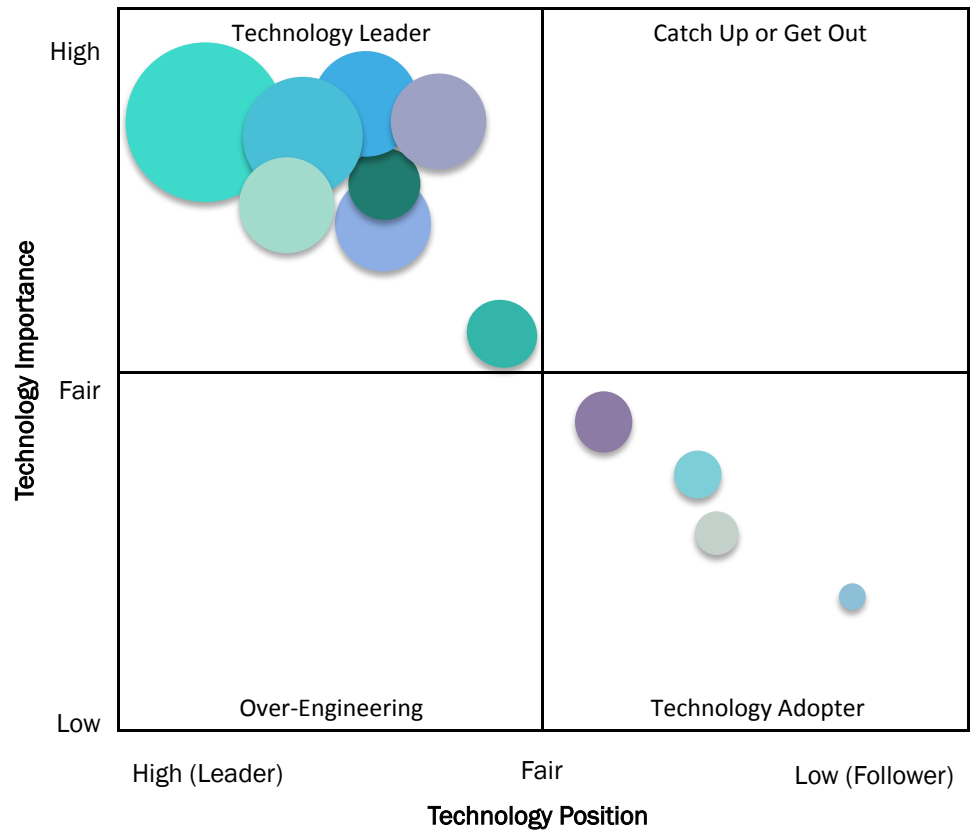


MERCK: GAP ANALYSIS, RESPIRATORY/ ANTI-INFECTIVES SEGMENT (2012)



Source: Mann and Seshan, *Strategy for the 21st Century*. IBT Global, Edition 6, 2012. p.174

TECHNOLOGY EVALUATION MATRIX: RESPIRATORY/ ANTI-INFECTIVES SEGMENT (\$B) (2012)



- Abbott Laboratories
- AstraZeneca Plc.
- Bayer AG
- Bristol-Myers Squibb Co.
- GlaxoSmithKline Plc.
- Johnson & Johnson
- Lilly (Eli) & Co.
- Merck & Co., Inc*
- Novartis AG Basel
- Pfizer Inc.
- Roche Holding Ltd.
- Sanofi



**STRATEGY: ACQUISITION OF
NOVAVAX, INC.**

ENVIRONMENTAL THREATS AND OPPORTUNITIES PROFILE: ACQUISITION OF NOVAVAX, INC.

Most Impactful Threats:

- Competition
- Politics

Most Impactful Opportunities:

- Social
- Technology



ENVIRONMENTAL THREATS AND OPPORTUNITIES PROFILE (ETOP) FOR STRATEGY: ACQUISITION OF NOVAVAX, 2013

Factors	Impact of Factor	Importance of Factor	Environmental Threat/Opportunity	Rank
Competition	-4	9	-36	1
Politics	-3	8	-24	2
Energy	2	4	8	3
Economics	2	6	12	4
Spirit / Ethics	3	5	15	5
Ecology	3	5	15	6
International	3	7	21	7
Social	4	9	36	8
Technology	5	10	50	9
Total ETOP Score =			97	

Impact is ranked from -5 (strongly negative) to +5 (strongly positive).

Importance if ranked from 1 (unimportant) to 10 (very important).

Comments: Competition is the greatest Threat for Merck's acquisition of Novavax, due to the saturation of other biotechnology competitors, especially those developing pandemic and seasonal influenza vaccines. Politics is the second biggest Threat because of strict regulations by the FDA to ensure drug safety and effectiveness. However, the government has shown certain support for the development of pandemic influenza vaccines. Technology is the biggest Opportunity, as Novavax will provide Merck with innovative Virus-Like Particle technology to develop recombinant pandemic and seasonal influenza vaccines. This technology may allow Merck to elaborate effective and safe influenza vaccines, among other types of vaccines based on such technology. Social factors are the second biggest Opportunity as there is an increase in population, which is prone to be infected by the influenza virus, especially the elderly and the children.

