Analysis of Merger & Acquisition Frameworks from a Deal Rationale Perspective in Technology Sector

by

Sridhar Narayanan

Submitted to the System Design and Management Program in partial fulfillment of the requirements for the degree of Master of Science in System Design and Management at the MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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Abstract

Mergers and Acquisitions (M&A) activity has been a widely researched area over the past century by both academic and industry experts. This paper summarizes the various frameworks that have been developed to explain the motivations to conduct M&A. While the frameworks themselves have been developed based on surveys of past success and failures, they are heavily relied upon by various M&A schools of thought to advise present and future strategies for the industry. In comparing these frameworks, the paper summarizes how deal rationales drive success or failure of M&A transactions. I analyze the HP-Autonomy case study to demonstrate how the different frameworks would approach the deal in question. I also look at the failure modes demonstrated in the deal to better evaluate relevance of the frameworks to the intended deal rationale. Further I talk about how innovation fuels inorganic growth for companies in the technology domain. In doing so, I focus on the relevance of these frameworks to the technology domain and how the industry should approach and utilize these M&A frameworks. Based on the studies and the key concerns of the technology domain, I conclude on the possibility of McKinsey Framework being a truly comprehensive Framework that can be used as a basis for understanding the motivation for a M&A transaction. In summary, this paper will provide an overview of the M&A frameworks developed over past 6 merger waves, compare them within the scope of technology domain and evangelize on their applicability and relevance.

Thesis Supervisor: Dr. Bruce G. Cameron
Title: Director, System Architecture Lab
Acknowledgments

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Chapter 1

Introduction

1.1 Motivation

The Strategic deal rationale in an M&A transaction outlines the motivation behind the deal structure and is instrumental in setting the foundation for measuring the eventual success or failure of the transaction. A study by Mckinsey "The Granularity of Growth" ¹ shows that for Strategic Value creation, a company’s choice of markets and M&A is four times more important than outperforming in its markets. A survey of 200 large companies puts portfolio momentum at 43% and M&A growth at 35%, a combined 78% compared to 22% for market share, as a means to judge growth performance of a company. This finding is especially significant considering that most management teams tend to focus on growing share organically and factoring that goal into their strategic plans ². Most research on performance of M&A transactions also mention that about 70% of all transactions end in failure (retrieved from

¹The granularity of growth-McKinsey Insights
²A proven recipe for organic growth: Deliberate focus on a diversified approach - McKinsey, 2019
www.communicaid.com on 17/11/2011). Godfred Yaw Koi-Akrofi summarizes some of the data sources that talk about the high failure rates in his paper. Koetter, Cartwright and Cooper, Child et al., and Sally Riad made it clear that despite the high hopes of successes driven by the motives, research has shown that only 50% of mergers and acquisitions succeed. Gerds and Schewe also maintain that the failure rate is higher than 60%, which were confirmed by Chang, Curtis, and Jenk, and Watkins and Copley earlier. KPMG also did a research on M&A and found out that 75% to 83% of M&A fail. Considering these conflicting aspect of keenness to do M&A despite high rates of failure, it is imperative to understand the true motivations behind a transaction. Proponents of the deal usually mention faster growth and/or anticipated synergy as two principle motivations for justifying the deal. In fact, Deloitte conducted a study in 2016-2017 and demonstrated that Revenue Growth was one of the major drivers for conducting deals and 80% of the survey participants called out synergies as an integral part of the deal thesis. However,
over the past century, there have been waves of M&A driven by various overarch-
ing motivations, that have led many researchers and industrial advisers to define
frameworks for what drives a company to do M&A. I intend to do a comparison of
these various frameworks to better understand their relevance on today’s technology
transactions.

1.2 What constitutes technology today?

To best understand the challenges in technology M&A it is important to set the con-
text by understanding what really qualifies as a technology transaction. The technol-
yogy sector encompasses companies related to the research, development and/or dis-
tribution of technologically based goods and services. This sector contains businesses
revolving around the manufacturing of electronics, creation of software, computers
or products and services relating to information technology. One of the difficulties in
analyzing this sector stems from the substantial level of diffusion of technology into
other non-technical domains. But the motivation to do a technology-based acquisi-
tion in a primarily non-technical sector would be very similar in terms of challenges
and diligence concerns. From a practical approach, we can see that the stock mar-
ket usually categorizes technology transactions into some of the following brackets:
Electronic Technology, Technology Services, Communications, health technology etc.

The technology sector prior to the early 90s was initially anchored in semiconduc-
tors, computing hardware and communications equipment. As the world of software
and internet started to take off, the technology sector was expanded to include not
just the products but also the host of service-based business models that became
a norm. While the differentiation between these sub-sectors of technology is some-
what apparent, it is much harder to define the boundaries when transactions span
sub-sectors, or even involve companies that have a conglomerate status that boast of offerings in various sub-sectors. For the purposes of this paper, we consider all the transactions that involve a target belonging to the technology sector according to stock market categorizations. Any transactions that involve an acquirer in the technology sector but a target in a non-technology sector is kept out of our purview.

1.3 Background

To dig further it is important to setup the context and understand a typical M&A Workflow. The field of M&A is one in which research is abundant and therefore there has been a lot of attempts to develop frameworks to understand the occurrence of merger and acquisition waves. Before taking a deeper look, we should first define a merger and an acquisition.

M&A describes that aspect of management that deals with buying, selling and combining companies and business entities. Mergers and Acquisitions are both business amalgamation forms but differ significantly in the approach used to perform the combination.

Merger: A merger is the type of business combination where two companies join to form a new company. In this type of business combination, the two companies may be of similar sizes (merger of equals) or differing sizes (usually bigger company survives the merger, sometimes smaller companies have been known to initiate the merger and drive the new merged company). It is often done through purchase and surrender of stocks.

Acquisition: In an acquisition type of business combination, one company is purchased by another company. Unlike in a merger, there is no new company formed, because the purchasing company (the owner) is retained and merely absorbs the other
company that it has purchased or acquired. The acquired company might retain its
identity as a business entity, but it will now be under the control of the acquiring
company. It could also be fully integrated and re-branded within the acquiring
company ecosystem.

For the purposes of this paper we would consider M&A to represent either/both
these kinds of transactions unless explicitly called out for differentiation.

1.3.1 Types of M&A

Mergers and Acquisitions can be categorized into five types\(^{14}\):

1. Horizontal merger: A merger between companies that are in direct competition
   with each other in terms of product lines and markets. This is usually a con-
   solidatory move done to leverage synergies, economies of scale or gain market
   share. A good example of such a merger is the HP and Compaq merger in
   2001, that involved both consumer laptop manufacturers coming together to
   increase the overall market share of HP.

2. Vertical merger: A merger between companies that are along the same supply
   chain. This really involves combination of companies on the production and
distribution side of the business, with the rationale being higher quality control,
better flow of information along the supply chain, and merger synergies. A good
example is Apple acquiring the chipset maker P A Semi, Passif Semiconductor
to integrate chipset design and manufacturing as an intrinsic capability to
power its hardware line of iPhones and iPads. Prior to this Vertical merger
Apple depended on Samsung to handle the chip manufacturing for its designs.

\(^{14}\)https://corporatefinanceinstitute.com/resources/knowledge/deals/types-of-mergers
3. Market-extension merger: A merger between companies in different markets that sell similar products or services. A very recent example of this is the NVidia - Mellanox deal announced in March 2019, where NVidia plans to acquire its prior partner in the data center networking space. This helps NVidia leverage the synergies between the two chip-makers while also ensuring a better offering as a combination in the cloud and enterprise data centers. This helps NVidia expand its reach beyond the graphics chipsets and including networking chipsets as a part of its offering and sell to an expanded customer base.

4. Product-extension merger: A merger between companies in the same markets that sell different but related products or services. A recent example of product extension merger is Broadcom acquiring CA Technologies in July 2018. The rationale for Broadcom is that the deal is meant to integrate CA’s security or network management software offerings with Broadcom’s router and switching hardware for networks and mainframes in telecommunications companies where both vendors have a strong presence.

5. Conglomerate merger: A merger between companies in unrelated business activities. The biggest risk in a conglomerate merger is the immediate shift in business operations resulting from the merger, as the two companies operate in completely different markets and offer unrelated products/services. An example of conglomerate merger is the Disney-Pixar Animation Studios merger which brought together the traditional cartoon character company and the animation studio that produced some of the greatest animation movies.
1.3.2 M&A Workflow

A typical M&A workflow starts with investigation into the market and competitive landscape and vetting of the prospective opportunity. This is then followed by the Letter of Intent (LOI) process which involves the preliminary negotiations with the target and development of the plan of record. Once the LOI is approved the process moves on to due diligence and Integration scoping involving expanded teams from both acquirer and target. This includes technical, financial due diligence and detailed business case analysis and validation of the Target’s claims. These steps eventually lead to the final approval and the deal closes on Day 1 when the target gets rolled into the acquirer. Over the period of next 3 months the Integration team leads the process of integrating the processes and implementing the detailed project plans that ensure the smooth running of the combined organization. The integration team then forms the transition plan for moving the integration process over to the individual business units in the company to handle the course of rationalization and strategic alignment of the combined units, while tracking their performance over the next couple of years over a series of metrics defined by the strategic motivations behind the deal structure.

![Figure 1-1: Typical M&A Transaction Process](image)

Any of the above processes if not implemented and monitored carefully can result
in the failure of the deal and loss of value over time. It is very easy to call out the Integration process as being ineffective in failure cases since it is the most complex of all. But deals have known to fail to generate shareholder value even after surpassing the strongest integration metrics and vice versa. Many failure analysis efforts have also found insufficient due diligence as a significant factor. However, not much attention is given to the initial investigation process which includes formulation of the Strategic Deal Rationale. Irrespective of the nature or type of the M&A, every transaction is precluded by a deal rationale.

1.4 Specific Objective

In this paper, I intend to look at the different frameworks defined for understanding M&A rationales, compare their relevance to the success and failure studies of deals in literature and form opinions on the applicability of these frameworks to the technology related M&A deals of the present.

1.5 Outline

The next chapter provides an overview of the waves of M&A and summarizes the intent and resulting metrics on the successes and failures.

Chapter three presents a review of various empirical studies on the successes and failures of deals over the various merger waves.

Chapter four presents a literature review of the various frameworks defined to explain the motivations for M&A and a case analysis of one of the biggest technology deals from rationale perspective.

Chapter five analysis a specific case of one of the biggest deals of this century
from the deal rational perspective and discusses alignment with popular frameworks.

Chapter six analyses the seventh wave of M&A from a technology perspective against the backdrop of the frameworks, providing insights on how best to use these frameworks to approach a transaction.

Chapter seven concludes with potential opportunities to take the research in this document further.
Chapter 2

History of M&A Activity

M&A activity has been happening since late 1800s and a clustering behavior has been observed over the past century. An analysis by Sudi Sudarsanam (2003) characterizes these clusters of activity as a wave interspersed with periods of inactivity. While it is difficult to identify the exact start and the length of each wave, various research sources have attributed some significant technology or environmental shock as being responsible for the start of the wave and war/recession/crisis as a possible reason for the end. Until now there have been six distinct waves of noticeable M&A activity and with every subsequent wave, the impact has also transformed from being US-centric to have significant global effects. Let us look at the waves in detail.

2.1 Wave 1: 1893-1904

The first wave of mergers and acquisitions occurred in the period between the 1890s and early 1900s when US companies tried to build monopolies in their respective industries. This intra-industry consolidation led to horizontal consolidation of major
industries and created giants in the oil, mining and steel industries, among others.\(^1\) The U.S. Congress responded to the wave of mergers with the creation in 1890 of the Sherman Antitrust Law or the Sherman Act, which aimed to protect the interests of consumers by combating monopolies, to prevent prices in certain sectors from being controlled by conglomerates. However, the Sherman Act did not have the desired effect in its first years in effect, because during the period of major consolidation, the U.S. Justice Department, which was responsible for enforcing the law, did not have enough staff to fully enforce it.

