Creating Value in the Merger and Acquisition Integration Process

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Abstract

This paper presents a model of the mergers and acquisitions (M&A) integration process that synthesizes disparate research streams in strategic management, organizational behavior, and human resources. Managing a M&A integration process is a dynamically complex problem and our information feedback control perspective provides new insights for scholars, policy makers, and practicing managers. The strategy field needs more theories about how to implement strategy initiatives such as M&A, and SD modelling is particularly suited to build process theories and explore the dynamic consequences of different implementation policies. Our simulation experiments show that integration fatigue is a key leverage point in determining the success or failure of M&A integrations. We discuss how successfully managing integration fatigue can maintain high levels of commitment, work quality, productivity, and organizational experience and skills.

Keywords: mergers and acquisitions, post-merger integration process, post-acquisition integration

Introduction

Organisations that have successfully sustained high growth rates over a long period of time, 15 years or more, have primarily used acquisitions as the engine of growth (Hess, 2010). The value of worldwide merger and acquisition (M&A) investments totalled US$3.5 trillion during 2014, a 47% increase from 2013. This is still below the all time high in 2007. Research shows, however, that a large percentage of M&A investments destroy economic value (for a review, see Haleblian *et al*., 2009; for the latest meta analysis, see King *et al*., 2004). Industry studies estimate that between 70-90% of M&A's fail to deliver the benefits that initially motivated the deal (Christensen *et al*., 2011). Recent research by the Hay Group reveals that only 9% of business leaders (http://www.haygroup.com/au/challenges/index.aspx?id=12290) think their merger or acquisition fully achieved its original objectives. Academic evidence also shows that the change and disruption associated with M&A restructuring often damages employee well-being and reduces organisational capabilities as high performing individuals leave the company (Rafferty and Restubog, 2010).

Researchers cannot currently provide reliable advice to managers about how to improve M&A outcomes because we do not have a good understanding of why some M&A's succeed while the vast majority fail. Three different streams of management research on post-acquisition integration – strategy, organisational, and human resource perspectives – have remained largely separate and this fragmentation has limited the explanatory power. In their meta-analysis of strategy M&A research, King *et al*. (2004) argued that: "Empirical research has not consistently identified antecedents for predicting post-acquisition performance. …our results indicate that unidentified variables may explain significant variance in post-acquisition

performance, suggesting the need for additional theory development." Similarly, change management scholars have reflected that while there has been much research on the human, organizational, and cultural aspects of M&A over the last 30 years, "…there have only been modest improvements in the M&A success rate" (Marks and Mirvis, 2011: 161).

Overall, empirical research has not converged on a set of factors that consistently predict post-acquisition performance (Cartwright and Schoenberg, 2006; King *et al*., 2004). There are critical gaps in existing theory and empirical findings. Decades of research shows that M&A transactions, on average, do not positively contribute to an acquiring firm's performance (King *et al*., 2004; Zollo, 2009). However, there is wide variation in post-acquisition performance (Capron and Pistre, 2002; Datta, Pinches, and Narayanan, 1992; King *et al*., 2004; Zollo, 2009). Some acquiring firms capture substantial value from M&A transactions, while the vast majority of firms destroy considerable value from M&A moves.

While there is a long history of System Dynamics research exploring firm growth dynamics (Forrester, 1963, 1968; Oliva, Sterman, and Giese, 2003b; Packer, 1964; Sterman *et al*., 2007), there has been limited published System Dynamics work on the M&A integration process. System dynamics is particularly useful for scholars interested in strategic management decision making and dynamics (Gary *et al*., 2008). This is evident from the large body of work that successfully applies System Dynamics to build process theories in strategic management (examples include Azoulay, Repenning, and Zuckerman (2010), Black, Carlile, and Repenning (2004), Gary (2005), Gary, Wood, and Pillinger (2012), Oliva and Sterman (2001), Rahmandad and Repenning (2015), Repenning (2002), and Repenning and Sterman (2002)).

Research also shows that post-merger integration implementation processes are vital to acquisition performance and often determine whether an M&A move creates or destroys value (Cording, Christmann, & King, 2008; Homburg & Bucerius, 2006). However, there has been limited work examining how different integration implementation policies effect post-acquisition performance. This gap in the literature on post-acquisition integration is surprising given research shows that different managerial policies for implementing corporate strategy moves can lead to substantial differences in performance outcomes (Gary, 2005). No cohesive theoretical framework currently explains the wide variance in post-acquisition performance and why some firms succeed and others fail in M&A moves. Building and testing an integrated dynamic theory is needed to explain the effects of managerial policies on post-acquisition performance over time.

This paper investigates how different policies for managing post-acquisition or post-merger integration lead to different levels of success. We combine in-depth fieldwork with system dynamics modelling to build an information feedback perspective on the M&A integration process. An organisation involved in integrating an acquisition into its existing business activities is a complex system of interdependent components, and SD modelling enables us to capture the complex, interdependent web of causal relationships among variables, and facilitates testing to ensure the proposed causal relationships can in fact generate the observed longitudinal patterns (Black *et al*., 2004; Repenning, 2002).

Focusing on the evolution in post-acquisition performance over time – from the announcement through to the end of the integration process – is novel in management research on M&A. Prior studies typically examine post-acquisition performance at a particular point in time – such as the day of the announcement, 3

months after the announcement, 1 year after the announcement, 3 years after the announcement, etc. This is an important reason why progress on understanding post-acquisition integration has stalled. Investigating the longitudinal development of post-acquisition performance shifts attention to identifying the underlying causal mechanisms driving integration performance over time rather than explaining static differences in performance among acquirers (Gary *et al*., 2008).

