Turnaround Success in High Technology Growth Stage Firms

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Firms in growth industries face frequent innovation cycles, environmental ambiguity, and time-based pressures that often lead to performance declines or failure. This study explores actions and firm circumstances that are associated with successful growth stage turnarounds. We apply life cycle theory to a sample of technology-based firms with the aim of clarifying what factors enable a timely turnaround in the context of a growth industry. We find that successful turnarounds are significantly associated with a smaller firm size and with a more severe decline. These results offer implications for life cycle theory and add depth to turnaround literature.

INTRODUCTION

Even though life cycle theory provides logic for expecting favorable firm performance in a growth industry, many firms struggle to survive in this stage. Given the high pace of innovation and environmental ambiguity, performance declines do occur; growth is not linear. Growth and firm life can be fragile; a study that comprised six decades of 25,000 publicly traded firms finds the average half-life to be just 10 years (Daepp, Hamilton, West, & Bettencourt, 2015).

Although innovation is critical to our economy and to firm health, the advantages conferred by innovation are frequently tenuous (McGrath, 2013). While stakeholders benefit from innovation "winners," the firms they displace face downside in terms of valuation, morale, and at times failure (Madsen & Desai, 2010; Morrow, Sirmon, Hitt, & Holcomb, 2007). Some growth stage firms respond by turning around the decline while others fail to do so. In this study we explore variables associated with successful growth stage turnarounds.

Clear patterns of turnaround success remain elusive. This pattern holds broadly across turnaround categories, actions, industries, firm type, and research methodology. Perhaps the inconclusiveness stems from research that has its foundations in mature firms (Grinyer & Spender, 1979; Schendel, Patton, & Riggs, 1976). Or perhaps it stems from the belief that a crisis must occur before a management team will recognize the need for a turnaround (Filatotchev & Toms, 2006; Martin & Kimberly, 2008). There remains an obvious problem, or opportunity depending on one's view; performance declines and failures remain high.

The purpose of this research is to take a fresh view, to limit the extraneous factors that thwart the ability to generalize. We do so in two ways. First, using life cycle theory as a lens we restrict our investigation to growth industries. What works well at one point may not be optimal as the environment changes. We focus on the growth stage as this period experiences a high degree of uncertainty, is important to a country's economy, and lacks research depth in the turnaround field. Within the realm of growth we selected technology-based industries. This choice stemmed from interest in the particular challenges these firms face, such as high velocity markets and competitive disruptions (Anderson & Tushman, 1990).

A few scholars have focused on growth, but have taken a more limited approach, such as focusing on a single firm (Bruton & Rubanik, 1997) or a single industry (Ndofor, Vanevenhoven, & Barker, 2013). The bulk of empirical turnaround research has focused on companies across a range of life cycle stages (Clapham, Schwenk, & Caldwell, 2005; Francis & Desai, 2005). That apples-and-oranges approach may well have contributed to the lack of consensus on the topic.

Our second contribution challenges the notion that turnaround studies need long periods of analysis. Rather than assume a turnaround should be measured over periods that average more than three years (Bruton, Ahlstrom, & Wan, 2003; Francis & Desai, 2005), we advocate that a turnaround should be measured within an appropriate timeframe. Three years in a growth industry can swing a firm from success to failure, or the converse. We address this shortcoming by using a time frame measured in quarters. Such an approach is limited and unique in this area (Pearce, 2007; Sudarsanam & Lai, 2001).

THEORETICAL FRAMEWORK

In general, industry life cycle factors are viewed via broad patterns, such as industry innovation, competiveness, and survival rates. Compared to other stages, the growth stage generally exhibits broader variety (Govindarajan & Trimble, 2005), dynamism, and creative destruction (Schumpeter, 1934). These attributes enable firms to take chances and to engage in innovation with the knowledge that opportunities remain as buyer uncertainty continues.

