

Bachelor's Thesis

Preventing Corporate Turnarounds

Developing a Conceptual EWS Framework for the Prediction of
Turnaround Situations

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Management Summary

Currently, corporate crises are seen as an inevitability and an unavoidable part of the corporate life cycle. Therefore, the early recognition of crises has not been a focal point of business research in the past decades. The development of a conceptual framework would not only be beneficial for the company and the management, by predicting imminent crisis situations, but also for the employees, who would no longer be part of extreme downsizing campaigns. Therefore, the research hypothesis focused on challenging the existing consensus. By stating that a reliable framework would be able to prevent corporate turnarounds, the objective of this thesis was given.

The created framework, consisting several analytical methods, including a multiple discriminant analysis and a logistic regression, was applied to several cases of corporate crises. The inclusion of companies operating in different industries in the analysis sample ensured the cross-industry predictive capabilities of the developed framework. The analysis relied on audited, publicly available financial information from annual reports. By focusing on the existing errors in crisis recognition, it was ensured that the developed framework creates added value for company executives.

The application of the established framework unambiguously indicated that imminent corporate crises are clearly identifiable on average 2,25 years earlier than they have currently been. In some cases, the EWS model revealed the earliest symptoms more than four years before the crisis was recognized. Not only was confirmed that crises are predictable, but also that their early recognition can prevent corporate turnarounds. Furthermore, the application of the model allowed the creation of a condensed conceptual framework, which facilitates the overall application greatly.

Overall, it was concluded that the created EWS model is a step forward regarding crisis recognition and possibly serves as the foundation for a more extensive framework in the future. By complementing the created model with qualitative factors, the cause-analysis of looming crises could be facilitated. Another way of improving on the conceptual framework would be the analysis of industry-specific scales, which would facilitate its interpretation. While it is recommended to focus on the implementation of industry-specific factors, as this would generate more value for managers, the application of the model in a practical environment should be considered first. Such an application is anticipated to confirm the frameworks value in real-life situations, which is crucial in order for it to be part of every manager's toolbox.

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III. List of Abbreviations

| | |
|----------------|--|
| BV | Book Value |
| CA | Current Assets |
| CF | Cash Flow |
| CL | Current Liabilities |
| COGS | Cost of Goods Sold |
| D/E | Debt-to-equity |
| EBITDA | Earnings Before Interest, Taxes, Depreciation and Amortization |
| EBIT | Earnings Before Interest and Taxes |
| EBT | Earnings Before Taxes |
| EWS | Early Warning Signals |
| FA | Fixed Assets |
| MV | Market Value |
| PR | Public Relations |
| RE | Retained Earnings |
| ROA | Return on Assets |
| ROE | Return on Equity |
| ROI | Return on Investment |
| ROTA | Return on Total Assets |
| R&D | Research and Development |
| SEC | Securities and Exchange Commission |
| TA | Total Assets |
| TIE | Times Interest Earned |
| WC | Working Capital |

IV. Formula Directory

Financial ratios:

$$\text{Working capital turnover} = \frac{\text{Sales Revenue}}{\text{Net working capital}}$$

$$\text{Cash flow to debt ratio} = \frac{\text{Operating cash flow}}{\text{Total debt}}$$

$$\text{Debt ratio} = \frac{\text{Total debt}}{\text{Total assets}}$$

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

$$\text{Quick ratio} = \frac{\text{Cash} + \text{marketable securities} + \text{receivables}}{\text{Current liabilities}}$$

$$\text{ROA} = \frac{\text{Net income}}{\text{Total assets}}$$

$$\text{ROE} = \frac{\text{Net income}}{\text{Shareholder's equity}}$$

Discriminant analysis:

$$Z = (1.2X_1) + (1.4X_2) + (3.3X_3) + (0.66X_4) + (1.0X_5)$$

$$X_1 = \frac{\text{Working capital}}{\text{Total assets}} \quad X_2 = \frac{\text{Retained earnings}}{\text{Total assets}} \quad X_3 = \frac{\text{EBIT}}{\text{Total assets}}$$

$$X_4 = \frac{\text{Market value of equity}}{\text{Book value of debt}} \quad X_5 = \frac{\text{Sales}}{\text{Total assets}}$$

Logit model:

$$F = \frac{1}{(1 + e^{-(13.7813 - 4.7252X_1 + 52.9741X_2 - 3.0594X_3 - 1.558X_4 + 0.1886X_5)})}$$

$$X_1 = \frac{\text{Gross profit}}{\text{Total assets}} \quad X_2 = \frac{\text{Net income}}{\text{Total assets}} \quad X_3 = \frac{\text{Quick assets}}{\text{Current liabilities}}$$

$$X_4 = \frac{\text{Total debt}}{\text{Total assets}} \quad X_5 = \frac{\text{Net worth}}{\text{Net fixed assets}}$$

Other formulas:

$$\text{Working capital} = \text{Current assets} - \text{current liabilities}$$

$$\text{Total market value} = \text{Year end stock price} \times \text{Shares outstanding}$$

1 Introduction

Recent headlines such as “Eastman Kodak files for bankruptcy” (De La Merced, 2012), “All Toys R Us stores to close their doors” (BBC, 2018), “Alpiq is rehabilitated” (Müller, 2018) or “GM cutting 4,000 workers in latest round of restructuring” (Shepardson, 2019), show that corporate crises and turnaround management are omnipresent issues in contemporary media. Combined with the increasing number of corporate insolvencies (Pepels, 2015b) and widespread organizational decline (Panicker & Manimala, 2015), it is obvious why these subjects are also of abiding interest to researchers and managers alike (Marti, 2013; Schweizer & Nienhaus, 2017).

Research reveals that the prevailing belief is that corporate crises are unavoidable and an inherent part of the corporate life cycle (Hofer, 1980; Lymbersky, 2011). Lymbersky (2011, p. 7) used the examples of Goldman Sachs and Chrysler to conclude that no company is immune against distress” and that “even the biggest and best can fall”. This aura of inevitability stems from managerial errors in recognizing the signs of looming crises (Collard, 2002; Faulhaber & Grabow, 2009; McKinsey, 2014; Müller, 2013; Pepels, 2015b; Slatter & Lovett, 1999). The early warning signs are often misinterpreted or hushed because the management is unwilling to admit that their strategy is failing (Slatter & Lovett, 1999). As a result, it is often only intervened as soon as the liquidity, and therewith the continued existence of the company, is threatened (Slatter & Lovett, 1999). This sort of behavior is aptly described as the boiling frog syndrome, which is a phenomenon that could be immensely problematic since, without recognizing the severity of the situation, initiating a turnaround is impossible and the chances of preventing corporate failures are faint (Mc Kinsey, 2014).

Not only are turnarounds extremely stressful processes (Faulhaber & Grabow, 2009; Finkin, 1987; Marti, 2013), they also frequently result in PR disasters due to the radical downsizing associated with it (Slatter, Lovett & Barlow, 2006). Ad-hoc corrective measures, which usually divert personnel from routine tasks, and the use of external resources escalate the already considerable costs of the event (Lenahan, 1999). To make matters worse, despite considerable efforts and turnaround specialists obtaining control of the firm, many turnaround situations lead to bankruptcy and liquidation regardless (Slatter & Lovett, 1999). Therefore, it seems favorable for all types of organizations if corporate turnarounds could be averted, which is why this thesis aims to challenge the comprehensive consensus regarding the inevitability of corporate crises.

1.1 Research Hypothesis and Objectives

The proposed research hypothesis, which is loosely based on Faulhaber and Grabow (2009), is boldly couched to challenge the existing research status quo and provide ample food for thought. It will serve as the common theme of the thesis and subsequent evaluation of the framework.

Corporate turnaround situations are predictable but a reliable framework for the timely recognition of such an event does not exist. Were managers able to grasp the severity of their circumstances in due time, major corporate turnarounds could be prevented.

The hypothesis indicates that the aim of this paper is to establish a model of EWS that will enable managers to predict and prevent corporate turnaround situations. By applying an initial, more extensive framework, yielding from literature research, to several distinct case studies, its applicability should be tested. Furthermore, the case studies will illustrate which measures prove to be crucial for the early recognition and how they are related. The use of case examples from various industries, should ensure the cross-industry applicability of the model.

More precisely, by creating an extensive framework of distinct EWS and applying it to organizational crises case studies, such as Alpiq or Under Armour, this paper aims to create a reliable cross-industry model for the early recognition of turnaround situations. The application of this framework will allow firms to predict looming turnarounds, determine the severity of the organization's current circumstances, and plan corrective measures accordingly. By doing so, this thesis will contribute immensely to the study of corporate crises and their prevention, while simultaneously generating added value for firms willing to use the framework.

In order to achieve this, this paper follows a distinct structure. First, the essential terms for the understanding of the subject matter will be defined. Afterwards, the state of the current research will be evaluated, and the underlying concepts will be introduced. In relation to those concepts, an extensive framework will be created, which will thereafter be examined regarding its suitability. Finally, the findings will be addressed, and the final framework will be presented. The conclusive highlighting of the analysis' limitations will further contribute to the understanding of the developed conceptual model and indicate areas for future research.

1.2 Relevance of Subject Area

For an attentive observer it seems peculiar how often the awareness that a company is in a crisis situation comes as a surprise (Slatter & Lovett, 1999). Especially, since being aware of any prospective strategic or operative challenges belongs to the main remits of any manager. Research has found that, while sometimes the company lacks early warning systems (Faulhaber & Grabow, 2009; Müller, 2013), most of the time the failure to recognize the severity of the situation is due to managerial (Collard, 2002; Faulhaber & Grabow, 2009; McKinsey, 2014; Müller, 2013; Pepels, 2015b; Slatter & Lovett, 1999). Fear of acknowledging mistakes, excessive optimism or overestimating one's competences has all been cited as possible reasons for this occurrence (Lymbersky, 2013). Collard (2002, as cited by Lymbersky, 2013, p. 61) even claimed that “most [...] managers [have not] learned to recognize the symptoms of oncoming illness in their business”, which makes their identification almost impossible.

Unsurprisingly, it has generally been found that the causes of a crisis are identifiable long before its actual occurrence (Faulhaber & Grabow, 2009; Müller, 2013; Situm, 2013; Slatter & Lovett, 1999). The oversight of red flags prior to the turnaround situation leads to a self-enforcing downward spiral concluding in corporate failure (Faulhaber & Grabow, 2009). Since crises become progressively more severe with passing time, they are more easily resolved if detected early (Bickhoff & Eilenberger, 2004; Evertz & Krystek, 2014; Lymbersky, 2013; Müller, 2013). The greater the timespan between the first signs of impending trouble and actual recognition of the crisis, the more limited is the influence of managers on its outcome (Evertz & Krystek, 2014). If purposeful interventions are applied early enough, the traumas associated with crises can be evaded (Slatter & Lovett, 1999). Consequently, as claimed by Birker (2015c), a turnaround should be initiated as soon as the first signs of distress become apparent, instead of when the crisis has become increasingly severe.

Despite the practical significance of early crisis recognition, the subject had little attention devoted to it for decades (Birker, 2015d). It can be assumed that this is due to the notion that crisis management can be neglected with the presence of good corporate governance (Birker, 2015b). This thesis aims to rekindle the interest in this subject and add to the understanding of crisis prediction and prevention.

2 Theoretical Framework

In the theoretical framework, the most crucial terms for understanding turnaround management are defined first. The definitions are presented in logical order, from broad to specific, which should facilitate the comprehension of their connectedness. Less essential terms are briefly summarized in the Glossary (Chapter IV), where they are listed alphabetically. Afterwards, the underlying concepts of the subject are introduced and elucidated.

2.1 Terminology

2.1.1 Organizational Crises

In their paper on *Reframing Crisis Management*, Pearson and Clair (1998) defined an organizational crisis as:

[...] a low-profitability, high-impact event that threatens the viability of the organization and is characterized by ambiguity of cause, effect, and means of resolution, as well as by a belief that decisions must be made swiftly. (p. 60)

In other words, a company may still generate profits while facing an organizational crisis, but corrections must be taken quickly in order remain profitable in the future. The cause of the crisis, as well as its way of resolution are uncertain, and time is of the essence. While this definition includes most of the essential characteristics of organizational crises, the definition used in this thesis further includes the limited duration (Birker, 2015b) and the uncertainty of the outcome (Birker, 2015b; Evertz & Krystek, 2014). First, the limited duration is an essential part of an organizational crisis in regard to turnaround management, since it indicates the necessity for quick, purposeful management action. Furthermore, with increasing severity over time, the crisis cannot be prolonged indefinitely. Second, by initiating a corporate turnaround, the outcome of an organizational crisis can range from bankruptcy to a successful resolution resulting in an improved market position (Birker, 2015b; Evertz & Krystek, 2014). In addition, the outcome often serves as the basis for measuring turnaround success (Barker & Duhaime, 1997; Faulhaber & Grabow, 2009). Consequently, both characteristics are decisive reasons for turnaround endeavors and should therefore be included in the definition of organizational crisis when addressing turnaround management.

2.1.2 Turnaround Situations

Hofer (1980) vaguely defined a turnaround situation as an organizational state that includes a decline in profitability. However, it has since then been found that profitability alone is an unreliable indicator for the presence of turnaround situations, since huge investments could lead to decreasing profitability without the company facing a crisis (Lymbersky, 2013; Slatter & Lovett, 1999). Additionally, profitability is not a meaningful signal because a loss in a single fiscal year may jeopardize one firm, while another can remain reasonably healthy (Slatter & Lovett, 1999). Furthermore, a crisis-ridden company may still be profitable, as illustrated by Conergy, a solar company that increased its turnover by 33 percent but still experienced a cash flow crisis and was in dire need of a turnaround (Lymbersky, 2013). Based on this example, turnaround situations could be equated to the presence of a cash flow crisis, which would still be too simplistic, since a turnaround situation already exists before the firm faces a current liquidity crisis (Slatter & Lovett, 1999). Taking the aforementioned definition as a foundation, turnaround situations can be defined as such an advanced organizational crisis that the survival of the business is threatened. Slatter & Lovett (1999, p. 1) defined it as a state “[where a company’s] financial performance indicates that the firm will fail in the foreseeable future unless short-term corrective action is taken.” Panicker and Manimala (2015) described it more precisely as:

A [situation] where a company suffers declining economic performance for an extended period of time, such that the performance level is so low that the survival of the company is threatened unless serious efforts are made to improve its performance. (p.22)

Conclusively, it can be deduced that a turnaround situation occurs as soon as corporate survival is doubtful. Once such a state is apparent, corrective measures must be taken in order to salvage the company from bankruptcy (Slatter & Lovett, 1999). Prior to this, the firm just faces a ‘normal’ organizational crisis, which not necessarily requires ad-hoc turnaround management practices. This definition is crucial because it allows the determination of a specific point in time, when a turnaround situation became apparent. Consequently, it allows this thesis to unambiguously define whether or not the application of the EWS framework warned of the imminent organizational decay prior to this distinct event.

2.1.3 Turnaround Management

As soon as an organization regresses into a turnaround situation, long-term strategic planning recedes into the background, and ad-hoc management measures are employed to try to turn the situation around (Pepels, 2015a). This process is commonly recognized as turnaround management (Pepels, 2015a). More broadly, it includes all activities undertaken by an organization, in an existence-threatening state, to avert impending insolvency and return to sustainable profitability (Buschmann, 2006; Driendl, 2012; Slatter & Lovett, 1999). In accordance with the previous definitions, it focuses on the rehabilitation of distressed companies and only occurs as soon as a turnaround situation is apparent and recognized by the management. Turnaround management differs greatly from daily business, as it usually is a compressed event, which features a high volume of work under drastic time constraints (Lenahan, 1999).

Although there are slight distinctions, the term turnaround management is often used interchangeably with corporate transformation, crisis resolution, or revitalization (Platt, 1998). Hughes (1995), for instance, referred to GM Europe “[...] who turned life-threatening losses into the highest profit level in the European automobile industry” (p.33), as an example of corporate reenergizing. Platt (1998) clearly identified corporate renewal as the hypernym, with crisis management, corporate transformation and turnaround management being its archetypes.

2.1.4 Turnaround Success

Since long-term strategic planning is not the highest priority during a corporate turnaround, concerns about the future and longevity of the company make way for the immediate objective of salvaging the firm from insolvency (Pepels, 2015a; Platt, 1998). According to Teerlink’s (2001) experience at Harley-Davidson, thinking about the future only starts as soon as the company has recovered. As a consequence, turnaround success is often reduced to the positive outcome of the initial process. By doing so, the application of methods such as cost-cutting, asset reduction or downsizing is reinforced, despite only leading to short-lived stabilization of the business (Slatter, Lovett & Barlow, 2006). Consequently, researchers have recognized the pitfalls to this being the sole measure of success and have directed the attention to the sustainability of turnaround endeavors (Barker III & Duhaime, 1997; Bickhoff & Eilenberger, 2004; Faulhaber & Grabow, 2009; Slatter, Lovett & Barlow, 2006; Slatter & Lovett, 1999).

Barker III and Duhaime (1997) render a turnaround successful when a previously crisis-ridden organization is able to recover, end the threat to corporate viability and achieve sustained profitability. According to Faulhaber and Grabow (2009), a turnaround is successful as soon as the organizations is able to generate industry-customary returns for two consecutive years. Driendl (2012) claims that one or more fiscal periods yielding profits indicate a successful turnaround. Bickhoff and Eilenberger (2004) believe that four consecutive years of generating profits above industry benchmarks are necessary to show a successful strategic reorientation of the business, and therewith a sustainable turnaround.

While there is disagreement regarding the definition of sustainability, it can overall be deduced that a successful turnaround not only includes the effective rehabilitation of the organization, but also the sustainable continuation of the business. In other words, a successful turnaround guarantees that the company fully recovers and is not expected to face another crisis in the foreseeable future (Slatter & Lovett, 1999).

2.2 Literature Review

While there has been a great variety of research into the area of corporate turnarounds, corporate renewal and turnaround management, the subject of early crisis recognition has not been a major focus of researchers in the past. The focus usually lied on either establishing a general approach and techniques for turnarounds (Slatter & Lovett, 1999; Platt, 1998) or addressing the topic from a more specific standpoint. Slatter, Lovett & Barlow (2006), for example, focused on the leadership behavior during turnarounds, whereas Driendl (2012) addressed turnarounds form a stock market perspective and showed how turnaround stocks can be extremely profitable. Others focused on the identification of distinct turnaround strategies, for example for small firms (Boyle & Desai, 1991), restaurants (Chathoth, Tse & Olsen, 2006), hospitals (Langabeer II, 2008), or industrial business units (Hambrick & Schecter, 1983).

The extensive literature review conducted for this thesis focuses on introducing the underlying key concepts of crisis behavior, crisis recognition and turnaround management. By doing so, the understanding of typical organizational crises can be fostered. The analysis of the common errors in crisis recognition ensures the practical suitability of the proposed EWS framework, whereas the following explanation of the existing instruments for crisis recognition, serves as the theoretical foundation of the techniques employed.

2.2.1 Crisis Development

Slatter and Lovett (1999) have encapsulated the phases of crisis development in a four-stage model (Figure 1). This model is introduced because it aptly describes the evolution of a crisis from a company's perspective. Furthermore, it illustrates why the internal recognition that a company is in trouble usually comes as a surprise. A firm typically follows the exact stages depicted on the left (Slatter & Lovett, 1999). However, the stages can be of varying duration, as, especially for fragile firms, the stages prior the collapse tend to be particularly short (Slatter & Lovett, 1999). The corresponding organizational characteristics of each stage are shown on the right. The beginning of a turnaround situation, according to the definition in Chapter 2.1.2, is illustrated by the red line and begins as soon as the livelihood of the company is threatened.

Initially, the symptoms of every crisis evolve in the hidden, away from the company's knowledge. Only when the corporate performance is affected, the first symptoms become visible. Nonetheless, this negative development is often believed to be a short-term phenomenon and no corrective measures are deemed necessary. After further decay, the organizational collapse becomes increasingly likely and turnaround management is the only possible expedient. If the subsequent managerial interventions are not effective, the crisis will result in corporate failure.

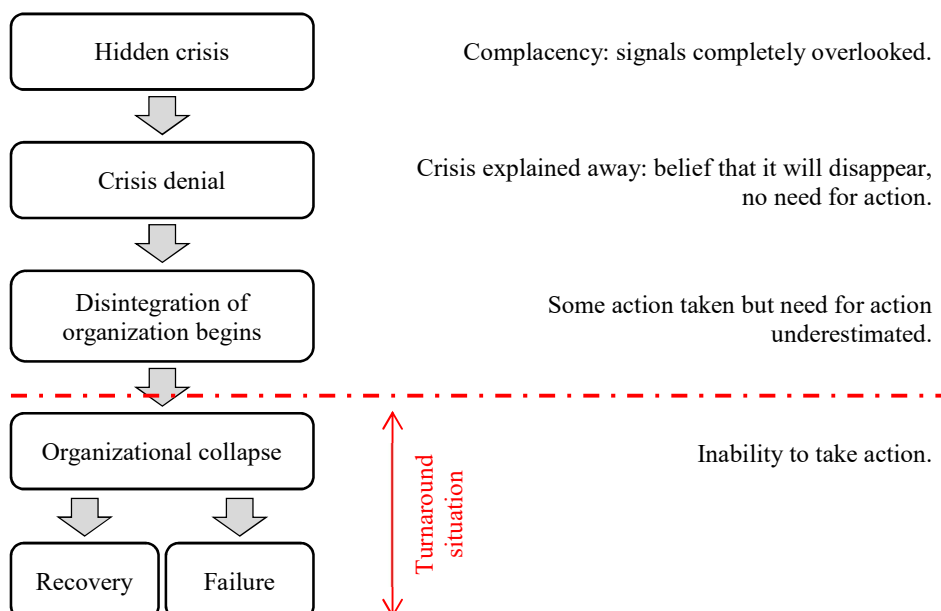


Figure 1: Four Stages of Crisis Development (adapted from Slatter & Lovett, 1999)

Hidden Crisis: Due to a lack of reliable control systems, the organization's executives are unaware of the existence of a crisis (Slatter & Lovett, 1999). The organizational climate is characterized by complacency and arrogance about their market position and capabilities (Slatter & Lovett, 1999). Organizational complacency leads to a feeling of immunity regarding crises (Pearson and Clair, 1998).

Crisis Denial: The management team tries to link the symptoms to chance or positive organizational change and the situation is believed to improve in due time (Slatter & Lovett, 1999). The bad situation is often thought to be caused by uncontrollable short-term external pressures (Slatter & Lovett, 1999). Overall, no management action is deemed necessary, since “[optimism] about the future is still the prevailing management rhetoric” (Slatter & Lovett, 1999, p. 62).

Disintegration of organization: As the situation worsens, the existence of the crisis and the subsequent need for management action is recognized but still underestimated (Slatter & Lovett, 1999). Consequently, the actions taken, such as budget cuts, only manage to delay the corporate decay (Slatter & Lovett, 1999). Inflexibility and a drive for self-preservation lead to increased autocracy and ostracism of colleagues advocating an alternative point of view (Slatter & Lovett, 1999). Overall, the published press reports still remain optimistic (Slatter & Lovett 1999).

Organizational collapse: It becomes evident that the current management is unable to cope with the crisis (Slatter & Lovett, 1999). The expectation of failure grows, competent people resign, and organizational morale falls (Slatter & Lovett, 1999). Only a rigorous focus on turnaround management, often combined with the recruitment of turnaround specialist, may avert the impending insolvency (Slatter & Lovett, 1999).

The key takeaway from this model is that organizational crises are triggered long before their occurrence is recognized within the company (Situm, 2013). In other words, “[...] a severe crisis does not occur overnight” (Slatter & Lovett, 1999, p. 61). Hence, an attentive observer should be able to recognize the accumulation of indicative signs ahead of corporate crises (Faulhaber & Grabow, 2009; Situm 2013; Slatter & Lovett, 1999). The failure of recognition is often coupled with the stressful nature of admitting that there is a problem and acknowledging management mistakes (Slatter & Lovett, 1999). Furthermore, since symptoms manifest themselves early and management optimism prevails thereafter, the crises usually proves to be worse than it was initially expected to be (Slatter & Lovett, 1999).

2.2.2 Crisis Types and Behavior

Initially, Andrade and Kaplan (1997) only distinguished between two crisis types, namely financial and economic distress. While the former is defined as having excessive debt, the latter included industry, operating and macroeconomic trouble (Platt, 1998). However, more recently, researchers have focused on including the measurement of time into the definition of crisis types (Evertz & Krystek, 2014; Müller, 2013). Consequently, three corresponding aggregate states that progress over time have been determined: potential, latent and acute (Evertz & Krystek, 2014). Those three states correspond with the three development stages prior to the organizational collapse depicted in Figure 1. During the potential state, the crisis symptoms are mostly hidden but become more obvious the more the crisis progresses. The disintegration of the company slowly begins once the latent state is reached and further accelerates in the final stage. The turnaround situation begins as soon as the survival of the company is threatened and shortly thereafter, organizational collapse is impending.

If the seriousness of the crisis is taken into consideration, three types of organizational crises – strategy crisis, earnings crisis and liquidity crisis – can be determined (Figure 2). All crises, apart from some exceptions, follow the same pattern and initially emerge as sole strategy crises, before they further evolve into earnings and liquidity crises (Müller, 2013). In individual cases, such as the default on receivables from a major customer, a company could directly reach the ultimate stage (Kraus & Haghani, 2004). Figure 2 depicts that the crisis types are equivalent to the three aggregate states, in terms of chronological progression, but differ regarding their severity. A strategy crisis is considerably less serious than an earnings or liquidity crisis and thus accompanied by less obvious signs. The more a crisis is allowed to deteriorate, the more severe it gets and the more obvious the warning signs become. This is illustrated by the grey arrows, which show the order of emergence, and the orange arrows, which show the order of recognition. Consequently, despite the presence of early crisis indicators, crises are usually not acknowledged until the liquidity of the company is endangered (Müller, 2013). It can be recognized that, since the crisis types are continuous progressions, solely tackling the causes of the most recent type will not guarantee the longevity of the organization. Therefore, once the presence of a liquidity crisis is acknowledged, the causes for the earlier crisis types need to be detected. This step is essential because more business areas become affected with the continuous development of the crisis (Lymbersky, 2013). The red line indicates the beginning of a turnaround situation with an ambiguous outcome.