In this first wave, more than 1,800 companies merged or were acquired in the period from 1890-1905. While there is no definite reason available for the wave creation, one can speculate that the work that led to eventual development of the automobile industry under Ford, the first flight powered by engine by Wright brothers may have been examples of technology innovation that led to early supplier consolidation in steel and oil sector. However, most mergers that were conceived during the first

\(^1\)Sudi Sudarsanam (2003)
wave ended in failure because they failed to achieve the desired level of efficiency. The failure was also extended by a slowing U.S. economy in 1903, followed by the stock market collapse of 1904, and the fear of the First World War. Also, the actual application of the Sherman Act made the legal environment more hostile for more mergers and acquisitions and in fact boosted other anti-trust laws, such as Clayton Antitrust Act of 1914, which complemented the terms of the first law.

2.2 Wave 2: 1910-1929

With a stricter antitrust environment, the creation of monopolies was hindered by the U.S. government, and what was seen during the second wave of mergers was the creation of oligopolies and vertical integration between different companies. The primary focus of the merger activity was in the food, paper, printing and iron industry.

The main factors that led to this new wave was a large availability of capital for investment in the United States, with the development caused by the post-World War I economic boom, and the technological shock caused by industrial innovations, such as in transportation, with the commoditization of motor vehicles and the development of passenger airlines. The emergence of oligopolies can be attributed to the merged companies of first wave facing restricted resources due to greater enforcement of anti-trust laws. This was the first large scale formation of conglomerates and American investment banks actively participated in the processes, performing a key role in facilitating the transactions. Some examples of conglomerates created at the time are IBM, General Motors, John Deere and Union Carbide. Although the availability of capital caused by favorable economic conditions have motivated many M&A deals, it also paved the way for the crash of the U.S. stock market in 1929.

\[\text{Stigler 1950}\]
which ended the wave and brought the arrival of the Great Depression. Over the period of 20 years, this wave saw close to 8000 M&A transactions.

### 2.3 Wave 3: 1955-1975

The third wave of mergers and acquisitions has been characterized by a trend towards diversification among companies. When neither horizontal nor vertical integration provided the solutions that the large companies were looking for, they turned their attention to conglomerate mergers and acquisitions. This Wave was spurred by the desire of US corporations to enter new markets and diversify their revenue streams.

The conglomerates formed during this period were extremely diverse in terms of product lines, in accordance with the trend at the time, and many of them acquired companies totally outside their original business area. One reason for the trend of diversification observed at this time was the antitrust atmosphere that arose in the United States. Clayton Act of 1914 made it illegal to purchase shares from other companies when such a merger resulted in a large reduction in the degree of competition within an industry. However, the Clayton Act had an important gap, it did not preclude the acquisition of a company’s assets, only shares.

With the passage of the Celler-Kefauver Act in 1950, the Clayton Act provisions were strengthened leading to the US Congress adopting a stronger antitrust posture. This led to formation of conglomerates in different business areas. The percentage of corporations active in unrelated business increased from 9% to 21% among the Fortune 500 companies, which suggest that diversification plays a key role in the third wave (Sudi Sudarsanam (2003)).

The third wave ended in mid-1969 due to efforts by the U.S. government to fragment conglomerates and prevent further mergers and acquisitions that were con-
sidered harmful to competition. The wave collapsed completely in 1973 when there was an economic recession due to a significant oil crisis. Over the span of 20 years, this wave accounted for close to 51,500 transactions, peaking in 1969 at 6,100 deals and dropping off precipitously in 1973 from 4,000 to 2,200 by the end of the wave in 1975.

2.4 Wave 4: 1984-1989

This wave is generally referred to as the merger wave, or takeover wave, of the 1980s and frequently said to be the period from 1984 to 1989. Foremost, the bids were usually hostile which meant that the bids did not have the target’s management approval. Second, the size of the target was also significantly larger than in the previous wave. Furthermore, the dominant source of financing shifted from equity to debt and cash financing.

Sudi Sudarsanam (2003) states that in the fourth wave divestitures constituted about 20-40% of the M&A activity. Schleifer and Vishny (1991) viewed this merger wave as one that is characterized by "bust up" takeovers, where large parts of the target were divested after acquiring. There was a new concept of LBO (Leveraged Buy Outs) that emerged, wherein the firm’s management used external debt to acquire the company. A large portion of the assets would then be sold off after acquisition.

This wave was heavily driven by investment banks, willing to dole out large sums of cash to finance hostile takeover bids by companies. The "junk" bond market began to develop where bonds of companies with poor or low credit quality were being sold.

The inevitable end of the fourth wave came in 1989, when the banks ended up
lending too much, too often, coupled with high inflation rates that increased the 
borrowing costs making it difficult for companies to sustain their capital structures. 
This was aggravated even more by the crash of the stock market in 1987, where many 
companies were forced to close their doors.

However, the end of the wave in this case is defined more as a hindsight than a 
clear observable end. This wave in fact comes very close to the start of the next one 
in 1990, that it can be characterized as a temporary pause in growth of M&A. David 
Ravenscraft \(^3\) finds that considering the average number of transactions per year 
there was surely a wave that occurred in the period considered. I believe that the 
clear demarcation in the fourth and fifth wave stems from the difference in motives 
and nature of M&A as opposed to the existence of a clear gap or decline in M&A 
Transactions. This wave resulted in close to 25000 deals over the 6 years.

### 2.5 Wave 5: 1993-2000

Driven by globalization, the stock market boom and the high level of market dereg-
ulation, the fifth wave of M&A began in 1992. The merger activity also boomed in 
continental Europe in parallel to the US market. Due to globalization the number of 
cross-border acquisitions increased significantly. Growth was the primary driver and 
with an eye on globalization, companies were involved in "mega" deals, in a scale 
that was hitherto unimaginable. Some of the biggest deals were done in pharmaceuti-
cal, oil and gas, finance and technology sectors like Glaxo-Smithkline, Exxon-Mobil, 
Citibank-Travelers and Vodafone-Mannesman. From a modest $342 billion of deals 
in 1992, the worldwide volume of mergers marched steadily upward to $3.3 trillion 
worldwide in 2000.

\(^3\)The 1980s Merger Wave: An Industrial Organization Perspective - David J. Ravenscraft
The fifth wave started due to technological innovations, Information technology and a focus on the core competencies to gain competitive advantage (Sudi Sudarsanam (2003)).

The end of the wave was once again caused by an economic recession. The beginning of the new millennium started with the burst of the internet bubble, causing global stock markets to crash. By the end of 2000, in the 8 years a staggering 98000 deals were executed.

2.6 Wave 6: 2001-2008

Globalization, private equity, and shareholder activism were the key features that characterize what took place during the Sixth Wave, which took place on the heels of the recovery period of the dot-com bubble. The US Federal Reserve Stimulus kept the interest rates low and flooded the market with dollars, boosting the rise of Private Equity funds and thereby creating an environment favorable for M&A transactions.

This wave also brought in an element of shareholder activism with many activist investors displaying influence and power over the actions of the corporation by exercising their ownership rights. The availability of capital caused the transactions to multiply in a market environment and further also led to distortions in the price of target companies. The overvaluation of companies eventually led to large volumes of resources directed towards bad assets and was one of the reasons for the Sub-prime crisis in 2007. This plunged the world into a recession and ended the sixth wave of transactions. This wave accounts for close to 90000 deals, heavily focused on software and technology services.
2.7 Summary of M&A waves

A walk through the history of M&A activity presents an interesting picture of the strategies adopted by companies at various times. The first three waves occurred during periods of economic boom and a flourishing stock market, the end of the waves was due to economic recessions usually preceded by a stock market crash (Sudi Sudarsanam (2003)). The fourth and fifth waves were respectively due to increased enforcement of anti-trust laws and technological innovations which led to the redeployment of assets \(^4\). Furthermore, Sudi Sudarsanam (2003) states that M&A waves are usually accompanied with high economic growth, technological innovations, recovery form economic recession and a rising stock market. An analysis of the sixth wave by Alexandridis, Mavrovitis and Travlos (2011) leads to the availability of abundant liquidity as a major driver for M&A Activity. Acquirers were less overvalued relative to targets, and merger proposals comprised higher cash elements. Moreover, the market for corporate control was less competitive, acquirers were less acquisitive, managers displayed less over-optimism and offers involved significantly lower premiums, indicating more cautious and rational acquisition decisions.

The focus of corporations also shifted in the different waves, whereas the first wave was directed to monopoly building with a significant impact on industry structure while the fifth and sixth wave were characterized by globalization with limited effect on industry structure. M&A activity in the last century is industry specific. The clustering of mergers and acquisition is focused on different industries. Gort (1969) argues that different industries are affected differently by economic shocks. In the first wave the oil, mining and steel industry were subject to increased M&A activity while in fifth wave, for example, the industries involved with information technology

\(^4\)Jovanovic and Rousseau (2002)
were most active in M&A activity. In-fact, it can be safely said that since the move to high level computing and application software development began in early 1990's, it has been a big driver of activity in the technology domain. The sixth wave was dominated by technology sector both directly as well as indirectly with many hardware companies gobbling up software offerings within their domain of expertise. So, there is a considerable amount of dispersion between active industries in the different M&A waves.

Figure 2-3: Evolution in the Number of M&A moves in the U.S. in relation to real GDP measured in $bn and pegged to the 2009 dollar


Also, it is important that while analyzing the waves over a century, the GDP transformations of US also need to be considered since the deals do not have the same dollar value over the years. So, based on the M&A transactions to GDP ratio
shown in Figure 2.2, Cretin et. al.\textsuperscript{5} conclude that the Great Merger Wave of late 1800s is an outlier of sorts and there is more closeness in the trends of the fifth, sixth waves and the mid-cycle variations of the second and third and top of the fourth wave. Cretin et. al. believe that the globalization effect has been a significant factor from the fourth wave onwards, making it more relevant to draw common conclusions on M&A activity patterns from 1990 onwards. This is also relevant from a technology perspective, since most of the transactions in the software domain, happened over the fourth, fifth and sixth waves.

Geographical dispersion is also very different between the waves. The first and second wave predominantly existed in the US, while from wave three onwards the M&A activity in Europe increased significantly. The last 2 waves have really been global M&A waves, where the activity in mergers and acquisitions also increased substantially in Asia-Pacific (APAC) and Europe-Middle East- Africa (EMEA) regions.

The dominant source of payment also gives an interesting picture about the changing climate of the capital market and corporate strategy. In the first wave, cash was the prevalent way of financing the deal. This was probably because the capital market was only just beginning to develop. In the second, third and fifth wave, equity was the dominant form of financing whilst the fourth and sixth waves are characterized by cash and debt financing. Most likely, this was due to the hostile character of most deals and the significant increase in LBOs.

See Table 2.1 for a summary of the waves of M&A\textsuperscript{6}.