Organizational characteristics also differ by life cycle stage, including strategy, administrative procedures, and management. New entrants tend to focus on survival or a market acceptance strategy. As the firms find success, they tend to increase their focus on expanding markets and products, emphasizing product development and commercialization, and preserving or searching for access to funding (Lester, Parnell, & Carraher, 2003; Miller & Friesen, 1984). Research indicates that changes in policies and procedures (P&P) impact organizational direction and plasticity as the stages progress. In the growth stage, firms develop more sophisticated P&P. While the management team still has its sights on the competition and the changing external environment (Adizes, 1979), management styles and priorities evolve as the firm grows and responds to the market (Lumpkin & Dess, 2001). Thus, context drives this study. From a context of industry growth we look to understand what levers a technology-driven firm may possess to enact a performance turnaround.

Applying Life Cycle Theory to Turnarounds

We began with growth and asked how life cycle theory could be used in the context of turnaround performance. By definition the growth stage is one of expansion beyond a prescribed benchmark. In our study, that benchmark is 150 basis points beyond the US gross domestic product (GDP) growth rate. While we selected variables that have been used in previous research (Francis & Desai, 2005; Ndofor, Vanevenhoven, & Barker, 2013; Schmitt & Raisch, 2013) our final choice was determined by our focus on growth stage firms.

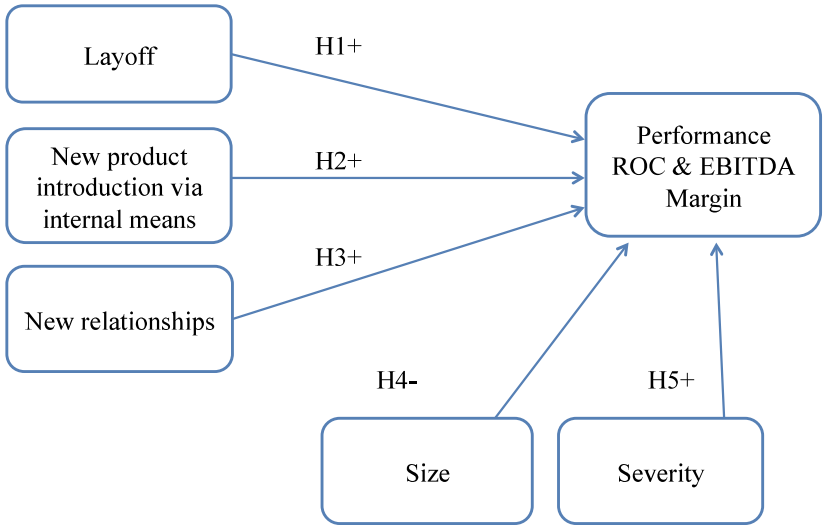
Life cycle theory portrays such firms as exhibiting entrepreneurialism and a rapid response to market change. Therefore we expect successful turnarounds to be predicted by a willingness to pivot, a growth stage construct operationalized in three ways as shown in Figure 1. We also examine variables associated with a firm's own circumstances, in the belief that they can facilitate a rapid response. Specifically, we

investigate the effect that firm size and decline severity may have on the ability to successfully turn around a performance decline.

Willingness to Pivot

Life cycle theory indicates that firm rivalry is more intense in the early stages (Mazzucato & Semmler, 1999), especially at the product or business unit level (Karniouchina, Carson, Short, & Ketchen, 2013). Given the focus on market success and the prevalence of competition, management teams appear to be in a heightened state of awareness (Benner & Tripsas, 2012). This market focus, combined with an abundance of opportunities, is expected to provide a firm with ample motivation to engage in turnaround actions (March & Simon, 1958; Teece, Pisano, & Shuen, 1997) such as asset reductions (Bruton & Rubanik 1997; Bruton & Wan, 1994).

FIGURE 1
RESEARCH MODEL



The picture is less clear for layoffs. Prior studies find that layoffs are ambiguously associated with turnaround performance (Bruton & Wan, 1994; Schmitt & Raisch, 2013). When a management team realizes its firm is underperforming, a layoff may be a quick lever to reduce costs. This course of action likely will be predicated on the belief that the firm has an opportunity to cut "fat" or eliminate employees tied to unsuccessful products. After all, growth stage research predicts action based on market knowledge. Unlike asset reductions, which can take longer and may require creditor involvement, a layoff is a management decision. It is quick to implement and ideally sheds unnecessary resources.