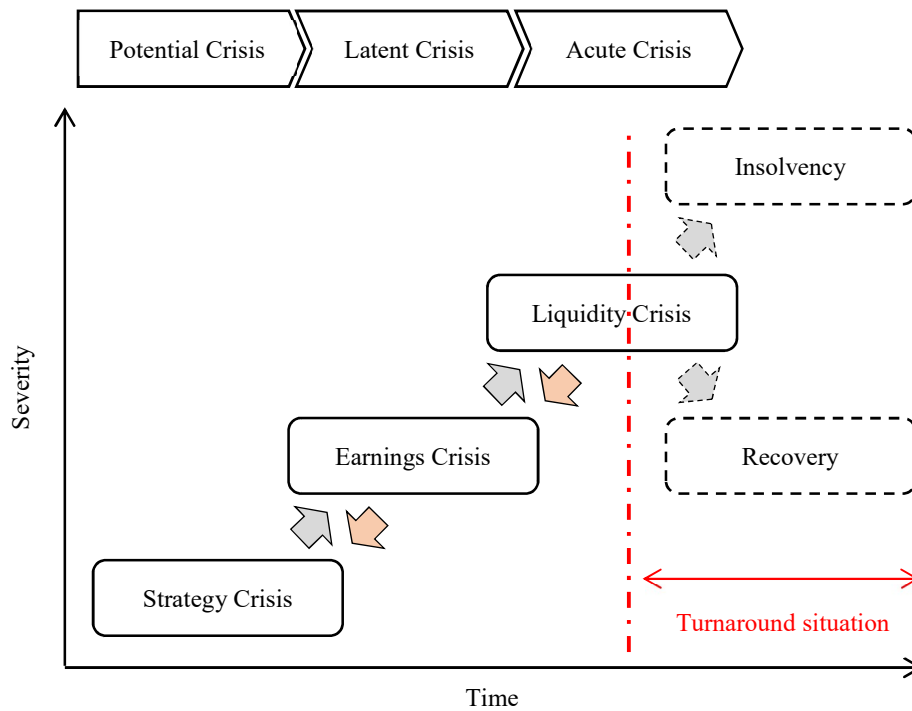


Figure 2: Emergence and Recognition of Organizational Crises (adapted from Bichkoff & Eilenberger, 2004; Evertz & Krystek, 2014; Müller, 2013)

During the acute state, a crisis could become non-controllable. However, if the crisis is correctly identified, corporate recovery is always possible prior to reaching the non-controllable state (Figure 3). The red line in the figure indicates the turning point where a turnaround becomes impossible. If Figure 2 and Figure 3 are combined, it can be recognized that, since the situation becomes progressively more serious and the profitability plummets, a successful turnaround is increasingly less likely, the further advanced the stage is upon recognition. Therefore, it can be determined that that organizational crisis follow the principle of ‘the earlier recognized, the easier rectified’, which reinforces the importance of a reliable EWS framework in business management.

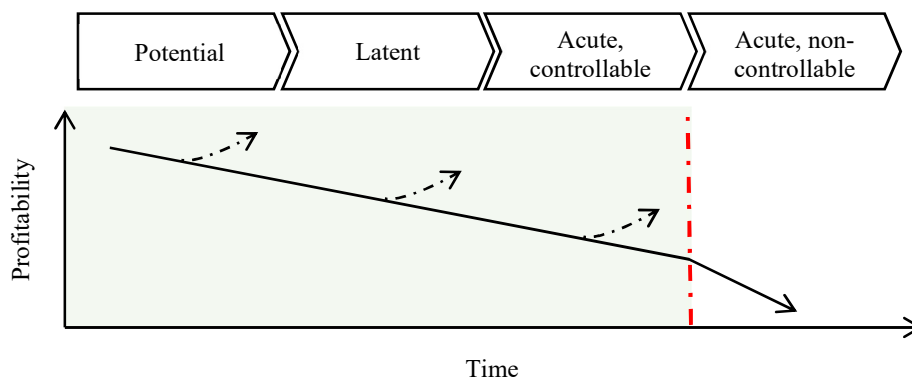


Figure 3: Possibility of Corporate Recovery (adapted from Birker, 2015d; Faeste, Schönfelder, Größ & Lay, 2016)

2.2.3 Recognition of Crises

As previously found, the moment of recognition is decisive for the crisis outcome. Prior to its occurrence, a crisis is indicated by obvious or ambiguous signals, which are often overlooked (Faulhaber & Grabow, 2009). The further a crisis is allowed to deteriorate, the smaller is the chance of a successful turnaround (Bickhoff & Eilenberger, 2004). Consequently, this section introduces some general symptoms of corporate crises, as well as the most prominent indicators of each specific crisis type. By drawing upon the warning signs, an attentive manager should be enabled to objectively assess the situation and interfere if necessary. According to Slatter and Lovett (1999) as well as Müller (2013) the general indicators of corporate decay and looming crises are:

- Poor financial results and creative accounting
- Profit warning and declining performance
- Declining market share
- A potential takeover bid
- Rapid management turnover
- Recurring failure of product launches
- Reliance on big projects
- Quality problems and declining customer service

A more precise analysis reveals that several crisis symptoms can be specifically linked to the crisis types depicted in Figure 2. Therefore, the recognition of earlier crisis stages can be facilitated.

Strategy crisis: A strategy crisis is usually indicated by the worsening of a company's competitive position (Kraus & Haghani, 2004). The primary indicators of it are missing long-term success potentials and strategic goals (Bickhoff & Eilenberger, 2004). Due to the nature of the indicators, this crisis type is often only preceded by weak signals and the operative business of the company is usually not yet affected (Kraus & Haghani, 2004). However, after some time has passed, one, or several, business segments begin to be affected to such an extent that it can be recognized in the operative environment (Bickhoff & Eilenberger, 2004). If this is the case, it can typically be identified by unplanned declines in sales causing an accumulation of inventories and an increase in debt financing (Bickhoff & Eilenberger, 2004). Despite this, a company may still generate profits while being in a strategic crisis (Lymbersky, 2013).

Earnings crisis: If the causes of a crisis are not tackled in the first stage, it is only a matter of time until the earnings situation of the company begins to be affected (Kraus & Haghani, 2004). Consequently, this crisis type is characterized by companies initially generating below industry-average profits, then forfeiting profit goals and finally beginning to incur net losses (Haghani, 2004; Kraus & Haghani, 2004). These losses can impact the equity capital of the company to such an extent that over-indebtedness is possible (Bickhoff & Eilenberger, 2004). Combined with the increased debt financing, resulting from the strategic crisis, a company’s credit rating could decline, which would escalate the costs of future borrowings (Bickhoff & Eilenberger, 2004).

Liquidity crisis: Again, if the crisis is not resolved, it deteriorates even further until the equity of the company is depleted (Haghani, 2004). This crisis manifests itself either in imminent or acute insolvency (Bickhoff & Eilenberger, 2004). The seriousness of a liquidity crisis can be exacerbated by the interplay of external factors such as imposed restrictions on future borrowing (Bickhoff & Eilenberger, 2004).

Müller (2013) found that each crisis type affects specific areas of the income and cashflow statements (Figure 4). By establishing a direct connection between the fiscal results of the company and crisis indicators, early recognition can be simplified. This connection enables managers to monitor specific indicators that possibly reveal a downward trend before the crisis is apparent. As visible in Figure 4, strategy crises are reflected in sales revenue and contribution margin decreases, while earnings crises affect earnings figures directly. Finally, liquidity crises would manifest themselves in the company’s cash flow statement.

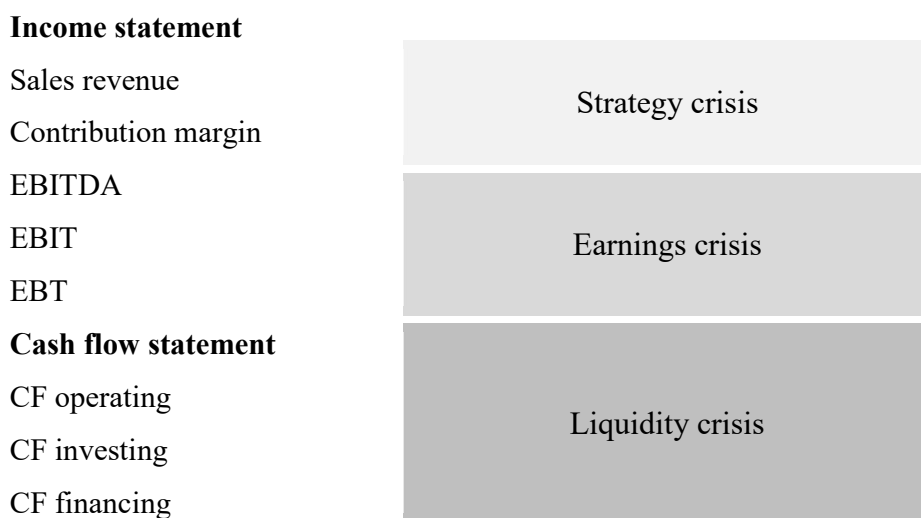


Figure 4: Recognition of Crises Types in Financial Statements

2.2.4 Errors in Crisis Recognition

Despite the existence of indicators, the early recognition of crises is an intricate management task (Müller, 2013). The difficulty, specifically in recognizing earlier crisis development stages, lies in distinguishing between chance or negative trend (Müller, 2013). Since strategy crises, in particular, are usually only announced by weak signals, it often is a mixture of detailed analysis and gut feeling to correctly determine whether the signals are random or reveal a downward trend (Müller, 2013). Since, as aforementioned, optimism often prevails in early crisis stages, changes in indicators are commonly attributed to random events, and managers frequently fail to acknowledge the red flags in advance (Collard, 2002; Faulhaber & Grabow, 2009; McKinsey, 2014; Müller, 2013; Pepels, 2015b). Consequently, this chapter addresses the most common errors that occur in crisis recognition, in order to ensure the validity of the later created framework.

In general, it has been found, based on examples of unnoticed crisis, that the failure to acknowledge crisis situations can be ascribed to one or several of six common factors (Müller, 2013). All these factors, according to Müller (2013), are briefly introduced below.

1. **Failure to identify the crisis:** The failure to correctly identify a worsening situation as an organizational crisis is the most common reason that crises are recognized too late. As aforementioned, this is often due to misidentifying a negative development as a random event (Müller, 2013). If the crisis fails to be correctly identified, no corrective measures can be taken to tackle the causes at an early stage. The failure of recognition is common for strategy crises, since this type is only foreshadowed by weak signals (Kraus & Haghani, 2004).
2. **Inexistence of an EWS framework:** The second most common reason is that no framework for the early recognition is employed within the company. It is obvious that the inexistence of such a framework makes the early recognition of crisis nearly impossible, as no set of rules is in place to help anticipate imminent crisis situations. Also, Faulhaber and Grabow (2009) found that the absence of EWS is frequently the decisive factor for failing to recognize an organizational crisis.

3. **Failure to take action:** As addressed in Chapter 2.2.1, the crisis is usually denied and believed to be evanescent, which leads to the management failing to initiate corrective measures at an early stage (Slatter & Lovett, 1999). Although the deteriorating situation is recognized, the signs are often ignored and excessive optimism regarding the company's future projects hinders management intervention (Slatter & Lovett, 1999).
4. **Failure to take responsibility:** Müller (2013) found that the management sometimes escapes the unpleasant fact that a crisis is apparent by focusing on the daily business, rather than targeting the worsening situation. Furthermore, the person in power begins to delegate challenging tasks, which is seen as a flight from responsibility.
5. **Failure to tackle the issue:** Similar to number four, the management fails to tackle the issue by sticking to existing patterns. However rather than justifying this action by heavily focusing on the daily business, it is attributed to the corporate mentality. In such cases, a 'we-have-always-done-it-this-way' mentality prevents the optimization of business processes in order to resolve the crisis.
6. **Failure to communicate the crisis accordingly:** The final reason for failing to acknowledge crisis situations is that the existence of the crisis is hushed or miscommunicated. It can be assumed that this stems from the fear of taking responsibility for one's own mistakes, especially in companies where crises are commonly believed to be the result of individual errors (Faulhaber & Grabow, 2009; Slatter & Lovett, 1999). As a result of the vague communication, the company lacks direction in tackling the crisis accordingly.

Slatter and Lovett (1999) found that after the existence of a crisis is acknowledged, the distinction between its symptoms and root causes is decisive for recovery or failure. This is because “[although] symptoms give clues to what might be wrong with the firm, [...] they do not provide a guideline for management action” (Slatter & Lovett, 1999, p. 13). Consequently, it is essential that the root causes of the organizational crisis can be determined. For example, since crises are usually only acknowledged in the last stage, the symptoms are shown in the liquidity issues of the firm. However, were the company to only tackle the liquidity issues by focusing on corporate restructuring, a turnaround would not be sustainable, because the causes of the strategy

crisis would not be resolved. As a result, the organization can be expected to plummet into another crisis situation shortly after resolving the liquidity issues (Slatter, Lovett & Barlow, 2006). Furthermore, since more business areas are affected in later crisis stages, a detailed investigation to find causes is crucial, because they may result from another department than the one where the symptoms became visible (Lymbersky, 2013). Consequently, the cause analysis could be delayed or even prevented by the existence of a silo mentality within the organization (Birker, 2015d). In such circumstances, the investigation could be interpreted as an act of scapegoating rather than a constructive analysis, which could lead to a potential failure to correctly identify the root causes of the corporate decay (Birker, 2015d).

Conclusively, the creation of an EWS framework directly tackles the two most prominent issues in crisis recognition. While it will not be able to support the cause analysis without including qualitative measurements, a solely qualitative framework would still be immensely beneficial. Müller (2013), for example, concluded that a reliable set of indicators, allowing the early detection of irregularities, is extremely sought-after. By also enabling the board of directors to use the framework, instead of just relying on information from the executive management, an independent analysis could be conducted in order to establish a second opinion regarding the severity of the crisis. By doing so, the other errors in crisis recognition could be tackled and previously unnoticed corporate declines can be recognized.

2.2.5 Instruments for Early Crisis Recognition

Since there are more action alternatives in the earlier stages, the possibility of a successful turnaround is far greater, if the crisis is recognized in due time (Birker, 2015d). Consequently, this section introduces the existing body of knowledge regarding instrument for early crisis recognition. The strengths and weaknesses of the most common tools – financial ratios, discriminant analyses and logit models (Zopounidis & Doumpos, 1999) – are highlighted in the course of this chapter. Some of these analytical tools, namely the discriminant analysis of the logit model, have not specifically been used as instruments for early crisis recognition before, but rather for the prediction of corporate bankruptcies. However, since crises develop in chronological order and insolvency is the final stage, this thesis argues that both tools could also be used to predict looming crisis situations. By monitoring the changes in the scores prior to the crisis occurrence, it is expected that the symptoms of a looming organizational decay are already observable and that the use of the tools can be extended to the early recognition of crises.

Financial ratios: Due to their high availability and relevance in business failure prediction, financial ratios are frequently used crisis indicators (Platt, 1998; Situm, 2013; Zopounidis and Doumpos, 1999). Overall, Situm (2013) found that monitoring changes in a company's financial figures can enable an early identification of problem areas and consequently warn of the impending insolvency. However, on their own, the ratios solely allow managers to determine the symptoms, not the causes, of organizational crises (Zopounidis & Doumpos, 1999). Since the crisis is usually recognized when the liquidity is endangered, it is extremely likely that the symptoms occur in another business area than the one where the crisis originated. Therefore, it is crucial that if a ratio analysis is used, managers further investigate the symptoms in order to find the causes and introduce appropriate corrective measures. The main caveat of the application of this method is that symptoms and root causes are frequently confused (Birker, 2015d; Slatter & Lovett, 1999). Failure to correctly identify the causes of crises or the misidentification of symptoms as causes, could lead to misdirected corrective measures, which ultimately are unable to salvage the firm from bankruptcy. In order to determine the causes, qualitative variables, such as the structure of the firm, the quality of the management and market trends, should be taken into consideration (Zopounidis & Doumpos, 1999).

The main drawback of this method, regarding external analysts, is that financial statements could be subject to creative accounting, and thus provide a distorted picture of the company's accounts and the severity of the crisis. This risk can be mitigated by relying on data from annually prepared statements, since such statements are audited and hence provide a more truthful view (Platt, 1998). Regardless, companies in financial distress may still succumb to creative accounting practices (Platt, 1998), which is shown by the prominent examples of Enron or Parmalat. In addition, there is a high possibility that there is a time lag between the internal occurrence and external recognition of the crisis as audited financial reports are published annually (Slatter & Lovett, 1999). Lastly, since the annual reports show one specific moment in time and declaration standards differ, the data could be distorted. Despite this obvious drawbacks, financial ratio analyses are commonly employed due to the lack of internal information available to outsiders (Dambolena & Khoury, 1980; Zopounidis & Doumpos, 1999).

Discriminant analysis (Z-score): A multiple discriminant analysis is a statistical approach that classifies an observation into groups dependent upon individual characteristics (Altman, 1968). It is primarily used to classify or make predictions between qualitative variables such as male/female or bankrupt/non-bankrupt (Altman, 1968). While it initially has been used in biological or behavioral sciences it has become a common tool to assess financial problems (Altman, 1968). Altman (1968) pioneered the use of financial ratios and discriminant analyses as a means of corporate bankruptcy prediction. The ultimate goal of his multicriteria model is to discriminate between bankrupt and healthy firms (Zopounidis & Doumpos, 1999). Moreover, a grey area was determined, which indicates an uncertain position and the need for further investigation (Zopounidis & Doumpos, 1999). The result of the analysis yields a score, known as the Z-score or Z value, which consist of the sum of products between variables and constants (Altman, 1968). The variables are specific financial ratios that have been found to be reliable indicators of bankruptcy (Altman, 1968). Since the calculations also rely on published financial data, the same disadvantages as for financial ratios apply. The main advantage of multiple discriminant analyses is that an entire profile of characteristics and their interaction can be considered (Altman, 1968).

Logit model: This classification method is also based on financial ratios but, unlike Altman's (1968) Z-score, its foundation is a logistic regression (Situm, 2013). In statistical analysis, regression models are used to explain the underlying pattern between the relationship of variables (Waters, 2011). Since the model also uses financial ratios, the same disadvantages regarding publicly available financial data apply. The logit model is one of the main alternatives to Altman's (1968) discriminant analysis and overcomes some of its limitations (Doumpos & Zopounidis, 1999; Situm, 2013). The most prominent advantage is that it indicates a company's probability of financial health (Situm, 2013). In other words, were a company to achieve a score of 82 percent, it shows that the firm has an 82 percent probability to be in a healthy financial situation.

3 Methodology

The methodology demonstrates how the hypothesis is examined based on the tools outlined in the theoretical framework. First, it elucidates how the techniques are applied and how they may be interpreted. Afterwards, it addresses how those techniques are compiled in a broad EWS framework that will later be applied to selected organizational case studies. By showing how the case studies were selected, the goals of the framework are reinforced, and transparency is created. Finally, this chapter is concluded in a conceptual framework, which illustrates how the parts are interlinked and how each contributes to answering the proposed research hypothesis.

3.1 Analytical Methods

3.1.1 Financial Ratios

The ratios used in the subsequent analysis have been selected based on their ability to predict crisis situations and their prominent use in past research. Table 5 in Appendix I shows how often specific ratios for crisis prediction have been used by researchers in order to determine signs of looming distress. The selected ratios have been summarized in Table 1 and were, with the exception of the quick ratio and ROE, used by more than one third of the sources analyzed. The ROE has been specifically taken into consideration because of its ability to illustrate the impact of debt on the generated return when compared with the ROA (Leach, 2010). The quick ratio has been added to the analysis due to its capability to quantify the impact of an accumulation of inventories on a firm's ability to cover all its short-term liabilities (Leach, 2010). However, financial ratios by themselves are meaningless if not contrasted historic company figures or industry averages in order to be interpreted correctly (Leach, 2010).

Table 1: Selected Financial Ratios

| Ratio | Category |
|--------------------------|---------------------|
| Working capital turnover | Activity ratio |
| Cash flow to debt ratio | Coverage ratio |
| Debt ratio | Leverage ratio |
| Current ratio | Liquidity ratio |
| Quick ratio | Liquidity ratio |
| ROA | Profitability ratio |
| ROE | Profitability ratio |

Activity ratios, such as the working capital turnover, compare sales revenue with a company's assets in order to quantify its efficiency (Platt, 1998). As shown by the formula, the working capital turnover measures how efficiently a company's working capital is employed to generate sales. If the ratio decreases from one fiscal period to another, it indicates that the firm's working capital is used increasingly less efficiently. A lower ratio could possibly indicate an accumulation of inventories.

$$\text{Working capital turnover} = \frac{\text{Sales Revenue}}{\text{Net working capital}}$$

$$\text{Working capital} = \text{Current assets} - \text{current liabilities}$$

Coverage ratios measure the ability of a firm to cover a given expense (Atrill, 2006). In the case of the cash flow to debt ratio, a firm's operating cash flow is compared to the total liabilities and it is evaluated to what extent the cash flow covers the debt (Atrill, 2006). If the ratio, for example, is 0,20, then 20 percent of the company's debt are covered by the operating cash flow. If the score is above 1, the company has a higher operating cash flow than liabilities.

$$\text{Cash flow to debt ratio} = \frac{\text{Operating cash flow}}{\text{Total debt}}$$

Leverage ratios calculate a firm's level of indebtedness by comparing its debt to its assets (Platt, 1998). More precisely, the debt ratio contrasts the total debt with the total assets in order to determine the "[...] proportion of invested funds raised from debt holders" (Platt, 1998, p. 78). Consequently, if the ratio is above 1, more assets are financed by debt and the company bears a higher financial risk (Kenton & Hayes, 2019). This means that lower debt ratios are more desirable as they are linked to a less risky business.

$$\text{Debt ratio} = \frac{\text{Total debt}}{\text{Total assets}}$$

Liquidity ratios provide insights regarding the solvency of the firm (Platt, 1998). Such ratios assess how likely it is for a company to continue trading in the foreseeable future (Leach, 2010). This thesis uses the current and the quick ratio, since a comparison of both not only evaluates the liquidity, but also specifically assesses a company's inventory development. An explicit focus on inventories is crucial, since their value can be subject to quick deterioration (Platt, 1998). Furthermore, inventories cannot be turned into cash as quickly as quick assets, since they need to be sold first (Leach, 2010). Both criteria combined show that the quick ratio serves as a more conservative, more stringent and more realistic measure of a firm's short-term ability to cover the claims of its creditors (Atrill, 2006). If the result of either ratio is 1, it shows that, were the evaluated assets to be liquidated at book value, the company would have enough funds to repay its creditors (Platt, 1998). Platt (1998) found that a current ratio of 2 indicates financial health, since the creditors could be repaid twice. A quick ratio of 1 is sufficient to label a business financially stable (Leach, 2010). Regardless, in practice a quick ratio below 1 does not necessarily indicate liquidity problems (Atrill, 2006).

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

$$\text{Quick ratio} = \frac{\text{Cash} + \text{marketable securities} + \text{receivables}}{\text{Current liabilities}}$$

Profitability ratios, such as ROA or ROE, compare profits with returns or investments (Platt, 1998). The ROE shows how much profit is generated for each dollar the shareholders invested in the firm, whereas the ROA quantifies the profits generated in regard to the assets used (Leach, 2010). Both figures need to be evaluated in the context of the industry the company is active in, but in general, higher ROE or ROA figures are more desirable (Leach, 2010). The major drawback of profitability ratios is that, despite showing that there are problems within the firm, they do not provide any insights into what could be wrong (Platt, 1998).

$$\text{ROA} = \frac{\text{Net income}}{\text{Total assets}}$$

$$\text{ROE} = \frac{\text{Net income}}{\text{Shareholder's equity}}$$

3.1.2 Z-Score

As previously addressed, the discriminant analysis was introduced by Altman (1968) in order to distinguish between bankrupt and non-bankrupt firms. Altman (1968) selected the ratios based on their statistical significance, inter-correlations and predictive accuracy. Since Altman (1968) calculated the variables as percentages, this thesis uses the calculation introduced by Slatter and Lovett (1999, p. 15), which has been adjusted to the use of ratio results in decimals.

$$Z = (1.2X_1) + (1.4X_2) + (3.3X_3) + (0.66X_4) + (1.0X_5)$$

$$X_1 = \frac{\textit{Working capital}}{\textit{Total assets}} \quad X_2 = \frac{\textit{Retained earnings}}{\textit{Total assets}} \quad X_3 = \frac{\textit{EBIT}}{\textit{Total assets}}$$

$$X_4 = \frac{\textit{Market value of equity}}{\textit{Book value of debt}} \quad X_5 = \frac{\textit{Sales}}{\textit{Total assets}}$$

According to Altman (1968), a company is financially healthy if it scores above 2,67, whereas it can be classified as bankrupt, if the score lies below 1,81. In between both scores, there is the so-called grey area, or zone of ignorance, which shows that the firm is in a temporarily sick position (Altman, 1968). Slatter and Lovett (1999) found that if score falls below 0, and no corrective action is taken, the company will be bankrupt within two years.

This thesis applies Altman's (1968) multiple discriminant analysis in order to predict corporate turnaround situations. It is argued, that negative changes in the Z-value reflect underlying problems within the organization and thus warn of imminent crisis situations, even if the score still lies far above 2,67. More precisely, if the score, for instance, drops from 10 to 7,5 within one fiscal period, it can be seen as an early indicator for a potential crisis. By monitoring these changes prior to corporate crises, it is expected that decreases in this score show the deteriorating situation far ahead of the crisis being reflected in the liquidity situation of the firm. Consequently, Altman's (1968) multiple discriminant analysis is believed to be one of the most crucial tools in the created EWS framework.

3.1.3 Logit Model

Similar to the multiple discriminant analysis, the logit analysis is based on several financial ratios. However, as the ratios are different to the ones used in Altman's (1968) Z-score, the logit analysis adds additional value to the EWS framework. Another distinction is that some variables are allocated vastly higher multipliers than others, which indicates their comparable importance (Situm, 2013). The logistic regression is calculated as follows (Situm, 2013, p. 285):

$$F = \frac{1}{(1 + e^{-(13.7813 - 4.7252X_1 + 52.9741X_2 - 3.0594X_3 - 14.558X_4 + 0.1886X_5)})}$$

$$X_1 = \frac{\text{Gross profit}}{\text{Total assets}} \quad X_2 = \frac{\text{Net income}}{\text{Total assets}} \quad X_3 = \frac{\text{Quick assets}}{\text{Current liabilities}}$$

$$X_4 = \frac{\text{Total debt}}{\text{Total assets}} \quad X_5 = \frac{\text{Net worth}}{\text{Net fixed assets}}$$

Since the logit model is able to show the probability of financial health for a company (Situm, 2013), this calculation is used in order to indicate the beginning of a turnaround situation in the subsequent case study analyses. As soon as the logit score falls below 78 percent, a firm can be considered financially stricken (Situm, 2013). Therefore, this thesis argues that if the score descends below the cut-off probability of 78 percent, the liquidity of a company is endangered, and a turnaround situation is apparent. The implication of this assumption is that, if the EWS framework is able to show a significant deterioration of the company's position prior to the logit score dropping below the healthy limit, early crisis recognition could be ensured.

3.2 Broad EWS Model

The aim of early warnings systems is to gain more time for countermeasures by continuously monitoring several crisis indicators that seek to reveal deteriorating organizational trends at an early stage (Pepels, 2015a). In order to do this, the development of crisis-relevant key figures is evaluated, and as long as the assessed figures do not significantly deviate from the target values no corrective action is deemed necessary (Pepels, 2015a). However, if there are considerable deviations, it possibly indicates the advent of a crisis situation and the developments should be subject to an extensive investigation.

The broad EWS framework, created for the analysis of the case studies, consists of the specific ratio analyses, Altman's (1968) discriminate model and Doumpou and Zopounidis' (1999) logistic regression. The framework will be applied to several corporate case studies and is tested on its predictive abilities. The analysis will consist of a thorough evaluation of the specific companies' financial performance over various fiscal periods. The results will be displayed in a radar chart, where the changes in each measurement can be traced and interpreted (Figure 5). The example radar scale shows how the findings will be presented. The figures will be interpreted based on the changes in each measurement and the predictive ability of the different measurements are assessed. By doing so, the final framework can be condensed to the few most decisive measurements in order to facilitate its application.

The radar chart will be interpreted on the basis of the changes in the assessed years. A positive movement on the radar scale can be interpreted as an improvement, whereas and a negative development depicts a deterioration of the current situation. Since not the firm's position within the industry, but rather the change in each measurement is examined, the scores are not interpreted regarding the respective industry average. More precisely, it is not assessed whether a ROA of 15 percent reflects an advantageous market position for a particular company, but whether the score has decreased in regard to the previous years and what the possible corresponding implications are.