The next section describes the fieldwork we conducted and the data we collected, the dynamic patterns of behavior that came from our interviews, and the feedback structure of the SD model that emerged from our interview data.

Model of M&A Integration Process

The feedback structure of the model emerged from multiple data sources including interviews with expert informants, focus group workshops, and industry expert reports and studies.

Individual interviews involved 17 post-acquisition integration professionals with over 190 post-acquisition integration experiences. Interview notes captured the key points from the discussion and where possible the interviews were recorded. The interview notes were sent to each interviewee to check that the notes accurately reflected the discussion, and also provided interviewees with an opportunity to add to or elaborate on the contents of the interview.

Causal diagrams were constructed iteratively throughout the period of data collection. Each causal link was reviewed as it emerged, to assess whether the relationship was consistent with multiple data sources and whether it was supported by prior studies. The first phase extended over a five-month period.

Following the conclusion of the individual interviews, two focus group interviews were held. During the focus group interviews, the findings from the

individual interviews were presented including the longitudinal performance patterns and the causal diagrams based on their extensive professional experience. The focus groups were asked to evaluate the preliminary findings and to elaborate, refine and correct the performance patterns and perceived causal relationships. The outcomes from the focus group interviews included broad agreement about the preliminary findings, suggestions for further longitudinal performance patterns, and extensions to the causal diagram.

Overall, data was collected from 26 experts, 7 of whom were interviewed twice or more. Data was captured from 33 hours of individual and focus group interviews and included 373 transcribed pages. In addition, over 400 pages of industry reports and studies on post-acquisition integration were reviewed. Insights from the interviews and focus groups were triangulated with the use of data from industry reports and publications.

After the focus groups, the causal loop diagram was converted into a simulation model of the post-acquisition integration process. The findings are presented in the next two sections, starting with the longitudinal performance patterns and then a causal loop diagram capturing the experts' perceived causal relationships responsible for driving the dynamics. Also, the formulations of the simulation model are discussed.

Typical Patterns of Behavior

Our interviews with experts identified four patterns of performance over time that are commonly observed in post-acquisition integration. These patterns are shown in Figure 1 and have been labelled: (1) Fulfilled and Exceeded Expectations, (2) Below Forecast, (3) Synergy Creep, and (4) Death Spiral. The patterns in Figure 1 are captured in terms of the outcome measure of Realized Synergies. Realized Synergies

are the financial synergies that have been realized as a result of the integration work. The patterns were captured in numerous other outcome measures but the Realized Synergies measure was considered to be the most significant of the post-acquisition integration outcomes.

The performance patterns are captured over the period considered to be appropriate to reflect performance effects of any integration and are included in figure 1. Interviewees indicated that the duration of integration would vary depending on the characteristics of the acquisition and integration program. Most commonly three to five years was considered an appropriate time frame for measuring the success of an integration project. Descriptions of all four patterns are provided below. The Synergy Creep and Death Spiral patterns are discussed in greater depth as these reflect the most problematic outcomes.

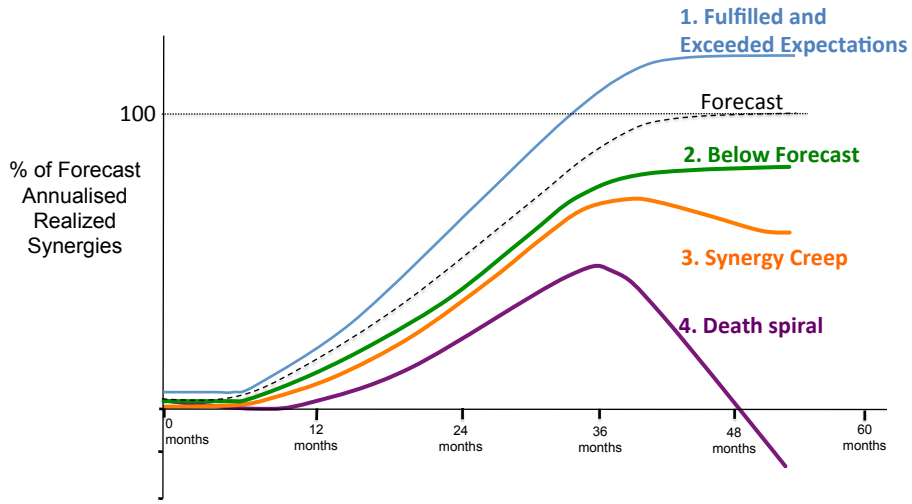

Figure 1: Four common patterns of behavior experts identified for M&A Integrations

The Fulfilled and Exceeded Expectations pattern is labelled number 1 in Figure 1. In this scenario the integration rolls out as planned and the target synergies are achieved as forecast. Expectations are exceeded when the realized synergies are higher and achieved earlier than expected. This may occur due to strong management involvement in planning pre-deal, adoption of effective governance processes to work through the integration, communicating effectively about the integration throughout the process, adopting appropriate synergy targets, allocating adequate resources to the integration projects, maintaining high employee morale and commitment, and retaining talented employees. Effective management of all of these aspects of the integration drives realized synergies to achieve or exceed the initial forecast. As one expert explained, "The best run processes feel very simple…it is about having people on the hook all the way through…the people who are ultimately responsible for doing the integration."