> *Hypothesis 1: A layoff will be positively associated with turnaround performance for underperforming firms in growth industries.*

How else might a firm implement a change in direction? Given a firm's relative underperformance, barring a unique systemic event that changes the risk profile of the entire industry, it has made a mistake. Logic may lead to examining a myriad of possibilities. The firm may have misjudged demand for its products, possibly from launching at an inopportune point. Examples of being too early include Webvan, an online grocery ordering and delivery firm, and SixDegrees.com, a social networking site that was too early for broad appeal with its 1997 inception.

Fortunately, firms in growth stage industries can make changes given the unique context of dynamism, product proliferation, and innovation cycles (Karniouchina, Carson, Short, & Ketchen, 2013; Tushman & Anderson, 1986). Evidence indicates that growth stage firms will likely react to perceived changes and opportunities with a variety of market oriented strategies (Lumpkin & Dess, 2001; Miller &

Friesen, 1984). Therefore, it is likely that management teams are aware of their relative performance and will adjust to changing conditions (McGrath, 2013).

Changing the supply side of the model implies two choices, either organic or inorganic solutions. Organically the firm may discontinue poorly performing products, release new products, or both. Some firms may believe that more aggressive changes are necessary, such as adjusting its structure or creating a new competitive roadmap (Hannan & Freeman, 1984; Jay, 2013) that may include incorporating resources from external sources. These external combinations can include a combination of relationships from alliances, joint ventures, and mergers and acquisitions.

Hypothesis 2: New product introductions will have a positive relationship with turnaround performance for underperforming firms in growth industries.

Hypothesis 3: The addition of external relationships will have a positive relationship with turnaround performance for underperforming firms in growth industries.

Corporate Context

Life cycle research frequently mentions firm size in conjunction with early stages. Research indicates that smaller firms may be more flexible and thus more inclined to change (Klepper, 1996; Quinn & Cameron, 1983). Such flexibility may stem from a lower level of institutional pressures (Salancik & Pfeffner, 1977) and reduced bureaucracy (Mintzberg, 1984). Smaller firms also focus on survival and market readiness (Churchill & Lewis, 1983), which may be linked to their management and organizational structure (Baird & Meshoulam, 1988; Lester, Parnell, & Carraher, 2003). As a result of these factors, smaller firms may be more likely and quicker to undertake actions that may turn around decline.

Alternative views suggest that larger firms may benefit from expanded resources, economies of scale, and greater network ties (Laursen & Salter, 2006; Porter, 1985). However, in times of pressure, smaller firms may be more aggressive, yielding faster decisions supported by a simpler organizational structure in smaller firms (Gray & Ariss, 1985; Hanks, Watson, Jansen, & Chandler, 1993).

Hypothesis 4: Firm size will be negatively related to turnaround performance.

Decline severity can dramatically impact the motivation for and salience of a turnaround. As we detail in the methods section, firms in this study are performing at least as well the industry median a year before the performance decline. Thus these firms possess varying degrees of recent performance decline; they are not experiencing long-term stagnation.

Life cycle theory highlights a firm's market orientation as a period of proactive assertion. This emphasis could imply that when a firm has a steeper decline it may associate the loss with a fear of significant or longer-term market erosion if it does not act. Perhaps as Lester et al. (2003) indicates, growth for some firms is a time of protecting share and product success, and thus too much emphasis on current success can leave a firm vulnerable to market shifts. As Jawahar and McLaughlin (2001) note, the growth stage is generally not a period of overconfidence; therefore it seems likely that management teams will not disregard the decline, but may recognize opportunities for meaningful changes and pivoting during this continued period of innovation.

Prior research has not found a clear relationship between decline severity and turnaround performance (Ndofor, Vanevenhoven, & Barker, 2013; Robbins & Pearce, 1992). However, we expect that a more severe decline will, perhaps paradoxically, lead to a successful pivot. With the clock running, growth continuing at a declining pace (Gort & Klepper, 1982; Mazzucato & Semmler, 1999), growth stage firms may have more "growth share" to lose.

Hypothesis 5: The severity of decline will be positively related to turnaround performance.