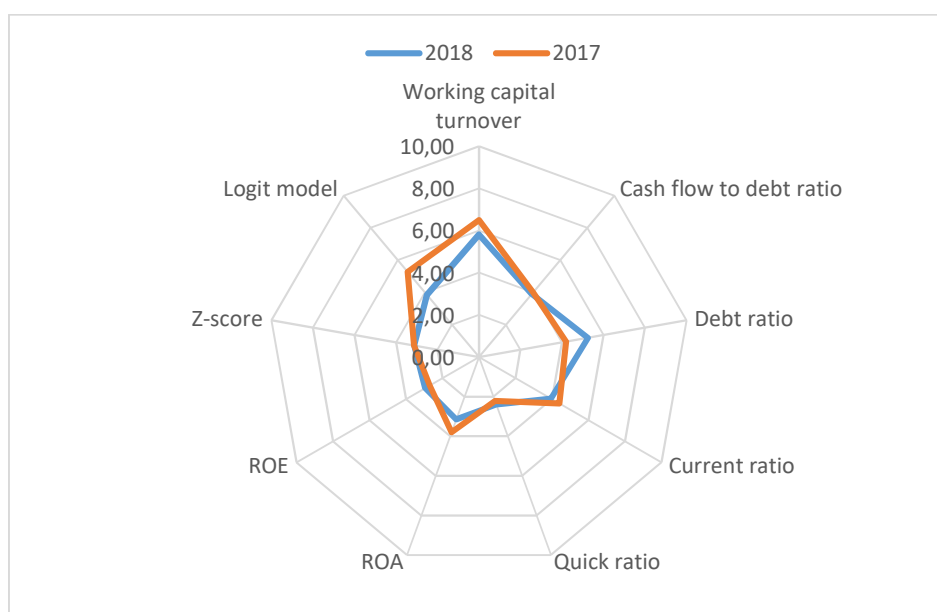


Figure 5: Example Radar Chart

Since all employed tools yield a different result that can only be interpreted on its specific scale, all figures need to be converted to a single scale in order to be compared to one another. Therefore, this thesis first determined the acceptable ranges for each ratio and converted those to a single 0 to 10 scale, where 0 is the lowest (worst) and 10 the highest (best) score. The acceptable ranges are based on the highest and lowest scores in the respective ratio across all case studies, which are adjusted if the scores are deemed outliers (see Figure 6: Scale Determinants in Appendix II). Such an adjustment has, for instance, been done regarding the ROE scores, where a bottom score of negative 228 percent is seen as an exception. In such cases, where the score exceeds the set range, they will be fixed on either lowest or highest range score respectively, in order to facilitate the interpretation of the results.

Table 3 shows the comparison of the actual ratio scales to the scale used in the radar chart. In order to convert the figures to the radar scale, a conversion function for each specific measurement was established (Table 2). In Table 2, the variable X_1 stand for the initial ratio result, whereas X_2 shows the results on the radar scale. Therefore, if the working capital turnover, for example, was 4,0 for any case study, the score shown on the ratio scale would be 5,8, as given by its specific scale conversion function.

Table 2: Formulas for Conversion to Radar Scale

| Ratio | Scale conversion function |
|--------------------------|-----------------------------------|
| Working capital turnover | $x_2 = \frac{(x_1 + 25)}{5}$ |
| Cash flow to debt ratio | $x_2 = \frac{(x_1 + 0,5)}{0,2}$ |
| Debt ratio | $x_2 = \frac{(x_1 - 1,5)}{-0,15}$ |
| Current ratio | $x_2 = 2x_1$ |
| Quick ratio | $x_2 = 2x_1$ |
| ROA | $x_2 = \frac{(x_1 + 20)}{6}$ |
| ROE | $x_2 = \frac{(x_1 + 20)}{6}$ |
| Z-score | $x_2 = x_1$ |
| Logit model | $x_2 = \frac{x_1}{10} \times 100$ |

3.3 Case Studies

Although every organizational crisis is specific to the organization, the use of past examples allows insights into the understanding of crises overall (Birker, 2015d). Consequently, this thesis analyses several cases of specific crises in order to evaluate the proposed hypothesis. By using several examples of past corporate crises, it can be evaluated to what extent the established framework is able to reliably predict organizational crises. Therefore, its practical suitability can be assessed. The results will either prove or disprove the proposed research hypothesis. Furthermore, the case studies are expected to illustrate how the applied measurements are interlinked and which of these are more decisive in predicting turnaround situations. As a result, the analysis should yield a more concise framework, consisting of the most meaningful measurements, which should facilitate its application.

The main criteria for selecting the case studies were the presence of a corporate crisis, the availability of financial information as well as the inclusion of various industries. First, in order to analyze the framework's ability to predict organizational crises, the presence of such crises in the sample used is a necessity. Second, based on the nature of the analysis employed, the availability of financial information in the form of annual reports is crucial. By analyzing companies operating in various industries, the cross-industry applicability of the framework can be examined. Were the case studies to show distinct similarities, it could be assumed that cross-industry applicability is given. Based on the selection principles, the sample was limited to public companies, since the analysis heavily relies on the accessibility of financial information. Furthermore, since historic financial statements are not always available, the sample focuses on more recent examples. Therefore, potential cases such as The LEGO Group (private company) or Fiat Automobiles and General Motors (absence of old statements) are disregarded. Furthermore, since the early recognition of crises is the focus of this thesis, organizational crises that were the result of single, unpredictable events are omitted. Such examples include HSBC or BP, which plunged as a result of the Global Financial Crisis or the Deepwater Horizon oil spill respectively. Other possible cases that are omitted are such where fraudulent behavior was either the cause or the prevalent feature responsible for delayed recognition. Those cases, which include Enron or WorldCom, are excluded based on the assumption that a framework would not have been able to prevent them.

The selected turnaround cases are listed in Table 4, where also the relevant industry and timespan are shown. The timespan analyzed has also been subject to the availability of financial information and has been determined to illustrate the corporate decline appropriately. In order to show the crisis development, the changes in the year-end stock price were depicted in a graph. By doing so, the recognition relevant time frame can be illustrated more appropriately.

Table 4: Selected Case Studies

| Company | Industry | Timespan |
|----------------------|----------------------------|-----------------|
| Alpiq | Energy | 2008 – 2018 |
| BlackBerry | Telecommunications | 2004 – 2016 |
| Bristol-Myers Squibb | Pharmaceuticals | 1997 – 2012 |
| General Electric | Conglomerate | 2010 – 2018 |
| Rieter Group | Textile, Engineering | 2008 – 2018 |
| Rolls-Royce | Aerospace, Defense, Marine | 2009 – 2018 |
| Starbucks | Restaurants | 2002 – 2012 |
| Under Armour | Apparel & Textile Products | 2009 – 2018 |

3.3.1 Sample Size

The sample size has been restricted to eight cases based on the limited time available to conduct the analysis and write the thesis. Nonetheless, by using eight distinct case studies, it can be ensured that the analysis is meaningful, and the results add value to the existing research. Furthermore, due to the nature of the analysis, the practical applicability of the proposed framework can be evaluated.

4 Findings

The findings of the cases are presented in a coherent manner. First, a brief overview of the company is given to specify the peculiarities of each case and the respective industry. By doing so, the individualities of each case can be highlighted, and a better understanding of the comparisons can be fostered. Second, by referring to the year-end stock price development, the reasons for selecting the overall, as well as the EWS-relevant timeframe are explained. Following, the results of the EWS model applications will be illustrated, and the development of each measurement score will be assessed. To increase the understanding, the calculated scores, as visible in the respective appendices, and their radar score counterpart have been given in squared brackets [ratio value/radar score]. Finally, every case will be concluded by specifically evaluating which scores successfully predicted the imminent crisis and which played a minor role in the early recognition. Therewith, the relevance of each score for the condensed EWS framework can be emphasized.

4.1 Alpiq Holding AG

Alpiq is one of the leading electricity producer and energy provider in Europe (Alpiq, 2019). The company is the result of the 2009 merger between the two Swiss energy companies Atel (Aare-Tessin Ltd. for Electivity) and EOS (Energie Ouest Suisse) (Alpiq, n.d.). While initially believed to have enormous future growth potential (Alpiq, 2010), Alpiq failed to live up to the hype and its share price plummeted (Figure 6). The decline is exacerbated by the impacts of climate and nuclear power reforms on the core business of the firm (Alpiq, 2010 & 2014).

In this case, the time frame was chosen to include the last pre-merger financial information up to the most recently published ones (Figure 6). The inclusion of the 2008 pre-merger results is essential because it could potentially explain one of the underlying reasons for the late recognition of the crisis. By extending the overall financial analysis to the 2018 fiscal results, it can be illustrated that the firm still trades at less than a fifth of its pre-merger value and thus has not managed a successful business turnaround yet. In terms of early recognition, the timespan from 2008 to 2012 seems to be most relevant, as by 2013 the stock price information by itself should have been sufficient proof of the evident organizational crisis. The results of the application of the EWS framework to the recognition timespan are depicted in Figure 7 and will be elucidated in this chapter, while the results of the complete analysis can be found in Appendix III.

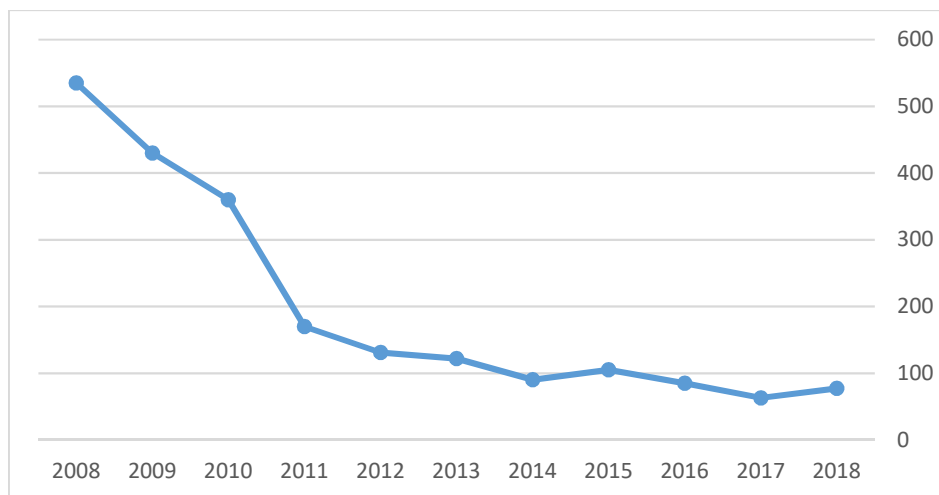


Figure 6: Year-end Stock Price Development Alpiq

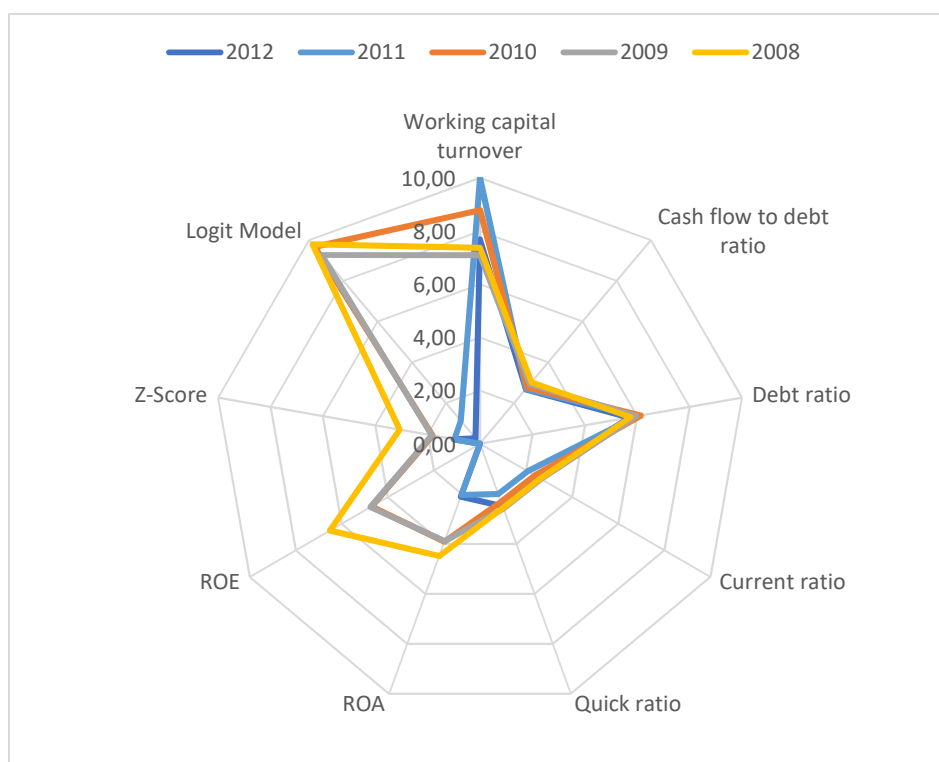


Figure 7: EWS Framework Recognition Timespan Alpiq

Activity: There is a net increase in the working capital turnover from 2008 [11,9/7,38] to 2012 [13,4/7,69]. The initial decline in the ratio, which dropped in 2009 [10,5/7,09], can potentially be attributed to post-merger integration difficulties, which seem to have been overcome by 2010 [18,9/8,79]. Due to very little working capital and comparably high revenues, 2011 [113,5/10] can be recognized as an outlier year, where the WC turnover skyrocketed. In the following year, the ratio decreased and lied below the 2010 [13,4/7,69], which indicates less efficient working capital management. The WC turnover decreased by two thirds after the analyzed period and has not recovered since.

Coverage: The debt ratio has already been extremely low in 2008 [0,10/3,02] and progressively decreased in the following years. By 2012, only four percent of the company's debt was covered by its operating cash flow [0,035/2,68], whereas in 2008 it was still nearly nine percent [0,085/2,93].

Leverage: This ratio initially increased from 2008 [0,60/5,96] to 2010 [0,58/6,14] and then marginally in the following two years. By 2012 [0,64/5,70] the ratio fell below the 2008 values, which hints at a riskier financial position. Overall, the debt ratio remained constant without severe fluctuations.

Liquidity: The liquidity ratios initially decreased from 2008 [Current: 1,30/2,60; Quick: 1,27/2,55] to 2011 [Current: 1,03/2,06; Quick: 1,00/2,01] but recovered in the following year [Current: 1,27/2,54; Quick: 1,25/2,50]. Overall, the potential liquidation of the company's assets would have covered its liabilities at any time during the corporate decay. Solely taking the liquidity ratios into account, it could be assumed that the liquidity of Alpiq was not endangered, despite incurring losses in 2011 and 2012.

Profitability: Post-merger [ROA: 3,36/3,89; ROE: 8,52/4,75], both ratios, were less than half of value in the previous year [ROA: 6,94/4,49; ROE: 19,1/6,52]. It could be argued that the focus on post-merger integration of Atel and EOS is responsible for this considerable decline. Furthermore, since both ratios remained on the same level in the following year [ROA: 3,49/3,92; ROE: 8,29/4,72], these lower scores may have been accepted as the standard for the newly created company. The cognitive behavior of accepting a less favorable position is commonly known as normalization of deviance and can be the decisive factor for failing to recognize the severity of a crisis situation (Tinsley, Dillon & Madsen, 2011). However, the profitability ratios plummeted in the next period [ROA: -7,71/ 2,05; ROE: -21,7/0] and were negative for the majority of the following years. In 2018, Alpiq has still not recovered and continues to generate losses.

Discriminant and logit analysis: The Z-score development of Alpiq shows that while already Atel was in an uncertain position [3,07/3,07], it got continuously worse in the post-merger years. By 2011 [0,98/0,98], the score fell below one, which clearly indicates liquidity problems. This is reinforced by the logit score drastically falling from 2010 [96,7%/9,67] to 2011 [11,4%/1,14]. Consequently, a turnaround situation was apparent in 2011, as Alpiq had a 11,4 percent chance that it was financially healthy. Similar to the other ratios, both the Z-score and the logit score immediately decreased after the merger and have failed to reach similar heights ever since.

Conclusively, it can be stated that, due to the prevailing circumstances in the aftermath of the Global Financial Crisis and the normalization of deviance, the crisis was likely only recognized in 2013 when Alpiq's net revenue decreased by more than 25 percent. Despite previously incurring net losses, the situation initially seemed to improve, before starting to deteriorate again in 2013. As a result, it can be argued that the company management was still optimistic that the losses were a short-lived phenomenon and no far-reaching corrective measures were taken, prior to the acknowledgement of the crisis. Regardless, the transition to a liquidity crisis occurred in 2011, as illustrated by the fall in the logit score. The application of the broad EWS model shows that the earliest possible indicators for a crisis situation were already visible in 2009. Initially, the halving of the Z-score and organizational profitability in 2009, followed by the halving of the cash flow to debt ratio until 2010, possibly indicated the imminent crisis situation. At this point, the crisis could have already been recognized and corrective measures could have been initiated. After all, the EWS model predicted to looming organizational crisis two years prior to the occurrence of a turnaround situation.

4.2 BlackBerry Limited

The company was originally founded as Research in Motion in 1984 and revolutionized the telecommunications industry with the introduction of the BlackBerry mobile phones around the turn of the century (Research in Motion, 2012). With the increasing prominence of Apple and Samsung in the telecommunications market, BlackBerry's sales began to decrease after 2011 (Appendix IV). In 2016, the company stated that it will outsource all its hardware developments to partners and solely focus on software (George-Cosh & McNish, 2016).

The year-end stock price development shows that the timeframe was chosen in order to illustrate the rise and fall of this once omnipresent brand. In terms of recognition, the relevant timespan includes the fiscal years from 2008 to 2013 (Figure 8). The former was included to show that there have been some negative developments while the stock price was still rising. Figure 9 shows the results of the application of the EWS framework to the recognition timespan. As with the other case studies, the complete financial analysis can be found in the respective appendix (Appendix IV).

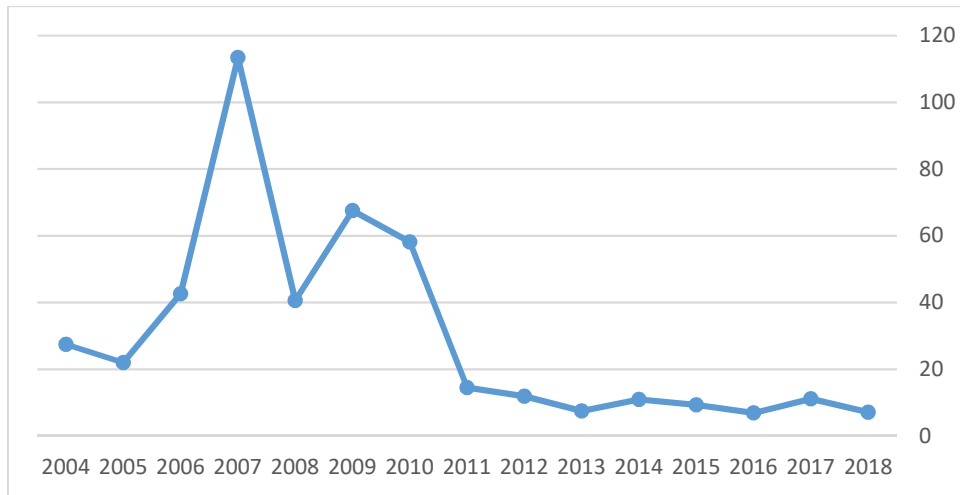


Figure 8: Year-end Stock Price Development BlackBerry

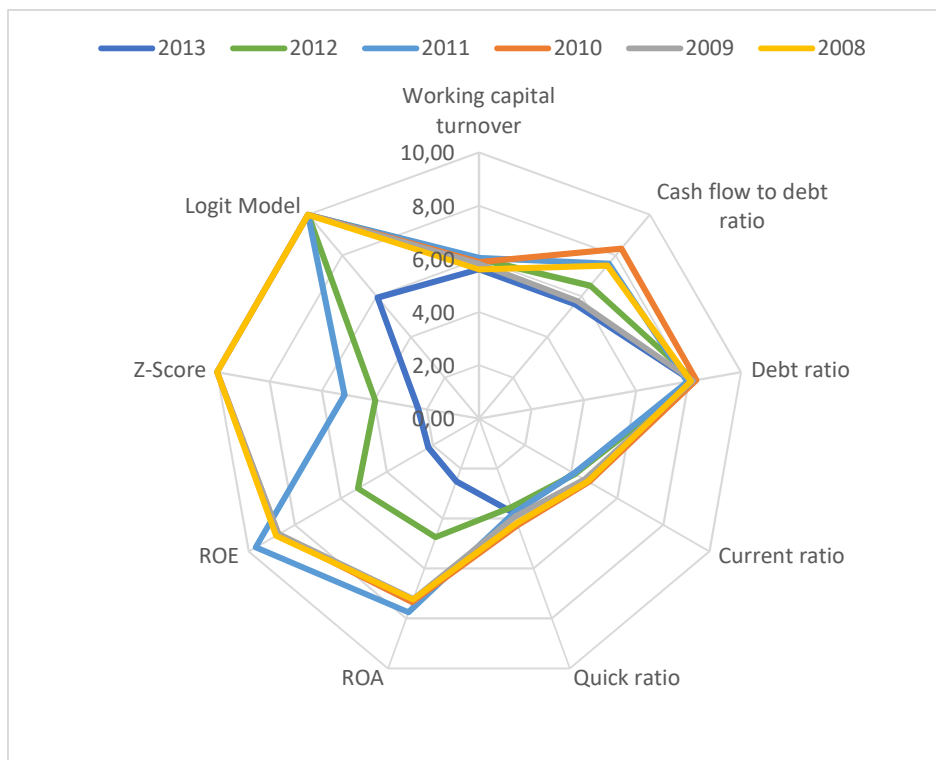


Figure 9: EWS Framework Recognition Timespan BlackBerry

Activity: The organizational efficiency, as measured by the working capital turnover, continuously increased from 2008 [3,00/5,60] to 2011 [5,16/6,03]. In the following year, there was a marginal decrease in the ratio [5,03/6,02], followed by substantial decrease in 2013 [3,03/5,61]. The working capital turnover has been decreasing ever since, falling below 1 in 2018. Overall, the WC turnover achieved a net increase in the recognition-relevant timeframe and behaved in a similar manner as in the Alpiq case study.

Coverage: The cash flow to debt ratio shows the first considerable decline between 2008 [1,00/7,50] and 2009 [0,65/5,76]. In the following period the ratio nearly doubled [1,17/8,33], before beginning to decrease again in 2011 [1,02/7,59]. In the 2012 fiscal year [0,80/6,51], a further decline in the coverage ratio can be recognized. The negative trend continued, and the ratio dropped by nearly 40 percent until 2013 [0,62/5,61]. In 2014, the operating cash flow coverage became negative.

Leverage: Similar to the Alpiq example, the debt ratio changed only marginally over the assessed period from 2008 [0,29/8,09] to 2013 [0,28/8,12]. The debt ratio initially decreased until 2010 [0,25/8,30], showing an increasingly less risky financial situation for BlackBerry. There was a small spark in the ratio in 2011 [0,31/7,96], which marks the highest level of debt for the recognition-relevant time period. The debt level increased rather drastically thereafter.

Liquidity: The quick and current ratios improved from 2008 [Current: 2,36/4,72; Quick: 2,08/4,18] until 2010 [Current: 2,39/4,78; Quick: 2,13/4,27] and began to drop in 2011 [Current: 2,06/4,13; Quick: 1,89/3,79]. Both ratios remained roughly on the same level for the rest of the timespan. Overall the liquidity ratios stayed above their respective limits, which implies financial health for the whole recognition-relevant period.

Profitability: The profitability ratios do not reveal as clear a picture as they did in the Alpiq case. In the beginning, the ratios slightly declined from 2008 [ROA: 23,5/7,25; ROE: 32,9/8,70] to 2009 [ROA: 23,4/7,23; ROE: 32,2/8,70]. From thereon the ratios improved until 2011 [ROA: 26,5/7,75; ROE: 38,2/9,69], before plummeting by nearly 75 percent in 2012 [ROA: 8,48/4,75; ROE: 11,5/5,25] and becoming negative in 2013 [ROA: -4,91/2,52; ROE: -6,83/2,20]. BlackBerry continued to generate negative profits until the 2018 fiscal period.

Discriminant and logit analysis: The logit score remained above 99 percent until 2013 [59,4%/5,94], where it fell notably, indicating the presence of a turnaround situation. The score fell further to 0 percent in the following fiscal year, which indicates a 100 percent probability that BlackBerry was in financial troubles. In 2010 [12,0/10], the Z-score was still above the upper limit of the radar scale but decreased by more than 50 percent in 2011 [5,13/5,13]. This worrying development continued, and the Z-value fell further until 2013 [2,33/2,33] and even became negative in 2014.

In the BlackBerry case, the crisis transitioned to an earnings crisis in 2012, as the net income began to be affected. In the following year, the logit score indicated the shift towards a liquidity crisis. According to the theory, it can be assumed that the crisis was recognized as soon as the first losses occurred in 2013. However, it could also be argued that the falling stock price may have already raised the awareness of the crisis in 2011. In this case, the EWS framework would have only confirmed its existence. However, since the previous stock price decline was followed by a period of continuous growth, optimism could have still been the prevailing management rhetoric at that time. Regardless, the framework clearly indicated the deteriorating situation two years before the solvency of the firm became endangered. In 2011, the Z-score already showed a remarkable decline, which should have already caused serious concern among BlackBerry's top management. In the following year, the falling profitability, combined with the decreasing coverage ratio, further underlined the increasing severity of the symptoms. In regard to the proposed hypothesis, the application of the model would have predicted the imminent crisis two years prior to the occurrence of a turnaround situation.

4.3 Bristol-Myers Squibb

Bristol-Myers Squibb is a pharmaceutical company that sells and licenses pharma products globally (Bristol-Myers Squibb, 2013). The pharmaceutical industry is heavily dependent on R&D as well as patents, which could have a decisive effect on net revenues (Bristol-Myers Squibb, 2013). In 2012, for example, the company's earnings plummeted due to the loss of exclusivity of Avapro/Avalide and Plavix (Bristol-Myers Squibb, 2013).

As visible in Figure 10, the organization was subject to a drastic decrease in the year-end stock price in the early 2000s but has been able to recover since. The analysis of the complete, fifteen-year timespan revealed that the period from the turn of the century to 2005 is the most decisive in terms of early crisis recognition. Therefore, the EWS framework application focuses this specific timeframe and its results are elucidated accordingly. The results, as explained, will be illustrated in a radar graph that allows the interpretation of the changes in the respective score (Figure 11). The complete analysis can be found in Appendix V and will not be discussed in detail.