The Below Forecast pattern, the line labeled number 2 in Figure 1, occurs when outcomes are consistently below forecast. Some synergies are realized from the integration but not all of the synergies are achievable or there are delays. As a result the total realised synergies end up as lower than forecast. An expert explained with reference to a graph the recognition of unachievable synergies as the outcome of the difference between forecast synergies and actual synergies realised over time: "…what we see on a lot of deals, there's one where it starts really quickly, then it levels out much earlier and doesn't get up, so you end up with this big value gap over here [referring to right hand side of the graph that indicates a time period later in the integration implementation]...the issue is normally around the process, because they should have been picking up the errors much earlier on….the issues are more

governance-related and how you can actually bring that back to running a robust program."

The Synergy Creep pattern is labelled number 3 in Figure 1 and the experts we interviewed believe this pattern occurs to some extent in the majority of post-acquisition integrations. Under the Creep scenario, synergies are initially achieved as planned, but then the energy and enthusiasm for synergy initiatives wane, integration fatigue sets in, monitoring and tracking the synergies fails or stops, and management focus moves away. Integration fatigue is described by one expert as: "…if the synergies that you came up with upfront aren't right, if your assumptions were bad, you need to go out and find some more synergies, because we still need to realize that [pre-deal forecast synergy]. People actually get fatigued and tired of continually trying to find and chase synergies."

A result of integration fatigue is that "creep" occurs in the realized synergies, a movement back towards the original position. In the synergy creep scenario once integration plan tracking fails or stops, there is a claw back of synergy cost savings or loss of synergy gains. For example, employees that were made redundant as part of the cost saving plans, are re-employed as contractors. One expert, while drawing the synergy creep pattern for realized synergies, explained: "So often you'll see synergies probably not tracked with the right amount of rigour. And I'll give you a classic example…we think we can reduce costs by about 2 million bucks by making a whole bunch of redundancies in our finance department. But then you find that six months down the line all of a sudden you've got rid of your fifteen or twenty people but suddenly you've got seven or eight new contractors working, providing services because you got rid of all these people, and now you've got contractors. Ultimately the actual impact to the P&L is potentially increased costs or costs haven't gone down

by the amount that you initially thought. They did go down initially but it's crept back into the business."

The fourth scenario, the Death Spiral pattern, occurs when the pressures of the integration are not well managed and they "break the business." There may be numerous initial causes for pressure to occur, but poor management decisions and processes create the downward spiral. Initial pressures may be the result of unachievable synergy targets. Poor assessment of synergies may drive up levels of fatigue and drive down management commitment, especially when management is, "given a KPI that is something he doesn't believe in."

Declining commitment leads to higher levels of voluntary turnover and uncertainty. Uncertainty leads to further declines in commitment, which in turn undermines productivity and quality. These feedback effects are exacerbated by a declining level of experience in the organisation as a result of unintended employee departures. Also, these feedbacks add costs and delays to the integration process that have flow on effects to the broader business. Once activated, these feedbacks can cause a downward spiral in the post-acquisition integration. One expert consultant explains the death spiral effect: "it is a cancer…it is debilitating…it creates a negative vibe that impacts value and performance…it is a distraction to everything and people do not want to be there and it is usually your star performers that leave…it is like a death spiral effect and it is hard to get momentum around the business to drive the integration program...and people talk to their customers about it." The Death Spiral pattern is labeled number 4 in Figure 1 and results in an initial period of increasing synergy realization followed by declining synergy realization over time.

Analysis of the four patterns of behavior, together with rich descriptions from the interviews, provided insights into the dynamics of the integration process.

Diagram and discussion of different decision units

Feedback structure

The causal diagram was developed throughout the data collection process and portrays a post-acquisition integration from the date of initiation of the integration project through to the end of the integration. The causal diagram is included as Figure 2. This section will provide an overview of the key elements of the causal diagram.