METHOD

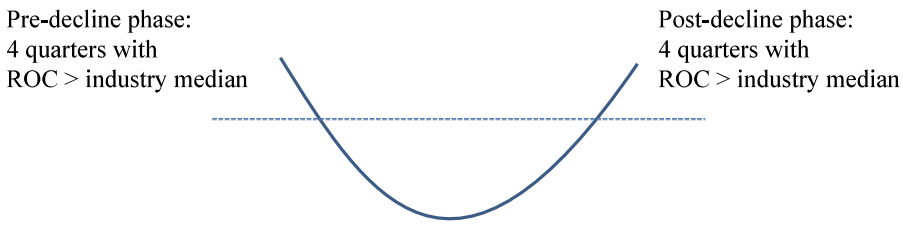
We choose technology-based industries that have been widely recognized as growth based: A) semiconductors and semiconductor equipment, B) prepackaged software, data processing, and related services, and C) computer storage, computer communications, and office equipment. The compound annual growth rate (CAGR) during the study period ranged from 4.9 percent in the semiconductor industry to 12.9 percent in the computer storage device industry. During the same period the US GDP grew at an annual rate of 3.1 percent (Worldbank.org). All CAGRs in the sample are at least 150 basis points above the GDP, indicating strong growth in comparison to the general economy, but not hyper-growth. Hyper-growth rates are generally found only in the nascent stages of a new industry, which would occur in an earlier life cycle stage.

To minimize social and cultural heterogeneity we excluded firms incorporated outside of the United States (Abebe, Angriawan, & Ruth, 2012). We included stand-alone firms traded on a major US exchange during a 10 year period beginning in 2005. We selected this sample to provide for comparability, as these firms are required to comply with heightened Securities and Exchange Commission regulations such as the Sarbanes-Oxley Act of 2002. In addition, this period begins after the technology collapse of 2000–2001, minimizing the possibility of industry specific abnormalities due to that adversity. Using data retrieved from Standard & Poor's Capital IQ database, 311 firms remained.

Aside from the macro constraints, additional performance criteria had to be met for a firm to be included in the sample. The point of employing such criteria, all of which are derived from previous turnaround research, is to substantiate the need for and completion of a turnaround. These criteria, as depicted in Figure 2, include:

1) Prior to a performance decline a firm must have reported at least four quarters with its return on capital (ROC) ratio being greater than the industry median ROC. We measured the year on a quarterly basis allowing for a firm to report one quarter below industry mean. Following previous research (Barker & Duhaime, 1997) we required a period of positive ROC relative to the industry to eliminate firms experiencing stagnation.
2) A firm must have experienced at least three consecutive quarters with its ROC below its industry median. Recognizing that turnaround actions may begin soon after performance degrades, there may also be short-lived positive performance associated with early turnaround actions. Thus, after the initial three quarter decline, firms with more than two quarters of nonconsecutive, positive ROC relative to its industry were excluded. Selecting a time-based criterion for performance is common, although only a few have used a short period, such as four quarters (Morrow, Sirmon, Hitt, & Holcomb, 2007; Sudarsanam & Lai, 2001).
3) Additionally, as a firm may not be focused on relative performance to a peer group, we included an absolute measure of performance degradation. A firm's net margin must also have either: a) been negative for at least one quarter during the first two quarters of the firm's industry relative ROC decline, or b) present a negative regression between quarters elapsed in the decline and the firm's net margin. While having a negative association was a first step, we wanted to assess the impact of an absolute decline (Arogyaswamy & Yasai–Ardekani, 1997). Prior studies also used a dual approach in defining a performance decline (Robbins & Pearce, 1992; Schmitt & Raisch, 2013).
4) A firm must have achieved industry median ROC or higher within 12 quarters of the initial decline and maintained it on average for a year, similar to the pre-decline phase. This span was selected to minimize longer-term impacts from environmental changes and to provide a basis for expecting that management will react with urgency to a declining competitive position (Pearce, 2007).

FIGURE 2
PERFORMANCE DECLINE CRITIERIA



Underperformance or decline phase: ROC < industry median for at least 3 quarters & absolute decline of at least 1 quarter or negative regression

The final sample includes 59 turnarounds. Of the 59, there are 29 from the semiconductor industry, 23 from the prepackaged software and services industries, and 7 from the computer storage, computer communications, and office equipment industries. Most are manufacturing firms, but 23 are service providers. Our sample included 18 firms that were able to turn performance around after just three quarters and 14 firms that took over eight quarters, with the other 27 between those endpoints.