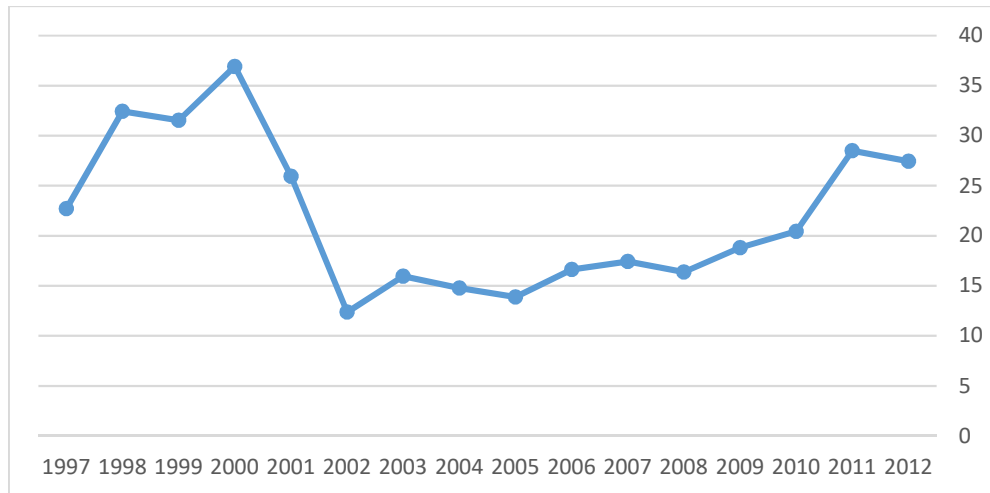


Figure 10: Year-end Stock Price Development Bristol-Myers Squibb

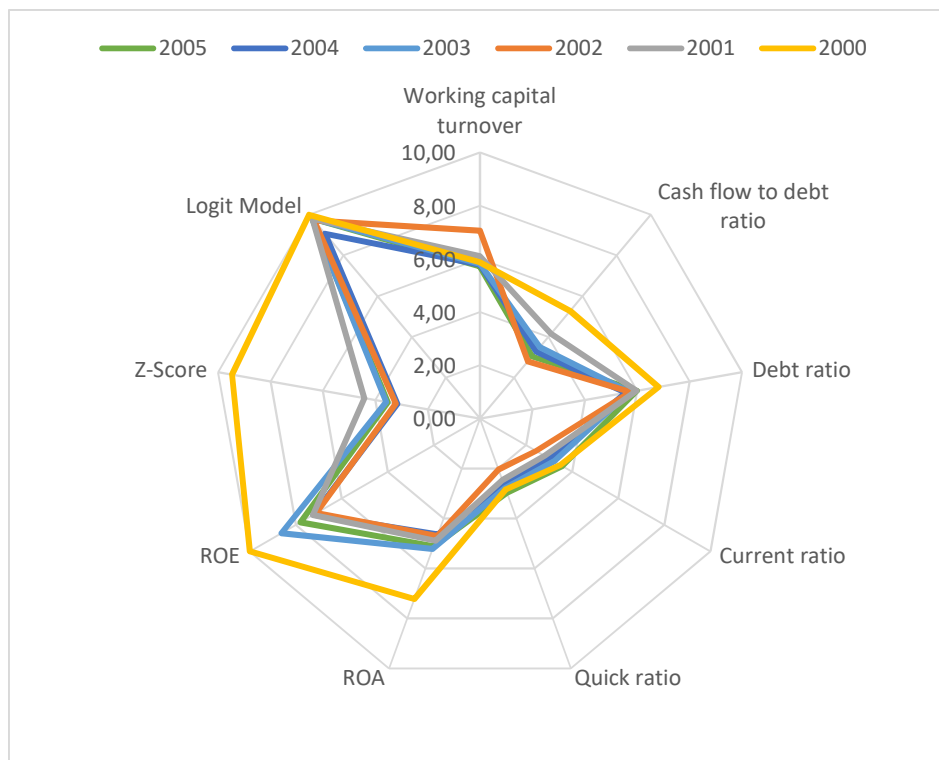


Figure 11: EWS Framework Recognition Timespan Bristol-Myers Squibb

Activity: The working capital turnover of Bristol-Myers Squibb has improved drastically between 2000 [4,35/5,87] and 2002 [10,37/7,06] and the ratio more than doubled. In the subsequent year [4,11/5,82], the ratio plummeted lower than the 2000 level and further decreased until 2005 [3,56/5,71]. Consequently, while the working capital was managed increasingly more efficiently until 2002, the notable drop in efficiency in 2003 indicates serious underlying issues within the organization.

Coverage: The cash flow to debt ratio decreased remarkably in the first two years from [0,55/5,27] in 2000 to [0,06/2,80] in 2002. This shows that by 2002, at the lowest point of the year-end stock price development, Bristol-Myers Squibb could only cover 6 percent of its debt with its operating cash flow. The ratio then improved remarkably in 2003 [0,20/3,49], before declining in 2004 [0,16/3,28] and 2005 [0,11/3,04].

Leverage: The debt ratio in the Bristol-Myers Squibb example shows a substantial increase in the first five fiscal periods from [0,48/6,81] in 2000 to [0,66/5,57] in 2004. This indicates that an increasingly higher proportion of the invested funds was raised from liabilities. In 2005 [0,60/5,99], the ratio began to decrease again.

Liquidity: Since both liquidity ratios remained above 1 for the entire period, they do not indicate grave liquidity issues. Both ratios decreased in the first three years from 2000 [Current: 1,74/3,49; Quick: 1,42/2,84] to 2002 [Current: 1,21/2,43; Quick: 1,02/2,04]. Subsequently, the current and quick ratio both increased until 2005 [Current: 1,78/3,57; Quick: 1,48/2,97], with shortly decreasing in 2004 [Current: 1,50/3,01; Quick: 1,32/2,64].

Profitability: Overall, the pharmaceutical industry is extremely profitable, which is shown by Bristol-Myers Squibb achieving a ROA of up to 34 percent and a ROE of over 70 percent in 2009. During the assessed period, the profitability initially decreased drastically between 2000 [ROA: 23,3/7,22; ROE: 44,6/10] and 2001 [ROA: 9,34/4,89; ROE: 23,4/7,26]. In the following two periods, Bristol-Myers Squibb achieved an increase in profitability until 2003 [ROA: 11,3/5,22; ROE: 31,7/8,62], before it dropped in 2004 [ROA: 7,85/4,64; ROE: 23,4/7,23] and rose again to similar heights in 2005 [ROA: 10,7/5,11; ROE: 26,8/7,79]. Overall, there is a distinct negative development over the recognition timespan, which serves as an indicator for the struggles Bristol-Myers Squibb faced during this period.

Discriminant and logit analysis: The Z-score shows the same pattern as the profitability ratios, as it decreased drastically from 2000 [9,47/9,47] to 2001 [4,42/4,42] and further declined in 2002 [3,22/3,22]. Thereafter, the score improved until 2005 [3,52/3,52], which shows that a potential crisis was tackled accordingly. The logit score never indicated the presence of a turnaround situation, as the lowest point in 2004 [90,7%/9,07] remained far above the 78 percent limit. Hence, the company never faced liquidity troubles during the organizational decay.

Conclusively, the Bristol-Myers Squibb case study serves as the perfect example that the early recognition of crisis leads to a timely resolution. Not only did the company's net income hardly decline over the analyzed period, the liquidity was never endangered either. Therefore, it can be claimed that the crisis was recognized in due time, since the strategy crisis never transitioned to the next crisis stage. The application of the EWS framework reveals that the first concerning signs became visible in 2001, when the Z-score decreased substantially. Due to the fall in the year-end stock price, it can be assumed that the crisis was recognized in 2002 and corrective measures were taken accordingly, stopping the organizational decay. Moreover, the fact that most of the scores improved in 2005, possibly indicates that the measures have been successful. Consequently, this case example proves the theory that crises can be rectified more easily, if they are recognized in their early stages. Nonetheless, the EWS results once again demonstrated the predictive strengths of the proposed framework, since the crisis signs became increasingly more obvious. Furthermore, without the earnings or liquidity situation of Bristol-Myers Squibb having been affected, a turnaround situation was never apparent. It can be assumed that the logit score would have decreased even further in 2005, potentially indicating a turnaround situation, if no corrective measures were taken. Therefore, the EWS model once again managed to predict the imminent turnaround situation.

4.4 General Electric Company

General Electric (GE) is an international conglomerate that was founded in 1892 and currently operates in several industries, ranging from aircraft engines, to gas production (Reuters, n.d.a). As visible in Figure 12, the year-end stock price plummeted quite recently, which makes it a very interesting case study for the application of the created EWS model. Furthermore, GE is renowned for successful turnaround management, as Jack Welch once pushed the company from an inefficient industrial giant to one of America's most profitable corporations (Wellauer, 1995). By having already experienced a corporate turnaround, albeit being over 30 years ago, it will be interesting to see to what extent the recent organizational decay was foreseeable.

Since the corporate decline occurred rather recently, the analyzed timeframe relevant for the early recognition, was set to 2014-2018. The former was included because it will show whether or not the decline was already imminent while the stock price kept improving. The detailed analysis of the complete timeframe can be found in Appendix VI.

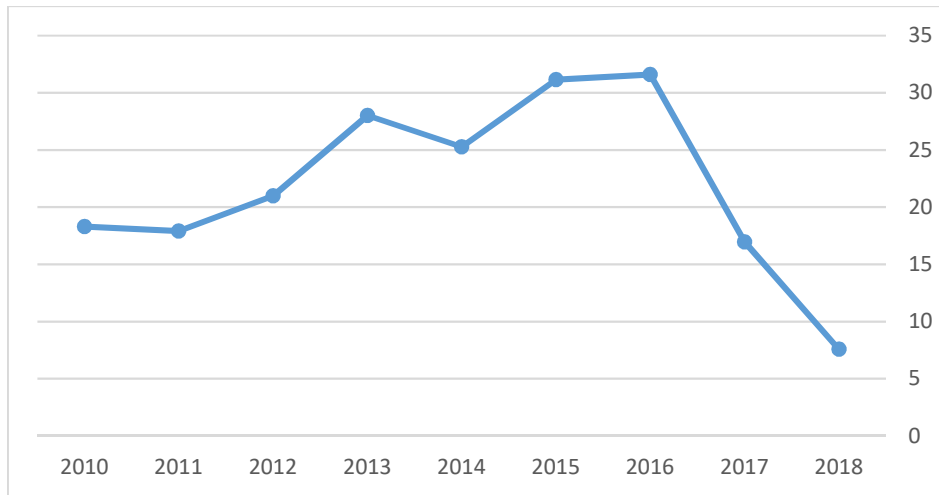


Figure 12: Year-end Stock Price Development General Electric

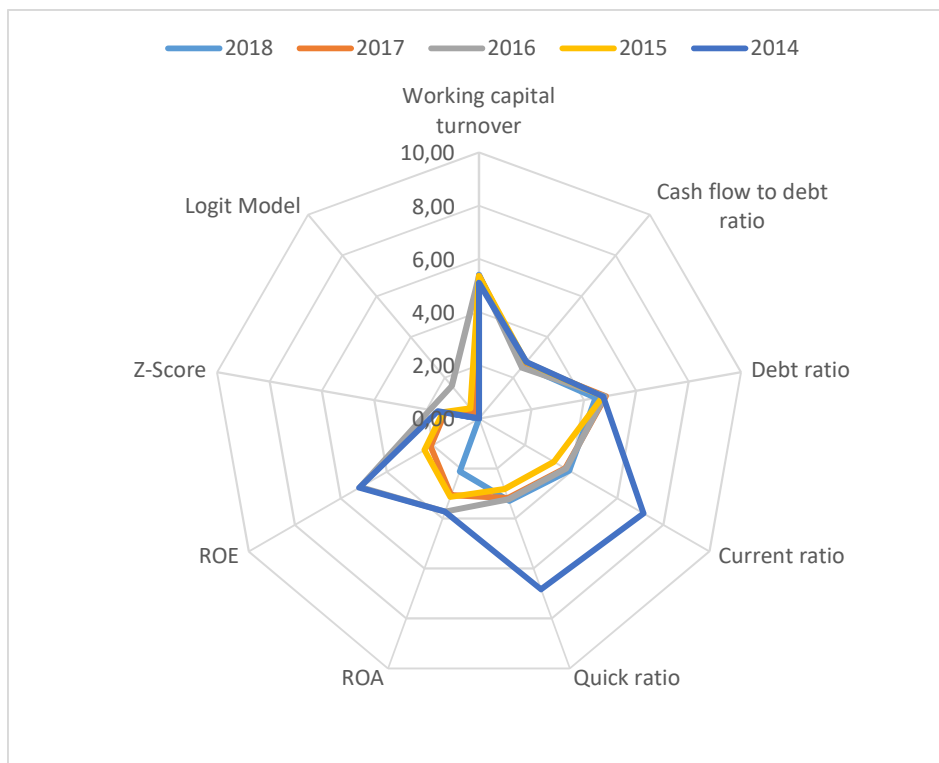


Figure 13: EWS Framework Recognition Timespan General Electric

Activity: Similar to previous cases studies, the working capital turnover increased in the analyzed timespan from 2014 [0,50/5,10] to 2018 [2,04/5,41]. The remarkable increase shows that the working capital is employed progressively more efficiently, despite the company suffering from a major stock price decline. The drastic increase from 2014 [0,50/5,10] to 2015 [1,79/5,35] may have increased management optimism regarding the future prospects of the firm, since it correlated with the initial stock price improvement.

Coverage: The cash flow coverage was already extremely poor in 2014 [0,05/2,77], remained on the same level in 2015 [0,05/2,76], before it became negative in 2016 [-0,0009/2,50]. In the following fiscal period in 2017 [0,04/2,68], it improved to around 4 percent, only to plummet again in 2018 [0,02/2,58]. Overall, at no point during the examined timespan was the operating cash flow covering more than five percent of the total liabilities of General Electric.

Leverage: There was small net increase in the debt ratio from 2014 [0,79/4,74] to 2018 [0,83/4,45], which shows that the financial situation of General Electric became riskier in the course of the corporate decay. However, this is only reflected in a marginal increase and the ratio remained roughly on the same level throughout the assessed period.

Liquidity: Both ratios decreased remarkably by more than 50 percent between 2014 [Current: 3,57/7,14; Quick: 3,42/6,83] and 2015 [Current: 1,63/3,25; Quick: 1,41/2,82]. In the following years, the both ratios gradually increased again until the most recent fiscal year [Current: 1,96/3,91; Quick: 1,65/3,29], without ever approaching similar values as in 2014.

Profitability: While the profitability initially increased until 2014 [ROA: 2,37/3,73; ROE 11,2/5,20], it plummeted to negative figures in 2015 [ROA: -1,18/3,14; ROE: -5,79/2,37]. However, the fact that the profitability recovered in 2016 [ROA: 2,34/3,72; ROE: 11,0/5,17] may have fostered the internal belief that the fall in corporate performance was only an evanescent issue. By again achieving negative profits in 2017 [ROA: -1,6/3,07; ROE: -7,39/2,10], and further declining profitability in 2018 [ROA: -7,26/2,12; ROE: -43,6/0], the corporate crisis was likely to have been acknowledged.

Discriminant and logit analysis: While the net profits were still increasing between 2010 and 2014, the logit score was declining and showed a 0,07 percent probability that General Electric was financially sound in 2014 [0,07%/0,01]. Although the score improved until 2016 [15,9%/1,59], the financial situation only improved marginally with the logit score still indicating imminent bankruptcy. Furthermore, also the Z-score already showed the underlying troubles within General Electric in 2014 [1,58/1,58]. The score continuously decreased, with the exception of a spike 2016 [1,88/1,88], and reached its lowest point in 2018 [1,05/1,05]. Overall, GE's discriminant value only slightly surpassed the proposed lower limit of 1,81 in its outlier year in 2016. This short-lived improvement coincided with the highest stock price for the complete timespan.

The General Electric case is somewhat an exception to the previously analyzed cases, in that the logit score and Z-value have indicated a crisis situation since the beginning of the timeframe. Although the stock price was still achieving continuous growth, the underlying issues within the corporation became increasingly more visible. A notable decrease in the liquidity, as well as the profitability ratios in 2015, further reinforced the existence of a corporate crisis even before the stock price plummeted. While the company generated net losses in 2015, the fiscal results were probably seen as negative outliers, due to the subsequent increase in net revenues in 2016. This development is also recognized on the stock market and reflected in an additional increase in the stock price. Consequently, it can be argued that the existence of the crisis was not acknowledged until 2018, when the net losses increased more than threefold. Since the logit score was consistently indicating a turnaround situation, a liquidity crisis was apparent, and the application of the model would not have predicted the crisis prior to affecting the solvency of the firm. However, since it can be argued that the crisis was not acknowledged until 2018, the EWS framework would have enabled the GE management to introduce corrective measures at least four fiscal periods prior to the crisis recognition.

4.5 Rieter Group

Rieter is a globally operating industrial company that originated in Switzerland in 1796 (Rieter, 2010). By focusing on innovation, Rieter became one of the leading suppliers in textile and automotive systems (Rieter, 2010).

The year-end stock price skyrocketed in the aftermath of the Global Financial Crisis, before dropping by more than 50 percent in 2011, and reaching its lowest point in 2018 (Figure 14). The fact that the crisis resolution seems to have not been sustainable, makes Rieter an interesting case study for the subject of turnaround management. Since the initial crisis has not been successfully resolved, the early recognition of the second major decline is somewhat superfluous. Consequently, this thesis focuses the application of the EWS framework on the initial crisis. The results are depicted in Figure 15 and will be explained accordingly. The analysis of the complete timespan will not be discussed in detail and can be found in Appendix VII.

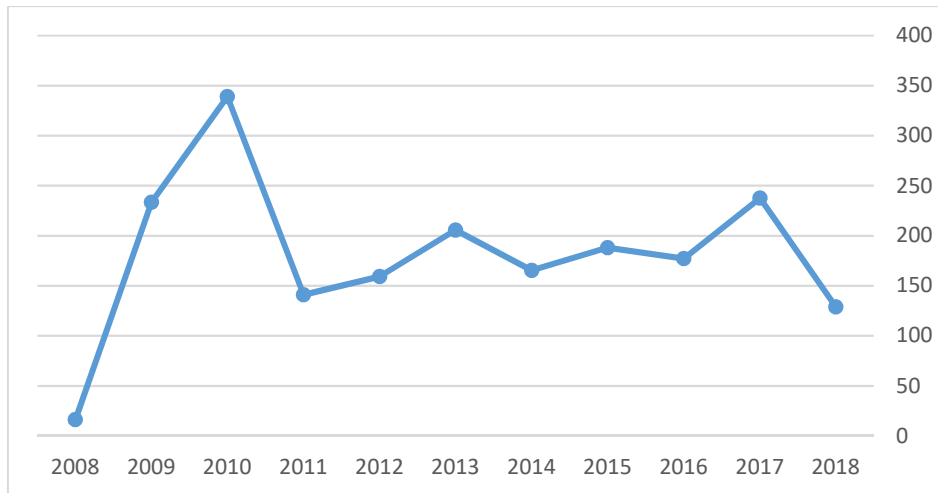


Figure 14: Year-end Stock Price Development Rieter

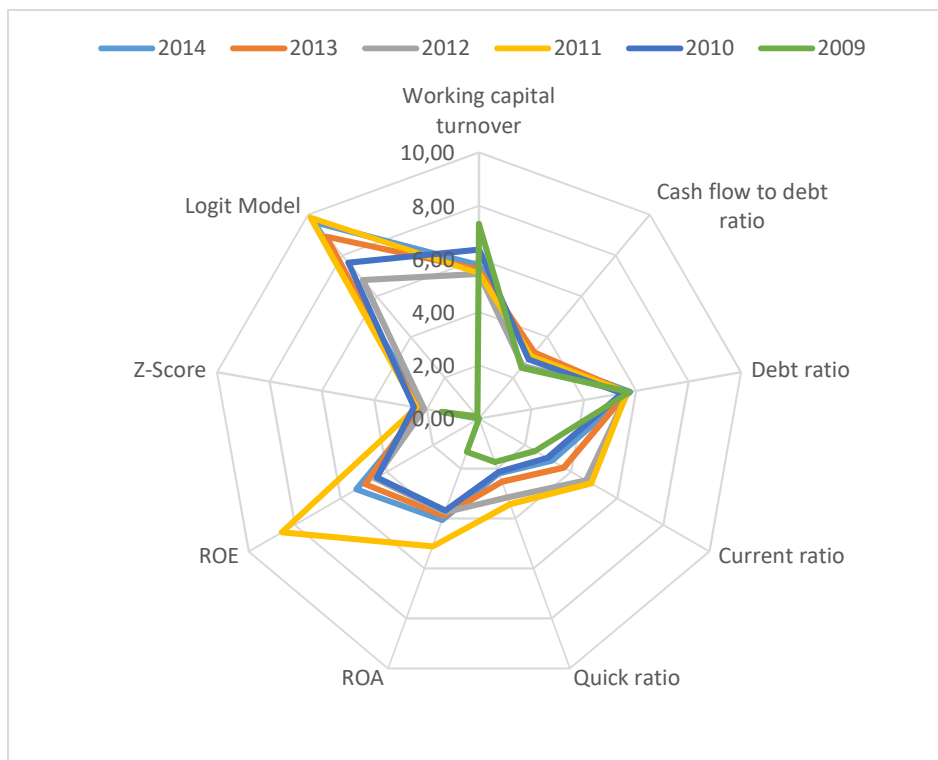


Figure 15: EWS Framework Recognition Timespan Rieter

Activity: The working capital turnover nearly halved in between 2009 [11,6/7,32] and 2010 [6,76/6,35]. The following year [2,28/5,46] saw another decline by two thirds. In 2012, the working capital turnover only changed marginally [2,18/5,44] and increased in 2013 [3,05/5,61] and 2014 [3,78/5,76]. Despite the improvement over the last two years, the working capital turnover was still less than a third of its initial value in 2009. This means that Rieter generally, employed their working capital less efficiently than in the aftermath of the financial crisis.

Coverage: The coverage ratio fluctuated highly but generally remained at a very low level. While the operational cash flow could not cover the debt of the company in 2009 [-0,001/2,49], the ratio increased until 2011 [0,11/3,06]. The following three years were very inconsistent as the ratio first decreased to around a tenth of the previous year's result in 2012 [0,01/2,57], then rose to a five-year high in 2013 [0,15/3,24], before slightly decreasing once again in the last year [0,12/3,08].

Leverage: The debt ratio remained at a constant level for the analyzed period between 2009 [0,64/5,74] and 2014 [0,63/5,77]. Consequently, it can be recognized that the financial risk within the firm remained at roughly the same level over the assessed timeframe.

Liquidity: The quick and the current ratio roughly doubled from 2009 [Current: 1,22/2,44; Quick: 0,87/1,74] to 2011 [Current: 2,44/4,88; Quick: 1,71/3,43]. Subsequently both ratios decreased from 2012 [Current: 2,33/4,66; Quick: 1,58/3,16] to 2014 [Current: 1,58/3,16; Quick: 1,09/2,19]. Therefore, it can be recognized that the current liabilities began to increase relative to the current and quick assets when the stock price plunged. This could have arguably been due to the necessity of an increased supply of debt capital in order to tackle the crisis accordingly.

Profitability: Rieter was incurring losses in the aftermath of the financial crisis in 2009 [ROA: -12,0/1,34; ROE -33,2/0] and only began generating profits in 2010 [ROA: 2,11/3,69; ROE 6,63/4,44]. 2011 [ROA: 10,7/5,12; ROE: 31,4/8,56] was an outlier period, as the profitability increased by more than 500 percent. In the following year, [ROA: 2,48/3,75; ROE: 7,03/4,51] both ratios reached pre-2011 figures and continuously increased thereon until 2014 [ROA: 4,37/4,06; ROE: 12,0/5,33]. Overall, Rieter achieved a substantial net increase in organizational profitability over the assessed period.

Discriminant and logit analysis: The developments in the Z-score and the logit score show that the increase in profitability may have distorted the reality to some extent. Although the Z-score increased from 2009 [1,43/1,43] to 2010 [2,48/2,48], it decreased in the following two years until 2012 [2,09/2,09]. By 2014 [2,13/2,13], the score had risen again. Regardless, the logit score indicated that Rieter's financial health improved remarkably from 2009 [1,04%/0,14] to 2010 [76,5%/7,65] and even surpassed the 78-percent threshold in 2011 [98,6%/9,86]. However, in 2012 [68,0%/6,80], the logistic regression analysis revealed the presence of a liquidity crisis.

The decreasing activity ratio already shows the first signs of concern in 2009. However, the logit model implies that Rieter's financial situation got increasingly healthier at the beginning. Therefore, the application of the EWS would have yielded contradictory statements. The most prominent indicator so far, the Z-score, did indicate an uncertain situation, since it never rose above 2,67. Therefore, according to Altman's (1968) analysis, the situation at the time should have been subject to further investigation, which probably would have uncovered more red flags. Furthermore, the opposing developments in the discriminant analysis and logistic regression should have alarmed the company's management in 2011 and warned of the decline in 2012. Overall, the aftermath of the Global Financial Crisis may have distorted the EWS analysis to some extent. Nonetheless, the Rieter case study is important because it shows that there may be ambiguous results and that an unsustainable turnaround results in another corporate decay soon after.

4.6 Rolls-Royce Holdings PLC

Rolls-Royce was originally founded as a car manufacturer in 1906 and entered the aerospace industry eight years later (Rolls-Royce, n.d.). The company quickly became known for its high-quality engineering and established itself as one of the prominent brands in engineering (Rolls-Royce, n.d.).

Similar to previous cases, the timeframe was chosen in order to reflect the rise and fall of the brand within a given time period (Figure 16). In terms of early recognition, the last year prior to the decline in stock price, and the first year where the price rose again, are seen as the boundaries of the relevant timeframe.

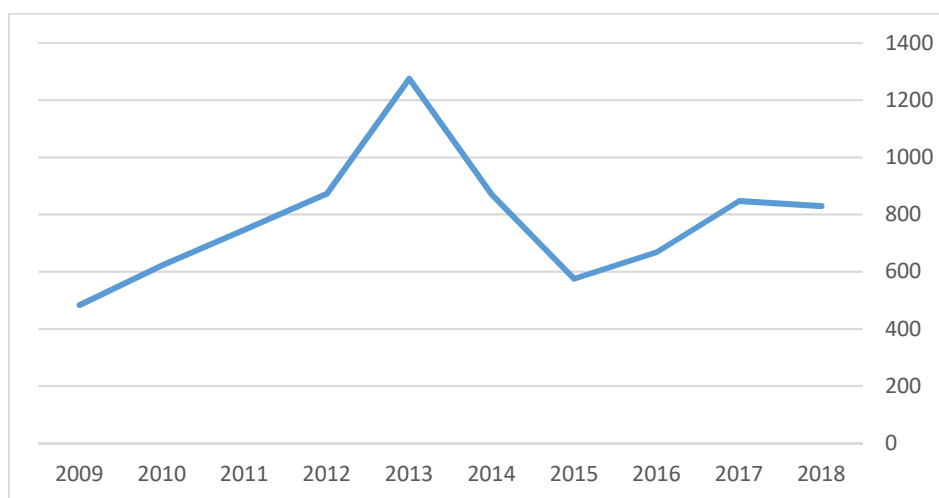


Figure 16: Year-end Stock Price Development Rolls-Royce

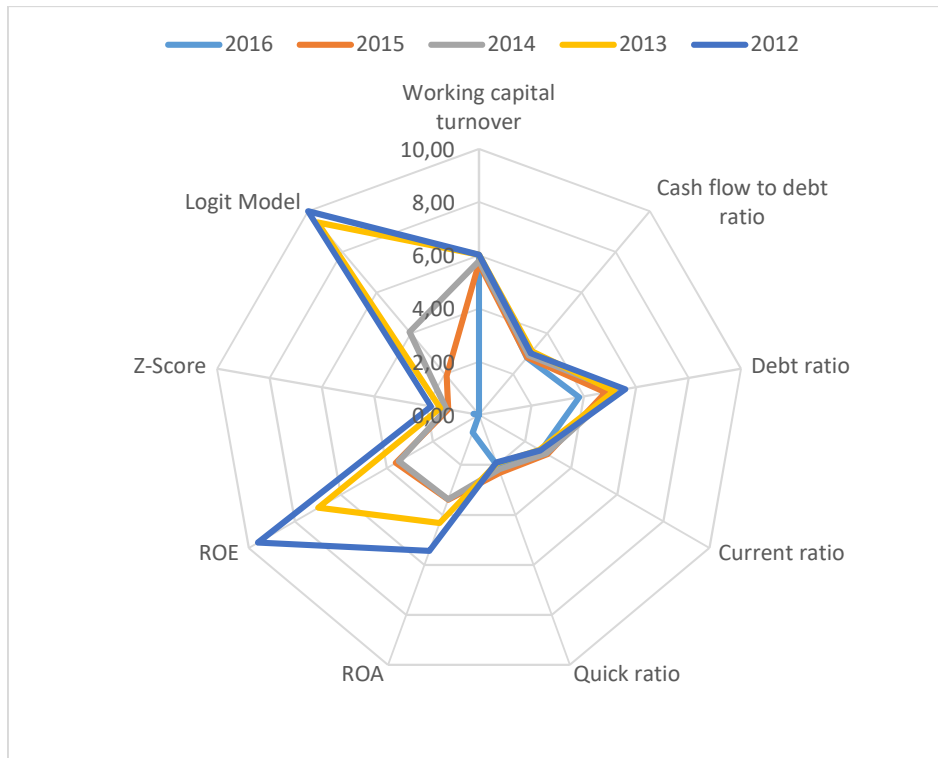


Figure 17: EWS Framework Recognition Timespan Rolls-Royce

Activity: While the working capital turnover marginally improved between 2012 [5,07/6,01] and 2013 [5,11/6,01], it plunged in 2014 [3,92/5,78] and further decrease in 2015 [3,48/5,70]. In the following fiscal period [4,50/5,90], the working capital was employed more efficiently again. The increase in the WC turnover possibly indicates that the previously existing problems have been overcome.