\textsuperscript{5}M&A Activity: Where Are We In the Cycle? - Cretin et. al.  
\textsuperscript{6}M&A waves and its evolution throughout history - T.J.A. Nouwen - 2011
<table>
<thead>
<tr>
<th></th>
<th>Wave 1</th>
<th>Wave 2</th>
<th>Wave 3</th>
<th>Wave 4</th>
<th>Wave 5</th>
<th>Wave 6</th>
<th>Wave 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predominant means of payment</td>
<td>Cash</td>
<td>Equity</td>
<td>Equity</td>
<td>Cash/debt</td>
<td>Equity</td>
<td>Debt</td>
<td>Debt/Equity</td>
</tr>
<tr>
<td>M&amp;A outcome</td>
<td>Creation of monopilies</td>
<td>Creation of oligopolies</td>
<td>Diversification/conglomerate creation</td>
<td>takeovers/bustup/LBO</td>
<td>Globalization</td>
<td>Globalization/LBO</td>
<td></td>
</tr>
<tr>
<td>Predominant Nature of M&amp;A</td>
<td>Friendly</td>
<td>Friendly</td>
<td>Friendly</td>
<td>Hostile</td>
<td>Friendly</td>
<td>Friendly</td>
<td>Friendly</td>
</tr>
<tr>
<td>Beginning of Wave</td>
<td>Economic Expansion, technology innovation</td>
<td>Economic recovery, enforcement of anti-trust laws</td>
<td>Strengthening laws on anti-competitive M&amp;As, Economic recovery after war</td>
<td>Deregulation of finance sector, economic recovery</td>
<td>Strong economic growth, deregulation, privatization</td>
<td>Recovery after recession, technology innovation</td>
<td>Recovery after global recession, technology innovation</td>
</tr>
<tr>
<td>Technology Focus</td>
<td>Very less, Mostly manufacturing</td>
<td>Less hi-tech, Transportation and heavy machinery</td>
<td>Less tech, more focus on conglomeration in existing domains</td>
<td>No specific tech focus</td>
<td>Heavily technology focus, especially software</td>
<td>Hi-tech focus, services oriented</td>
<td>Hi-tech focus, cloud based services</td>
</tr>
<tr>
<td>Number of Deals</td>
<td>1800</td>
<td>8000</td>
<td>51500</td>
<td>25000</td>
<td>98000</td>
<td>90000</td>
<td>68000+</td>
</tr>
<tr>
<td>End of Wave</td>
<td>Stock Market crash, First world war</td>
<td>The great depression</td>
<td>market crash due to oil crisis</td>
<td>stock market crash</td>
<td>Burst of internet bubble, 9/11 attacks</td>
<td>subprime mortgage crisis</td>
<td>Ongoing</td>
</tr>
</tbody>
</table>

Table 2.1: Summary of M&A Waves
Looking at the different waves of M&A activity over the past century gives a good idea about the evolution of corporate strategies. Martin Lipton of Cornerstone Business analyzes these waves of activity and claims that macro-economic developments, government policies and other exogenous conditions significantly shape the factors affecting the M&A activity. Some of the most important exogenous factors include: Anti-trust, Deregulation, Arbitrage, Currencies, Labor, Markets, Taxes. However, none of these really are within the control of the companies undergoes the transaction, and so would not be a determinant of why companies like to merge. In the next chapter we will cover the various frameworks that have been developed to understand why companies explore or should explore the option of M&A transaction.
Chapter 3

Empirical Studies of M&A Outcomes

There is no defined way to determine success in M&A but the commonly used approach is to evaluate the shareholder value created by doing the transaction. Also, there is no consensus on the exact time-frame to be considered for comparing transactions. There is a significant variation in the nature of the deal, the industry specific elements and also the external factors prevalent during the occurrence of the transaction, that make it difficult to analyze and compare deals. However, various studies have looked at different aspects of the mergers but the ones that I would like to focus on are specifically the ones comparing short-term (5, 10 days) v/s long-term (2-3 years) effects. While we look through some of the popular studies over the years, one of the primary objectives I intend to accomplish is to form an opinion on whether these studies can explain the rationales that the M&A frameworks typically advocate.
3.1 Literature Review

One of the early papers by Jensen and Ruback\(^1\) concluded that in mergers, value was created for the target company at the cost of the bidding company. They quantified that target shareholders gained almost 20% while the bidder stayed the same. One viewpoint would surely call this a failure from the bidder’s perspective, however there are others who say that a merger must be considered from the combined entity’s perspective and it would be a good deal. One of the primary drawbacks of this survey is not considering the relative sizes of the target and the bidder, which is a very important factor in evaluating the combined entity from the shareholder value perspective. Also, this survey comes from the early waves of M&A which as we saw earlier are significantly different in nature, scale and the sheer number of transactions from the waves closer to the end of the 20th century.

A relatively recent research by Bradley, Desai and Kim\(^2\) that looked at the third and fourth waves [1963-1984, 236 transactions] from a 10-day window centered on the day of announcement of the deal. The outcome was very similar though the target gains were found to be very high at approx. 32% v/s the Bidder’s gains at around 1%. Even if concessions are made for the target size being significantly smaller than the bidder, it doesn’t have a prominent change the nature of the outcome. Kaplan and Weisbach looked at 271 large acquisitions over the period 1971 â€“ 1982 and found similar patterns using a 5-day window around the deal announcement.

Henri Servaes looked at 704 transactions over the period 1972-1987\(^3\) and found

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a pattern in deals consisting of a better managed acquirer and a relatively badly managed target, perceived to be better from shareholder’s returns perspective. The market appreciated the potential of the well-managed acquirers in the form of rise in share price after announcement, in-spite of weaker target in the deal. The target share price would always be expected to grow in anticipation of better management of acquirer. This study further points out better management as a motivation for M&A from the bidder’s perspective, especially if the target is not well-managed.

One of the long-term studies came from Healy, Palepu, and Ruback ⁴ who looked at 50 large deals between 1979-1984, wherein the targets averaged 42% of the acquirer’s size in terms of assets. The companies were grouped in terms of degree of overlap and the focus was primarily in Oil and Gas, Steel as well as multi-industry diversification deals. Over a span of five years, there was a significant positive correlation between the performance of the companies and the shareholder returns, indicating that the market had a pretty good read into the future of large size deals. Also, of importance was the higher pattern of success in mergers within related industry as compared to diversification deals.

A substantially longer study covering most of fourth and fifth merger waves was undertaken by Andrade, Mitchell, and Stafford⁵ over 2000 merger transactions from 1973-1998. While the outcome was similar in that market prediction of deal success is more relevant in large deals over time, this study is significant in many aspects, over the Healy, Palepu, and Ruback study. In sheer scale of 2000 transactions over 50 transactions, this study is statistically more significant than the previous one. Also, the fact that this study covers two of the more recent waves of M&A, makes the

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findings more relevant from a hi-tech perspective and from a globalization standpoint, since the fifth wave had a significant technology concentration.

Moeller, Schlingemann, and Stulz analyzed 12,023 acquisitions over the duration of fourth and fifth waves from 1980 to 2001\(^6\) and observed a disproportionate number of loss-making deals in the period of 1998-2001 (see Figure 3-1). The Aggregate Dollar return is calculated over a 3-day window from the day prior to the announcement to 2 days after the announcement.

![Yearly aggregate dollar return of acquiring-firm shareholders (1980-2001)](image)

Data is from the SDC Mergers and Acquisitions Database. The graph shows the aggregate dollar return associated with acquisition announcements for each sample year. The aggregate dollar return is defined as the sum of the product of the abnormal return of each announcement multiplied by the equity capitalization of the acquirer.

One of the characteristics of the fifth merger wave was the availability of strong economic growth and deregulation, which had the effect of significant cash-flow.

While the fifth wave started off with caution and diligent mindset of the acquirers, the valuations of the companies began to rise steeply due to the internet revolution. Serial acquirers started to develop a hubris after successful acquisitions from the early period of the fifth wave, that led to over payment for acquisitions towards the later part. The dot-com boom had a significant part to play eventually resulting in both a spike in the number of failures and the eventual end of the wave.

Gunther Tichy’s study on success and failure of mergers\(^7\) was a very significant compilation of results of 80 empirical merger studies compressed into stylized facts. However, the part of the paper most interesting to my objective, is the attempt to relate the observations to some of the common M&A motivations.

1. Acquisition occurring for synergy considerations should focused on horizontal related domains. The empirical studies do not validate the increase in profits, share returns or market share that should ideally occur while considering synergistic opportunities. However, specifically the results on sale, investment, asset restructuring and management turnover is consistent with what would be expected from the synergy motivation. This goes on to show that not all aspects of synergies are always realized in the deals. Studies by Frank and Mayer, 1996; Cosh and Guest, 2001 provide ample explanations to justify Corporate Control as a successful approach especially when the Bidder is highly efficient, and target is rather inefficient.

2. Management interest (Executive-motivated deals) theories like hubris, free cash or empire building are difficult to check, but Kanniainen (2000) derived that managers with linear compensation scheme tend to over-invest, and the attitude

\(^7\)Gunther Tichy, "What Do We Know about Success and Failure of Mergers?" Journal of Industry, Competition and Trade, 1;4, 347-394, 2001.
of empire building is dependent on the degree of uncertainty, appetite for risk and preference for prudence. This has also been interpreted by many other authors (Rhoades, 1986; Roll, 1986; Marris, 1964)

3. Diversification motivation does not find any support in the studies considered. This is probably an artifact of the fact that it was a trend in the second and third wave as opposed to the fourth and fifth. However, there is enough data to show that approaching diversification to solve bidders declining growth has never proven successful. This study has not focused on the sixth wave of M&A, a good portion of which contains successful diversification examples, and probably newer studies would vouch for that approach.

4. Acquisitions to gain Market Power or Market Share has seen promise especially with close to 35% of the large firms being able to increase profits at the cost of sales. This is justified from the studies with a clear recommendation to pursue Horizontal acquisitions in a related domain as a highly successful option.

5. The disturbance hypothesis explains acquisitions as a reaction to changed environment or because of a shock like introduction of revolutionary technology, policy transformation, new form of governance etc. Andrade, 2001 mentions the digital revolution and Mitchell and Mulherin, 1996 explain the deregulation shocks as driving some of the major acquisitions in the 1990s.

6. Fridolfsson and Stennek, 1999 studies the preemptive merger hypothesis, profit reducing acquisitions are "successful" if forgoing an acquisition is more lossy. Greer (1986) provides justification for a defensive transaction - "buying so as to not be bought".

There have been studies conducted by some of the consulting firms that also
provide conclusions on why such a huge portion of the M&A transactions are a failure.

3.2 Failure Modes

In their effort to develop a framework for M&A, Bain and Co. studied why most of the M&A transactions (almost 50% to 75%) are known to fail \(^8\). Out of five primary reasons namely:

1. Poor strategic rationale, or a poor understanding of the strategic levers
2. Over-payment for the acquisition, based on overestimated value
3. Inadequate integration planning and execution
4. A void in executive leadership and strategic communications
5. A severe cultural mismatch

Bain called out the first one about poor strategic rationale as the most critical one, almost claiming that failure of this one can snowball into failure in one or many of the other categories. This is encouraging especially considering that qualitatively speaking, rationale or motivation whether right or wrong is always the first step before any deal.

KPMG in their 2004 report in Unlocking Shareholder value \(^9\) had a very interesting take on the deal rationale and its connection to the success or failure of a deal. Their claim, based on a survey conducted over 90 companies, was that 80% of the

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\(^8\)The strategic leader: Six rationales to guide merger success - Orit Gadiesh and Charles Ormiston

\(^9\)Unlocking Shareholder Value: The Keys to Success - 2004
deals failed to achieve success in Unlocking Shareholder Value. Interestingly, when they surveyed the motivations of the decision makers to go through with the deal, they found only 20% of the survey participants, called out maximizing shareholder value as a driving factor for the deal. The authors attempt to correlate this to the success rate and hypothesize that companies that factored in all the keys to unlocking shareholder value were the ones that were concerned about maximizing them as their primary rationale. While it is surely an interesting observation, one important factor that does show up from Bain and Co.’s analysis is that one failure mode doesn’t necessarily standout as the only reason, and there is a possible combination of effects that come into play in explaining unsuccessful deals.

An important point of concern in the survey-based approach adopted by consulting companies is the absence of standardization in the template used to source the data from the various companies. This does bring to light the possibility of inherent bias in the collected data and also raises questions on the veracity of the data in terms of willingness to share. Not all companies are willing to share their metrics of measurement of success/failure in a public forum and use of anonymous data brings challenges of its own in terms of interpretation.