We checked the power to find a Type 2 error. Recognizing that there is frequently a tradeoff between attaining a high power level and the resources to collect the data, we made several choices. First, using previous studies as a guide (Bruton & Wan, 1994; Ndofor, Vanevenhoven, & Barker, 2013; Schmitt & Raisch, 2013), we anticipated an effect size of 0.4. Second, in the absence of convention, we selected a mid-range power level of 0.80 (Cohen, Cohen, West, & Aiken, 2003). Third, similar to previous studies, we selected an alpha of 0.05. We found that we needed a sample size of 46 for the 8 variables in the study, making the actual size of 59 a robust test.

Measures

Dependent variables. We chose ROC to measure performance. Unlike return on assets, it alleviates concerns with asset intensity, and it may be used at any point in time rather than for a specific investment, which can be problematic for studies that use return on investment as a measure. ROC is a measure of how efficiently a firm uses its capital to generate earnings. The advantage to using ROC is that income, which may be scrubbed of taxes, is assessed without regard to asset levels. Therefore, similar to previous research (Arogyaswamy & Yasai–Ardekani, 1997; Barker & Duhaime, 1997), we selected ROC as a performance measure:

$$ROC = \frac{Earnings\ before\ interest\ \&\ tax * .625}{Total\ equity + Total\ debt + Minority\ interest} \quad (1)$$

The numerator begins with operating income, all earnings after expenses are deducted for running the firm, and then we apply a standard tax rate of 37.5 percent. The standard tax rate smooths differences in taxation policies that may occur at firms with more multinational operations. The denominator measures the total capital invested in the firm at a point in time. The change in ROC is calculated as the change in average ROC the year after the period of industry relative underperformance.

We chose the second measure, the change in earnings before interest, taxes, depreciation, and amortization (EBITDA) margin, based on its popularity with practitioners and investment professionals. The EBITDA margin assesses how effectively a firm generates sales; it is a common measure of operating profitability. While this metric has not been utilized in turnaround research to our knowledge, it is similar to ROI with the exclusion of a few variables driven by accounting and financing decisions. This formula is calculated as:

$$EBITDA\ margin = \frac{Operating\ income - (interest + tax + depreciation + amortization)}{Revenue} \quad (2)$$

The change in margin is calculated as the change in average EBITDA the year after the period of industry relative underperformance.

Independent variables. Given that we applied a condensed time window, we sought actions that are generally quick to implement and not in need of board or creditor approval. Also, given our growth industry focus, we anticipated a need for less dramatic interventions than might be needed in other stages (Ndofor, Vanevenhoven, & Barker, 2013). The independent and dependent variables are measured in different years, depending on when the turnaround occurred for each sample firm.

Similar to prior research (Schmitt & Raisch, 2013), we operationalized a layoff using a dummy variable of 1 for a firm that engaged in a layoff and a 0 for all others. A layoff is defined as a broad reduction in the workforce. Some layoffs were measured in terms of a percentage decline in the workforce while others were described as a monetary amount for employee restructuring. This inconsistency in defining layoffs has been identified in previous strategy research (Ndofor, Vanevenhoven, & Barker, 2013); parsing the data further would have required firm-specific surveys because state and federal reporting regulations vary in the classification of a layoff.

New products are internally generated goods or services. New external relationships include the addition of alliances, joint ventures, mergers, and acquisitions. Both are measured by counting the number that occurred beginning with the decline period. For each variable we counted the number of times the action transpired, identified via searching LexisNexis, annual reports, quarterly announcements, investor relations and firm websites, Bloomberg, and general web searches. These announcements were then categorized into two areas: new product introductions and the addition of external relationships. Previous research has primarily focused on LexisNexis (Morrow, Sirmon, Hitt, & Holcomb, 2007; Ndofor, Vanevenhoven, & Barker, 2013).

Life cycle research associates growth and firm size with flexibility in adapting to changes (Quinn & Cameron, 1983). Firm size was measured as the average annual revenue of the four quarters prior to decline.