Coverage: The cash flow to debt ratio showed an initial increase from [0,10/3,02] in 2012 to [0,12/3,11] in 2013, before falling to [0,08/2,91] in 2014. In the following two fiscal years, the coverage ratio further declined until reaching [0,06/2,80] in 2016. Consequently, it can be recognized that the cash flow coverage of the total liabilities progressively decreased over the analyzed timespan.

Leverage: The debt ratio continuously increased from [0,66/5,58] in 2012 to [0,71/5,25] in 2014, to [0,93/3,82] in 2016. This progressive incline in the debt ratio implies that financial situation of Rolls-Royce has become increasingly riskier over the course of the analysis, as the proportion of assets financed by debt increased remarkably.

Liquidity: The liquidity ratios increased in the first four years from 2012 [Current: 1,33/2,67; Quick: 0,95/1,91] to 2015 [Current: 1,48/2,96; Quick: 1,16/2,96], which implies that Rolls-Royce's ability to cover its current liabilities increased during this period. In 2016 [Current: 1,35/2,70; Quick: 1,02/2,70], both ratios decreased and have been declining ever since.

Profitability: 2012 [ROA: 12,7/5,44; ROE: 37,6/9,60] was an outlier year regarding Rolls-Royce's profitability as it skyrocketed. Subsequently, the ratios decreased by more than 50 percent in 2013 [ROA: 5,80/4,33; ROE: 21,9/6,98] and further plummeted in 2014 [ROA: 0,21/3,38; ROE: 0,91/3,48]. A slight increase in 2015 [ROA: 0,38/3,40; ROE: 1,67/3,61] was answered by negative profitability ratios in 2016 [ROA: -15,8/0,70; ROE: -216/0]. In the following years, the ratios fluctuated immensely between high returns in one period and negative returns in another. The annual statement shows that the outlier year in 2012, could have been to the restructuring of a business unit (Rolls-Royce, 2013).

Discriminant and logit analysis: The corporate decay was signaled by a steadily declining Z-score from [1,83/1,83] in 2012 to [0,21/0,21] in 2016. The immense initial drop from 2012 [1,83/1,83] to 2013 [1,48/1,48] classified the company as insolvent according to Altman's (1968) definition. By nearly reaching 0, the discriminant analysis indicates that Rolls-Royce was extremely close to organizational failure. The logit score shows a similar reality as in other case studies. Subsequently to the Z-score declining in 2013, the logit model indicated a 40,6 percent chance of financial health in 2014 [40,6%/4,06]. In the previous two years, the ratio only declined marginally from 2012 [99,9%/9,99] to 2013 [94,5%/9,45]. After already indicating financial troubles in 2014, the logit score further declined to 0 percent in 2016 [0,00%/0].

Conclusively, the declining discriminant and logit results show that the imminent crisis became increasingly severe and reached the liquidity crisis stage in 2014. The decline in the logit score indicated this transition to the next crisis stage already in the previous year. Furthermore, it could even be argued, since the Z-score was never above 1,85 in any of the previous period, that the symptoms of the looming crisis were already visible six fiscal periods before the logit score indicated that Rolls-Royce's solvency was endangered. Consequently, the application of this model once again managed to show the underlying organizational issues, while the stock market was still largely optimistic.

4.7 Starbucks

Starbucks was formed in 1985 and has become a global leader in ready-to-go beverages (Starbucks, 2013). The company focused on rapid extension in the early 2000s (Starbucks, 2003).

During this period, the stock price continuously grew until 2006 where it was subject to a rapid decline (Figure 18). In the following two-year period until 2008, the company stock price fell below the 2002 value, indicating an organizational crisis. Therefore, the application of the EWS model focuses on the years prior to the decline.

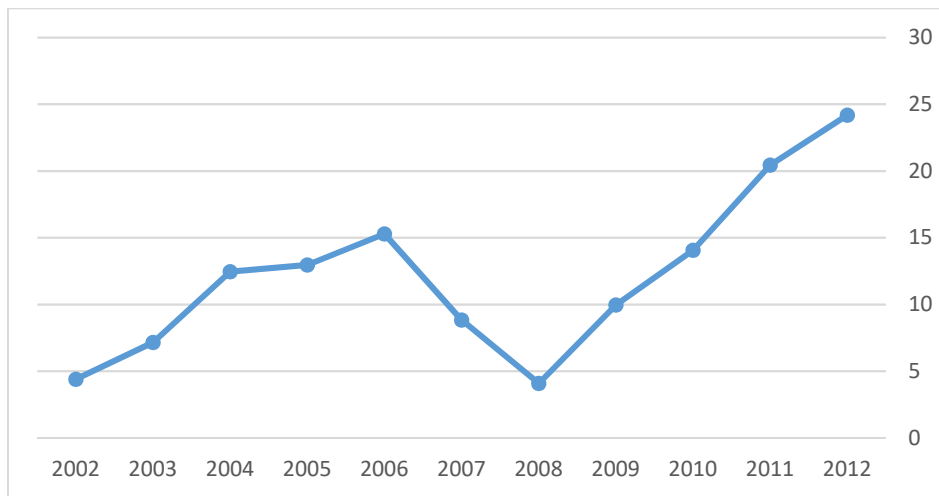


Figure 18: Year-end Stock Price Development Starbucks

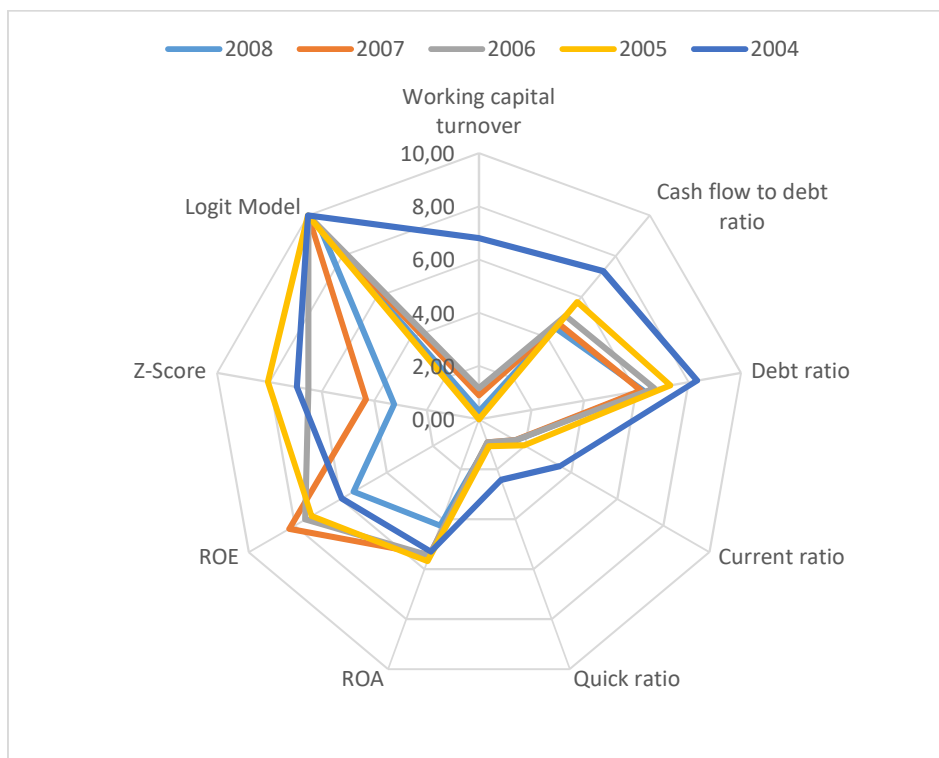


Figure 19: EWS Framework Recognition Timespan Starbucks

Figure 19 shows the results of the EWS analysis, which will be elucidated on the following pages. The complete financial data can be found in Appendix IX.

Activity: The working capital turnover for Starbucks drops drastically from [9,04/6,81] in 2004 to [-360/0] in 2005. While it recovered in the following period [19,2/1,16], it remained negative until 2008 [-23,5/0,30]. The considerable increase in assets with a comparably small increase in liabilities, possibly reflects business acquisitions. Since Starbucks was pursuing rapid growth, it can be argued that this decrease was not alarming to their management.

Coverage: The cash flow to debt ratio decreased continuously from [0,95/7,27] in 2004 to [0,64/574] in 2005, and to [0,39/4,48] in 2008. This development shows that the operating cash flow was increasingly less able to cover Starbucks's total liabilities. In consideration of the company's growth ambitions, this decrease was probably also expected by them.

Leverage: The leverage ratio continuously increased from [0,25/8,33] in 2004 to [0,41/7,30] in 2005 and further to [0,56/62,6] in 2008. These changes show that increasingly more assets have been financed by liabilities, which taking Starbucks's growth objectives into account, was probably also anticipated.

Liquidity: The same reasoning applies to Starbucks's liquidity ratios, which showed a substantial decrease from 2004 [Current: 1,76/3,51; Quick: 1,21/2,42] to 2008 [Current: 0,80/1,60; Quick: 0,48/0,96].

Profitability: Likewise, the profitability ratios fail to reveal clear symptoms of the organizational decline. First, both ratios increased from 2004 [ROA: 11,8/5,30; ROE: 15,7/5,96] to 2005 [ROA: 14,1/5,68; ROE: 23,7/7,28]. While the ROA dropped to [12,74/5,46] in 2006 and [12,6/5,43] in 2007, the ROE further increased to [25,3/7,55] in 2006 to [29,4/8,24] in 2007. The diverging ratios show that while the return increase in terms of equity, it decreased when compared to the company's assets. This further reinforces that Starbucks was following its growth strategy by acquiring businesses. Only in 2008, some signs of crisis became visible as the profitability decreased by more than 50 percent [ROA: 5,56/4,26; ROE: 12,7/5,44]. Consequently, only when the stock price reached its lowest level, the profitability of Starbucks was affected.

Discriminant and logit analysis: The Z-score initially increased from 2004 [6,96/6,96] to 2005 [8,06/8,06]. However, the subsequent decline in 2006 [6,51/6,51] indicated the beginning of a negative trend, which continued until 2008 [3,24/3,24], where the score reached a low point. The logit analysis never showed the presence of a turnaround situation and even at its minimum in 2008 [91,9%/9,91], the score indicated a more than 90 percent chance of financial health. Consequently, no turnaround situation was present during the analyzed period.

The organizational decay only transitioned to an earnings crisis in 2008, when the net revenue halved. Overall, it can be argued that, in this specific case, the company would have probably ignored any signs of potential crises because they were anticipated. By heavily focusing on organizational growth, Starbucks likely expected some ratios to decrease as a result of this strategy. However, the decrease in the Z-score in 2006 may have warned of the looming decline, while the stock price was still rising. This shows that, despite lower ratios having been projected, the decrease in the Z-score indicated an increasingly more vulnerable financial position. Therefore, it can be claimed that some acquisitions may not have been as favorable as they were believed to be. The further declining Z-score confirmed the negative trend and warned of the growing underlying troubles. Since the logit model never announced a turnaround situation, it shows that Starbucks recognized the crisis and has acted accordingly. This is further reflected by the subsequent stock market increase in the aftermath of the Global Financial Crisis, and its immense brand recognition nowadays.

4.8 Under Armour Inc.

Under Armour is a sports apparel brand focusing on the development of clothes, accessories and shoes (Reuters, n.d.b). Its business is still largely focused on North America, with only a handful of stores abroad (Reuters, n.d.b).

While the year-end stock price reflected an immense growth period between 2009 and 2015 (Figure 20), the company has recently faced financial troubles resulting in net losses for the last two fiscal periods (Appendix X). The complete analysis is visible in Appendix X and the results of the recognition relevant timeframe are discussed below. In order to test the predictive capabilities of the framework, the recognition analysis includes the fiscal periods from 2014 to 2018.

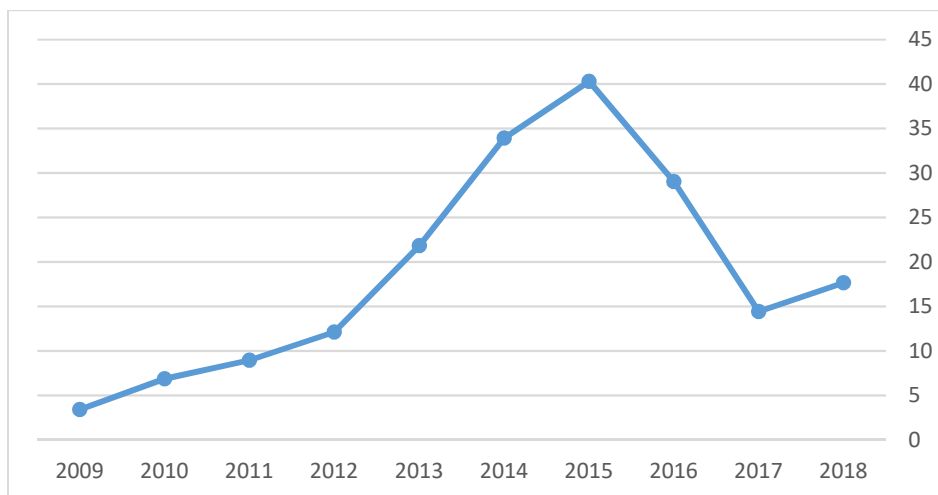


Figure 20: Year-end Stock Price Development Under Armour

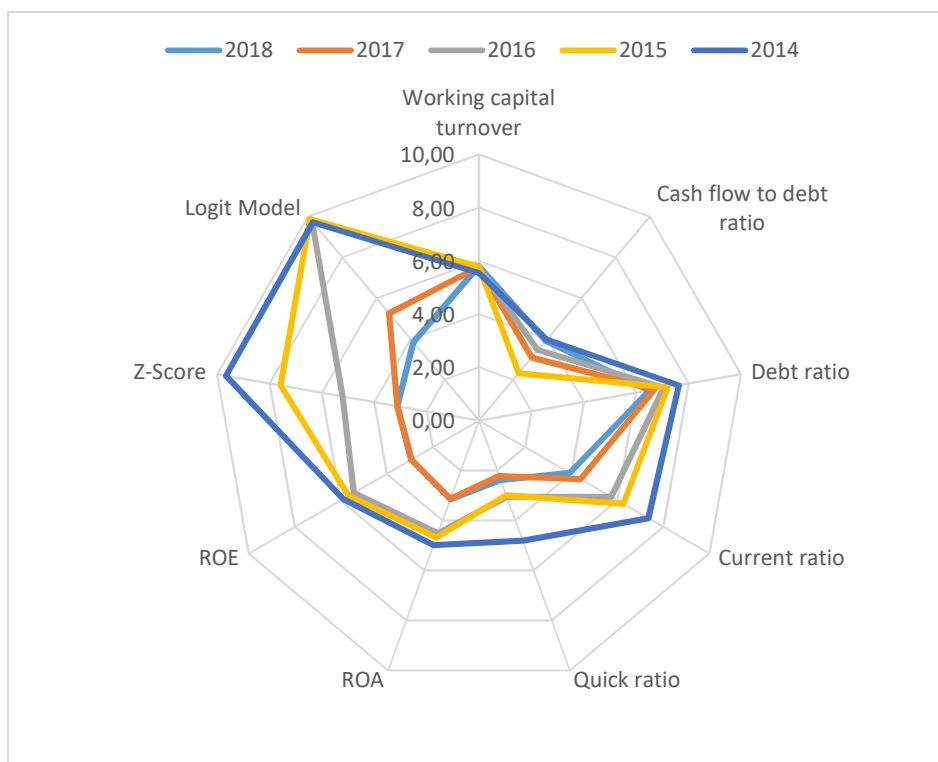


Figure 21: EWS Framework Recognition Timespan Under Armour

Activity: The activity ratio increased over the analyzed timespan from 2014 [2,73/5,55] to 2018 [4,06/5,81]. Only the 2016 [3,77/5,75] fiscal year resulted in a marginal decline in the working capital turnover. Therefore, Under Armour managed to increase its organizational efficiency, as measured by the WC turnover, in the course of the last six years. An increase in the efficiency ratio despite facing a crisis, seems to be the underlying tendency in the examined cases.

Coverage: During the assessed timeline, the coverage ratio was extremely volatile. While it initially decreased from [0,29/3,97] in 2014 to [-0,05/2,32] in 2015, the cash flow to debt ratio experienced a minor uplift the subsequent year to [0,19/3,44]. Regardless, the ratio then declined again in 2017 [0,12/3,09], before doubling in 2018 [0,28/3,91]. Overall, the operating cash flow has been concerningly inconsistent, which could have been a red flag as the crisis was imminent.

Leverage: The debt ratio shows a continuous deterioration from 2014 [0,36/7,63] to 2018 [0,52/6,50]. This development shows that the financial risk increased over the course of the last six fiscal periods. Since the downward trend already started prior to the fall on the stock markets, it could have been a potential indicator for the looming decay.

Liquidity: Similar to the debt ratio, the current ratio decreased progressively from 2014 [3,67/7,35] to 2018 [1,97/3,94]. This shows an accumulation of current liabilities, which can be seen as a sign of looming crises. Regardless, both liquidity ratios remained above the respective benchmarks. The quick ratio also experienced a net decrease from 2014 [2,40/4,88] to 2018 [1,20/2,39] but fluctuated more in between. In 2015 [1,49/2,99] the quick ratio declined only to rise in 2015 [1,53/3,06] and then fall again in the subsequent year [1,11/2,22].

Profitability: Although the profitability fell in the first three years from [ROA: 9,93/4,99; ROE: 15,4/5,90] in 2014 to [ROA: 7,05/4,51; ROE: 12,7/5,44], the negative development may have not caused too much concerns, as the ratios remained on roughly the same level. However, the EWS framework shows that this was the beginning of a negative spiral as the profitability turned negative in 2017 [ROA: -1,21/3,13; ROE: -2,39/3,93] and remained below zero for the following year [ROA: -1,01/3,15; ROE: -2,30/3,95]. Consequently, the fall in profitability already hinted at a looming crisis situation.

Discriminant and logit analysis: The substantial decline in the Z-score from [9,66/9,66] in 2014 to [7,58/7,58] in 2015 already implied that there were underlying issues within Under Armour. Since the Z-score further fell in the following three years from [5,21/5,21] in 2016 to [3,12/3,12] in 2017 and [3,11/3,11] in 2018, the crisis could have been foreseen. The logit model indicates a turnaround situation in 2017 [52,6%/5,26] which further deteriorated in 2018 [38,4%/3,84]. In the previous three years, the logistic regression never showed a lower probability of financial health than 97,2% in 2014 [97,2%/9,72].

In the Under Armour case, the strategy crisis transitioned to an earnings crisis in 2017. Due to the drastic decrease in net income, the company management supposedly realized the presence of the crisis in this year. This assumption is reinforced by the subsequent stock price increase, which may indicate that the market feels that the crisis is being tackled accordingly. However, the further declining Z-score and logistic regression result show an opposing picture. According to the increasingly negative development of the discriminant and logit analysis scores, it can be argued that the crisis could only be calmed at best.

Overall, the last case study of Under Armour serves as a prime example of the predictive capabilities of the proposed EWS framework. Not only did the fall in profitability and Z-value indicate the corporate decline three fiscal periods prior to a turnaround situation becoming apparent, the negative development already raised red flags while the stock price was still increasing. Consequently, the Under Armour case further reinforces the proposed hypothesis that potential organizational crises are predictable. Furthermore, it also shows that it is an important management task to be aware of looming crises, even during periods of excessive growth.

5 Conclusion

In the following chapter, the aforementioned findings of the EWS application to several case studies will be addressed, in regard to the proposed research hypothesis. First, it will be evaluated to what extent turnaround situations are predictable and whether the EWS framework facilitates their early recognition. The discussion of the case study findings will yield in a condensed conceptual framework that facilitates its application. Subsequently, the limitations of the framework are highlighted in order to identify areas of future research. The transparency regarding the limitations of the framework, further contributes to the understanding of its predictive abilities. Finally, the framework's limitations and areas for future research are highlighted.

5.1 Are Turnaround Situations Predictable?

The application of the EWS framework yielded clear results regarding the predictability of crisis situations. On average, the application of the EWS framework was able to predict looming organizational crises 2,25 years prior to their occurrence. In five out of eight cases, crisis symptoms were already visible two or more years prior to either the liquidity being affected, or the crisis situation being recognized. In the Rolls-Royce example, the signs should have already caused serious concerns six years prior to the crisis, whereas the General Electric case showed that the crisis could have been recognized four years earlier. In both these cases, as well as in the Under Armour example, the rising stock price indicated that the overall perception of the company was still positive during a period where red flags were clearly visible. Both the Bristol-Myers Squibb and the Starbucks case reinforced the notion that crises are more easily rectified, if they are recognized earlier. Rieter, on the other hand, demonstrated that, if a turnaround is not sustainable, the company will fall into another crisis in the foreseeable future. In both, the Rieter and the Starbucks case, the signs have to some extent been rather ambiguous. While the Starbucks example showed that the company's strategy may complicate the early recognition of crises, Rieter demonstrated that ambiguous results always require further investigation. In general, the case studies have clearly shown that turnaround situations, as implied by a fall in the logit score, are predictable. In nearly all of the cases, the symptoms were evident before a turnaround situation was apparent. The first indicators of the looming decay are often a decline in the Z-value followed by negative changes in the organizational profitability. The cash flow to debt ratio was in some cases more, and in others less meaningful. Overall, neither the activity, leverage nor liquidity ratios were able to unambiguously indicate a negative trend development.

The fact that the framework was able to predict corporate crises in nearly all of the examples, shows the cross-industry capabilities of the proposed EWS model. Consequently, it can be assumed that, even with taking industry-specific indicators into account, the framework will allow for the early recognition of crisis situations in most cases. Furthermore, since the framework was able to predict crises while the stock price was still rising, it can be demonstrated that crises can be recognized even before the market perception changes.

As shown by the General Electric and Starbucks example, the management of a company is able to prevent major corporate turnarounds, if the crises are recognized in early stages. This finding directly answers the second part of the hypothesis and leads to the assumption that all turnarounds are preventable, if they are predictable. This is due to the fact that the company has less time pressure and more action alternatives if the crises are identified early. Furthermore, the EWS allow managers to launch an extensive internal investigation to uncover the underlying issues, which may be impossible, if the crisis is recognized late, due to the increasing pressure for action. Furthermore, the intrinsic knowledge of the company, enables managers to initiate corrective measures once the crisis is acknowledged.

5.2 Conceptual Framework for the Early Recognition of Crises

The proposed conceptual framework is condensed to the most indicative factors. As aforementioned, the Z-score, the coverage ratio and the profitability ratios signaled the looming crisis reliably. Furthermore, the logit score is also included in the new framework, because of its importance in defining the existence of a turnaround situation. As a result, the radar chart can be simplified, which facilitates the interpretation of the results.

5.3 Limitations

5.3.1 Quantitative Analysis

As already addressed in the theoretical framework, the nature of the analysis employed is subject to the validity of publicly available financial statements. Since the annual reports only show the specific performance and the end of the fiscal years, the predictive abilities of the framework may be restricted. Furthermore, it is argued that, were the scores monitored on a more regular basis, the organizational decline could be recognized at even earlier stages. This assumption is based on the findings in the case studies which often revealed a quick deterioration from one year to another, rather than a slow progressive decline. In addition, due to the dependence on financial data, the cases were restricted to public companies. Therefore, solely based on this paper, the predictive abilities of the framework for private companies can only be anticipated, but not confirmed. Moreover, the framework does not indicate why the analyzed scores are changing, which would require further analysis of the financial statements, macroeconomic- and company-specific factors. However, the focus is on predicting turnaround situations, such an analysis would have gone beyond the scope of this paper. Furthermore, a detailed cause analysis is closely linked to qualitative, company-specific information, which is extremely difficult to obtain. By not being able to determine the root causes, the framework can neither indicate how the crisis could be overcome.

5.3.2 Qualitative Analysis

Although, the analysis of qualitative factors is the basis to determine the root causes of an organizational crisis, this thesis has not included such aspects in the proposed framework. First, it is argued that, due to the unique, company-specific factors contributing to the organizational decay, a thorough qualitative analysis of the case studies would have exceeded the scope of this thesis. Second, since such analyses require industry-, or company-specific experience, combined with the unrestricted access to internal information, an extensive qualitative assessment of the evaluated cases was impossible. Third, based on the specific intrinsic knowledge of managers, it is argued that they are better suited to determine the cause of specific crises, that a research-based framework would be. Furthermore, such an analysis would have immensely restricted the available case studies and would have prevented the evaluation of the cross-industry characteristics. Consequently, by not including a qualitative analysis, the proposed framework is limited in its ability to predict the causes of the crisis situations.

5.3.3 Other Limitations

For simplicity reasons, this paper assumes that all crises that are predictable are preventable. However, in reality, this is not necessarily the case. Cognitive errors, misleading forecasts, miscommunication or an adverse organizational culture could all be possible factors why this assumption may not be correct. However, since the influence of such factors would have gone beyond the scope of this thesis, this assumption is necessary in order to answer the hypothesis.

Furthermore, industry-specific factors have not been taken into consideration. The inclusion of such factors which could further advance the predictive abilities regarding specific industries. However, as the primary goal was to evaluate the cross-industry applicability of the framework, such an analysis would have exceeded the scope of this paper.

The thesis does not address the prediction of crises that are due to unforeseeable events or fraudulent behavior as this should be part of a company's risk management, rather than crisis prediction.

Finally, all the cases have been analyzed retrospectively, which arguably makes it easier to determine negative trends. Consequently, it could be argued that while the developments seem obvious in past cases, the application of the framework in real time, would not yield similarly clear results. Therefore, the capabilities of the conceptual EWS model, when applied in practice, would need to be verified. Nonetheless, due the clear results of the analysis conducted in this thesis, a successful transition to corporate application can be expected. In addition, since up-to-date figures could be used, the predictive abilities are even expected to increase.

5.4 Recommendations for Future Studies

Future studies would add value to the existing framework by analyzing industry-specific boundaries for each of the decisive framework measurements. By doing so, the interpretation of the results will be facilitated, and more meaningful scales could be established. Therefore, the illustration in the radar scales can be optimized. Furthermore, future research could focus on the inclusion of qualitative factors in an EWS framework, which would not only allow the recognition of crises at an earlier stage, but it would also contribute to the cause-analysis of the organizational decline.