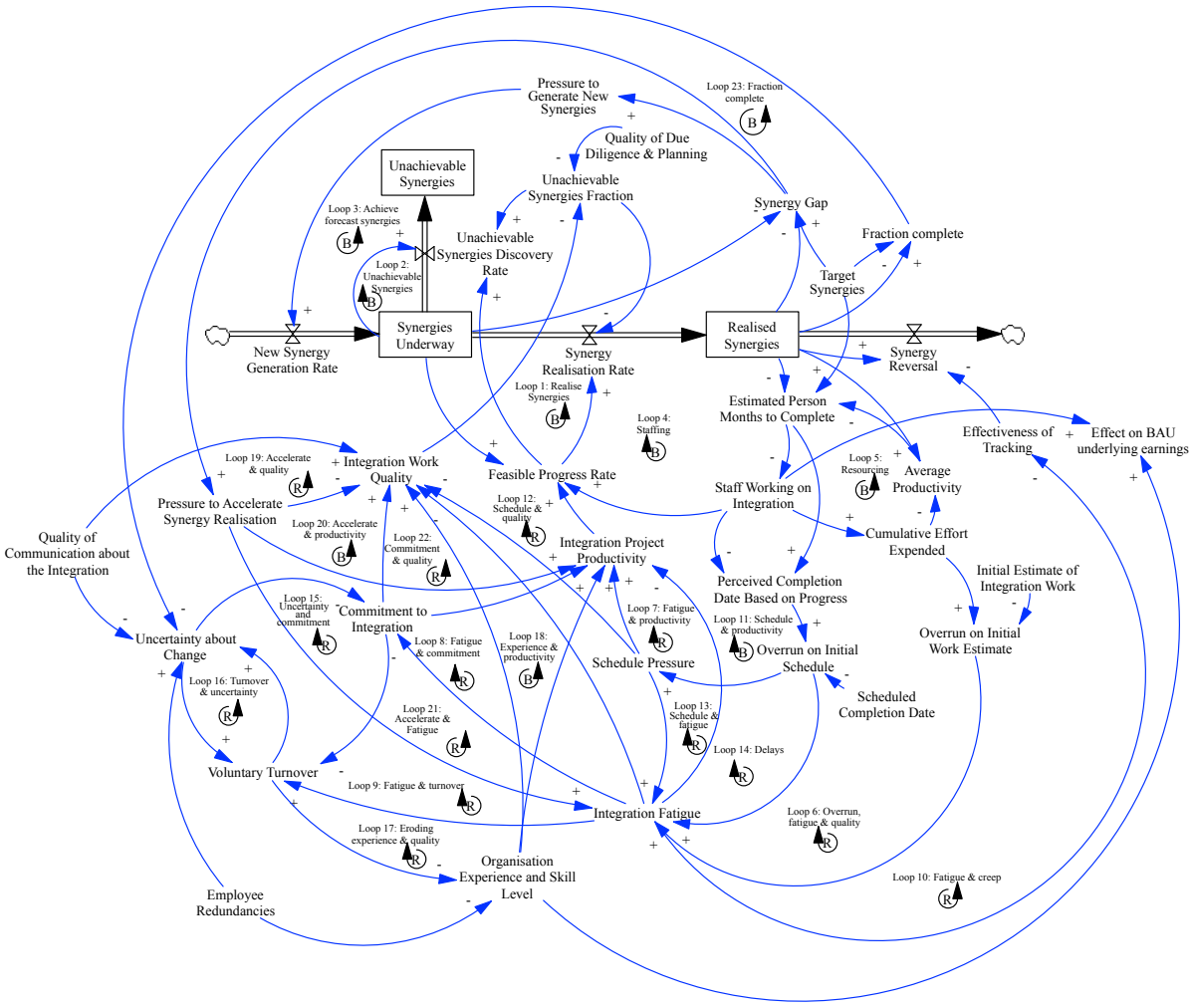

Figure 2: Causal Diagram of the M&A Integration Process

The motivation for any integration is to realize the potential synergies. Target Synergies are an exogenous input to the integration program identified in acquisition evaluation and due diligence process. To illustrate, consider an integration of a recently acquired business into an established business. The acquisition was motivated by the ability to capture synergies and it is only through integration of the business into the acquirer's operations that the potential value can be realized. Target Synergies may be realized through revenue uplift or through cost savings delivered by the integration of the businesses and are forecast to total $150 million per annum with the expectation that this total value can be realized over a three-year period.

Target Synergies = 150 (Units: $M/Year) (1)

Synergies are shown as stocks: Synergies Underway and Realized Synergies. Synergies Underway include the synergies associated with integration initiatives currently in progress or yet to be started. The initial value includes the total initial value of the Target Synergies the integration is expected to deliver.

d(Synergies Underway)/dt = New Synergy Generation Rate – Synergy Realisation Rate - Unachievable Synergies Discovery Rate (2)

Initial Synergies Underway = Target Synergies (Units: $M/Year) (3)

Synergies Underway are realized at the Synergy Realisation Rate and captured as Loop 1 in the causal diagram. The Synergy Realisation Rate is determined by the Feasible Progress Rate and the fraction of synergies that are not achievable - Unachievable Synergies Fraction. The units of this rate are: ($M/Year)/ Month.

Synergy Realisation Rate = Feasible Progress Rate * (1 - Unachievable Synergies Fraction) (4)

Despite efforts to validate the existence of synergies during the due diligence evaluation phase, some synergies initially believed to be achievable will not be achievable. For example, experts we interviewed highlighted that often the cost to

shut down a legacy IT system outweighs the economic benefits, and as a result the legacy system is not ultimately shut down. A further example is where planned rationalization of office space requires breaking a lease that attracts penalties resulting in the plan becoming declared uneconomical and not plausible in the short to medium term. In this case cost saving synergies expected from the shut down and the headcount reduction expected due to redundancy following the shut down of the system are classified as Unachievable Synergies and the initiatives associated with these synergies stopped together with the associated synergies removed from the stock of Synergies Underway. Synergies may be unachievable due to poor assessment in the pre-integration due diligence work or as a result of poor Integration Work Quality. Synergies move to the stock of Unachievable Synergies at the Unachievable Synergies Discovery rate and the units of this equation are: ($M/Year)/Month.

Unachievable Synergies Discovery Rate = Feasible Progress Rate * Unachievable Synergies Fraction (5)

Unachievable Synergies Fraction= Unachievable Synergy Fraction from Quality of Due Diligence & Planning + (1-Unachievable Synergy Fraction from Quality of Due Diligence & Planning)*(1-Integration Work Quality) (6)

The discovery of Unachievable Synergies is labeled Loop 2. Management continuously monitors the total of the Realized Synergies and Synergies Underway and compares this to the Target Synergies to determine if there is a Synergy Gap (Units: $M/Year).

Synergy Gap = Target Synergies - Synergies Underway - Realized Synergies (7)

When there is a Synergy Gap, management exert pressure to search for and identify new synergies to close this gap, and these new synergies are generated at the New Synergy Generation Rate (Units: ($M/Year)/Month). The causal loop capturing new synergy generation is labeled Loop 3.