A firm's decline severity measures how much the firm's performance decreased compared to its four-digit standard industrial classification group. Severity was operationalized as the percentage decline in the firm's ROC relative to its industry group peers. There is a concern that that this variable is correlated with ROC as a dependent variable; however, our concern is mitigated to a degree by the use of a second dependent variable, EBITDA margin, and by a lack of multicollinearity.

Control variables. We control for several variables that may impact the association between turnaround actions and performance. To capture firm type differences we created a dummy variable of 0 for service related industries and 1 for manufacturing firms. To capture variance due to the nationwide financial crisis, we created a dummy variable of 1 for firms that began a downturn in 2008. Financing and capital resources may also have an impact on the relationship (Abebe, Angriawan, & Ruth, 2012; Morrow, Johnson, & Busenitz, 2004). Therefore to control for the firm's short-term ability to meet financial needs we measured financial slack as free cash flows rather than organizational related slack.

Data Analysis

We used regression to assess the relationship between turnaround actions, company circumstances, and performance. Not only is regression a robust statistical technique, but it is also utilized in previous turnaround research (Boyne & Meier, 2009; Musteen, Liang, & Barker, 2011). One independent variable and two control variables are dummy coded; the remaining variables are continuous.

As some of the data reflected skewness and kurtosis, we transformed those variables. Typically the transformation process includes a trial and error process, where different transformations are applied based on the characteristics of the data, on common practices within a research area, or on generally used transformations (Field, 2009; Hair, Black, Babib, & Anderson, 2010). Lacking precedents from similar studies, we began with a natural log transformation to all non-dummy variables. This transformation improved the data issues, and therefore we used it. Tests for homogeneity of variances passed, based on scatterplot analysis. Autocorrelation of errors was not an issue as evidenced by Durbin-Watson test statistics of 1.89 and 2.12 (Field, 2009).

Data interpretation is not straightforward given the many natural log transformations and dummy variables. To interpret coefficients from the dummy variables we calculate the semi-elasticity or percentage change in Y when X (dummy variable) changes by 1 unit. Using Model 1 in Table 2 as an example, where X_1 = firm type, X_2 = financial crisis, and X_3 = financial slack, the model is:

$$(Y) = b_0 + b_1 X_{1dummy} + b_2 X_{2dummy} + b_3 ln(X_3) + \cdots + \varepsilon \quad (3)$$

This model is algebraically equivalent to the "raw" relationship:

$$Y = e^{b_0} * e^{b_1 X_{1dummy}} * e^{b_2 X_{2dummy}} * {X_3}^{b_3} \ldots * e^{\varepsilon} \quad (4)$$

Therefore a change of 1 unit for a dummy variable is moving from 0 → 1. Using dummy 1, firm type, as an example, the algebraic equation is:

$$Y(X_{1dummy} = 0) = e^{b_0} * e^{0} * e^{b_2 X_{2dummy}} * {X_3}^{b_3} \ldots * e^{\varepsilon} \quad (5)$$

Introducing the 1 unit change of $X_{1dummy} = 1$, we have:

$$Y(X_{1dummy} = 1) = e^{b_0} * e^{b_1} * e^{b_2 X_{2dummy}} * {X_3}^{b_3} \ldots * e^{\varepsilon} \quad (6)$$

The percentage change in Y is:

$$\frac{\Delta Y}{Y} 100 = \frac{Y(X_{1dummy} = 1) - Y(X_{1dummy} = 0)}{Y(X_{1dummy} = 0)} 100 = \left(\frac{Y(X_{1dummy} = 1)}{Y(X_{1dummy} = 0)} - 1 \right) 100$$

$$= \left(\frac{e^{b_0} * e^{b_1} * e^{b_2 X_{2dummy}} * {X_3}^{b_3} \ldots * e^{\varepsilon}}{e^{b_0} * e^{0} * e^{b_2 X_{2dummy}} * {X_3}^{b_3} \ldots * e^{\varepsilon}} - 1 \right) 100 = \left(e^{b_1} - 1 \right) 100 \quad (7)$$