KPMG’s analysis is based on 1999 data which as we know was the year when the fifth wave of M&A was peaking with companies leveraging the ripe technology landscape and IT sector booming as it entered the new millennium. We have also seen how the fifth wave was driven by companies with significant overvaluation due to the market demand for technology. Hubris attitudes and competitive acquisitions became a norm around the time frame considered. CEO hubris as a key psychological factor in acquisitions is also covered in many other analysis researches like Roll (1986),

\[\text{Corporate serial acquisitions: An empirical test of the learning hypothesis - Nihat Aktas, Eric de Bodt, and Richard Roll - 2007}\]
Rau and Vermaelen (1998), Malmendier and Tate (2006), Moeller et al. (2005), among others, that interpret the empirical evidence to indicate hubris. There is significant evidence that includes long term post acquisition under-performance, CEO option exercise patterns, and value destroying deals even in research by Fuller et al. (2002), Billett and Qian (2005), Conn et al. (2005), Croci (2005). While most of these papers covered earlier waves Nikhat et al. compare data obtained from over 1900 deals between 1990 and 2002 and justifies that there is no reason to doubt that similar Hubris scenarios also existed in the fifth wave. What this surely tells us is the Hubris is a very defining failure aspect for successful M&A along-with a genuine lack of focus on maximizing shareholder value.

The aspect of a Failed M&A transaction can be viewed as a systems problem especially when looking at the fifth wave of M&A. We have already seen from the history of M&A waves as to how the fifth wave was driven by Deregulation, Privatization and a booming stock market. Armed with strong cash-flow and an environment conducive to technological growth many strong companies started to flourish. The early 90’s was when the internet era began to spread its wings and led to creation of many of the behemoths like Yahoo, Google, Hotmail, Netscape etc. With the growth of internet, companies were able to expand their reach and globalization effect was observed in all domains beyond technology, but powered by technology.

Globalization led to more opportunities to do cross-border mergers and acquisitions. The acquirers interested in growth strategies had a large pool of opportunities to pick from and realized immediate success by engaging in inorganic strategies. Many successful deals were closed in this decade in various industry verticals like pharmaceutical, Oil and gas, telecommunications, software-hardware technology and semiconductors. Some acquirers were involved in multiple serial transactions and built themselves a strong reputation. Cisco is one such company that started its
acquisition strategy in 1993 and completed almost 100 deals by the end of the millenium. Not every company could however claim similar levels of success. Yahoo, for example, got into early successes with three or four search engine acquisitions, but then acquired Geocities, a web-hosting company for a significant premium and could never really make use of them for a decade, after which they closed them down. One way to interpret these occurrences is the possibility of hubris setting in.

Hubris attitude is the feeling that one can do no wrong. This usually occurs when a company has made a bunch of very successful acquisitions due to factors conducive to an inorganic development, that executive decision makers tend to attribute the success to their general ability to identify targets. This was an observed trend in the fifth wave with the pool of available targets was significant large and economic environment was strong enough to provide substantial cash-flow for companies to explore risks in M&A strategies. However, towards the end of century the pool of available companies began to decrease, and companies were left to fight over
the limited supply of technology companies, which contributed to overvaluation of these targets. Executives who were previously successful continued to exercise their flawed judgement in pushing acquisitions when they felt competitive pressure on their targets in focus.

This also leads to another failure reason which is "doing an acquisition because the competition might acquire" or "to turn a partner relationship into acquisition because a possible competitive acquisition might destroy partnership". Hubris and fear of competition in a limited pool forces some companies to engage in M&A with insufficient due diligence, possible over-payment, and even lack of strategic fit just to make quick revenue numbers for short term. We examine some of these reasons later in the paper in our case analysis. A slightly different failure approach is the "Herd-ing", which is basically companies following a leader or a first-mover and mimicking their actions. This has been analyzed in many papers especially the financial herding models are cited in Scharfstein and Stein, 1990; Graham, 1999; Boot, Milbourn, and Thakor, 1999; and Devenow and Welch, 1996. Austen and Sirower (2002) described the waves of Herding that was also the basis for the takeover waves in the past. The herding attitude leads to failure if the companies have not considered their economic foundations and strategic fit, to make an efficient integrated combination.

Keeping in mind the factors instrumental in establishing success and failure of M&A deals, many researchers, academics and industry experts have developed guiding principles or frameworks to approach inorganic strategies. We look at a collection of frameworks from rationale perspective in the next chapter.
Chapter 4

Literature Review

"Despite the massive number of books and articles published about M&A, no one has ever tried to link strategic intent to the implications for the integration that result" - HBS Professor Joseph Bower

M&A Frameworks have been developed based on 6 waves of M&A activity that have happened starting in the 20th century till now. Various approaches have been used to analyze motivations for using M&A as a growth model, based on surveys of transactions during every wave of M&A.

4.1 M&A Strategy and Frameworks

Stephen G Morrissette, Adjunct Associate Professor in Strategic Management at University of Chicago Booth School of Business\(^1\), provides an interesting compilation of various M&A strategies and models that have been developed over time to better understand the motivations for performing inorganic transactions. Stephen approaches the different models in terms of the unique nature of the questions they

address. His further expresses that these models must be understood in a combination for analyzing deals and opportunities.

1. Industry View/Porter Five Forces: Does the deal improve our ability to deal with industry forces? If so, which force(s) does this deal impact? Does it make it more difficult for new entrants? Is it a vertical integration play locking up a key supplier? ²

2. Product Life Cycle: Does the proposed deal improve our position from a product life cycle perspective? Does the deal help our new product pipeline? Does it add breadth of offerings needed to compete as a product matures?³

3. Porter Fundamental Strategy: Does this deal change our position on the broad versus narrow, low-cost versus differentiated field? ⁴

4. Ansoff: Is the deal a play to get market penetration (same product/same market), product expansion (new product/same market), market expansion (same product/new markets), or diversification (new markets, new products). Is it consistent with the Ansoff quadrant(s) describing our business strategy? ⁵

5. BCG Growth-Share Matrix: Which products of the target company are stars? Cash cows? Question Marks? Dogs? Does the target change our position? How does the target company’s product(s) change our portfolio? ⁶

6. GE/McKinsey: Is target in high attractive markets? Is it a High competitive position? Should we change our position? ⁷


8. Competitive Position: Does the target add products or capabilities that move our position on our key competitive variables?  

Once the strategic fit of the deal’s rationale has been understood in the context of the overall business strategy, it would make sense to dig into specific frameworks and apply the models that have been developed.

### 4.2 Bower’s Framework

Prof. Joseph L Bower of Harvard University performed an analysis is based on the set of acquisitions that were done between 1997 and 1999 that were valued over $500 million. Based on this effort he came up with a set of categories on which most deals could be understood and researched.

#### 4.2.1 Key Categories

Acquisitions occur for five reasons:

1. to deal with overcapacity through consolidation in mature industries;

   Overcapacity generally occurs in the older, capital intensive sectors like automotive, steel, petrochemical and generally forms a significant 37% of the acquisition deals. The philosophy of co-existence of many players in this space is usually not observed. Companies tend to look for synergistic targets and grab market share by consolidation.

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8Knez & Gertner, 2012  
2. to roll-up competitors in geographically fragmented industries;

Geographical acquisitions, while appearing to resemble the Overcapacity case, differ substantially in the fact that they tend to occur at a very early stage in the industry’s life cycle. Usually companies that have established competencies in the local market and have the potential to scale globally, would try to acquire targets in different regions. The acquired company generally remains operational locally while being able to pass on the advantages of lower operational cost and improved value to customers.

3. to extend into new products or markets;

This category covers deals created to extend a product line, identify adjacent opportunities or create presence in new markets. This is very similar to geographic roll-ups in many cases, but it may also include deals between big companies in matured industries. The success of deals depends a lot of the relative difference in size of the companies involved in the deal. Overcapacity problems could occur in cases of Merger of Equals.

4. as a substitute for R&D;

While related to product extension, this is heavily relevant to acquisitions to minimize in-house R&D investments from both cost and time to market perspective. This approach is very prevalent in high-tech, pharmaceutical, bio-tech sectors, where acquisitions help to build market position quickly in response to shortening product life-cycles.

5. to exploit eroding industry boundaries by inventing an industry.

This is probably the most complex of all the rationales, considering that this involves a large size acquisition, based on an unproven hypothesis, followed by
a significant rationalization challenge, cultural adjustment, process integration and a good understanding of the strategic fit of the federation of companies. This approach needs a very strong integration strategy to fulfill the strategic rationale for creating of the new business model.

4.3 Ally v/s Acquire

This approach is based on a survey conducted on 200 US based companies in 2002 and a detailed analysis of 1592 alliances formed by these companies between 1993 and 1997 (peak of the fifth wave of M&A)\textsuperscript{10}.

There are some guidelines on when companies should pursue an acquisition option:

1. Reciprocal Synergies - Both the Bidder and Target have an iterative knowledge sharing process to execute tasks

2. Hard Resources - In cases when companies have hard assets like Plants, manufacturing lines etc. it is better to go for acquisitions. Generating synergies by combining human resources generally bring in cultural challenges and productivity issues.

3. Extent of Redundant Resources - The greater the redundancy, the better it will be to merge/acquire and rationalize the redundant parts of the business, or to use them to achieve economies of scale.

4. Market Uncertainty - In mature markets, with low levels of Uncertainty, it is advisable to explore the acquisition option.

\textsuperscript{10}When to Ally and When to Acquire - Jeffrey Dyer, Prashant Kale, and Harbir Singh - 2004
5. Competitive Forces - If the level of competition is high and several competitors are vying for a target, it may leave a firm with no choice but to acquire sooner.

### 4.4 McKinsey framework

McKinsey developed an approach to look at M&A and suggests that an acquirer’s rationale should be a specific articulation of one of the following archetypes:

1. **Improve Target company performance** - Acquire to rationalize and save costs, sometimes also focus on revenue growth

2. **Consolidation of Industry capacity** - Horizontal M&A, companies in same domain, same customer base.

3. **Accelerate market Access for target products** - smaller targets can use channel capabilities of bigger acquirers, acquirers see benefit through additional offerings, and entering new markets.

4. **Get Skills/tech at low cost (inorganic vs organic)** - Acqui-hire, Research and Development, time to market advantage.

5. **Exploit Industry specific scalability** - Flavor of Horizontal M&A that focuses on industry specific synergies.

6. **Pick early winners and scale** - The Venture Investment approach to M&A

Beyond the above archetypes, there are some more complex and harder strategies that companies explore in specific cases including:

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11 The six types of successful acquisitions - Marc Goedhart, Tim Koller, and David Wessels - 2017
1. Roll up strategy - For fragmented markets, this strategy is about trying to make many related acquisitions to roll up into the acquirer’s ecosystem. These are also referred to as technology tuck-ins.

2. Consolidation for improving competitive behavior - works only if it eventually leads to 3-4 players. Smaller companies always have pricing discounts.

3. Enter transformational merger - technology, domain and organizational change are some reasons to implement.

4. Buy Cheap - In fragmented market, not every player can survive, and some of targets might have good technology but yet fail due to bad management decisions, ineffective sales, or maybe just not scaling up in time to be competitive. Usually such targets start losing value and end up on the market at a much lower valuation that they had envisioned. this is usually a good time for the acquirer to consider exploring the target as a potential acquisition opportunity.

4.5 Bain & Co. framework

Bain and Co. brought out an analysis in their 2002 article on rationales that appeared to underline the importance of Strategic rationales and strategic M&A as opposed to mere asset transfers and diversification as was the trend for most of the century.

1. Active investing

Leveraged buyout companies and private equity firms engage in "active investing" which is acquiring a company and running it more efficiently and

\[\text{\footnotesize The strategic leader: Six rationales to guide merger success - Gadiesh, Ormiston, 2002}\]
profitably as a stand-alone firm. For corporations, this is more a Venture capital arm strategy and a more strategic rationale is needed from a transactional perspective.