6 References

- Alpiq (n.d.). Pooling traditional strengths. *Alpiq*. N.d. Retrieved May 20, 2019 from <https://web.archive.org/web/20101002094617/http://www.alpiq.com/about-alpiq/history/history.jsp>
- Alpiq (2010). 2009 annual report. Retrieved from <https://www.alpiq.com/alpiq-group/about-alpiq/publications/archive/>
- Alpiq (2011). 2010 annual report. Retrieved from <https://www.alpiq.com/alpiq-group/about-alpiq/publications/archive/>
- Alpiq (2012). 2011 annual report. Retrieved from <https://www.alpiq.com/alpiq-group/about-alpiq/publications/archive/>
- Alpiq (2013). 2012 annual report. Retrieved from <https://www.alpiq.com/alpiq-group/about-alpiq/publications/archive/>
- Alpiq (2014). 2013 annual report. Retrieved from <https://www.alpiq.com/alpiq-group/about-alpiq/publications/archive/>
- Alpiq (2015). 2014 annual report. Retrieved from <https://www.alpiq.com/alpiq-group/about-alpiq/publications/archive/>
- Alpiq (2016). 2015 annual report. Retrieved from <https://www.alpiq.com/alpiq-group/about-alpiq/publications/archive/>
- Alpiq (2017). 2016 annual report. Retrieved from <https://www.alpiq.com/alpiq-group/about-alpiq/publications/archive/>
- Alpiq (2018). 2017 annual report. Retrieved from <https://www.alpiq.com/alpiq-group/about-alpiq/publications/archive/>
- Alpiq (2019). 2018 annual report. Retrieved from <https://www.alpiq.com/alpiq-group/about-alpiq/publications/archive/>
- Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, 23:4, 589-609.
- Andrade, G. & Kaplan, S. N. (1997). *How costly is financial (not economic) distress? Evidence from highly leveraged transactions that became distressed* (Working Paper No. 6145). Cambridge (USA): National Bureau of Economic Research.

- Atrill, P. (2006). *Financial management for decision makers* (4th ed.). Harlow: Pearson Education Limited.
- Barker III, V. L. & Duhaime, I. M. (1997). Strategic change in the turnaround process: Theory and empirical evidence. *Strategic Management Journal*, 18:1, 13-38.
- BBC (2018). All toys r us stores to close their doors. *BBC*. 2018, March 14. Retrieved from <https://www.bbc.com/news/business-43401674>
- Beer, M. & Nohria, N. (2001). Cracking the code of change. In Harvard Business Review (Ed.), *Harvard business review on turnarounds* (pp. 1-21). Boston: Harvard Business School Publishing Corporation.
- Bickhoff, N. & Eilenberger, G. (2004). Einleitung. In N. Bickhoff, M. Blatz, G. Eilenberger, S. Haghani & K. J. Kraus (Eds.), *Die unternehmenskrise als chance: Innovative ansätze zur sanierung und restrukturierung* (pp.5-12). Berlin: Springer-Verlag.
- Birker, K. (2015a). Basis eines krisenbewussten managements. In W. Pepels (Ed.), *Handbuch turnaround-management* (2nd ed., pp. 85-100). Berlin: Berliner Wissenschafts-Verlag GmbH.
- Birker, K. (2015b). Genese der unternehmenskrise. In W. Pepels (Ed.), *Handbuch turnaround-management* (2nd ed., pp. 33-50). Berlin: Berliner Wissenschafts-Verlag GmbH.
- Birker, K. (2015c). Krisenbewältigung durch sanierung. In W. Pepels (Ed.), *Handbuch turnaround-management* (2nd ed., pp. 417-430). Berlin: Berliner Wissenschafts-Verlag GmbH.
- Birker, K. (2015d). Typologie der unternehmenskrise. In W. Pepels (Ed.), *Handbuch turnaround-management* (2nd ed., pp. 51-83). Berlin: Berliner Wissenschafts-Verlag GmbH.
- BlackBerry (2015). Form 40-f: For the fiscal year ended March 1, 2014. Retrieved from <https://global.blackberry.com/en/company/investors/documents>
- BlackBerry (2016). Form 40-f: For the fiscal year ended February 28, 2015. Retrieved from <https://global.blackberry.com/en/company/investors/documents>

- BlackBerry (2017). Form 40-f: For the fiscal year ended February 29, 2016. Retrieved from <https://global.blackberry.com/en/company/investors/documents>
- BlackBerry (2018). Form 40-f: For the fiscal year ended February 28, 2017. Retrieved from <https://global.blackberry.com/en/company/investors/documents>
- BlackBerry (2019). Form 40-f: For the fiscal year ended February 28, 2018. Retrieved from <https://global.blackberry.com/en/company/investors/documents>
- Boyle, R. D. & Desai, H. B. (1991). Turnaround strategies for small firms. *Journal of Small Business Management*, 29:3, 33-42.
- Bristol-Myers Squibb (1998). Form 10-k: Filed 03/31/98 for the Period Ending 12/31/97. Retrieved from <https://www.bms.com/investors/financial-reporting/sec-filings.html>
- Bristol-Myers Squibb (1999). Form 10-k: Filed 03/30/99 for the Period Ending 12/31/98. Retrieved from <https://www.bms.com/investors/financial-reporting/sec-filings.html>
- Bristol-Myers Squibb (2000). Form 10-k: Filed 03/30/00 for the Period Ending 12/31/99. Retrieved from <https://www.bms.com/investors/financial-reporting/sec-filings.html>
- Bristol-Myers Squibb (2001). Form 10-k: Filed 04/02/01 for the Period Ending 12/31/00. Retrieved from <https://www.bms.com/investors/financial-reporting/sec-filings.html>
- Bristol-Myers Squibb (2002). Form 10-k405: Filed 04/01/02 for the Period Ending 12/31/01. Retrieved from <https://www.bms.com/investors/financial-reporting/sec-filings.html>
- Bristol-Myers Squibb (2003). Form 10-k: Filed 03/28/03 for the Period Ending 12/31/02. Retrieved from <https://www.bms.com/investors/financial-reporting/sec-filings.html>
- Bristol-Myers Squibb (2004). Form 10-k: Filed 03/15/04 for the Period Ending 12/31/03. Retrieved from <https://www.bms.com/investors/financial-reporting/sec-filings.html>

- Bristol-Myers Squibb (2005). 2004 annual report. Retrieved from <https://www.bms.com/investors/financial-reporting/annual-reports.html>
- Bristol-Myers Squibb (2006). 2005 annual report. Retrieved from <https://www.bms.com/investors/financial-reporting/annual-reports.html>
- Bristol-Myers Squibb (2007). 2006 annual report. Retrieved from <https://www.bms.com/investors/financial-reporting/annual-reports.html>
- Bristol-Myers Squibb (2008). 2007 annual report. Retrieved from <https://www.bms.com/investors/financial-reporting/annual-reports.html>
- Bristol-Myers Squibb (2009). 2008 annual report. Retrieved from <https://www.bms.com/investors/financial-reporting/annual-reports.html>
- Bristol-Myers Squibb (2010). 2009 annual report. Retrieved from <https://www.bms.com/investors/financial-reporting/annual-reports.html>
- Bristol-Myers Squibb (2011). 2010 annual report. Retrieved from <https://www.bms.com/investors/financial-reporting/annual-reports.html>
- Bristol-Myers Squibb (2012). 2011 annual report. Retrieved from <https://www.bms.com/investors/financial-reporting/annual-reports.html>
- Bristol-Myers Squibb (2013). 2012 annual report. Retrieved from <https://www.bms.com/investors/financial-reporting/annual-reports.html>
- Buschmann, H. (2006). *Erfolgreiches turnaround-management: Empirische untersuchung mit schwerpunkt auf dem einfluss der stakeholder*. Wiesbaden: Deutscher Universitäts-Verlag.
- Chathoth, P. K., Tse, E. C-Y. & Olsen, M. D. (2006). Turnaround strategy: A study of restaurant firms. *International Journal of Hospitality Management*, 25:4, 602-622.
- Collard, J. M. (2002). Steering clear of the brink: Early warning signs pinpoint business troubles: Changing leadership style to accomplish a turnaround. *The Journal of Private Equity*, 5:4, 25-31.
- De La Merced, M. J. (2012). Eastman kodak files for bankruptcy. *The New York Times*. 2012, January 19. Retrieved from <https://dealbook.nytimes.com/2012/01/19/eastman-kodak-files-for-bankruptcy/>

- Doumpos, M. & Zopounidis, C. (1999). A multicriteria discrimination method for the prediction of financial distress: The case of Greece. *Multinational Finance Journal*, 3:2, 71-101.
- Downsizing. (n.d.). *Cambridge Dictionary*. Retrieved March 13, 2019 from <https://dictionary.cambridge.org/de/worterbuch/englisch/downsize?q=downsizing>
- Driendl, T. (2012). *Was Sie über turnarounds wissen müssen*. Rosenheim: TM Börsenverlag AG.
- Evertz, D. & Krystek, U. (2014). Restrukturierung und sanierung im wandel. In D. Evertz & U. Krystek (Eds.), *Unternehmen erfolgreich restrukturieren und sanieren: Herausforderungen und lösungsansätze für den turnaround* (pp. 3-24). Stuttgart: Schäffer-Poeschel Verlag für Wirtschaft·Steuern·Recht GmbH.
- Exler, M. W. (2013). Vorwort. In M.W. Exler (Ed.), *Restrukturierungs- und turnaround-management: Strategie – erfolgsfaktoren – best practice* (pp. 5-6). Berlin: Erich Schmidt Verlag GmbH & Co. KG.
- Fæste, L., Schönfelder, J., Gruß, C. & Lay, C. (2016). Desperate times call for effective turnarounds. *Boston Consulting Group*. 2016, November 11. Retrieved from <https://www.bcg.com/publications/2016/transformation-turnaround-desperate-times-effective-turnarounds.aspx>
- Faulhaber, P. & Grabow, H. J. (2009). *Turnaround-Management in der praxis: Umbruchphasen nutzen – neue stärken entwickeln* (4th ed.). Frankfurt/Main: Campus Verlag GmbH.
- Finkin, E. F. (1987). *Successful corporate turnarounds: A guide for board members, financial managers, financial institutions and other creditors*. Connecticut: Quorum Books.
- General Electric (2012). 2011 annual report. Retrieved from <https://www.ge.com/investor-relations/events-reports>
- General Electric (2013). 2012 annual report. Retrieved from <https://www.ge.com/investor-relations/events-reports>

- General Electric (2014). 2013 annual report. Retrieved from <https://www.ge.com/investor-relations/events-reports>
- General Electric (2015). 2014 annual report. Retrieved from <https://www.ge.com/investor-relations/events-reports>
- General Electric (2016). 2015 annual report. Retrieved from <https://www.ge.com/investor-relations/events-reports>
- General Electric (2017). 2016 annual report. Retrieved from <http://www.annualreports.com/Company/general-electric>
- General Electric (2018). 2017 annual report. Retrieved from <https://www.ge.com/investor-relations/events-reports>
- George-Cosh, D. & McNish, J. (2016). BlackBerry outsourcing handset business. *The Wall Street Journal*. 2016, September 28. Retrieved from <https://www.wsj.com/articles/blackberry-outsourcing-handset-business-1475063579>
- Haghani, S. (2004). Strategische krisen von unternehmen und praxisorientierte möglichkeiten ihrer frühkennung. In N. Bickhoff, M. Blatz, G. Eilenberger, S. Haghani & K. J. Kraus (Eds.), *Die unternehmenskrise als chance: Innovative ansätze zur sanierung und restrukturierung* (pp.41-65). Berlin: Springer-Verlag.
- Hambrick, D. C. & Schechter, S. M. (1983). Turnaround strategies for mature industrial-product business units. *The Academy of Management Journal*, 26: 2, 231-248.
- Hofer, C. W. (1980). Turnaround strategies. *Journal of Business Strategy*, 1:1, 19-31.
- Hughes, L.R. (1995). Reenergizing a mature business. In McKinsey (Ed.), *Corporate renewal: The challenge of revitalization and growth* (pp. 33-46). Paper presented at McKinsey Conference 1995. Zurich: McKinsey & Company, Inc.
- Kenton, W. & Hayes, A. (2019). Debt ratio definition. *Investopedia*. 2019, April 20. Retrieved May 22, 2019 from <https://www.investopedia.com/terms/d/debtratio.asp>
- Kraus, K. J. & Haghani, s. (2004). Krisenverlauf und krisenbewältigung – der aktuelle stand. In N. Bickhoff, M. Blatz, G. Eilenberger, S. Haghani & K. J. Kraus (Eds.), *Die unternehmenskrise als chance: Innovative ansätze zur sanierung und restrukturierung* (pp.13-37). Berlin: Springer-Verlag.

- Langabeer II, J. (2008). Hospital turnaround strategies. *Hospital Topics*, 86:2, 3-10.
- Leach, R. (2010). *Ratios made simple: A beginner's guide to the key financial ratios*. Petersfield: Harriman House Ltd.
- Lenahan, T. (1999). *Turnaround management*. Oxford: Butterworth-Heinemann.
- Lin, F., Liang, D. & Chen, E. (2011). Financial ratio selection for business crisis prediction. *Expert Systems with Applications*, 38:12, 15094-15102.
- Lymbersky, C (2011). Introducing the international turnaround management standard. *Turnaround Management Journal*, 1:2, 7-11.
- Lymbersky, C (2013). *International turnaround management standard*. Hamburg: MLP Management Laboratory Press UG.
- Macrotrends (n.d.a). Blackberry: 20 year stock price history. *Macrotrends*. Retrieved May 17, 2019 from <https://www.macrotrends.net/stocks/charts/BB/blackberry/stock-price-history>
- Macrotrends (n.d.b). Bristol-myers squibb: 47 year stock price history. *Macrotrends*. Retrieved May 17, 2019 from <https://www.macrotrends.net/stocks/charts/BB/blackberry/stock-price-history>
- Macrotrends (n.d.c). General electric: 57 year stock price history. *Macrotrends*. Retrieved May 18, 2019 from <https://www.macrotrends.net/stocks/charts/GE/general-electric/stock-price-history>
- Macrotrends (n.d.d). Starbucks: 27 year stock price history. *Macrotrends*. Retrieved May 17, 2019 from <https://www.macrotrends.net/stocks/charts/SBUX/starbucks/stock-price-history>
- Macrotrends (n.d.e). Starbucks: 14 year stock price history. *Macrotrends*. Retrieved May 18, 2019 from <https://www.macrotrends.net/stocks/charts/UAA/under-armour/stock-price-history>
- Marti, A. (2013). Vorwort. In: J. Müller (Ed.), *Turnaround: Ein leitfaden für manager und verwaltungsräte* (pp. 11-12). Basel: Verlag Neue Zürcher Zeitung.
- Müller, G. V. (2018). Alpiq ist saniert. *Neue Zürcher Zeitung*. 2018, August 27. Retrieved from <https://www.nzz.ch/wirtschaft/alpiq-ist-saniert-ld.1414870>

- Müller, J. (2013). *Turnaround: Ein Leitfaden für Manager und Verwaltungsräte*. Basel: Verlag Neue Zürcher Zeitung.
- Panicker, S. & Manimala, M. J. (2015). Successful turnarounds: the role of appropriate entrepreneurial strategies. *Journal of Strategy and Management*, 8:1, 21-40.
- Pearson, C. M. & Clair, J. A. (1998). Reframing crisis management. *The Academy of Management Review*, 23:1, 59-76.
- Pepels, W. (2015a). Turnaround management – eine Einführung. In W. Pepels (Ed.), *Handbuch turnaround management* (2nd ed., pp. 17-31). Berlin: Berliner Wissenschafts-Verlag GmbH.
- Pepels, W. (2015b). Vorwort zur zweiten Auflage. In W. Pepels (Ed.), *Handbuch turnaround-management* (2nd ed., pp. 5-6). Berlin: Berliner Wissenschafts-Verlag GmbH.
- Ray, D. (2009). Formula to predict the future. *Ward's Dealer Business*, 43:2, 43.
- Research in Motion (2005). Research in motion annual report 2004. Retrieved from <http://www.annualreports.com/Company/BlackBerry-Ltd>
- Research in Motion (2006). Research in motion annual report 2005. Retrieved from <http://www.annualreports.com/Company/BlackBerry-Ltd>
- Research in Motion (2007). Research in motion annual report 2006. Retrieved from <http://www.annualreports.com/Company/BlackBerry-Ltd>
- Research in Motion (2008). Research in motion 2007 annual report. Retrieved from <http://www.annualreports.com/Company/BlackBerry-Ltd>
- Research in Motion (2009). Research in motion 2008 annual report. Retrieved from <http://www.annualreports.com/Company/BlackBerry-Ltd>
- Research in Motion (2010). RIM 2009 annual report. Retrieved from <http://www.annualreports.com/Company/BlackBerry-Ltd>
- Research in Motion (2011). RIM 2010. Retrieved from <http://www.annualreports.com/Company/BlackBerry-Ltd>
- Research in Motion (2012). RIM 2011. Retrieved from <http://www.annualreports.com/Company/BlackBerry-Ltd>

- Research in Motion (2013). Form 40-f: For the fiscal year ended March 3, 2012. Retrieved from <http://www.annualreports.com/Company/BlackBerry-Ltd>
- Research in Motion (2014). Form 40-f: For the fiscal year ended March 2, 2013. Retrieved from <http://www.annualreports.com/Company/BlackBerry-Ltd>
- Reuters (n.d.a). General electric co (ge.n). *Reuters*. Retrieved May 22, 2019 from <https://www.reuters.com/finance/stocks/company-profile/GE.N>
- Reuters (n.d.b). Under Armour Inc (UA). *Reuters*. Retrieved May 23, 2019 from <https://www.reuters.com/finance/stocks/company-profile/UA>
- Rieter (2010). Annual report 2009. Retrieved from <https://www.rieter.com/de/investor-relations/ergebnisse-und-praesentationen/jahresrechnung/archiv/>
- Rieter (2011). Annual report 2010. Retrieved from <https://www.rieter.com/de/investor-relations/ergebnisse-und-praesentationen/jahresrechnung/archiv/>
- Rieter (2012). Annual report 2011. Retrieved from <https://www.rieter.com/de/investor-relations/ergebnisse-und-praesentationen/jahresrechnung/archiv/>
- Rieter (2013). Annual report 2012. Retrieved from <https://www.rieter.com/de/investor-relations/ergebnisse-und-praesentationen/jahresrechnung/archiv/>
- Rieter (2014). Annual report 2013. Retrieved from <https://www.rieter.com/de/investor-relations/ergebnisse-und-praesentationen/jahresrechnung/archiv/>
- Rieter (2015). Annual report 2014. Retrieved from <https://www.rieter.com/de/investor-relations/ergebnisse-und-praesentationen/jahresrechnung/archiv/>
- Rieter (2016). Annual report 2015. Retrieved from <https://www.rieter.com/de/investor-relations/ergebnisse-und-praesentationen/jahresrechnung/archiv/>
- Rieter (2017). Annual report 2016. Retrieved from <https://www.rieter.com/de/investor-relations/ergebnisse-und-praesentationen/jahresrechnung/archiv/>
- Rieter (2018). Annual report 2017. Retrieved from <https://www.rieter.com/de/investor-relations/ergebnisse-und-praesentationen/jahresrechnung/archiv/>
- Rieter (2019). Annual report 2018. Retrieved from <https://www.rieter.com/de/investor-relations/ergebnisse-und-praesentationen/jahresrechnung/archiv/>

- Rolls-Royce (n.d.). Our history. *Rolls-Royce*. Retrieved May 23, 2019 from <https://www.rolls-royce.com/about/our-history.aspx>
- Rolls-Royce (2010). Rolls-royce group plc: Annual report 2009. Retrieved from <https://www.rolls-royce.com/investors/annual-report-archive/annual-reports.aspx>
- Rolls-Royce (2011). Rolls-royce group plc: Annual report 2010. Retrieved from <https://www.rolls-royce.com/investors/annual-report-archive/annual-reports.aspx>
- Rolls-Royce (2012). Rolls-royce holdings plc: Annual report 2011. Retrieved from <https://www.rolls-royce.com/investors/annual-report-archive/annual-reports.aspx>
- Rolls-Royce (2013). Rolls-royce holdings plc: Annual report 2012. Retrieved from <https://www.rolls-royce.com/investors/annual-report-archive/annual-reports.aspx>
- Rolls-Royce (2014). Rolls-royce holdings plc: Annual report 2013. Retrieved from <https://www.rolls-royce.com/investors/annual-report-archive/annual-reports.aspx>
- Rolls-Royce (2015). Rolls-royce holdings plc: Annual report 2014. Retrieved from <https://www.rolls-royce.com/investors/annual-report-archive/annual-reports.aspx>
- Rolls-Royce (2016). Rolls-royce holdings plc: Annual report 2015. Retrieved from <https://www.rolls-royce.com/investors/annual-report-archive/annual-reports.aspx>
- Rolls-Royce (2017). Rolls-royce holdings plc: Annual report 2016. Retrieved from <https://www.rolls-royce.com/investors/annual-report-archive/annual-reports.aspx>
- Rolls-Royce (2018). Rolls-royce holdings plc: Annual report 2017. Retrieved from <https://www.rolls-royce.com/investors/annual-report-archive/annual-reports.aspx>

- Rolls-Royce (2019). 2018 annual report: Rolls-royce holdings plc. Retrieved from <https://www.rolls-royce.com/investors/annual-report-archive/annual-reports.aspx>
- Schweizer, L. & Nienhaus, A. (2017). Corporate distress and turnaround: integrating the literature and directing future research. *Business Research*, 10:1, 3-47.
- Shepardson, D. (2019). GM cutting 4,000 workers in latest round of restructuring. *Reuters*. 2019, February 04. Retrieved from <https://uk.reuters.com/article/uk-gm-layoffs-idUKKCN1PT21V>
- Situm, M. (2013). Krisenindikatoren und methoden zur früherkennung von unternehmenskrisen. In M.W. Exler (Ed.), *Restrukturierungs- und turnaround-management: Strategie – erfolgskfaktoren – best practice* (pp. 269-290). Berlin: Erich Schmidt Verlag GmbH & Co. KG.
- Six Group (n.d.). Rieter holding ag. Retrieved May 18, 2019 from https://www.six-group.com/exchanges/shares/security_info_de.html?id=CH0003671440CHF4
- Slatter, S., & Lovett, D. (1999). *Corporate turnaround: Managing companies in distress*. London: Penguin Books.
- Slatter, S., Lovett, D., & Barlow, L. (2006). *Leading corporate turnaround: How leaders fix troubled companies*. Chichester: John Wiley & Sons Ltd.
- Starbucks (2003). FY 02 annual report: Financials. Retrieved from <https://investor.starbucks.com/financial-data/annual-reports/default.aspx>
- Starbucks (2004). FY 03 annual report: Financials. Retrieved from <https://investor.starbucks.com/financial-data/annual-reports/default.aspx>
- Starbucks (2005). FY 04 annual report: Financials. Retrieved from <https://investor.starbucks.com/financial-data/annual-reports/default.aspx>
- Starbucks (2006). FY 05 annual report: Financials. Retrieved from <https://investor.starbucks.com/financial-data/annual-reports/default.aspx>
- Starbucks (2007). FY 06 annual report: Financials. Retrieved from <https://investor.starbucks.com/financial-data/annual-reports/default.aspx>
- Starbucks (2008). FY 07 annual report: Financials. Retrieved from <https://investor.starbucks.com/financial-data/annual-reports/default.aspx>

- Starbucks (2009). Fiscal 2008 annual report. Retrieved from <https://investor.starbucks.com/financial-data/annual-reports/default.aspx>
- Starbucks (2010). Fiscal 2009 annual report. Retrieved from <https://investor.starbucks.com/financial-data/annual-reports/default.aspx>
- Starbucks (2011). Fiscal 2010 annual report. Retrieved from <https://investor.starbucks.com/financial-data/annual-reports/default.aspx>
- Starbucks (2012). Fiscal 2011 annual report. Retrieved from <https://investor.starbucks.com/financial-data/annual-reports/default.aspx>
- Starbucks (2013). Fiscal 2012 annual report. Retrieved from <https://investor.starbucks.com/financial-data/annual-reports/default.aspx>
- Teerlink, R. (2001). Harley's leadership u-turn. In Harvard Business Review (Ed.), *Harvard business review on turnarounds* (pp. 133-143). Boston: Harvard Business School Publishing Corporation.
- Tinsley, C. H., Dillon, R. L., & Madsen, P. M. (2011). How to avoid catastrophe. *Harvard Business Review*, 89:4, 90-97.
- Under Armour (2010). 2009 under armour annual report. Retrieved from <https://about.underarmour.com/investor-relations/financials/annual-reports>
- Under Armour (2011). 2010 under armour annual report. Retrieved from <https://about.underarmour.com/investor-relations/financials/annual-reports>
- Under Armour (2012). 2011 under armour annual report. Retrieved from <https://about.underarmour.com/investor-relations/financials/annual-reports>
- Under Armour (2013). 2012 under armour annual report. Retrieved from <https://about.underarmour.com/investor-relations/financials/annual-reports>
- Under Armour (2014). 2013 under armour annual report. Retrieved from <https://about.underarmour.com/investor-relations/financials/annual-reports>
- Under Armour (2015). 2014 under armour annual report. Retrieved from <https://about.underarmour.com/investor-relations/financials/annual-reports>
- Under Armour (2016). Under armour annual report 2015. Retrieved from <https://about.underarmour.com/investor-relations/financials/annual-reports>

- Under Armour (2017). 2016 annual report. Retrieved from <https://about.underarmour.com/investor-relations/financials/annual-reports>
- Under Armour (2018). 2017 annual report. Retrieved from <https://about.underarmour.com/investor-relations/financials/annual-reports>
- Under Armour (2019). 2018 annual report. Retrieved from <https://about.underarmour.com/investor-relations/financials/annual-reports>
- Waters, D. (2011). *Quantitative methods for business* (5th ed.). Harlow: Pearson Education Limited.
- Wellauer, T. (1995). Revitalization and growth – the essential ingredients. In McKinsey (Ed.), *Corporate renewal: The challenge of revitalization and growth* (pp. 23-32). Paper presented at McKinsey Conference 1995. Zurich: McKinsey & Company, Inc.
- Zopounidis, C. & Doumpos, M. (1999). Business failure prediction using the UTADIS multicriteria analysis method. *Journal of the Operational Research Society*, 50:11, 1138-1148.