To interpret coefficients from the natural log transformed predictor variables we analyzed the elasticity of Y with respect to a continuous variable X_i. The percentage change in Y that occurs in response to a one percentage increase in X_i:

$$\frac{\frac{dY}{Y} 100}{\frac{dX_i}{X_i} 100} = \frac{dY}{dX_i} \frac{X_i}{Y} \equiv b_3 \quad (8)$$

RESULTS

Firms participated in a wide range of turnaround activities. Layoffs were used by 19 firms, nearly a third of the sample. New product introductions were far more prevalent with 44 firms launching new products. In terms of new relationships, 26 firms entered an alliance, 6 engaged in a joint venture, and 32 participated in a merger or acquisition. Firm size ranged from about $4 million to $1.6 billion. Depth of decline ranged from -0.9% to -20.7%.

Appendix A provides the means, standard deviations, and bivariate correlations of the data. Analysis of the correlation data suggests that certain variables have moderate to high levels of correlation. Given that multicollinearity could be an issue, we calculated the variance inflation factor between these variables. All factors displayed values below 2.1, well below the general cutoff of 10, indicating that the model does not suffer from multicollinearity (Hair, Black, Babib, & Anderson, 2010).

Tables 1 and 2 present the results of the regression analysis with the dependent variables, ROC change and EBITDA margin change respectively. In both tables, Models 1 and 3 report the control variables, and Models 2 and 4 show a full model.

TABLE 1
LINEAR REGRESSION – TURNAROUND ACTIONS AND ROC CHANGE

	Model 1		Model 2	
	B	SE	B	SE
Intercept	2.80	0.21	2.15	0.22
Manufacturing	-0.05	0.15	0.05	0.11
Financial crisis	0.33	0.18	0.27*	0.12
Slack	-0.23**	0.07	-0.06	0.05
Layoff			0.03	0.12
New products			-0.08	0.05
New relationships			0.07	0.08
Size			-0.07	0.05
Severity			0.08***	0.01
R^2	0.22		0.71	
Adjusted R^2	0.18		0.66	
F change	5.13**		6.61***	

* p < .05
** p < .01
*** p < .001
Unstandardized coefficients

Hypothesis 1, which proposed that a layoff would be positively related to turnaround performance, was in the hypothesized direction but unsupported by either ROC change or EBITDA margin change. A layoff was nearly significant with EBITDA margin change (*p*-value of 0.066). Finer granularity on a quarterly basis was not possible given that firms report headcount annually and that most do not opt to disclose more often. In the future it would be useful to survey firms for quarterly data and to assess plans to redeploy current staff from less to more rewarding projects.

Hypothesis 2 proposed that the introduction of new products would be positively related to a successful turnaround. Interestingly, it was related positively with the change in EBITDA margin, but negatively with ROC change. While both results fell short of significance, the discrepancy in direction was surprising. One explanation could be that firms are funding product expansion with debt, thus reducing the ROC. Another explanation could be that firms discontinue some product lines that are performing poorly and while they are adding new ones, the earnings decline, which leads to a reduction in ROC.

The association between the addition of new relationships and performance was positive for both measures. However, since the relationships were not significant, Hypothesis 3 was unsupported. One possible reason for the lack of significance for Hypothesis 3 may be that more time is needed to integrate relationships.

As predicted in Hypothesis 4, firm size is negatively associated with turnaround performance. However, the relationship is significant only with EBITDA margin change, as shown in Model 4. Reasons for the discrepancy could stem from minority interest in the ROC equation, although we are uncertain. Hypothesis 5 stated that the severity of decline would be positively associated with performance. The results suggest that severity is strongly associated with ROC change. While the relationship was also as predicted for EBITDA margin change, the association was not significant.

TABLE 2
LINEAR REGRESSION – TURNAROUND ACTIONS AND EBITDA MARGIN CHANGE

	Model 3		Model 4	
	B	SE	B	SE
Intercept	2.51	0.34	2.41	0.50
Manufacturing	0.39	0.24	0.48	0.26
Financial crisis	0.68*	0.29	0.58*	0.27
Slack	-0.20	0.11	-0.01	0.11
Layoff			0.53	0.28
New products			0.05	0.11
New relationships			0.05	0.18
Size			-0.22*	0.11
Severity			0.05	0.03
R^2	0.18		0.41	
Adjusted R^2	0.14		0.31	
F change	3.96*		3.70**	

* p < .05
** p < .01
*** p < .001
Unstandardized coefficients

With both overall models presenting significance, we decided to run post-hoc analyses. We ran supplemental analyses to assess the potential impact of the number of actions taken. The results indicate no significant performance difference between firms that engaged in new products and new relationships versus those that did not engage in either. Likewise, no significant difference in performance appeared between firms that engaged in all actions and those that did not. Post hoc analysis also indicated that the length of the decline is not a significant factor in the association between a layoff and performance.