New Synergy Generation Rate = Pressure to Generate New Synergies/Time to Identify New Synergies (8)

Staff are allocated to the integration project based on the estimated person-months of work required to complete the integration (i.e., to realize the remaining target synergies) and the Average Productivity of staff. The staffing of the project is captured in Loop 4. Staff work at the Feasible Progress Rate to deliver Realized Synergies or recognise Unachievable Synergies.

The allocation of staff to the integration depends on the historical effort already expended on the integration and the progress made in realizing synergies to that time. Loop 5 includes the effect of Cumulative Effort Expended (the total number of person months) on Average Productivity and in turn on the allocation of resources as Staff Working on Integration.

In Loop 6 Cumulative Effort Expended on the integration project is compared to the Initial Estimate of Integration Work required. An Overrun on Initial Work Estimate will affect the level of Integration Fatigue in the organisation. Fatigue is a phenomenon that has previously been recognized in project work (Lyneis and Ford, 2007) and mergers and acquisitions (Marks and Mirvis, 2010). An increase in Overrun on Initial Work Estimate will have the effect of increasing Integration Fatigue. An increase in Integration Fatigue decreases Integration Work quality (Lyneis and Ford, 2007). A decrease in work quality increases the Unachievable Synergies Fraction and decreases the Synergy Realisation Rate (closing the reinforcing Loop 6).

Loop 7 includes the effect of fatigue on productivity (Lyneis and Ford, 2007). An increase in fatigue will decrease the Integration Project Productivity and reduce the Feasible Progress Rate and Synergy Realisation rate, forming a further reinforcing loop. Similarly, reinforcing Loop 8 captures the effect of an increase in Integration

Fatigue that decreases Commitment to Integration, and flowing through to decrease Integration Project Productivity, the Feasible Progress Rate, and the Synergy Realisation Rate.

Loop 9 captures the effect of fatigue on Voluntary Turnover of staff (Lyneis and Ford, 2007). Oliva, Sterman, and Giese (2003a) recognise that sustained long weeks of work will increase turnover. It is common in integration projects to work long hours over a sustained period of time. The effect of increasing Voluntary Turnover is to increase the level of change in the organisation and increase Uncertainty about Change, that is the level of uncertainty in the organisation about the changes occurring as part of the integration. Increasing uncertainty decreases managers' and employees' commitment to the integration (Bordia *et al*., 2004; Hui and Lee, 2000; Schweiger and Denisi, 1991). The negative link between Uncertainty about Change and Commitment to Integration follows on to effect Integration Productivity and so on, as explained for Loop 8, forming a further reinforcing loop.

A further effect of Fatigue is on attention to tracking and ensuring that realized synergies are maintained and not reversed. This relationship is included in the causal diagram as reinforcing Loop 10. Loop 10 and Integration Fatigue are important in explaining the behavior of the model therefore the key formulations from the simulation model are included here.

Integration Fatigue is influenced by Overrun on Initial Work Estimate, Overrun on Initial Schedule (explained in the discussion of Loops 11, 12, 13 and 14 below), and Pressure to Accelerate Synergy Realisation (explained in the discussion of Loops 19, 20, and 21 below).

d(Integration Fatigue)/dt = Change in Fatigue (9)

Initial Integration Fatigue = Normal Fatigue (10)

Change in Fatigue= ((Normal Fatigue*Effect of Schedule Pressure on Fatigue*Effect of Overrun on Fatigue*Effect of Greater Effort than Expected on Fatigue*Effect of Pressure to Accelerate on Fatigue)-Integration Fatigue)/Time to Change Fatigue (11)

Normal Fatigue = 1 (12)

An Integration Fatigue value of 1 indicates normal work intensity without any fatigue. Values greater than 1 indicate fatigue. As the level of fatigue increases the Effectiveness of Tracking decreases nonlinearly. Declining Effectiveness of Tracking results in Synergy Reversal. Synergy Reversal is a function of the level of Realized Synergies and Effectiveness of Tracking over the time it takes for the synergies to be reversed (Units: ($M/Year)/Month).

Synergy Reversal = ((Realized Synergies*(1-Effectiveness of tracking))/Time for Synergy Reversal) (13)

Synergy Reversal is a loss or decline in previously Realized Synergies. When this occurs there is a claw back or creep in synergies, for example retrenched employees are hired back as contractors to the organisation. A robust tracking program is a key factor in sustaining integration success. One expert explained the importance of tracking:

> "If people aren't being measured, they're not going to do what you ask them to do. That's the reality of anything in business. The successful and sustainable mergers are ones where the tracking process is very clear, very clean, robust, links into your P&L system, there's no where to hide and it's kept for a long period of time. The opposite end is minimal tracking process."

An Overrun on Initial Schedule occurs when the Perceived Completion Date Based on Progress is later than the Scheduled Completion Date. An effect of an Overrun on Initial Schedule is to create Schedule Pressure. Loops 11 and 12 introduce the impact of both Overrun on Initial Schedule and Schedule Pressure. Schedule Pressure is pressure applied to complete the integration work faster with the objective

of completing the integration on the Scheduled Completion Date. The effect of Schedule Pressure is to increase Integration Project Productivity as staff work faster, forming a balancing Loop 11. A further effect is to decrease quality as the error rate increases with faster work, forming a reinforcing Loop 12. An additional effect of Schedule Pressure is to increase Integration Fatigue as staff work harder or longer, forming a further reinforcing Loop 13.