2. Growing scale

Mergers most often aim to grow scale, which really implies gaining scale in specific elements of a business and using these elements to become more competitive overall.

3. Building adjacencies

The next most common impetus for mergers and acquisitions is to expand into highly related or adjacent businesses. This can mean expanding business to new locations, new products, higher growth markets, or new customers, but the key point being closeness to the core capabilities and functionalities.

4. Broadening scope

In mergers geared to broaden the scope of products or technologies, a serial acquirer systematically buys specific expertise to either accelerate or substitute for a traditional new-business development or technology R&D function. For these firms, major ongoing investment to scan for new product concepts or technologies is an integral part of their growth strategy. For most of these firms, organic development would be too expensive, too slow, and/or would dilute focus on their existing businesses.

5. Redefining business

Deployed strategically, mergers and acquisitions can redefine a business. This is an appropriate strategic rationale when an organization’s capabilities and re-
sources are affected by changes in technology, in a way that it becomes difficult to gain knowledge or technological relevance by making internal investments and incremental adjustments.

6. Redefining industry

Sometimes a bold, strategic acquisition can redefine an entire industry, changing the boundaries of competition and forcing rivals to reevaluate their business models. This is usually an approach that is possible by bigger firms who have already established themselves as innovators and have the financial strength to play their bets.

4.6 Boston Consulting Group Approach

BCG conducted a research on 705 public companies over a ten year period from 1993-2002 (fifth wave of mergers) and came up with a set of M&A strategies that drive competitive advantage 13.

1. Reducing Costs relative to Competitors: This strategy is effective in fragmented industries to encourage consolidation and achieve scale and synergies in cost.

2. Acquiring Necessary Capabilities: using acquisition to fill gaps in capability over developing internally is recommended especially in fast moving technology sectors, where time to market and product innovation is of critical importance. BCG also uses Cisco example to highlight active monitoring of portfolio and speed of integration.

13 Growing Through Acquisitions - Kees Cools, Kermit King, Chris Neenan, Miki Tsusaka - 2004
3. Building a New Business Model: One motivation for doing M&A is to rapidly scale up a new business model. This is a more transformative reason and needs significant due diligence, usually a forte of experienced acquirers.

4.7 Scope, Scale, Capabilities

One of the fundamental approaches to evaluate a potential M&A opportunity as pointed out by Stephen Morrissette is to first determine the strategic rationale of the deal (Scope, Scale or Capabilities):

1. Scope Deals: add a new product, new line of business, new distribution channel, new customer segment or new geography.

2. Scale Deals: typically describes deals that are an expansion in the same business whereby the rationale is combining operations for achieving synergies in terms of efficiency or to obtain minimum efficient scale.

3. Capabilities Deals: relates to acquiring new talent such as R&D capabilities or plugging of gaps in existing product lines.

Stephen recommends a cautionary approach to scope deals based on many failed acquisitions for scope growth in the past.

4.8 Joining Forces

In their book Joining Forces Marks and Mirvis talk about 3 key motivations for M&A in order to create value:

1. Acquisition for extending Product Lines
2. Acquisition to gain foothold in new businesses.

3. Acquisition to leverage opportune time and cost

They further note that deals focused on Revenue generation succeed over cost reduction, encouraging businesses to think long term profitability over short term gains. In supporting this observation, the authors also detail the various avenues available to ensure the synergies are realized:

1. Economies and Cost Savings

2. Resource Combinations

3. Revenue Enhancement

   (a) Increase pricing power based on larger size

   (b) Leverage larger customer base

   (c) Cross-sell products and services

   (d) Streamline Marketing and reduce agency costs

   (e) Faster product development through combined R&D

4. New Knowledge and capabilities

There are a few other framework approaches like one by Clayton M. Christensen, Richard Alton, Curtis Rising, and Andrew Waldeck described in 2011 Harvard Business Review article \(^\text{14}\) which states that M&A is primarily done only for two reasons: Improve current performance or Reinvent a business model. This approach consolidates some of the granularity of the other frameworks into these two broad buckets.

\(^{14}\)The Big Idea: The New M&A Playbook - Clayton M. Christensen, Richard Alton, Curtis Rising, and Andrew Waldeck, 2011
to make it easier for business to approach frameworks from a goals perspective. In contrast, LEK consulting brings out its Edge Strategy framework, which encourages firms to keep focus on its core strategy and build acquisitions around the edge adjacencies to make steady incremental returns while managing risks associated with large transformational M&A. The edge strategy is applicable in all levels from Product Extension strategy to New business strategy.

### 4.9 Comparison of frameworks

The above list of frameworks, while not being exhaustive does try to cover the opinions based on analysis done by academic researchers, consulting companies and independent experts who have incorporated decades of collective experience in the M&A space into their analysis on the rationale for inorganic strategies. In order to best analyze these frameworks, it is important to understand the time-frame. These frameworks vary in the data collection process, time-line of analysis, measures of success/failure as well as industry focus but in many ways extrapolate with great confidence on how they are applicable to most M&A transactions.

Igor Ansoff first analyzed the American manufacturing firms over a period after World War II and overlapping on the third wave of M&A\textsuperscript{15}. His study resulted in a comprehensive set of motivations listed below:

1. Complete product lines.

2. Increase market share

3. Fully utilize existing market capabilities, contacts or channels

\textsuperscript{15} Acquisition Behavior of U.S. Manufacturing Firms (1946-1965), 1971
4. Offset unsatisfactory sales growth in present market

5. Capitalize on distinctive technological expertise

6. Obtain patents, licenses, or technological know-how

7. Meet demands of diversified customers.

8. Fully utilize existing production capacity

9. Increase control of sales outlets

10. Reduce dependence on suppliers

11. Reduce dependence on one or few customers

12. Acquire goodwill, prestige or brand names

13. Capitalize on distinctive managerial talents

14. Offset unsatisfactory profit margins in present markets

15. Attain minimum size needed for efficient R&D

In many respects the frameworks that came up at the start of the 21st century, have some level of commonality with some or most of the motivations mentioned above. While Ansoff’s motivations were based specifically on the manufacturing firms, motivations like Completing product lines, market share, capabilities, IP acquisition, Synergies are domain agnostic and relevant even today. Domain specific reasons like utilize production capacity, control of sales outlets, dependence on suppliers or customers have implications in different ways for technology firms of today. The 2019 acquisition of Mellanox (network infrastructure maker) by NVidia (chip
manufacturer) is a latest example of Vertical integration where a partnership down-
stream in the supply chain has been converted into an acquisition opportunity to
leverage the benefits of partnered offerings and also reduce dependence on other sup-
pliers by integrating a critical part of the value chain within one's own ecosystem.
Amazon's acquisition of Whole Foods in 2017 was partly driven by the interest to
ensure last mile delivery, but mostly to gain control of the sales outlets to bring the
online offerings from the software platform closer to the customer base.

In contrast Christensen et al. in their 2011 M&A Playbook attempt to distill
most of the above reasons to two primary and generic categorizations, each of which
incorporate many aspects. For example, completing product lines, utilizing existing
market channels, offset unsatisfactory profit margins and sales growth are means to
achieving the bigger goal of improving current performance. With broad categoriza-
tions, it can be very easy force fit some of the specific approaches, but there a big
risk in doing so. One of the concerns in acquiring to offset sales growth in present
market is the possible lack of understanding on the root cause of the weak growth.
A inherently failing business acquiring to fix a symptom will lead to disastrous con-
sequences for both the target and bidder as Stephen points out in risk to acquisition
for scope approach 1.

Interestingly, in-spite of the detailed approach by Ansoff and the fact that his
research is focused during a wave of diversification and conglomerate business build-
ing, we do not see him call out "creation of new business model" as a motivation.
My feeling is that this is an artifact of the focus of his survey on manufacturing firms
and possibly the unilateral attention to economic recovery in terms of growth in
the sectors like automobile and housing. However, it could also be argued that An-
soff intended to capture the conglomerate creation aspects within "Meets demands
of diversified customers", "Acquire prestige or brand names" or even "capitalizing
on distinctive managerial talents" since the Post war recovery era was marked by a move from goods to services and the creation of white collar jobs like corporate managers, salespersons etc. This aspect of moving value generation from products to services has been most relevant in the technology sector over the fifth, sixth wave and is continuing to be the story even now. Most of the frameworks definitions by the consulting firms talk about creation of new business models, especially as firms find new ways to go to market with their product offerings.
<table>
<thead>
<tr>
<th>Frameworks</th>
<th>Bower</th>
<th>Ally vs Acquire</th>
<th>McKinsey</th>
<th>Bain</th>
<th>BCG</th>
<th>LEX Consulting</th>
<th>Joining Forces</th>
<th>M&amp;A Playbook</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach</td>
<td>Academic</td>
<td>Academic</td>
<td>Consulting</td>
<td>Consulting</td>
<td>Consulting</td>
<td>Consulting</td>
<td>Blended</td>
<td>Blended</td>
</tr>
<tr>
<td>Nature</td>
<td>survey</td>
<td>survey</td>
<td>internal data</td>
<td>internal data</td>
<td>survey</td>
<td>internal data</td>
<td>survey</td>
<td>theory</td>
</tr>
<tr>
<td>M&amp;A Motivations</td>
<td>Consolidation, competitive roll-up, product-market extension, Substitute for R&amp;D, building new business</td>
<td>Reciprocal Synergies, hard resources, managing redundancy, market uncertainty, Competitive Forces</td>
<td>Improve Target performance, Consolidation, Accelerate market access for target products, acquire skills/technology at low cost, exploit industry specific scalability, Pick early winners and scale</td>
<td>Active Investing, Growing scale, building adjacencies, broadening scope, redefining business, redefining industry</td>
<td>Synergies, capabilities, new business model</td>
<td>Edge strategy (adjacencies in product, market, enterprise)</td>
<td>Product Extension, New business, synergies</td>
<td>Improving current performance, Reinventing a business model</td>
</tr>
<tr>
<td>Uniqueness</td>
<td>Focused on one of the most important waves from a technology perspective, with very structured categorization</td>
<td>The approach is very transactional vs long term pipeline.</td>
<td>Venture related approach, target focused attitude</td>
<td>Ventures approach, Focus on adjacencies, new business models</td>
<td>focus on new business models, synergies as a motivation</td>
<td>Services based approach</td>
<td>Advocates steal deals - compare to mckinsey</td>
<td>Rolling up motivations into two very broad categories that are fundamental to a firm's growth strategy</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Joseph Bower</td>
<td>Jeffrey H. Dyer, Priam Kale, Harbir Singh</td>
<td>Marc Goedhart, Tim Koller, and David Wessels</td>
<td>Orit Gadish and Charles Ormiston</td>
<td>Kees Cools, Kermit King, Chris Neenan, Miki Tsusaka</td>
<td>Marks, Mirvis</td>
<td>Christensen et al</td>
<td></td>
</tr>
<tr>
<td>Joining Forces - Product Extension</td>
<td>Bower - Competitive Acquisition</td>
<td>BCG - New business Models</td>
<td>Bower, Bain &amp; Co. - new business model</td>
<td>BCG, Bower - New business, synergies</td>
<td>McKinsey - Competitive Acquisition</td>
<td>Joining Forces - New business Models</td>
<td>Radical approach that focuses more on new business models. There is no explicit focus on M&amp;A for skills/technology or even a target focused approach. Absence of target focused approach</td>
<td>Too broad categorization, specific motivations tend to get ineffectively rolled up into two categories</td>
</tr>
<tr>
<td>Ally or Acquire - Competitive</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Missing Relative to McKinsey Framework</td>
<td>Target Focused approach to M&amp;A is not covered within the categorization</td>
<td>Acquiring skills considered too soft from acquisition perspective. Using M&amp;A to hire talent is not recommended. Cases where Target is acquired for efficiency improvements is not considered</td>
<td>NA</td>
<td>Acquiring skills by acquisition is not called out as a motivation for M&amp;A. In the current technology landscape acqui-hire is a key factor. Target Focus appears to be financially motivated from investment perspective</td>
<td>There is surely an effort to fill technology gaps by M&amp;A, but Acquiring skills by acquisition is not called out as a motivation for M&amp;A.</td>
<td>Conservative approach revolving around adjacencies. Falls short of recommending a holistic M&amp;A approach considering all possibilities.</td>
<td>Radical approach that focuses more on new business models. There is no explicit focus on M&amp;A for skills/technology or even a target focused approach. Absence of target focused approach</td>
<td></td>
</tr>
</tbody>
</table>

Table 4.1: Comparison of Frameworks
In-fact Bower calls out R&D motivations and creation of new business models as significantly separate categorizations for the very reason that the challenges associated with redefining a business or industry are very different from R&D motivations. Redefining a business involves integration of processes and rationalization to match up to the strategic objectives of the acquirer. On the other hand, R&D acquisitions have a greater emphasis on the time to market and people retention is the biggest motivation along with technology. One of the concerns with Bower's research is also the fact that his focus was on acquisitions greater than $500 Million and this generally rules out a big chunk of R&D acquisitions which usually involve lower valued Early stage targets working on cutting edge themes.