7 Appendix

7.1 Appendix I: Financial Ratios for Business Failure Prediction

Table 5: Financial Ratios for Business Failure Prediction

| | Altman (1968) | Beaver (1966) ¹ | Blum (1974) ¹ | Dambolena & Khoury (1980) | Deakin (1972) ¹ | Ding et al. (2008) ¹ | Li & Sun (2008) ¹ | Lin, Linag & Chen (2011) | Mertens et al. (2008) ¹ | Ohlson (1980) ¹ | Platt (1998) | Situm (2013) | Zmjewski (1984) ¹ | Zopounidis & Doumpos (1999) |
|-------------------------------------|---------------|----------------------------|--------------------------|---------------------------|----------------------------|---------------------------------|------------------------------|--------------------------|------------------------------------|----------------------------|--------------|--------------|------------------------------|-----------------------------|
| Asset turnover | X | | | | | | X | | | | X | | | |
| CA to TA | | | | | X | | | | | | | | | |
| Cash ratio | | | | | | | | | | | X | | | |
| CF to debt | | X | X | | X | | | | X | | | | X | |
| CF to TA | | | | | X | | | | | X | | | | |
| CF to sales | | | | | X | | X | | | | | | | |
| CL to equity | | | | X | | | | | | | | | | |
| CL to TA | | | | | | | | | | | | | | X |
| CL to Inventory | | | | X | | | | | | | | | | |
| CL to sales | | | | | X | | | | | | | | | |
| Current ratio | | X | | X | | | | | X | | X | | X | X |
| D/E ratio | | | | X | | | | | | | | X | | |
| Debt ratio | | X | | X | X | X | | X | X | X | X | | | X |
| Equity to FA | | | | | | | | | | | | | | X |
| Equity to equity and long-term debt | | | | | | | | | | | | | | X |
| FA to equity | | | | X | | | | | | | | | | |
| FA turnover | | | | | | | | | | | X | | | |
| Gross profitability ratio | | | | | | | | | | | | | | X |
| Inventory turnover | | | | X ² | | | | | | | X | | | |
| Inventories to WC | | | | X | | | | | | | | | | X |

¹ As cited in Lin, Linag & Chen (2011)

² Used two alternative measures for inventory turnover

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| | | | | | | | | | | | | | |
|----------------------------------|---|---|--|---|---|---|---|---|---|---|---|---|---|
| Long-term debt to WC | | | | X | | | | | | | | | |
| MV of equity to BV of debt | X | | | | | | X | | X | | | | |
| Net income to gross profit ratio | | | | | | | | | | | | | X |
| No-credit interval | | X | | | | | | | | | | | |
| Profit margin | | | | X | | | | | | X | | | |
| Quick assets to sales | | | | | X | | | | | | | | |
| Quick assets to TA | | | | | X | | | | | | | | |
| Quick ratio | | | | X | | | | | | X | | | X |
| RE to TA | X | | | | | X | | X | | | | | |
| Return on WC | | | | X | | | | | | | | | |
| Return on FA | | | | X | | | | | | | | | |
| ROA | | X | | X | X | | | X | | X | | X | X |
| ROE | | | | X | | | | | | X | X | | X |
| ROI | | | | | | | | | | | X | | |
| ROTA | X | | | | | | X | | | | | | |
| Sales to equity | | | | X | | | | | | | | | |
| TIE ratio | | | | X | | | | | | X | | | |
| WC to net worth | | | | | | | | | | | | | X |
| WC to TA | X | X | | | | | | X | | | | | |
| WC to sales | | X | | X | X | | | | X | X | | | |

7.2 Appendix II: Scale Determinants

Table 6: Scale Determinants

| Working capital turnover | | |
|--------------------------|---------|---------|
| | Lowest | Highest |
| Alpiq | 3,904 | 18,931 |
| BlackBerry | 0,447 | 5,027 |
| Bristol-Myers Squibb | 2,46 | 14,188 |
| General Electric | 0,487 | 2,041 |
| Rieter | 2,182 | 13,327 |
| Rolls-Royce | 3,401 | 12,903 |
| Starbucks | -23,507 | 21,492 |
| Under Armour | 2,612 | 4,065 |

| Cash flow to debt ratio | | |
|-------------------------|--------|---------|
| | Lowest | Highest |
| Alpiq | -0,023 | 0,104 |
| BlackBerry | -0,186 | 1,166 |
| Bristol-Myers Squibb | 0,059 | 0,55 |
| General Electric | -0,001 | 0,058 |
| Rieter | -0,001 | 0,19 |
| Rolls-Royce | 0,054 | 0,11 |
| Starbucks | 0,435 | 0,954 |
| Under Armour | -0,037 | 0,587 |

| Debt ratio | | |
|----------------------|--------|---------|
| | Lowest | Highest |
| Alpiq | 0,565 | 0,645 |
| BlackBerry | 0,111 | 0,52 |
| Bristol-Myers Squibb | 0,478 | 0,665 |
| General Electric | 0,774 | 0,835 |
| Rieter | 0,538 | 0,681 |
| Rolls-Royce | 0,663 | 1,033 |
| Starbucks | 0,237 | 0,573 |
| Under Armour | 0,264 | 0,525 |

| Current ratio | | |
|----------------------|--------|---------|
| | Lowest | Highest |
| Alpiq | 1,031 | 1,704 |
| BlackBerry | 2,059 | 6,489 |
| Bristol-Myers Squibb | 1,15 | 2,21 |
| General Electric | 1,625 | 3,57 |
| Rieter | 1,222 | 2,439 |
| Rolls-Royce | 1,202 | 1,485 |
| Starbucks | 0,787 | 1,9 |
| Under Armour | 1,971 | 3,756 |

| Quick ratio | | |
|----------------------|--------|---------|
| | Lowest | Highest |
| Alpiq | 1,003 | 1,675 |
| BlackBerry | 1,779 | 6,284 |
| Bristol-Myers Squibb | 0,947 | 1,987 |
| General Electric | 1,41 | 3,417 |
| Rieter | 0,864 | 1,714 |
| Rolls-Royce | 0,793 | 1,16 |
| Starbucks | 0,461 | 1,363 |
| Under Armour | 1,112 | 2,493 |

| ROA | | |
|----------------------|--------|---------|
| | Lowest | Highest |
| Alpiq | -8,0% | 6,9% |
| BlackBerry | -77,8% | 26,5% |
| Bristol-Myers Squibb | -5,4% | 34,2% |
| General Electric | -7,3% | 2,4% |
| Rieter | -19,0% | 10,7% |
| Rolls-Royce | -15,8% | 14,4% |
| Starbucks | 5,6% | 16,9% |
| Under Armour | -1,2% | 11,1% |

| ROE | | |
|----------------------|---------|---------|
| | Lowest | Highest |
| Alpiq | -22,6% | 19,1% |
| BlackBerry | -162,0% | 32,9% |
| Bristol-Myers Squibb | 14,4% | 71,5% |
| General Electric | -4,4% | 12,2% |
| Rieter | -53,1% | 12,0% |
| Rolls-Royce | -228,0% | 68,2% |
| Starbucks | 12,5% | 29,4% |
| Under Armour | -2,4% | 15,8% |

| Z-score | | |
|----------------------|--------|---------|
| | Lowest | Highest |
| Alpiq | 0,648 | 3,068 |
| BlackBerry | -0,557 | 25,454 |
| Bristol-Myers Squibb | 3,152 | 9,469 |
| General Electric | 1,054 | 1,879 |
| Rieter | 1,435 | 2,678 |
| Rolls-Royce | 0,212 | 1,85 |
| Starbucks | 3,243 | 7,451 |
| Under Armour | 3,117 | 9,663 |

| Logit model | | |
|----------------------|--------|---------|
| | Lowest | Highest |
| Alpiq | 1,00% | 97,87% |
| BlackBerry | 0,00% | 100,00% |
| Bristol-Myers Squibb | 90,33% | 100,00% |
| General Electric | 0,05% | 15,94% |
| Rieter | 0,02% | 98,60% |
| Rolls-Royce | 0,00% | 99,94% |
| Starbucks | 91,90% | 99,99% |
| Under Armour | 38,44% | 99,88% |

7.3 Appendix III: Analysis Alpiq

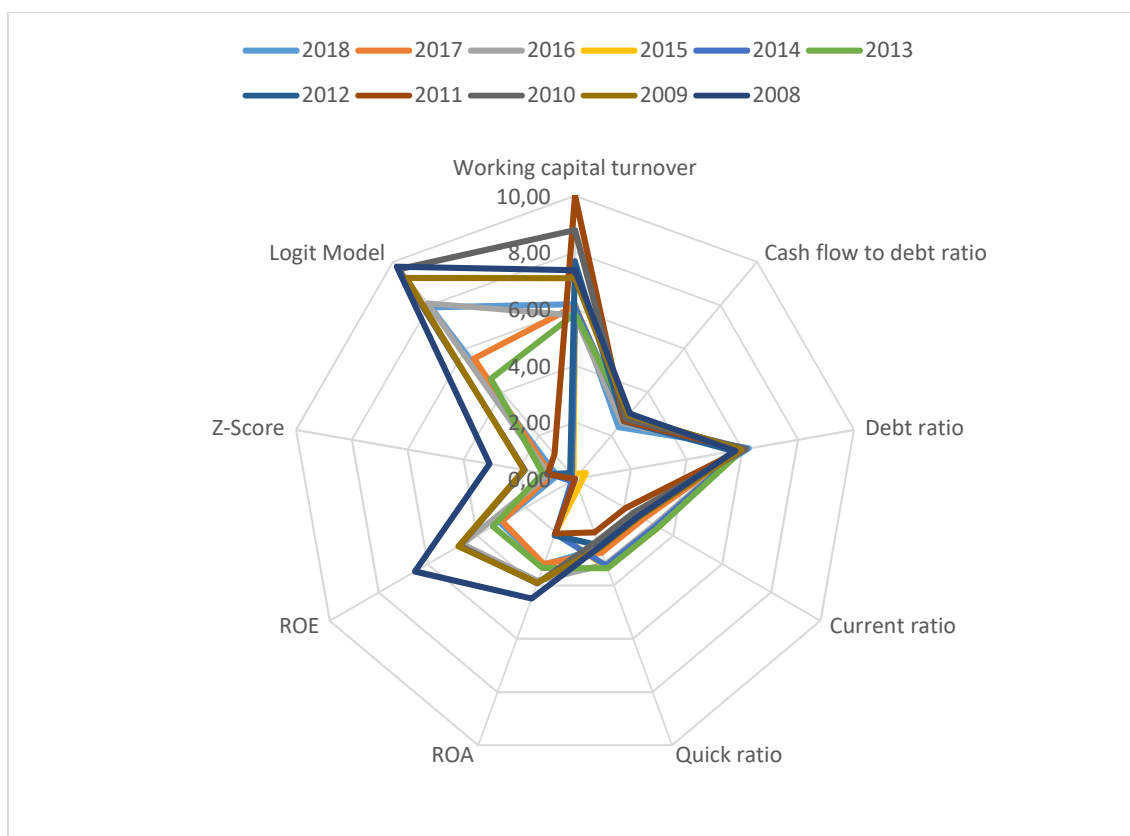


Figure 22: EWS Framework Complete Timespan Alpiq

Table 7: EWS Values Alpiq

Radar Chart

| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 |
|--------------------------|------|------|------|-------|------|------|-------------|--------------|------|------|------|
| Working capital turnover | 6,17 | 6,10 | 5,78 | 5,93 | 6,04 | 5,84 | 7,69 | 10,00 | 8,79 | 7,09 | 7,38 |
| Cash flow to debt ratio | 2,39 | 2,76 | 2,58 | 2,85 | 2,79 | 2,89 | 2,68 | 2,69 | 2,77 | 2,93 | 3,02 |
| Debt ratio | 6,23 | 5,93 | 5,98 | 5,81 | 5,98 | 6,02 | 5,70 | 5,98 | 6,14 | 5,96 | 5,75 |
| Current ratio | 2,66 | 2,80 | 3,25 | 3,40 | 3,31 | 3,41 | 2,54 | 2,06 | 2,38 | 2,65 | 2,60 |
| Quick ratio | 2,60 | 2,76 | 3,19 | 3,33 | 3,25 | 3,35 | 2,50 | 2,01 | 2,32 | 2,59 | 2,55 |
| ROA | 3,22 | 3,20 | 3,83 | 2,01 | 2,07 | 3,34 | 2,11 | 2,05 | 3,92 | 3,89 | 4,49 |
| ROE | 3,07 | 2,98 | 4,59 | -0,44 | 0,14 | 3,34 | 0,00 | 0,00 | 4,72 | 4,75 | 6,52 |
| Z-Score | 0,65 | 0,85 | 0,96 | 0,69 | 0,77 | 1,16 | 1,00 | 0,98 | 1,81 | 1,83 | 3,07 |
| Logit Model | 7,91 | 5,55 | 8,09 | 0,10 | 0,18 | 4,63 | 0,27 | 1,14 | 9,67 | 9,26 | 9,79 |

Notes: Working capital turnover for 2001 has been manually overridden because the value was outside of the established scale. ROE for 2012 and 2011 have been manually overridden because the values were outside of the established scale.

Table 8: Financial Data Alpiq (adapted from Alpiq 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018 & 2019)

| Balance Sheet | | | | | | | | | | | | |
|-------------------------------------|------------------|-------------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--|
| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | |
| Non-current assets | CHF 5 475 | CHF 5 655 | CHF 5 695 | CHF 6 381 | CHF 7 475 | CHF 9 097 | CHF 8 505 | CHF 11 454 | CHF 13 793 | CHF 14 302 | CHF 5 884 | |
| Inventories | CHF 71 | CHF 59 | CHF 73 | CHF 68 | CHF 80 | CHF 93 | CHF 83 | CHF 111 | CHF 116 | CHF 133 | CHF 102 | |
| Current assets | CHF 3 599 | CHF 4 542 | CHF 4 043 | CHF 3 509 | CHF 3 905 | CHF 5 425 | CHF 4 430 | CHF 4 154 | CHF 4 680 | CHF 5 797 | CHF 4 682 | |
| Total assets | CHF 9 074 | CHF 10 197 | CHF 9 852 | CHF 10 435 | CHF 11 861 | CHF 14 552 | CHF 14 784 | CHF 17 446 | CHF 18 473 | CHF 20 099 | CHF 10 566 | |
| Non-current liabilities | CHF 2 419 | CHF 2 989 | CHF 3 460 | CHF 4 495 | CHF 4 790 | CHF 5 499 | CHF 6 046 | CHF 6 482 | CHF 6 759 | CHF 7 790 | CHF 3 146 | |
| Current liabilities | CHF 2 711 | CHF 3 243 | CHF 2 486 | CHF 2 064 | CHF 2 357 | CHF 3 184 | CHF 3 484 | CHF 4 031 | CHF 3 935 | CHF 4 379 | CHF 3 590 | |
| Total liabilities | CHF 5 130 | CHF 6 232 | CHF 5 946 | CHF 6 559 | CHF 7 147 | CHF 8 683 | CHF 9 530 | CHF 10 513 | CHF 10 694 | CHF 12 169 | CHF 6 736 | |
| Retained earnings | CHF -1 681 | CHF -1 615 | CHF -1 690 | CHF -1 885 | CHF -869 | CHF 176 | CHF 255 | CHF 1 338 | CHF 2 879 | CHF 3 017 | CHF 2 243 | |
| Total equity | CHF 3 944 | CHF 3 965 | CHF 3 886 | CHF 3 670 | CHF 4 712 | CHF 5 788 | CHF 4 904 | CHF 6 205 | CHF 7 779 | CHF 7 930 | CHF 3 830 | |
| Total equity and liabilities | CHF 9 074 | CHF 10 197 | CHF 9 852 | CHF 10 435 | CHF 11 861 | CHF 14 522 | CHF 14 784 | CHF 17 446 | CHF 18 473 | CHF 20 099 | CHF 10 566 | |
| Income Statement | | | | | | | | | | | | |
| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | |
| Net Revenue/Sales | CHF 5 186 | CHF 7 163 | CHF 6 078 | CHF 6 715 | CHF 8 058 | CHF 9 370 | CHF 12 710 | CHF 13 961 | CHF 14 104 | CHF 14 822 | CHF 12 897 | |
| COGS | | | | | | | | | | | | |
| Gross profit/EBITDA | CHF 9 | CHF 278 | CHF 778 | CHF 50 | CHF 312 | CHF 789 | CHF 1 200 | CHF 36 | CHF 1 472 | CHF 1 545 | CHF 1 281 | |
| EBIT | CHF -160 | CHF 91 | CHF 379 | CHF -511 | CHF -673 | CHF 279 | CHF -928 | CHF -1 193 | CHF 970 | CHF 1 064 | CHF 1 001 | |
| Net income | CHF -63 | CHF -84 | CHF 294 | CHF -830 | CHF -902 | CHF 4 | CHF -1 086 | CHF -1 346 | CHF 645 | CHF 676 | CHF 733 | |
| Cash Flow Statement | | | | | | | | | | | | |
| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | |
| Cash flow from operating activities | CHF -116 | CHF 329 | CHF 94 | CHF 461 | CHF 414 | CHF 670 | CHF 334 | CHF 401 | CHF 582 | CHF 1 036 | CHF 698 | |
| Cash flow from investing activities | CHF 701 | CHF 320 | CHF 299 | CHF 224 | CHF -7 | CHF -43 | CHF 657 | CHF -869 | CHF -296 | CHF -1 327 | CHF -1 235 | |
| Cash flow from financial activities | CHF -744 | CHF -406 | CHF -708 | CHF -707 | CHF -1 225 | CHF -165 | CHF -754 | CHF 308 | CHF -442 | CHF 700 | CHF 557 | |
| Net cash flow | CHF -174 | CHF 276 | CHF -318 | CHF -65 | CHF -826 | CHF 465 | CHF 236 | CHF -169 | CHF -182 | CHF 414 | CHF -23 | |
| Share Information | | | | | | | | | | | | |
| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | |
| Year end stock price | 77 | 63 | 85 | 105 | 90 | 122 | 131 | 170 | 360 | 430 | 535 | |
| Average shares outstanding (in Mio) | 27,874649 | 27,874649 | 27,874649 | 27,616917 | 27,189873 | 27,189873 | 27,189873 | 27,189873 | 27,189873 | 26,749165 | 21,260615 | |

Notes: All figures in Million CHF expect per share data / 2008 figures of Atel excluding EOS and Emosson / Net cash flow includes exchange rate effects

Table 9: Ratio Analysis Alpiq

| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 |
|-----------------------------|--------------|--------------|--------------|--------------|--------------|-------------|--------------|--------------|-------------|-------------|-------------|
| Activity ratios | | | | | | | | | | | |
| Working capital turnover | 5.84009009 | 5.514241724 | 3.903660886 | 4.647038824 | 5.205426357 | 4.181169121 | 13.43351797 | 113.504065 | 18.93154362 | 10.45275035 | 11.87569061 |
| Coverage ratios | | | | | | | | | | | |
| Cash flow to debt ratio | -0.022612086 | 0.052792041 | 0.015808947 | 0.070285104 | 0.057926403 | 0.077162271 | 0.035047219 | 0.038143251 | 0.054423041 | 0.085134358 | 0.103622328 |
| Leverage ratios | | | | | | | | | | | |
| Debt ratio | 0.565351554 | 0.611160145 | 0.603532278 | 0.628557738 | 0.602563022 | 0.596687741 | 0.644615801 | 0.602602316 | 0.578898934 | 0.605453008 | 0.637516563 |
| Liquidity ratios | | | | | | | | | | | |
| Current ratio | 1.327554408 | 1.400555042 | 1.626307321 | 1.700096899 | 1.656767077 | 1.703831658 | 1.27152698 | 1.03051352 | 1.189326557 | 1.323818223 | 1.302002225 |
| Quick ratio | 1.30136481 | 1.38236201 | 1.59694288 | 1.667151163 | 1.622825626 | 1.674623116 | 1.247703789 | 1.002976929 | 1.159847522 | 1.293445992 | 1.273637735 |
| Profitability ratios | | | | | | | | | | | |
| ROA (in percent) | -0.694291382 | -0.823771698 | 2.984165652 | -7.954000958 | -7.60475508 | 0.027487631 | -7.345779221 | -7.715235584 | 3.491582309 | 3.363351411 | 6.937346205 |
| ROE (in percent) | -1.597363083 | -2.118537201 | 7.565620175 | -22.61580381 | -19.1426146 | -0.0691085 | -22.1451876 | -21.69218372 | 8.291554184 | 8.524590164 | 19.1383812 |
| Z-Score | | | | | | | | | | | |
| Z | 0.647551164 | 0.849028043 | 0.956366827 | 0.686969949 | 0.77214803 | 1.116103877 | 1.000181272 | 0.980594348 | 1.807462648 | 1.830787687 | 3.068263631 |
| X1 | 0.097862023 | 0.127390409 | 0.158038977 | 0.138476282 | 0.130511761 | 0.15399945 | 0.063988095 | 0.007050327 | 0.040329129 | 0.070550774 | 0.10278251 |
| X2 | -0.185254574 | -0.158379916 | -0.171538774 | -0.18064207 | -0.073265323 | 0.012094557 | 0.017248377 | 0.076693798 | 0.155849077 | 0.15010697 | 0.212284687 |
| X3 | -0.017632797 | 0.008924193 | 0.038469346 | -0.048969813 | -0.056740578 | 0.019172622 | -0.062770563 | -0.068382437 | 0.052509067 | 0.052937957 | 0.094737838 |
| X4 | 0.418391418 | 0.281788011 | 0.398477155 | 0.442106462 | 0.342393811 | 0.382029772 | 0.373753763 | 0.439672635 | 0.915312725 | 0.945200177 | 1.688602884 |
| X5 | 0.571523033 | 0.702461508 | 0.616930572 | 0.643507427 | 0.679369362 | 0.643897746 | 0.859713203 | 0.800240743 | 0.763492665 | 0.737449624 | 1.220613288 |
| Logit Model | | | | | | | | | | | |
| F | 79.13191% | 55.52387% | 80.93470% | 0.99769% | 1.81701% | 46.25054% | 2.69516% | 11.35937% | 96.72238% | 92.64230% | 97.87236% |
| X1 | 0.00991845 | 0.02726292 | 0.078968737 | 0.004791567 | 0.026304696 | 0.054219351 | 0.081168831 | 0.00206351 | 0.079683863 | 0.076869496 | 0.121237933 |
| X2 | -0.006942914 | -0.008237717 | 0.029841657 | -0.07954001 | -0.076047551 | 0.000274876 | -0.073457792 | -0.077152356 | 0.034915823 | 0.033633514 | 0.069373462 |
| X3 | 1.30136481 | 1.38236201 | 1.59694288 | 1.667151163 | 1.622825626 | 1.674623116 | 1.247703789 | 1.002976929 | 1.159847522 | 1.293445992 | 1.273637375 |
| X4 | 0.565351554 | 0.611160145 | 0.603532278 | 0.628557738 | 0.602563022 | 0.596687741 | 0.644615801 | 0.602602316 | 0.578898934 | 0.605453008 | 0.637516563 |
| X5 | 0.720365297 | 0.701149425 | 0.682352941 | 0.575144962 | 0.630367893 | 0.63625371 | 0.576601999 | 0.541732146 | 0.56398173 | 0.554467907 | 0.650917743 |
| Other ratios | | | | | | | | | | | |
| Total market value (in Mio) | CHF 2 146 | CHF 1 756 | CHF 2 369 | CHF 2 900 | CHF 2 447 | CHF 3 317 | CHF 3 562 | CHF 4 622 | CHF 9 788 | CHF 11 502 | CHF 11 374 |
| Working capital | CHF 888 | CHF 1 299 | CHF 1 557 | CHF 1 443 | CHF 1 548 | CHF 2 241 | CHF 946 | CHF 123 | CHF 745 | CHF 1 418 | CHF 1 086 |
| | | | | | | | | | | | 2.71828 |

7.4 Appendix IV: Analysis BlackBerry

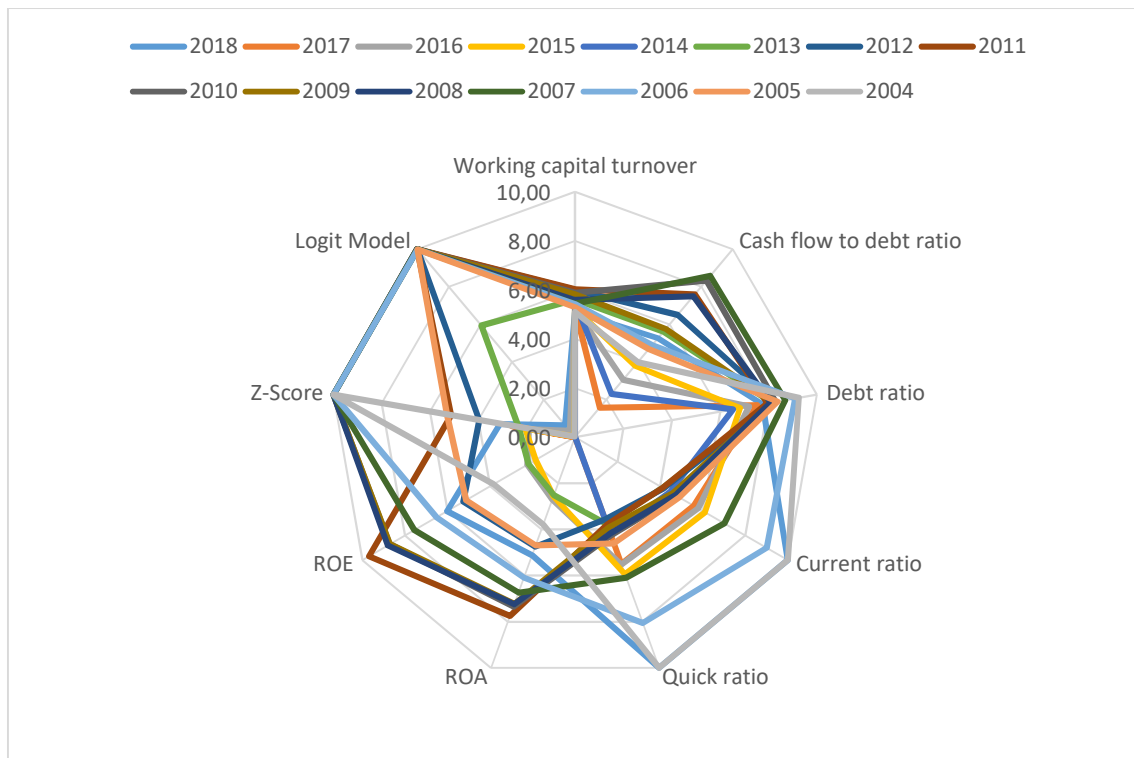


Figure 23: EWS Framework Complete Timespan BlackBerry

Table 10: EWS Values BlackBerry (Part 1)

Radar Chart

| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 |
|--------------------------|--------------|-------------|------|------|-------------|------|------|-------|
| Working capital turnover | 5,09 | 5,24 | 5,22 | 5,24 | 5,49 | 5,61 | 6,01 | 6,03 |
| Cash flow to debt ratio | 5,26 | 1,57 | 3,05 | 3,80 | 2,30 | 5,61 | 6,51 | 7,59 |
| Debt ratio | 7,75 | 7,54 | 7,20 | 6,83 | 6,53 | 8,12 | 8,24 | 7,96 |
| Current ratio | 10,00 | 5,58 | 5,80 | 6,11 | 4,46 | 4,12 | 4,16 | 4,13 |
| Quick ratio | 10,00 | 5,50 | 5,52 | 5,94 | 4,24 | 3,77 | 3,56 | 3,79 |
| ROA | 5,12 | 0,00 | 2,71 | 2,56 | 0,00 | 2,52 | 4,75 | 7,75 |
| ROE | 6,03 | 0,00 | 2,25 | 1,86 | 0,00 | 2,20 | 5,25 | 9,69 |
| Z-Score | 3,10 | 2,63 | 1,91 | 2,06 | 0,00 | 2,33 | 3,96 | 5,13 |
| Logit Model | 0,64 | 0,00 | 0,34 | 0,04 | 0,00 | 5,94 | 9,99 | 10,00 |

Table 11: EWS Values BlackBerry (Part 2)

Radar Chart

| | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 |
|--------------------------|--------------|--------------|--------------|--------------|--------------|------|--------------|
| Working capital turnover | 5,88 | 5,81 | 5,60 | 5,44 | 5,42 | 5,30 | 5,10 |
| Cash flow to debt ratio | 8,33 | 5,76 | 7,50 | 8,58 | 4,89 | 4,68 | 3,98 |
| Debt ratio | 8,30 | 8,17 | 8,09 | 8,69 | 9,10 | 8,38 | 9,26 |
| Current ratio | 4,78 | 4,58 | 4,72 | 7,02 | 9,02 | 4,90 | 10,00 |
| Quick ratio | 4,27 | 3,93 | 4,18 | 6,09 | 8,05 | 4,60 | 10,00 |
| ROA | 7,35 | 7,23 | 7,25 | 6,74 | 6,09 | 4,69 | 3,78 |
| ROE | 8,72 | 8,70 | 8,82 | 7,57 | 6,52 | 5,13 | 3,84 |
| Z-Score | 10,00 | 10,00 | 10,00 | 10,00 | 10,00 | 5,30 | 10,00 |
| Logit Model | 10,00 | 10,00 | 10,00 | 10,00 | 9,98 | 9,99 | 0,03 |

Notes: Quick and current ratio for 2018 and 2004 have been manually overridden because the values were outside of the established scale. ROE and ROA for 2017 and 2014 have been manually overridden because the values were outside of the established scale. Z-score for 2014, 2010, 2009, 2009, 2007, 2006 and 2004 have been manually overridden because the values were outside of the established scale.