Overrun on Initial Schedule also has a direct effect on Integration Fatigue. When there is an overrun on schedule, staff working on the integration are required to work on the integration past the initial scheduled completion date. This additional time in the integration will increase Integration fatigue. Similarly Marks and Mirvis (2010) discussed fatigue as a function of amount of time working on mergers and acquisitions. Loop 14 is a reinforcing loop that captures the effect of overruns and delays on Integration Fatigue and the Synergy Realisation Rate.

Loops 15 and 16 are reinforcing loops involving Uncertainty about Change, Commitment to Integration, and Voluntary Turnover. As an example of the effect of these reinforcing loops, consider the effect of an increase in Voluntary Turnover. An increase in Voluntary Turnover will increase Uncertainty about Change. This will have two flow on effects. Through loop 15, there will be a decrease in Commitment to Integration leading to further increasing Voluntary Turnover, completing a reinforcing loop. Through loop 16 the increase in Uncertainty to change will further increase Voluntary Turnover, closing the reinforcing loop.

A further effect of an increase in Voluntary Turnover is to decrease the Organisation Experience and Skill Level as staff leave the organisation. This is captured in Loop 17. In the interviews, experts commented that it was usually the most experienced people who left first as they were able to easily find work elsewhere.

The decrease in experience also decreases Integration Work Quality as a less experienced workforce completes the integration work, in turn increasing the Unachievable Synergies Fraction to form a reinforcing loop. A decrease in Organisation Experience and Skill Level also decreases Integration Project Productivity that subsequently decreases the Feasible Progress Rate and the Synergy Realisation Rate and so on. Loop 18 captures this effect and is a further reinforcing loop.

Loops 19, 20 and 21 capture the effect of management Pressure to Accelerate Synergy Realisation. An increase in pressure to accelerate may occur when there is an increase in the Synergy Gap (difference between synergies realized and underway and Target Synergies expected at a given time during the integration). When the gap grows, management take actions to decrease the Synergy Gap by increasing the pressure to deliver Realized Synergies faster. The result is a decrease in Integration Work Quality as staff work faster and make more errors, which increases the Unachievable Synergies Fraction, and decreases the Synergy Realisation Rate, and leading to an ever widening Synergy Gap. This is reinforcing loop 19. In contrast, Loop 20 is a balancing loop that captures the increase in Integration Project Productivity as staff work harder in response to the increase in pressure, flowing on to increase the Feasible Progress Rate, increase Synergy realization, and decrease the Synergy Gap. In Loop 21 the effect of the increase in Pressure to Accelerate Synergy Realisation flows on to increase Integration Fatigue as staff work harder and longer. This reinforcing loop has the effect of decreasing Integration Work Quality, increasing Unachievable Synergies Fraction, decreasing the Synergy Realisation Rate and increasing the Synergy Gap from what it would otherwise have been.

A further effect on Integration Work Quality is from Commitment to Integration and is captured in the reinforcing Loop 22. A decrease in Commitment to Integration has the effect of decreasing Integration Work Quality, flowing on to decrease the Synergy Realization Rate and increase Integration Fatigue, resulting in a reinforcing decrease in Commitment to Integration.

Our interviews revealed that it is also common for the integration project to have an effect on the underlying earnings of the broader business. This effect is represented as Effect on BAU underlying earnings on the right side of the causal diagram. For example these changes may occur as a result of flow on effects on experience from changes in Organisation Experience and Skill Level, and the amount of distraction from BAU as the number of staff working on the integration changes.

When activated, the feedback loops captured in the causal loop diagram in Figure 2 are capable of explaining all of the performance patterns in Realized Synergies shown in Figure 1: Fulfilled and Exceeded Expectations, Below Forecast, Synergy Creep, and Death Spiral. The next section discusses the simulation experiments with the model to generate the four typical patterns of behavior.

Simulation Experiments

After constructing the model, we extensively tested the sensitivity of the model and then calibrated the model to reproduce the four typical behavior patterns identified in our interviews for M&A integration outcomes. Figure 3 shows the simulation experiments replicating the four behavior patterns.