When we look at the strategic motivations proposed by the consulting companies like McKinsey and Bain, it becomes very apparent that there is a noticeable tilt towards a Ventures based approach in focusing on targets performance and a target focused attitude especially with the rationale to pick winners early on and scale. The aspect of focusing on new business models has been around through most of the second half of the 20th century, but it has seen a level of predominance in the fifth and sixth wave, when the SaaS business models services-based approach came to the forefront.

Synergies is an important motivation for many firms based on the survey conducted over the latest waves of M&A. However, I believe that synergies is a means to implementing an effective M&A strategy v/s being the unidirectional motivation. If the barrier to scaling and gaining market share is acquiring a competitor with similar resources, synergies may be a good primary approach. However, in general, the success of any deal in terms of value creation, revolves around identifying synergies in both revenue and cost. While companies find it very comfortable to indicate cost synergies as a part of their strategy, it is usually a guarded approach since cost
synergies are shared between Acquirer and Target. Explicit indication of extent of cost synergies as a part of the deal rationale influences the Target valuation estimates and impacts negotiation efforts for the deal \(^{16}\). Another interesting study by McKinsey concludes that synergistic efforts and returns announcements are interpreted very positively in most cases as a promise and openness in value creation \(^{17}\). So identifying and acting on synergies is very important for deal success as is the use of synergistic movements as messaging medium to establish credibility from acquirer's perspective.

One of the key factors that many frameworks focus on is the concept of Core and Adjacencies. Many companies prefer to use the roll-up strategy and acquire many companies that have related business offerings, to stimulate growth. The biggest concern while exploring an add-on or a group of add-ons should be how they would contribute to value creation. To do that a company should have clarity on what constitutes its core business offering and what are the possible ways to enhance the core offering. Bain defines a company’s core as the clients, products and services that a) drive the majority of its profits and profitable growth, and b) provide its key competitive advantage \(^{18}\). A successful roll-up strategy is based on a significant overlap in the offering model of the target and the acquirer. The more a company strays from its core, the less is the overlap and the differentiations increase to a point that it might have to be run separately, beating the whole purpose of the roll-up.

In fact this is very similar model to LEK Consulting’s Edge Strategy which de-

\(^{16}\)How Successful M&A Deals Split the Synergies: Divide and Conquer - Jens Kengelbach, Dennis Utzerath, Christoph Kaserer, and Sebastian Schatt - BCG August 2013

\(^{17}\)Making M&A deal synergies count - Ankur Agrawal, Rajeev Varma, and Andy West - October 2017

fines innovating at the edge of the core competencies. LEK calls out three types of Edge strategies: Product, Journey and Enterprise. While product edge talks about value add services around the core product, the journey edge extends that concept to explore the last mile use case of the products and encourages development of innovative business models. The enterprise edge is probably the most complex of all since this is the ability to recognize the existence of an underlying platform within a core offering that can scale over diverse domains. In its Buy-and-Build article, Bain analyzes how Ascend Learning identified their platform connecting educators to learners and providing analytics and metrics as their core as opposed to the actual content on the platform. Realizing this aspect, helped them make acquisitions of learning platforms in various verticals and roll them up seamlessly into a single platform. LEK approaches with a similar framework and advises companies to explore inorganic opportunities close to core to extract maximum value from the acquisitions.

Another lesser known strategy that some companies follow is to buy targets at a very early stage and help them grow within their own ecosystem. Conglomerates who follow this strategy must be prepared to make early bets with a high probability of failure. However, the rate of return if successful is also very high and generates substantial revenue and technology differentiation that is beneficial to the acquirer. Both Mckinsey and Joining Forces talk about making such opportune acquisitions at low cost, but true success is heavily dependent on the acquirer’s capability to integrate and grow the target. On the flip side companies also keep an eye out for cheaply priced targets that have lost share value due to market conditions, sales challenges, technology debt etc. Sometimes it may be worth acquiring such targets with significant overlap to leverage the skilled workforce, unique technology, or sometimes even for global presence. However, these are possibly the riskiest transactions that need a deeper due diligence to understand the extent of investment that would be
required to integrate and monetize the combined offerings.

4.10 Discussion

M&A is a process between two primary stakeholders (acquirer and target) and due consideration must be given to the needs of both. From the empirical studies and the comparison of the motivations offered by the various frameworks it appears that McKinsey Framework has a good coverage of the key motivations from both the acquirer and the target perspective. While other frameworks like Bower, Ally vs Acquire, and even BCG do roll in these considerations under the synergies, McKinsey framework focuses on the key motivation of improving target performance and creating a channel for target profitability as a means to also ensure growth of the acquirer. McKinsey further considers acquiring for skills and technology as an important motivation to consider inorganic growth, which not many of the other frameworks explicitly call out, in fact there is also a recommendation to avoid acquisition for soft resources like talent. McKinsey also brings out corner cases like competitive buying or Technology tuck-ins as complex motivations to highlight the fact that these need to be looked at deeply, since these are reasons that could evolve into failure modes with insufficient due diligence. By focusing on picking winners and scaling, McKinsey does propagate the Ventures investment approach and an element of risk taking, which is becoming a very significant driver of some of the recent M&A waves.

To better understand these frameworks, we will look at how some of these motivations specified in the different frameworks approach one of the biggest technology acquisition failures of recent times in the next chapter.
Chapter 5

HP - Autonomy deal

Hewlett-Packard announced the acquisition of Autonomy, which focuses on so-called intelligent search and data analysis, on Aug. 18, 2011. The then CEO Leo Apotheker proclaimed, "Together with Autonomy we plan to reinvent how both structured and unstructured data is processed, analyzed, optimized, automated and protected.". However, what was also envisioned along with this acquisition was the decision to abandon its tablet computer and consider getting out of the personal computer business. The deal value was pegged at $11.1 billion, which was about 12.6 times Autonomy’s 2010 revenue. Soon after the deal was closed, Autonomy’s sales began to plummet and by November 2012, HP took a massive $8.8 billion write-off on Autonomy and accused its former management of accounting fraud.

5.1 Deal rationale

The following is the actual text of deal rationales mentioned in the messaging by HP at the time of deal announcement, and the interpretation of 451 Market Research.
"Together with Autonomy, we plan to reinvent how both unstructured and structured data is processed, analyzed, optimized, automated and protected. Autonomy has an attractive business model, including a strong cloud-based solution set, which is aligned with HP’s efforts to improve our portfolio mix. We believe this bold action will squarely position HP in software and information to create the next-generation Information Platform ... Autonomy offers solutions that are synergistic across HP’s enterprise offerings and strengthens capabilities for data analytics, the cloud, industry capabilities and workflow management. This will bolster HP’s cloud offerings with key assets for information management and data analytics. Autonomy also complements existing HP offerings from enterprise servers, storage, networking, software, services and its Imaging and Printing Group (IPG) ... Acquiring Autonomy would provide differentiated IP for services, including extensive vertical capabilities in key industries such as government, financial services, legal, pharmaceutical and healthcare ... Autonomy provides HP with a content management platform and accelerates a major component of the IPG enterprise strategy to continue its growth of document and content management and higher value commercial printing opportunities." Source: Acquirer press release, 8/18/11.

"This deal shows that HP is getting serious about software. Autonomy gives HP a few things that it badly needs if it is to be taken seriously as a software provider, especially one in the information management business. It greatly boosts HP’s presence in the archiving, e-discovery and enterprise search businesses." Source: The 451 Group, 8/18/2011.
5.2 Analysis of the Rationale

HP at the time of the announcement was primarily a infrastructure player in the data storage market along with products in the consumer computing space. It also had other vertical component business like printers, display systems, networking hardware etc. There were also some software offerings like virtualization software, systems and application management, content management etc. but these were meant to enable better management of the hardware products. What HP did lack was a strong software product that could handle information management of the various data storage products that was their core strength. Around 2011 it had already become apparent that data was the biggest value and extracting value-based outcomes from the data was very critical to prevent commoditization of the traditional infrastructure business.

It does appear that the motivation from HP perspective was to really incorporate the search and data analysis capabilities to be able to have a footprint in the software end of the product line. According to the then CEO, the plan was to leverage Autonomy’s analytics capabilities to reinvent the unstructured and structured data and develop a value proposition around the software offering. This does fall under the classic case of Product Extension M&A according to Bower’s approach, especially for a hardware company to expand its capabilities into software and envision an combined value opportunity. In fact this was also a time when HP was losing market share to other important hardware vendors of the time like Dell and Apple and the peripherals business wasn’t a high margin business. Most frameworks would have categorized this as a Product Extension play, as well as possibly identifying this as an opportunity to realize a newer business model by providing a full stack software analytics along-with data storage infrastructure. Just purely based on this
reasoning, it was justified for HP to think about acquisition as a means to fulfill their growth strategy, even though some of the frameworks like the Edge strategy by LEK Consulting may have disagreed with a radical acquisition decision and probably advised keeping it closer to the core, possibly partnering with a software vendor as a first step.

One other important thing to note was that the CEO advocated decoupling of the core consumer laptop and peripherals businesses while encouraging this acquisition. While a certain level of rationalization and leanness is desirable while looking for synergies in an acquisition this almost amounted to distancing from the core businesses while looking for software business models for growth. LEK Consulting’s approach values incremental M&A over significant addition of product lines focused around core capabilities and looking for adjacencies. In this case this was a big pivot almost leading to dropping core business lines and going for new avenues. This would have been a significant departure from the values advocated by LEK.