Source: Rowe, Alan, J., Mason, Richard O., Dickel, Karl E., Mann, Richard B., Mockler, Robert J., *Strategic Management- A Methodological Approach*. 4th Ed. 1999, Reading, MA: Addison - Wesley. p.115.
Mann and Seshan, *Strategy for the 21st Century*. IBT Global, Edition 6, 2012. p.75-81

CRITICAL ISSUES

- Merck does not currently have a program devoted to Biotechnology and would benefit from the acquisition of a company that would provide a product pipeline in the Biotechnology Industry

RECOMMENDED STRATEGIES

- For Merck, its researchers want to develop universal flu vaccines that go beyond cellular immunity and protection from challenge,³ as well as Seasonal influenza vaccines that have clinical data demonstrating differentiation from marketed products

JUSTIFICATION

- Novavax, Inc. has technological advances that have allowed it to make breakthroughs in gene therapy techniques that would open up Merck to entirely new product lines.

³Staff Writer. "Vaccine – Areas of Interest". *Merck Online*. 2013. Internet: <http://www.merck.com/licensing/areas-of-interest/vaccines.html>. Accessed 26 July 2013.

IMPLEMENTATION PLAN

- Investment from Merck's Research and Development department would allow Novavax to build more of its smaller facilities, which due to its manufacturing in single-use bioreactor systems the economically sized labs can be distributed to regions that need a local supply of influenza vaccine.⁴
- A Novavax VLP vaccine plant capacity of 75 to 100 MM doses could be built and commissioned for \$35-40 MM within 24 months.

⁴Staff Writer. "Facilities". *Novavax Online*. 2013. Internet: <http://www.novavax.com/go.cfm?do=Page.View&pid=96>. Accessed 20 July 2013.

⁵Staff Writer. "GE Healthcare". *Novavax Online*. 2013. Internet: <http://www.novavax.com/go.cfm?do=Page.View&pid=9>. Accessed 21 July 2013.


FINANCIAL ANALYSIS

Year	Change in Permanent Investment	Change in Net Working Capital	Cash Outflow	Depreciation	Net Income	Cash Inflow	Net Cash Flow	Cumulative Cash Flow	Discounted Net Cash Flow @ 10%	Cumulative Discounted Cash Flow @ 10%
2013	967.00		967.00	42.17	(250.17)	(208.00)	(1,175.00)	(1,175.00)	(1,175.00)	(1,175.00)
2014	88.90	14.56	103.46	46.38	(267.38)	(221.00)	(324.46)	(1,499.46)	(294.96)	(1,469.96)
2015	80.14	21.15	101.29	50.56	(276.56)	(226.00)	(327.29)	(1,826.75)	(270.49)	(1,740.45)
2016	80.80	15.55	96.35	54.60	(288.60)	(234.00)	(330.35)	(2,157.10)	(248.20)	(1,988.65)
2017	65.97	19.89	85.86	57.88	(304.88)	(247.00)	(332.86)	(2,489.96)	(227.35)	(2,216.00)
2018	56.09	151.45	207.54	60.77	197.36	258.14	50.60	(2,439.37)	31.42	(2,184.58)
2019	47.76	29.25	77.00	63.20	242.28	305.48	228.48	(2,210.89)	128.97	(2,055.61)
2020	55.51	85.85	141.36	65.73	299.40	365.13	223.77	(1,987.11)	114.83	(1,940.78)
2021	43.50	62.94	106.43	67.70	358.29	426.00	319.56	(1,667.55)	149.08	(1,791.70)
2022	64.75	45.13	109.88	70.41	389.00	459.41	349.53	(1,318.02)	148.24	(1,643.46)
2023	54.02	136.01	190.03	72.52	454.70	527.22	337.19	(980.83)	130.00	(1,513.46)
2024	83.22	167.48	250.69	75.42	538.53	613.96	363.27	(617.56)	127.32	(1,386.14)
2025	69.31	114.04	183.34	78.44	637.96	716.40	533.06	(84.50)	169.85	(1,216.29)
2026	67.48	149.37	216.85	81.23	770.45	851.68	634.83	550.33	183.89	(1,032.41)
2027	88.74	173.94	262.67	84.50	909.25	993.75	731.07	1,281.40	192.51	(839.89)
2028	58.82	135.64	194.45	87.04	1,009.01	1,096.05	901.60	2,183.00	215.84	(624.06)
2029	93.92	353.94	447.86	90.54	1,188.10	1,278.64	830.78	3,013.78	180.80	(443.25)
2030	86.08	268.02	354.10	93.26	1,389.44	1,482.70	1,128.60	4,142.38	223.29	(219.97)
2031	84.55	204.61	289.16	53.90	1,677.98	1,731.88	1,442.72	5,585.10	259.49	39.52

Source:

Seshan, V. Ph.D. "Cash Flow Projections." Strategic Management, Financial Analysis and Cash Flow. 13th Edition. Cengage, Mason, OH., Book & CD-ROM., 2012.

CONCLUSION

- The potential acquisition strategy would be beneficial to Merck
 - There are Potential Difficulties:
 - Control, Adaptability, and Organization
 - Work Load
 - Merck should take a Competitive approach
- 

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