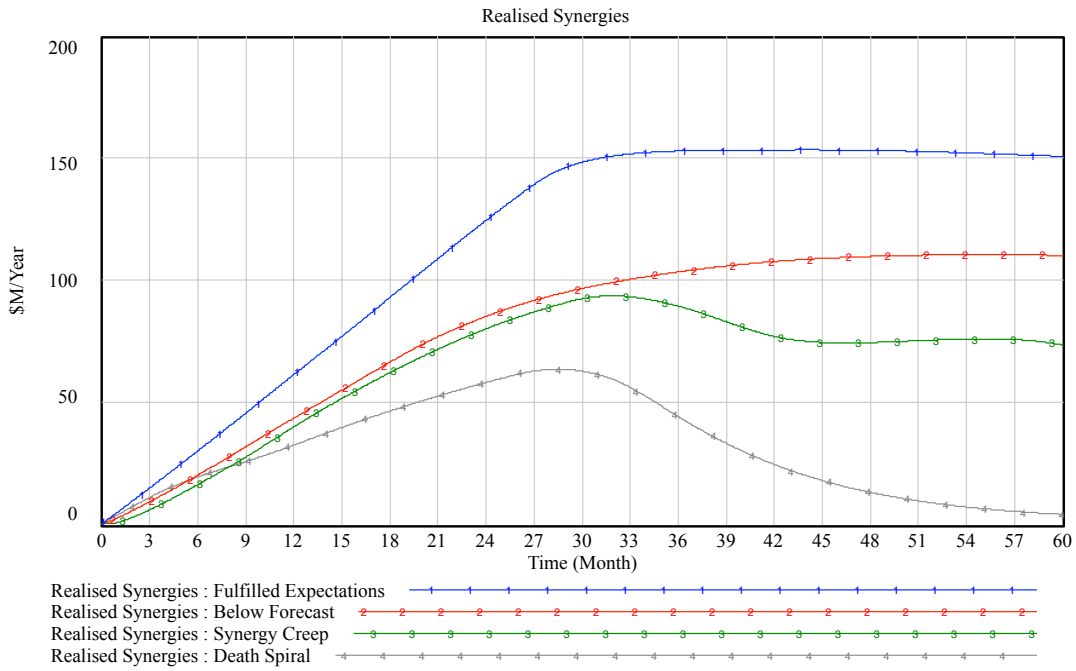

Figure 3: Simulations replicating the 4 typical behavior patterns of M&A Integrations

Fulfilled and Exceeded Expectations

The Fulfilled and Exceeded Expectations performance pattern of behavior (line 1 in Figure 3) reflects a successful outcome for the post-acquisition integration process. In this scenario the Realized Synergies forecast are achieved or exceeded. The factors that can contribute to the success are a high Quality of Due Diligence and Planning and as a result realistic forecast synergies. High Quality of Communication throughout the integration process will contribute to higher Integration Work Quality and lower levels of Uncertainty about change. These factors maintain high levels of Commitment to Integration and Integration Work Quality, flowing through the feedback structure to minimise Unachievable Synergies and maintain the Synergy Realisation Rate at high levels. In addition, Voluntary Turnover throughout the process has been minimised with high levels of experienced staff maintained within the organisation. Overall, the M&A integration process is well managed.

Below Forecast

The Below Forecast performance pattern (line 2 in figure 3) occurs when there is a positive Synergy Gap between expected and Target Synergies. This may occur when Target Synergies identified are overestimated, that is the Unachievable Synergies Fraction is higher than expected, but management decisions limit the potential negative effects of the positive Synergy Gap between expected and pre-deal forecast synergies. Management pressure to achieve new synergies and accelerate synergies are applied but with the on-going health of the business kept as a priority. Management commitment to the integration remains high and adequate resources allocated to integration limit Integration fatigue, maintaining the Effectiveness of Tracking and limiting Synergy Reversal. High levels of commitment ensure that Voluntary Turnover is limited and a high level of experience is maintained within the organisation.

Synergy Creep

Rising Uncertainty and Integration Fatigue may initiate the Synergy Creep performance pattern (line 3 in Figure 3). Rising Integration Fatigue results in failure of the tracking system near the end of the integration and synergies are reversed (lost). The initial stages of the Synergy Creep performance pattern are the same as the Below Forecast performance pattern, but near the end the performance pattern turns downwards indicating a reversal in previously achieved realized synergies.

Death Spiral

Without appropriate management processes and policies, the Death Spiral pattern may occur (line 4 of Figure 3). There are multiple initial causes of pressure in M&A integration, but it is the reinforcing feedback effects that, if inadequately managed, drive the downward spiral. For example, the initial effects of Integration

Fatigue on Commitment may be exacerbated by increases in Voluntary Turnover of management and employees. In turn, rising Voluntary turnover increases Uncertainty and decreases the level of experience in the organisation. These dynamics are captured in reinforcing feedback Loops 15 and 16 in Figure 2. These two loops reinforce initial changes in Integration Fatigue and Commitment. If not appropriately managed then pressure can activate further reinforcing feedback loops with the potential to "break the business" including loops 17 and 22. Breaking the business results in declining outcome measures and the "death spiral effect" as Realized Synergies are eroded, Uncertainty rises, employees depart, and organisation experience deteriorates.

Discussion

Our efforts to model the M&A integration process are motivated by the substantial opportunity to improve knowledge and understanding about this dynamically complex phenomenon for strategy scholars, policy makers, and practicing managers. With failure rates so high, there is scope to make dramatic improvements in M&A integration outcomes. Until researchers have an improved understanding of the drivers of employee and organisation outcomes in M&A and can provide managers with better guidance about effective strategy implementation and change management policies, much of the M&A activity will likely continue to result in disappointing outcomes.

Our simulation experiments show that poor management policies drive the Death Spiral performance pattern. When the integration process starts to go wrong, a large number of reinforcing feedback loops are activated that lead to the Death Spiral. Integration Fatigue is a key leverage point in managing a successful M&A integration. If fatigue builds up in response to schedule pressure, schedule overrun and/or pressure

to accelerate synergy realisation, it can have deleterious effects on work quality, productivity, employee turnover, and commitment leading to the Death Spiral. Even a small amount of pressure can trigger a rapid decline in the performance of the integration if not well managed.

The silver lining is that managerial decisions and actions can control the integration process and prevent the vicious reinforcing feedback loops from dominating the process and the outcomes. Senior management's rigid fixation on achieving the initial target synergies is understandable, but can undermine the integration process if many of the synergies initially expected from the due diligence and planning are not actually achievable. Deciding when to apply pressure to generate new synergies and to accelerate synergy realisation to meet targets and how much pressure to apply are difficult challenges in a high-order, nonlinear system such as managing an M&A integration process.