Around the 2010-2011 time-frame there were many other acquisitions happening in the unstructured data space. HP had already made some really big acquisitions like 3PAR, Arcsight, Palm and a number of smaller ones like Fortify Software in the past year and not all of them were successful. A key point was that most of the high billed acquisitions were inherently infrastructure companies with significantly different product lines. With Oracle’s decision to renege on their partnership with HP on Itanium chips, their revenue numbers had already taken a hit and the earnings call had not been very promising. Adding the announcement of Autonomy Acquisition for $11.8 Billion, caused a lot of concern leading to outright loss of shareholder value immediately after the announcement. While synergies is an important factor in every acquisition, there was no way to explain how HP intended to monetize the niche market for storage search enough to justify the large investment.
If we look at this deal from the possible failure modes being exhibited, we can clearly see that the intention to really move away from being a hardware vendor and transitioning to a software offering was ambitious and even drastic since the PC business was the core business of HP along with the other peripheral hardware. While this acquisition does fit the conditions for product extension M&A according to Bower, this fits the bill for a more important failure mode of failure of requisite due diligence (Bain failure cases) from an executable business model. Rationalizing a portfolio to better align a software offering with hardware would be justified as a product extension, but replacement of core business line indicates a strong leaning towards possible failure.
This case also appears to be a prime example of the Hubris hypothesis. With so many acquisitions under the belt within a year prior to the announcement, it was but natural for Apotheker to trust his experience and judgement. Even though the financial due diligence that was performed for the deal clearly indicated that the valuation of the company and the price that was being quoted was very beyond in terms of multiples for the technology that was being acquired, the board ignored the CFO and decided to continue with the deal. Not heeding to the advice of the CFO and stubbornness to walk back on a direction taken initially, showed signs of hubris on the part of the management. This can be clearly seen from the following excerpt from the New York Times article in 2012:

"During press conference, at least one large shareholder asked Mr. Lane, the chairman, if the company had performed such an analysis and asked what growth assumptions were used in the model. Mr. Lane seemed unfamiliar with any discounted cash flow analysis but contended the price was justified because Autonomy was unique and critical to H.P.’s strategic vision."

CEO Apotheker was fired within a month of deal announcement and oddly enough he was the one advocating the strategic changes and had a vision including the announcement. This put the whole rationale, both internal and external into question and eventually snowballed into integration challenges over the year, until the heavy write-off.

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1HP’s Purchase of Autonomy: "Hubris at the Top" and Failure of Internal Controls - Dov Fisher 2013
Chapter 6

Seventh Wave

6.1 Introduction to seventh wave of M&A

The seventh wave of M&A is believed to have started around 2013-14 with the US M&A market reaching a really high value of $895Bn (15% YoY growth and a 60% growth from the previous low in 2009)\(^1\). Some indicators like M&A activity as a percentage of total US market capitalization or rate of expected improved bids and M&A market activity have shown patterns very similar to previous waves and it has been able to verify the existence of a current wave. The key drivers for the latest wave appear to be expansion and reorganization around growth regions and taxation concern. In Figure 5.1, we can observe that the past waves have demonstrated clear spikes at the peak with a clear rise in the number of transactions until the peak. However, looking at the trends over 2015, 2016 the wave appears to be attaining a level of stagnancy as opposed to what would have been seen based on typical M&A activity trends of the past. The number of transactions remained constant for the

\(^1\)M&A Activity: Where Are We In the Cycle? - OFI Asset Management
two years in particular, which is a different behavior as compared to the earlier waves.

![Mergers & Acquisitions North America](image)

**Figure 6-1: Aggregate Dollar Return for Shareholders 1980-2001**

To better understand M&A activity in the technology sector, it is imperative to understand how innovation occurs. The technology domain can be categorized on a crude level into sub-sectors like hardware/infrastructure, software products and services. Each of these category of sub-sectors follows a strategy for inorganic growth that can be understood from recent popular deals in the seventh wave mentioned in Table 6.1

If we look at these categorizations, we can notice how they align closely to the motivations defined in the frameworks. There are however deeper motivations as we have seen in the earlier chapters beyond the categorizations in the table, that have been noticed in the past decade.
6.2 Understanding Technology Innovation

To be able to best understand the Motivations for inorganic strategies in technology, it would be interesting to understand the nature of technology innovation first. James Utterback\(^2\) looked at the dynamic processes that take place within the industry and the member firms over time. He forms an opinion about the relevance of the innovation model for various industries focused on manufacturing products using the typewriter industry as an example to explain the key aspects of the model.

### 6.2.1 Phases of Innovation

According to him every innovation phase begins in the Fluid Phase when there is a lot of innovation that takes place, with very high level of uncertainty in outcomes at all levels: product, process, leadership and management. This is characterized by a rapid rate of product change, with very crude implementations of new technology, that tackles specific needs in come niche markets. This phase is defined by product...
innovation and frequent, major changes in product designs occur as companies attempt to better understand the customer need and adjust their products. This is the phase when R&D resources are in the greatest demand and cutting-edge development is the norm. The real basis of competition between various firms is on the core product functionality. Since the products are yet in the early stage of adoption, a scalable process model is not really the primary motivation and the process model undergoes changes as needed very easily and at low cost to the firm.

As the products gain popularity and the technology matures, the industry enters the Transition phase. In this phase, there is an emergence of a dominant design and a clear presence of a few leading firms, who develop the dominant design. The focus then is really to find differentiating features around the core product functionality that enables the leaders to capture market share, thereby further reducing the number of competitors. The R&D efforts are now focused on finding the key differentiators and thus there is less radical and more incremental innovation in this phase. Also, this stage is very important from manufacturing, workflow and supply-chain perspective, wherein innovation is focused on defining scalable processes, that can handle the mature technology and rising demand for the products at scale.

The third phase of innovation is the Specific Phase. Here the quality to cost ratio becomes an important factor in the competitive market. Most innovation efforts are focused on improving the processes to reduce cost and improve the quality of the products being offered to customers. There is very limited differentiation between the competitors’ products and any change in the product features is tightly coupled with the process parameters, that radical changes in product lines will be considered a revolutionary and with significant cost impact. Also, at this stage the competition is mostly driven by oligopolies. The R&D emphasis moves on from product focus to incremental feature development and new ways to improve the processes for reducing
Figure 6-2: Utterback Model - Dynamics of Innovation
Source: Mastering the Dynamics of Innovation - James Utterback
<table>
<thead>
<tr>
<th>Aspect</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>From high variety, to dominant design, to incremental innovation on standardized products</td>
</tr>
<tr>
<td>Process</td>
<td>Manufacturing progresses from heavy reliance on skilled labor and general-purpose equipment to specialized equipment tended by low-skilled labor</td>
</tr>
<tr>
<td>Organization</td>
<td>From entrepreneurial organic firm to hierarchical mechanistic firm with defined tasks and procedures and few rewards for radical innovation</td>
</tr>
<tr>
<td>Market</td>
<td>From fragmented and unstable with diverse products and rapid feedback to commodity-like with largely undifferentiated products</td>
</tr>
<tr>
<td>Competition</td>
<td>From many small firms with unique products to an oligopoly of firms with similar products</td>
</tr>
</tbody>
</table>

Figure 6-3: Utterback Model Aspects
Source: Mastering the Dynamics of Innovation - James Utterback
cost and improving margins.

This model was designed to explain the innovation patterns that were observed and very common to all forms of manufacturing processes irrespective of the complexity of the industry. Thus, this model is very applicable to automobile, Consumer Goods, Computer hardware, peripherals, portable electronics, machine tools etc.

6.2.2 Technology S-Curves and Utterback Model

Within the realm of the products, it is also imperative to understand how the technology maturity blends with the innovation model. A typical technology maturity curve is represented as an S-curve. On the S-curve we can see that at the Incubation stage, there may be many small players who are trying to use the technology to productize and understand the challenges associated with the technology. This is also the phase when early players attempt to figure out the right business model.

As the adoption increases and the performance of the technology becomes better with incremental innovation, the technology is said to be in its growth phase. This is the phase that significantly also coincides with the move from Fluid to Transition phase of the Utterback model. At the technology grows better in performance, it leads some of the dominant players and adopters of the technology to plan for product versioning to incorporate the changes in technology into the products. This is a period of definition of product lines based on the technology.

As the technology reaches maturity, it becomes a low margin play to continue to productize on the existing technology since everyone in the market is building products on the same technology. The market leaders are left to differentiate with incremental feature changes to stay relevant in the same technology, until a new technology comes in to take its place. Any new technology that is significantly
differentiated from the first one, ends up forming its own curve parallel to the first one. Depending on the extent of freshness in the innovative technology, this also leads to the forming of a new Utterback curve of innovation.

While the S-curve appears to overlap throughout the innovation cycle, it is dependent on the depth of the technology basis being used to define the product innovation. For example, in the data storage space, the storage media technology has moved from tape drives, HDD, Flash, SSD to NVMe over the span of 2 decades. Each of these storage technologies had its own technology curves where innovation was driven to improve the performance until it was just more feasible to move on to the next technology. So, if we look at the Utterback model from the point of view of a drive manufacturer like Seagate, Western Digital etc., every technology curve would align with the Utterback curve of innovation. As the technology improves the manufacturing model only improves on the last iteration of process innovation. However, if

Figure 6-4: Technology Innovation S-Curve
we look at the Utterback model from a data storage infrastructure vendor like Dell, HPE, IBM, these technology waves would just be a part of a long-term innovation curve where the transitional phase and specific phase are really long compared to the Fluid phase.

What is important to gather from the above discussion is the points on the curves when companies are really looking out for growth opportunities. The following observations are intuitive and rely on experience and not based on any empirical observations. In most cases ventures investments happen early on the technology S-curves and as the curve enters the growth phase, acquirers start to view potential targets with new technologies if the strategies show significant alignment. On the Utterback curve, it is a lot easier to identify the hotspots of M&A activity, depending on the acquirers appetite for inorganic strategies. Most serial acquirers tend to make multiple acquisitions of lower valuations early on in the Product innovation cycle by hedging best on few complementary product lines and this is generally best seen in the Fluid phase. The maximum activity for bigger players who wait to understand the use cases before acquisitions happens in the early transition phase when the market consolidation is in play. This leads to creating of few technology leaders and some niche smaller players while most of the companies in the Fluid phase have either died out, become cheap targets for consolidation by larger players, or interesting low-cost acquisition opportunities for acquirers in adjacent markets. By the time we enter the Specific phase, the technology and the industry have moved to point where acquisitions are really only possible if there is a genuine need for multiple different technologies to co-exist for niche use cases.
6.3 Innovation Dynamics and M&A in Technology Sector

Based on our definition of what constitutes technology and the study of waves of M&A, it is apparent that the bulk of "hi-tech" technology innovation happened in the fourth, fifth and sixth waves of M&A. There were obviously developments in telecommunications, semiconductor technology, technology around modes of transportation and early computing. But true globalization in technology was triggered after the fourth wave of M&A with software adding a significant sub-category to the technology sector:

1. Hardware/Infrastructure: This is a category that truly follows the dynamics model of innovation. The product life cycle revolves around a dominant design and incremental innovation as the underlying technology undergoes improvement over time. As with any tangible product development, there is a significant process factor involved once the product design transitions to the manufacturing stage. For example, the data center infrastructure transformed from monolithic mainframes during the era of early transistor technology in the 70’s and 80’s to small form factor data center hardware driven by developments in solid state semiconductor technology. After that major transition, the storage drive technology underwent significant changes to pack more storage capacity into a small disk. But the maturity of the infrastructure market over the years ensured that there was a level of process standardization. Today irrespective of the technology or the brand of storage drive vendor, all the enterprise grade storage drives come in a standard hot-pluggable media card, that makes it easy to integrate incremental innovation, even when drive technology
is undergoing radical changes.

This clearly means that the frameworks that were based on the manufacturing waves like Ansoff or even Bower apply equally well to the infrastructure sector. There have been many consolidation efforts over the years, and has now resulted in a few strong drive vendors serving many different infrastructure vendors. Also drive vendors are making themselves relevant by developing analytics on drive performance and predictive maintenance. This creates opportunities for hardware vendors to also explore inorganic strategies that allow them to differentiate in a commoditized market. Consulting frameworks are very relevant in suggesting synergies for consolidation approaches, explore new monetizing business models on their Infrastructure platform, or even consider adjacent opportunities to horizontally integrate.

2. Software as a Product (SaaP): Pure software products follow similar trend to the hardware/infrastructure. The design and distribution model for SaaP involves similar efforts in product innovation and very similar trends in adoption rates as the software is available for customer use. One example of this is the Office productivity software space, where many vendors came up with offerings proprietary to their specific operating systems like Excel, Sun, lotus notes, visicalc etc. Some were platform dependent until Excel was extended to windows. With windows adoption, Excel became a dominant player. However, an important thing to understand was that the software was the enabler to sell the operating system and the cost was rolled into the price of the hardware/infrastructure, which further influenced the adoption of technology. The Transition phase was very much driven by dominant design until internet revolution brought the idea of browser-based productivity software. This led to
open source alternatives coming into force and the dominance of Excel currently remains relegated to on-premise, enterprise scale use cases, with incremental feature enhancements.