DISCUSSION

Our results indicate that firms in growth industries are agile, as previously noted by research over two decades (e.g., Klepper, 1996; Tripsas & Gavetti, 2000). Even in the midst of underperformance, firms will continue to innovate with new products, to expand their strategic relationships, and to adjust their workforce. In spite of results that do not clearly indicate that these actions are associated with successful turnarounds, we established that management teams attempt to change their condition via many options.

Even amid our confined time frame, severity of decline was a significant factor in successful turnarounds. With market centricity a focal point in growth firms (Mintzberg, 1984), this result may have been expected. Yet here again the life cycle stage of the firms we studied appears relevant. If one's industry is on the upswing and one's results show less than a drastic decline, maintaining the status quo may seem tempting. However, a deep decline is far more difficult to ignore, suggesting even to firms reluctant to act, the necessity for corrective action.

Our results also indicate that smaller firms are more successful at turning around firm performance. Using life cycle theory as a guide we could posit that a smaller organization may have fewer layers of management and quicker decision-making. Additionally a smaller firm may have narrower boundaries, competing in fewer product categories or markets, thus having greater maneuverability where it does compete. Finally, management in smaller firms may realize that they have fewer resources to absorb the blow or hide poor performance.

Thus, our results appear to support our proposition that actions can be associated with life cycle dynamics. Given the pace of innovation and the speed with which consumers adapt new technology, it made sense to collapse the time frame. We were able to measure a turnaround in quarters and conclude that industry and organizational variables impede or enhance change based on life cycle dynamics.

This study should be considered in light of its limitations. Our data, like those in similar studies, include announcements but not the timing of implementation. While these data are beneficial, it would require a much longer data collection period to include implementation, as only the firm can provide the accounting data as to when changes are complete.

The study may also have some endogeneity concerns from uncontrolled confounder variables. We balanced our choice to present a fresh look at an important economic sector with the challenge of finding a large enough sample to be statistically powerful. Even though there are concerns, as mentioned in previous studies (Chen & Hambrick, 2012; Morrow, Sirmon, Hitt, & Holcomb, 2007), our sample does allow for a robust test of the hypotheses.

Further limitations relate to the literature we cite. The speed of change may have escalated (DeSilver, 2014), while global competition has simultaneously increased. In tandem or separately these factors may contribute to a lessening of usefulness for studies that occurred decades ago. It is likely that management perceptions and actions may differ markedly in our increasingly borderless, technology driven world. Alternatively, management actions may be similar, but their effect may have changed.

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APPENDIX A
MEANS, STANDARD DEVIATIONS, AND BIVARIATE CORRELATION MATRIX[a]

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9
ROC change	11.04	7.48									
EBITDA change	14.34	13.86	0.61**								
Layoff	0.32	0.47	0.22	0.24							
New products	8.51	11.58	-0.29*	-0.15	-0.06						
New relationships	2.69	3.77	-0.19	-0.12	0.05	0.54**					
Size[b]	4.52	1.42	-0.45**	-0.19	0.19	0.38**	0.27*				
Severity	5.85	4.73	0.82**	0.45**	0.29*	-0.18	-0.10	-0.42**			
Manufacturing	0.61	0.49	-0.08	0.13	0.25	0.04	-0.28*	0.29*	-0.13		
Financial crisis	0.20	0.41	0.22	0.30*	0.19	-0.01	-0.04	0.08	0.15	0.06	
Slack	23.90	67.50	-0.38**	-0.16	-0.05	0.34**	0.27**	.52**	-0.42**	0.06	0.00

[a] n = 59.

Non-dummy variables are LN for correlations

* p < .05

** p < .01