References

Azoulay P, NP Repenning, EW Zuckerman. 2010. Nasty, Brutish, and Short: Embeddedness Failure in the Pharamaceutical Industry. *Administrative Science Quarterly* **55**(3): 472-507.

Black L, PR Carlile, NP Repenning. 2004. A Dynamic Theory of Expertise and Occupational Boundaries in New Technology Implementation: Building on Barley's Study of CT Scanning. *Administrative Science Quarterly* **49**: 572-607.

Bordia P, E Hobman, E Jones, C Gallios, VJ Callan. 2004. Uncertainty During Organisational Change: Types, Consequences, and Management Strategies. *Jounral of Business and Psychology* **18**(4): 507-532.

Capron L, N Pistre. 2002. When do acquirers earn abnormal returns? *Strategic Management Journal* **23**(9): 781-794.

Cartwright S, R Schoenberg. 2006. Thirty years of mergers and acquisitions research: Recent advances and future opportunities. *British Journal of Management* **17**(S1): S1-S5.

Christensen CM, R Alton, C Rising, A Waldeck. 2011. The Big Idea: The New M&A Playbook. *Harvard Business Review* **89**(3): 48-57.

Datta DK, GE Pinches, V Narayanan. 1992. Factors influencing wealth creation from mergers and acquisitions: A meta analysis. *Strategic Management Journal* **13**(1): 67-84.

Forrester JW 1963. Dynamics of Corporate Growth. In *Proceedings of the Management Strategy for Corporate Growth in New England*. Massachusetts Institute of Technology.

Forrester JW. 1968. Market Growth as Influenced by Capital Investment. *Industrial Management Review (MIT) (currently published as the Sloan Management Review)* **9**(2): 83-105.

Gary MS. 2005. Implementation Strategy and Performance Outcomes in Related Diversification. *Strategic Management Journal* **26**(7): 634-664.

Gary MS, M Kunc, JDW Morecroft, SF Rockart. 2008. System dynamics and strategy *System Dynamics Review* **24**(4): 407-429.

Gary MS, RE Wood, T Pillinger. 2012. Enhancing Mental Models, Analogical Transfer, and Performance in Strategic Decision Making. *Strategic Management Journal* **33**(11): 1229-1246.

Haleblian J, CE Devers, G McNamara, MA Carpenter, RB Davison. 2009. Taking stock of what we know about mergers and acquisitions: A review and research agenda. *Journal of Management* **35**(3): 469-502.

Hess ED. 2010. *Smart Growth: Building an Enduring Business by Managing the Risks of Growth*. Columbia Univ Press, New York.

Hui C, C Lee. 2000. Moderating Effects of Organization-Based Self-Esteem on Organizational Uncertainty: Employee Reponse Relationships. *Journal of Management* **26**(2): 215-232.

King DR, DR Dalton, CM Daily, JG Covin. 2004. Meta-analyses of post-acquisition performance: Indications of unidentified moderators. *Strategic Management Journal* **25**(2): 187-200.

Lyneis JM, DN Ford. 2007. System dynamics applied to project management: a survey, assessment, and directions for future research. *System Dynamics Review* **23**(2/3): 157-189.

Marks ML, PH Mirvis. 2010. *Joining forces: making one plus one equal three in mergers, acquisitions, and alliances*. Jossey Boss, Sanfrancisco, CA.

Marks ML, PH Mirvis. 2011. Merge ahead: A research agenda to increase merger and acquisition success. *Journal of business and psychology* **26**(2): 161-168.

Oliva R, JD Sterman. 2001. Cutting Corners and Working Overtime: Quality Erosion in the Service Industry. *Management Science* **47**(7): 894-914.

Oliva R, JD Sterman, M Giese. 2003a. Limits to growth in the new economy: exploring the 'get big fast' strategy in e-commerce. *System Dynamics Review* **19**(2): 83-117.

Oliva R, JD Sterman, M Giese. 2003b. Limits to growth in the new economy: exploring the‘get big fast’ strategy in e-commerce. *System Dynamics Review* **19**(2): 83-117.

Packer DW. 1964. *Resource Acquisition in Corporate Growth*, *Wright Allen Series in System Dynamics*. MIT Press, Cambridge MA.

Rafferty AE, SLD Restubog. 2010. The impact of change process and context on change reactions and turnover during a merger. *Journal of Management* **36**(5): 1309-1338.

Rahmandad H, N Repenning. 2015. Capability Erosion Dynamics. *Strategic Management Journal* **Early View**.

Repenning NP. 2002. A Simulation-Based Approach to Understanding the Dynamics of Innovation Implementation. *Organization Science* **13**(2): 109-127.

Repenning NP, JD Sterman. 2002. Capability Traps and Self-Confirming Attribution Errors in the Dynamics of Process Improvement. *Administrative Science Quarterly* **47**: 265-295.

Schweiger DM, AS Denisi. 1991. Communication with employees following a merger: a longitudinal field experiment. *Academy of Management Journal* **34**(1): 110-135.

Sterman JD, R Henderson, ED Beinhocker, LI Newman. 2007. Getting Big Too Fast: Strategic Dynamics with Increasing Returns and Bounded Rationality. *Management Science* **53**(4): 683-696.

Zollo M. 2009. Superstitious learning with rare strategic decisions: Theory and evidence from corporate acquisitions. *Organization Science* **20**(5): 894-908.