What makes SaaS space different is that process innovation doesn’t really apply due to very less process overhead involved either in development of software products or deployment of the products at scale. However this also means the Innovation cycles transform much quicker and companies establishing dominance in the space have to enter the space soon and differentiate strongly. The success of Excel as a software product also had lot to do with Windows as the operating system in the initial stages. This was a case of mutual assistance where software helped platform sales and platform integrating software deeply. It also helped to be an early mover in the software space for Microsoft.

Due to the fast-moving innovation curves, M&A has become a very strong option for many companies to succeed in this space. However, a key aspect of the software space that makes it tough to justify and correctly value M&A transactions is the availability of open-source alternatives at very low to almost no cost. Open Source software tend to offer most of the common desirable features, while leaving the niche requirements to proprietary vendors who can monetize on them. The business model for a software offering is heavily dependent on the scale of adoption and the extent of value-added features that can be offered on top of the common functionality. Software Companies tend to look around their adjacency to find new features that can be integrated into their offerings, that would provide them with the additional market share. Hardware companies tend to look for software acquisitions to be able to attract customers with a full stack offering. They do this by rolling in the software into their
hardware costs and offering it as a complementary option. So the strategies around the journey edge and platform edge evangelized by LEK consulting are very relevant to understand software acquisitions by hardware vendors. Joining Forces also calls out Product Extension as a motivation to justify the extension of the value chain from pure hardware to software-based outcomes running on commodity hardware. Bower while talking of product/market extension also brings into play an additional aspect of R&D.

"Software is not knowledge, Your greatest asset is your knowledge about your domain" - Eric Evans.

"In designing a large system, there are so many contributing components, all complicated and all absolutely necessary to success, that the essence of the domain model, the real business asset, can be obscured and neglected." - Eric Evans

This clearly talks about the domain knowledge present in the development team is more important that the actual software tool itself. This is also why there is a trend of serial entrepreneurs succeeding in the software domain. One of the biggest motivators for the companies in software domain is "Acqui-hire" (acquiring for the skills), mentioned by McKinsey, Bain and Bower for innovative growth. However, the Ally or Acquire approach by Dyer et al. strongly advises against acquiring for soft resources, since the belief is that people would leave later for better opportunities. In thinking about such acquisitions, it would help to keep in mind the challenges of culture mismatch, technology aspirations and the concerns of employee retention as an integral part of the integration process.

3. Services - With the growth of the internet and move to cloud-based software,
there have been efforts at innovating around what models could best provide customers the value they desire. Eventually customers just care about getting their desired outcomes and not necessarily interested in understanding the products that help them reach the outcomes\(^3\). These are business models based on either offering the hardware/infrastructure or the software product as a subscription service leading to a host of new offerings like Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS) or Infrastructure-as-a-Service (IaaS). These models do not follow the traditional definitions of the Innovation model defined by James Utterback, since the process overhead to develop a product is not applicable in a services-based product. However, we can envision the service-based model itself as an innovation in consumption models where Services are the new products and best way to monetize on consumption

\(^3\) Delivering Customer Outcomes versus Selling Products: The GE Digital Case\(\text{\textregistered}\) by Frank M. Grillo and Karl Hellman
by reducing cost and increasing value is an ongoing process innovation.

The emergence of service-based models has been disruptive to both the Software as a product and the hardware/infrastructure businesses. Infrastructure companies are now rushing to avoid commoditization and looking at value added services to enable selling commodity hardware. The sixth wave of M&A has seen a significant uptick in the deals that drive disruptive business models and it is already turning out to be the defining story for the seventh wave too. For example, Virtualization of Hardware into software instances became a rage with VMware leading the market in VM technology. EMC which was a pure infrastructure vendor at the time acquired VMware and made it a part of its full stack solutions. This was a clear example of developing a new business model, beyond the simple adjacencies focus. While most models like LEK Consulting, Bower would have called out this deal for not being close to adjacencies, LEK does mention services-based approach around core competencies as a promising motivation. In the case of EMC-VMware an argument could be made that Virtual machines (VMs) extend the scale of the underlying infrastructure, buy better utilizing the available resources and allowing multiple instances to be managed conveniently. Apple buying Beats is another example of a traditionally hardware company buy a streaming music service to enhance and transform its original iTunes music platform.

The services domain is seeing a lot more focus in M&A with the trends in 2017-2019. This is a case of Hardware/software companies buying a disruptive platform that transforms the current value offering. This can be seen from data collected over the past 2 years from FactSet that demonstrate how Technology

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4 New Wave Of M&A To Be Driven By Innovation And Disruptive Deals - Pip McCrostie - Forbes
Services sector has been growing in the past year over infrastructure-based acquisitions just based on the average value per company in that sector.

4. Emerging Technology / Technical Skills: The seventh wave has been heavily influenced by key technology trends like Artificial Intelligence (AI), Machine Learning (ML), Data Science and Analytics, BlockChain, Internet of Things to name a few. There has been an explosion in the number of start-ups in these domains which are claiming expertise in a highly fragmented landscape. With the ever-increasing amounts of data being generated, the storage of data, processing in flight and at rest, data analytics, and generating intelligent outcomes are critical challenges that every big company (even non-technology ones) has to consider in order to succeed in a fast changing environment. Over the sixth
and seventh waves we are noticing how the technology has truly become an enabler rather than just being the core of a company’s offering.

One of the biggest challenges is the inability to understand how to best use tools to generate outcome. Companies tend to get pulled into the hype and executives feel the need to have their own story around the technology. Not having a significant strategy around enabling technologies is a mark of a non-innovative company rooted in legacy technologies. The need to be on the bleeding edge or just on the relevance side of the trend makes executives make rushed and badly informed decisions, which they might never be able to recover from, due to the fast moving trends\textsuperscript{5}. This is a space that needs a deep analysis based on Ally or Acquire since it is an enabling technology and not part of the core offering. Revenue generating business models based on enabling technology are usually interesting triggers for an acquisition. However, in some cases careful analysis tends to reveal that enabling technology is more relevant to improve efficiency and it is usually harder to justify an acquisition since it is difficult to pass the cost over to the customer\textsuperscript{6}.

An important part of dealing with any emerging technology is first to gather the skills to understand the technology and how it can be best used to generate value. With the exponential, growth of data, the need for data scientists to capture, analyze and develop data-driven outcomes has become imperative, and there is a dearth of data scientists who are capable enough to meet this growing requirement\textsuperscript{7}. Companies like Google, Facebook, Apple, Amazon, Microsoft are hiring data scientists in droves and this leaves many other companies wanting.

\textsuperscript{5}How to make AI work for your business - Jacques Bughin, Michael Chui, and Brian McCarthy - McKinsey Aug 2017
\textsuperscript{6}How Companies Are Already Using AI - Satya Ramaswamy - April 2017
\textsuperscript{7}https://insidebigdata.com/2018/08/19/infographic-data-scientist-shortage/
This has led to a trend of high valuation for start-ups that have data scientists not just from the technology IP perspective but also considering the amount of talent pool within the company. Big companies are using acqui-hire to get talent pools in short time\(^8\). There is an added advantage of getting a team that has proven its mettle in working together.

It isn’t therefore surprising that the latest frameworks by McKinsey and Bower call out Acqui-hire as one of the key motivations for companies to do M&A. However, as Ally v/s acquire cautions, it is important to understand whether partnering would instead provide the same value over time. Acquiring a technology that stands a risk of getting obsolete in a certain period of time, might not necessarily be a good idea, unless the returns are sufficiently realized sooner and is worth the risk of obsolescence.

### 6.4 Discussions

Keeping in mind the products, services and inherent technology skills needed to survive the future waves of technology transitions, it is very important to not just look at developing technology organically, but also consider the speed at which the transitions are taking place and think of effective inorganic approaches to be relevant. We have seen that for different aspects of the technology components, some of the frameworks appears to be more suitable, and that not one framework is sufficient to cover all the possible motivations to consider M&A as an option. However, the intention of the frameworks is really to provide a common set of guidelines that is applicable for most M&A transactions so that sufficient due diligence is performed to ensure success.

\(^8\)https://exitround.com/acquihires-from-2005-to-today-from-hype-to-pragmatism/
Out of all the frameworks discussed, based on the technology trends, needs of technology firms, and the applicability of the frameworks to the HP - Autonomy case, the McKinsey Framework appears to be the most comprehensive in dealing with most popular motivations that would be expected in a technology M&A transaction. While bringing out the six archetypes, the framework also covers the edge cases of tuck-ins, Consolidation, transformational mergers and competitive approaches of buying when a low-priced target is available. It is quite possible that the relevance of the McKinsey framework could also be because it is the most recent of all the other frameworks, but McKinsey attributes their research to being spread over their history of handling M&A which I interpret as covering most of the fourth, fifth and sixth wave of M&A. Another reason to hold McKinsey framework as a good reference is also the fact that it aligns very well with Bower’s approach of formal categorization on many key motivations. While McKinsey Framework certainly explains even the older waves very well, what is interesting is how it includes aspects like Diversification and Adjacencies which could be interpreted as conflicting but can be applied for different deals, especially in a market that is not risk averse. Also a key factor of the McKinsey Framework is the extent of alignment it has with the BCG and Bain approach to deal rationales. Bain and Co. particularly notices the trend of scope based growth deals outnumbering the scale based deals significantly in the disruptive market covered in the sixth wave of M&A 9. This is where core competencies are challenged, and with infrastructure getting commoditized, companies have no choice but to expand beyond the core and develop new outcome-based monetization. While this doesn’t fit well into traditional Utterback model or even typical S curves, McKinsey is able to justify different types of motivations: new business models, adjacencies, product

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9Using M&A to Ride the Tide of Disruption - Les Baird, David Harding, Peter Horsley, and Shikha Dhar - Bain and Co. - January 2019
extension, market extension. In that regard, McKinsey also shows alignment with LEK edge strategy and is highly relevant in understanding the opportunities closely related to the core offering/functionality of the acquirer.

The various M&A studies conducted to analyze the success or failure of transactions provide some insights on the motivations that drive M&A, based on detailed, comprehensive surveys. The McKinsey framework appears to be aligned with some of the key conclusions, especially synergy considerations in horizontal mergers within related domains, acquisitions for market share, as well as the relatively rare cases of defensive acquisitions due to competition.
Chapter 7

Future Directions

This study is a summary of various frameworks and their relevance to the technology M&A in the current environment. While it appears that McKinsey Framework is very promising and comprehensive in many aspects, it doesn’t provide much details about the exact data and the extent of data on M&A transactions that was used to define the framework. It would surely help to understand in greater detail whether the nature of companies considered in the McKinsey analysis all concentrated in technology sector or whether they are spread in all domains. At this point we can only speculate based on the timing of the research that they have a significant focus on the technology sector.

Another approach of extending this thesis is to perform a more quantitative analysis on the seventh wave of M&A and compare to the sixth wave specifically based on frameworks. This would help to validate some of the intuitive conclusions and interpretations that have been considered in this thesis.

One of the interesting aspects that came out of my case study of the HP-Autonomy deal, was that there was more than one rationale to go ahead with the
transaction like the need to fill a capability gap, the competitive reaction of potentially losing the target to a competitor, HP’s desire to enter the software space etc. However, what is not very clear is what was really the primary rationale and how did the primary rationale affect the due diligence process and negotiation process. It would also help to extend the research in this thesis to go deeper and understand specific cases of multiple deal rationales, and what research is available that can look at these specific cases.