Table 12: Financial Data BlackBerry (adapted from Research in Motion 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013 & 2014; BlackBerry 2015, 2016, 2017, 2018 & 2019)

| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 |
|-------------------------------------|-----------------|------------------|-----------------|-----------------|------------------|------------------|------------------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Balance Sheet | | | | | | | | | | | | | | | |
| Non-current assets | \$ 1,232 | \$ 1,572 | \$ 2,523 | \$ 2,382 | \$ 2,495 | \$ 6,064 | \$ 6,675 | \$ 5,387 | \$ 4,392 | \$ 3,260 | \$ 2,034 | \$ 1,170 | \$ 1,056 | \$ 1,077 | \$ 576 |
| Inventories | 3 | 26 | 143 | 122 | 244 | 603 | 1,027 | 618 | 622 | 682 | 396 | 256 | 135 | 92 | 43 |
| Current assets | \$ 2,548 | \$ 1,691 | \$ 3,011 | \$ 4,167 | \$ 5,057 | \$ 7,101 | \$ 7,056 | \$ 7,488 | \$ 8,813 | \$ 4,842 | \$ 3,477 | \$ 1,919 | \$ 1,257 | \$ 1,544 | \$ 1,355 |
| Total assets | \$ 3,780 | \$ 3,263 | \$ 5,534 | \$ 6,549 | \$ 7,552 | \$ 13,165 | \$ 13,731 | \$ 12,875 | \$ 10,204 | \$ 8,101 | \$ 5,511 | \$ 3,089 | \$ 2,312 | \$ 2,621 | \$ 1,931 |
| Non-current liabilities | \$ 811 | \$ 600 | \$ 1,287 | \$ 1,755 | \$ 1,659 | \$ 2,571 | \$ 242 | \$ 307 | \$ 170 | \$ 112 | \$ 103 | \$ 59 | \$ 35 | \$ 7 | \$ 6 |
| Current liabilities | \$ 464 | \$ 606 | \$ 1,039 | \$ 1,363 | \$ 2,268 | \$ 3,448 | \$ 3,389 | \$ 3,630 | \$ 2,432 | \$ 2,115 | \$ 1,474 | \$ 547 | \$ 279 | \$ 631 | \$ 209 |
| Total liabilities | \$ 1,275 | \$ 1,206 | \$ 2,326 | \$ 3,118 | \$ 3,927 | \$ 3,705 | \$ 3,631 | \$ 3,937 | \$ 2,402 | \$ 2,227 | \$ 1,578 | \$ 605 | \$ 313 | \$ 637 | \$ 215 |
| Retained earnings | \$ -45 | \$ -438 | \$ 768 | \$ 1,010 | \$ 1,394 | \$ 7,267 | \$ 7,913 | \$ 6,749 | \$ 5,274 | \$ 3,546 | \$ 1,653 | \$ 359 | \$ 148 | \$ 94 | \$ -119 |
| Total equity | \$ 2,505 | \$ 2,057 | \$ 3,208 | \$ 3,431 | \$ 3,625 | \$ 9,460 | \$ 10,100 | \$ 8,938 | \$ 7,603 | \$ 5,874 | \$ 3,934 | \$ 2,484 | \$ 1,999 | \$ 1,984 | \$ 1,716 |
| Total equity and liabilities | \$ 3,780 | \$ 3,263 | \$ 5,534 | \$ 6,549 | \$ 7,552 | \$ 13,165 | \$ 13,731 | \$ 12,875 | \$ 10,204 | \$ 8,101 | \$ 5,511 | \$ 3,089 | \$ 2,312 | \$ 2,621 | \$ 1,931 |
| Income Statement | | | | | | | | | | | | | | | |
| Net Revenue/Sales | \$ 932 | \$ 1,309 | \$ 2,160 | \$ 3,335 | \$ 6,813 | \$ 11,073 | \$ 18,435 | \$ 19,907 | \$ 14,953 | \$ 11,065 | \$ 6,009 | \$ 3,037 | \$ 2,066 | \$ 1,350 | \$ 595 |
| COGS | \$ 262 | \$ 692 | \$ 1,219 | \$ 1,731 | \$ 6,856 | \$ 7,639 | \$ 11,856 | \$ 11,082 | \$ 8,368 | \$ 5,968 | \$ 2,929 | \$ 1,379 | \$ 925 | \$ 636 | \$ 323 |
| Gross profit | \$ 670 | \$ 617 | \$ 941 | \$ 1,604 | \$ -43 | \$ 3,434 | \$ 6,579 | \$ 8,825 | \$ 6,585 | \$ 5,097 | \$ 3,081 | \$ 1,658 | \$ 1,141 | \$ 715 | \$ 271 |
| EBIT | \$ 283 | \$ -1,181 | \$ -223 | \$ -423 | \$ -7,163 | \$ -1,235 | \$ 1,490 | \$ 4,636 | \$ 3,238 | \$ 2,722 | \$ 1,731 | \$ 807 | \$ 420 | \$ 34 | \$ 37 |
| Net income | \$ 405 | \$ -1,206 | \$ -208 | \$ -304 | \$ -5,873 | \$ -646 | \$ 1,164 | \$ 3,411 | \$ 2,457 | \$ 1,893 | \$ 1,294 | \$ 632 | \$ 382 | \$ 213 | \$ 52 |
| Cash Flow Statement | | | | | | | | | | | | | | | |
| Cash flow from operating activities | \$ 704 | \$ -224 | \$ 257 | \$ 813 | \$ -159 | \$ 2,303 | \$ 2,912 | \$ 4,009 | \$ 3,035 | \$ 1,452 | \$ 1,577 | \$ 736 | \$ 150 | \$ 278 | \$ 64 |
| Cash flow from investing activities | \$ -630 | \$ 724 | \$ -439 | \$ -1,173 | \$ -1,040 | \$ -2,240 | \$ -3,024 | \$ -1,698 | \$ -1,470 | \$ -1,824 | \$ -1,154 | \$ -365 | \$ 67 | \$ -878 | \$ -197 |
| Cash flow from financing activities | \$ 2 | \$ -722 | \$ -78 | \$ 16 | \$ 1,224 | \$ -36 | \$ -149 | \$ -2,097 | \$ -843 | \$ 25 | \$ 80 | \$ -154 | \$ -368 | \$ 54 | \$ 949 |
| Net cash flow | \$ 82 | \$ -223 | \$ -276 | \$ -346 | \$ 30 | \$ 22 | \$ -264 | \$ 240 | \$ 715 | \$ -349 | \$ 507 | \$ 218 | \$ -151 | \$ -546 | \$ 816 |
| Share Information | | | | | | | | | | | | | | | |
| Year end stock price | 7.11 | 11.17 | 6.89 | 9.28 | 10.98 | 7.44 | 11.87 | 14.5 | 58.13 | 67.54 | 40.58 | 113.4 | 42,5933 | 22,0033 | 27,4733 |
| Average shares outstanding (in Mio) | 532,888 | 525,265 | 526,603 | 527,684 | 525,168 | 524,160 | 524,101 | 535,986 | 564,492 | 565,059 | 559,778 | 185,353 | 188,914 | 187,653 | 159,868 |

Notes: All figures in Million US\$ expect per share data / Net cash flow includes exchange rate effects / Stock price information from Macrotrends (n.d.a)

Table 13: Ratio Analysis BlackBerry

| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 |
|-----------------------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|-------------|-------------|-----------|-----------|-----------|-----------|
| Activity ratios | | | | | | | | | | | | | | | |
| Working capital turnover | 0.447216891 | 1.2064511613 | 1.095334686 | 1.189372325 | 2.442811043 | 3.031207227 | 5.027270248 | 5.159927424 | 4.422880559 | 4.058779232 | 3.000312543 | 2.2125192 | 2.1125341 | 1.4784287 | 0.5186223 |
| Coverage ratios | | | | | | | | | | | | | | | |
| Cash flow to debt ratio | 0.552156863 | -0.185737977 | 0.110490112 | 0.260744067 | -0.040488923 | 0.621592443 | 0.801982925 | 1.018288037 | 1.166475897 | 0.651857183 | 0.999453608 | 1.21508 | 0.4789287 | 0.4361747 | 0.2967483 |
| Leverage ratios | | | | | | | | | | | | | | | |
| Debt ratio | 0.337301587 | 0.369598529 | 0.420310806 | 0.476103222 | 0.519994703 | 0.281428029 | 0.2644438133 | 0.305786408 | 0.254962928 | 0.274921828 | 0.286257933 | 0.1960049 | 0.1355397 | 0.2431589 | 0.111379 |
| Liquidity ratios | | | | | | | | | | | | | | | |
| Current ratio | 5.49137931 | 2.790429043 | 2.897978826 | 3.057226706 | 2.229717813 | 2.059454756 | 2.082030097 | 2.062809917 | 2.390291544 | 2.288786116 | 2.358437933 | 3.5114394 | 4.509039 | 2.4480243 | 6.4890724 |
| Quick ratio | 5.484913793 | 2.747524752 | 2.760346487 | 2.967718269 | 2.122134039 | 1.884570766 | 1.778990853 | 1.892561983 | 2.134671477 | 1.966191899 | 2.089678662 | 3.0432383 | 4.0263241 | 2.3014058 | 6.2839928 |
| Profitability ratios | | | | | | | | | | | | | | | |
| ROA (in percent) | 10.71428571 | -36.9598529 | -3.758583303 | -4.641930066 | -7.76747881 | -4.906950247 | 8.477168451 | 26.49320388 | 24.07923869 | 23.36167257 | 23.47710212 | 20.446178 | 16.52475 | 8.1414532 | 2.6835244 |
| ROE (in percent) | 16.16766467 | -58.62907146 | -6.483790524 | -8.860390557 | -162.0137931 | -6.828752643 | 11.52475248 | 38.16289998 | 32.31951752 | 32.21952263 | 32.89297803 | 25.430723 | 19.115685 | 10.75715 | 3.0198752 |
| Z-Score | | | | | | | | | | | | | | | |
| Z | 3.099823584 | 2.628777966 | 1.908762154 | 2.062338934 | -0.557150875 | 2.331980643 | 3.958745087 | 5.13075015 | 11.95775821 | 14.80038523 | 12.48621786 | 25.454093 | 19.035776 | 5.3025681 | 14.472603 |
| X1 | 0.551322751 | 0.332516089 | 0.356342609 | 0.428156971 | 0.369306144 | 0.277478162 | 0.267059937 | 0.299650485 | 0.331315513 | 0.336515222 | 0.363428604 | 0.4443874 | 0.4229382 | 0.3485067 | 0.5936331 |
| X2 | -0.01190476 | -0.134232402 | 0.13877846 | 0.154222019 | 0.184586864 | 0.551993923 | 0.576287233 | 0.524194175 | 0.516871188 | 0.437667842 | 0.299952442 | 0.1162942 | 0.0640216 | 0.0359333 | -0.061721 |
| X3 | 0.074867725 | -0.361936868 | -0.040296635 | -0.064590014 | -0.948490466 | -0.093809343 | 0.108513582 | 0.36007767 | 0.31730108 | 0.336004321 | 0.314117267 | 0.2611982 | 0.181579 | 0.0129928 | 0.0191692 |
| X4 | 2.971634259 | 4.865016625 | 1.559885929 | 1.57052839 | 1.468384171 | 1.052564211 | 1.713323842 | 1.974040386 | 12.61226882 | 17.1511625 | 14.39876323 | 34.716434 | 25.675664 | 6.4786892 | 20.417458 |
| X5 | 0.246560847 | 0.401164572 | 0.39031442 | 0.509238052 | 0.902145127 | 0.841093809 | 1.342582478 | 1.546174757 | 1.46536894 | 1.365840996 | 1.0903994 | 0.9832157 | 0.8934713 | 0.5152423 | 0.3078714 |
| Logit Model | | | | | | | | | | | | | | | |
| F | 6.36886% | 0.00000% | 3.43126% | 0.37812% | 0.00000% | 59.40870% | 99.90899% | 99.99996% | 99.99987% | 99.99986% | 99.99985% | 99.99668% | 99.81112% | 99.86038% | 0.31870% |
| X1 | 0.177248677 | 0.189089795 | 0.170039754 | 0.244922889 | -0.005693856 | 0.260843145 | 0.479134804 | 0.685436893 | 0.645305181 | 0.629189476 | 0.558968694 | 0.556688 | 0.4933188 | 0.2726191 | 0.1404443 |
| X2 | 0.107142857 | -0.369598529 | -0.037585833 | -0.046419301 | -0.777674788 | -0.049069502 | 0.084771685 | 0.264932039 | 0.240792387 | 0.233616726 | 0.234771021 | 0.2044618 | 0.1652475 | 0.0814145 | 0.0268352 |
| X3 | 5.484913793 | 2.747524752 | 2.760346487 | 2.967718269 | 2.122134039 | 1.884570766 | 1.778990853 | 1.892561983 | 2.134671477 | 1.966191899 | 2.089678662 | 3.0432383 | 4.0263241 | 2.3014058 | 6.2839928 |
| X4 | 0.337301587 | 0.369598529 | 0.420310806 | 0.476103222 | 0.519994703 | 0.281428029 | 0.264438133 | 0.305786408 | 0.254962928 | 0.274921828 | 0.286257933 | 0.1960049 | 0.1355397 | 0.2431589 | 0.111379 |
| X5 | 2.033279221 | 1.308524173 | 1.27150218 | 1.44038623 | 1.452905812 | 1.560026385 | 1.513108614 | 1.659179506 | 1.731122629 | 1.801998045 | 1.934065383 | 2.123223 | 1.8933303 | 1.8422878 | 2.9797629 |
| Other ratios | | | | | | | | | | | | | | | |
| Total market value | \$ 3,789 | \$ 5,867 | \$ 3,628 | \$ 4,897 | \$ 5,766 | \$ 3,900 | \$ 6,221 | \$ 7,772 | \$ 32,814 | \$ 38,164 | \$ 22,716 | \$ 21,019 | \$ 8,046 | \$ 4,129 | \$ 4,392 |
| Working capital | \$ 2,084 | \$ 1,085 | \$ 1,972 | \$ 2,804 | \$ 2,789 | \$ 3,653 | \$ 3,667 | \$ 3,858 | \$ 3,381 | \$ 2,726 | \$ 2,003 | \$ 1,373 | \$ 978 | \$ 913 | \$ 1,147 |
| e | | | | | | | | | | | | | | | 2,71828 |

7.5 Appendix V: Analysis Bristol-Myers Squibb

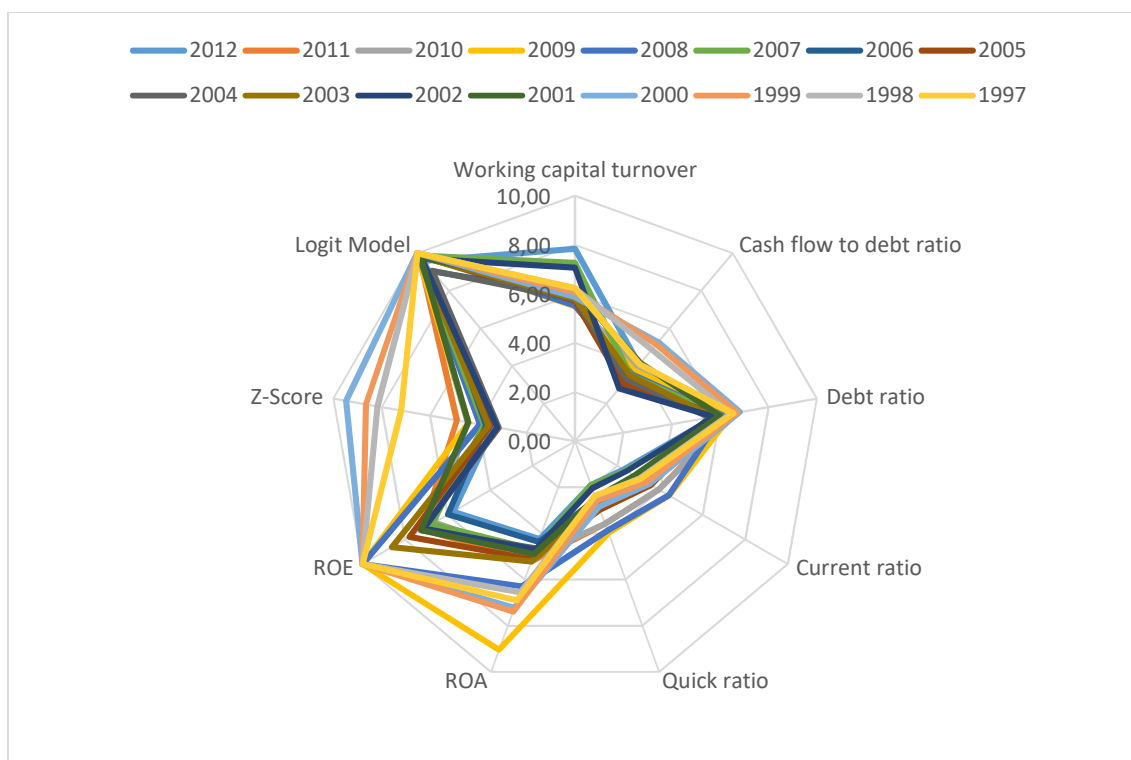


Figure 24: EWS Framework Complete Timespan Bristol-Myers Squibb

Table 14: EWS Values Bristol-Myers Squibb (Part 1)

Radar Chart

| | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 |
|--------------------------|------|------|------|--------------|--------------|------|------|------|
| Working capital turnover | 7,84 | 5,56 | 5,60 | 5,49 | 5,51 | 7,27 | 5,94 | 5,71 |
| Cash flow to debt ratio | 4,06 | 3,91 | 3,95 | 3,75 | 3,57 | 3,51 | 3,17 | 3,04 |
| Debt ratio | 5,87 | 6,54 | 6,69 | 6,51 | 6,09 | 6,02 | 5,94 | 5,99 |
| Current ratio | 2,30 | 3,94 | 3,94 | 4,42 | 4,40 | 2,39 | 3,17 | 3,57 |
| Quick ratio | 1,90 | 3,58 | 3,58 | 3,97 | 3,87 | 1,89 | 2,53 | 2,97 |
| ROA | 4,24 | 5,21 | 5,00 | 9,04 | 6,29 | 4,71 | 4,37 | 5,11 |
| ROE | 5,73 | 7,21 | 6,62 | 10,00 | 10,00 | 6,75 | 5,98 | 7,79 |
| Z-Score | 3,38 | 4,89 | 4,45 | 4,40 | 3,94 | 3,77 | 3,69 | 3,52 |
| Logit Model | 9,58 | 9,90 | 9,87 | 10,00 | 9,99 | 9,87 | 9,03 | 9,83 |

Table 15: EWS Values Bristol-Myers Squibb (Part 2)

Radar Chart

| | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 |
|--------------------------|------|------|------|------|--------------|--------------|--------------|--------------|
| Working capital turnover | 5,78 | 5,82 | 7,06 | 6,10 | 5,87 | 6,08 | 6,22 | 6,24 |
| Cash flow to debt ratio | 3,28 | 3,49 | 2,80 | 4,15 | 5,27 | 5,14 | 4,87 | 4,10 |
| Debt ratio | 5,57 | 5,71 | 5,74 | 5,98 | 6,81 | 6,70 | 6,44 | 6,55 |
| Current ratio | 3,01 | 3,22 | 2,43 | 2,80 | 3,49 | 3,35 | 3,03 | 3,07 |
| Quick ratio | 2,64 | 2,79 | 2,04 | 2,46 | 2,84 | 2,58 | 2,39 | 2,36 |
| ROA | 4,64 | 5,22 | 4,70 | 4,89 | 7,22 | 7,39 | 6,55 | 6,90 |
| ROE | 7,23 | 8,62 | 7,11 | 7,26 | 10,00 | 10,00 | 10,00 | 10,00 |
| Z-Score | 3,15 | 3,59 | 3,22 | 4,42 | 9,47 | 8,66 | 8,18 | 7,19 |
| Logit Model | 9,07 | 9,82 | 9,72 | 9,80 | 10,00 | 10,00 | 10,00 | 10,00 |

Notes: ROE for 2009, 2008, 2000, 1999, 1998, 1997 have been manually overridden because the values were outside of the established scale.

Table 16: Financial Data Bristol-Myers Squibb (adapted from Bristol-Myers Squibb 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012 & 2013)

| | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 |
|-------------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Balance Sheet | | | | | | | | | | | | | | | | |
| Non-current assets | \$ 26,376 | \$ 17,652 | \$ 17,803 | \$ 17,050 | \$ 14,789 | \$ 15,824 | \$ 15,273 | \$ 15,855 | \$ 15,634 | \$ 15,451 | \$ 14,899 | \$ 14,708 | \$ 7,754 | \$ 7,847 | \$ 7,490 | \$ 7,241 |
| Inventories | \$ 1,657 | \$ 1,384 | \$ 1,204 | \$ 1,413 | \$ 1,765 | \$ 2,162 | \$ 2,079 | \$ 2,060 | \$ 1,830 | \$ 1,601 | \$ 1,573 | \$ 1,486 | \$ 1,831 | \$ 2,126 | \$ 1,873 | \$ 1,799 |
| Current assets | \$ 9,521 | \$ 15,318 | \$ 13,273 | \$ 13,958 | \$ 14,763 | \$ 10,348 | \$ 10,302 | \$ 12,283 | \$ 14,801 | \$ 11,997 | \$ 9,975 | \$ 12,349 | \$ 9,824 | \$ 9,267 | \$ 8,782 | \$ 7,736 |
| Total assets | \$ 35,897 | \$ 32,970 | \$ 31,076 | \$ 31,008 | \$ 29,552 | \$ 26,172 | \$ 25,575 | \$ 28,138 | \$ 30,435 | \$ 27,448 | \$ 24,874 | \$ 27,057 | \$ 17,578 | \$ 17,114 | \$ 16,272 | \$ 14,977 |
| Non-current liabilities | \$ 13,980 | \$ 9,323 | \$ 8,699 | \$ 9,910 | \$ 10,601 | \$ 6,966 | \$ 9,088 | \$ 10,040 | \$ 10,390 | \$ 10,201 | \$ 7,688 | \$ 7,495 | \$ 2,766 | \$ 2,932 | \$ 2,905 | \$ 2,726 |
| Current liabilities | \$ 8,279 | \$ 7,780 | \$ 6,739 | \$ 6,313 | \$ 6,710 | \$ 8,644 | \$ 6,496 | \$ 6,890 | \$ 9,843 | \$ 7,461 | \$ 8,220 | \$ 8,826 | \$ 5,632 | \$ 5,537 | \$ 5,791 | \$ 5,032 |
| Total liabilities | \$ 22,259 | \$ 17,103 | \$ 15,438 | \$ 16,223 | \$ 17,311 | \$ 15,610 | \$ 15,584 | \$ 16,930 | \$ 20,233 | \$ 17,662 | \$ 15,908 | \$ 16,321 | \$ 8,398 | \$ 8,469 | \$ 8,696 | \$ 7,758 |
| Retained earnings | \$ 32,733 | \$ 33,069 | \$ 31,636 | \$ 30,760 | \$ 22,549 | \$ 19,762 | \$ 19,845 | \$ 20,464 | \$ 19,651 | \$ 19,439 | \$ 18,860 | \$ 22,125 | \$ 17,781 | \$ 15,000 | \$ 12,540 | \$ 10,950 |
| Total equity | \$ 13,623 | \$ 15,956 | \$ 15,713 | \$ 14,843 | \$ 12,241 | \$ 10,562 | \$ 9,991 | \$ 11,208 | \$ 10,202 | \$ 9,786 | \$ 8,967 | \$ 10,736 | \$ 9,180 | \$ 8,645 | \$ 7,576 | \$ 7,219 |
| Total equity and liabilities | \$ 35,897 | \$ 32,970 | \$ 31,076 | \$ 31,008 | \$ 29,552 | \$ 26,172 | \$ 25,575 | \$ 28,138 | \$ 30,435 | \$ 27,448 | \$ 24,874 | \$ 27,057 | \$ 17,578 | \$ 17,114 | \$ 16,272 | \$ 14,977 |

Income Statement

| | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 |
|-------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Income Statement | | | | | | | | | | | | | | | | |
| Net Revenue/Sales | \$ 17,621 | \$ 21,244 | \$ 19,484 | \$ 18,808 | \$ 20,597 | \$ 19,348 | \$ 17,914 | \$ 19,207 | \$ 19,380 | \$ 18,653 | \$ 18,119 | \$ 19,423 | \$ 18,216 | \$ 20,222 | \$ 18,284 | \$ 16,701 |
| COGS | \$ 4,610 | \$ 5,598 | \$ 5,277 | \$ 5,140 | \$ 6,396 | \$ 6,218 | \$ 5,956 | \$ 5,928 | \$ 5,989 | \$ 5,406 | \$ 6,388 | \$ 5,575 | \$ 4,759 | \$ 5,539 | \$ 4,856 | \$ 4,464 |
| Gross profit | \$ 13,011 | \$ 15,646 | \$ 14,207 | \$ 13,668 | \$ 14,201 | \$ 13,130 | \$ 11,958 | \$ 13,279 | \$ 13,391 | \$ 13,247 | \$ 11,731 | \$ 13,848 | \$ 13,457 | \$ 14,683 | \$ 13,428 | \$ 12,237 |
| EBIT | \$ 2,340 | \$ 6,981 | \$ 6,071 | \$ 5,602 | \$ 5,471 | \$ 3,534 | \$ 2,635 | \$ 4,516 | \$ 4,418 | \$ 4,680 | \$ 2,647 | \$ 2,986 | \$ 5,478 | \$ 5,767 | \$ 4,268 | \$ 4,482 |
| Net income | \$ 1,960 | \$ 3,709 | \$ 3,102 | \$ 10,612 | \$ 5,247 | \$ 2,165 | \$ 1,585 | \$ 3,000 | \$ 2,388 | \$ 3,106 | \$ 2,034 | \$ 2,527 | \$ 4,096 | \$ 4,167 | \$ 3,141 | \$ 3,205 |

Cash Flow Statement

| | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 |
|-------------------------------------|------------------|---------------|------------------|----------------|-----------------|----------------|------------------|----------------|-----------------|--------------|------------------|-----------------|---------------|---------------|---------------|----------------|
| Cash Flow Statement | | | | | | | | | | | | | | | | |
| Cash flow from operating activities | \$ 6,941 | \$ 4,840 | \$ 4,491 | \$ 4,065 | \$ 3,707 | \$ 3,153 | \$ 2,083 | \$ 1,836 | \$ 3,176 | \$ 3,512 | \$ 945 | \$ 5,402 | \$ 4,652 | \$ 4,470 | \$ 4,120 | \$ 2,476 |
| Cash flow from investing activities | \$ -6,727 | \$ -1,437 | \$ -3,812 | \$ -4,380 | \$ 5,079 | \$ -202 | \$ 206 | \$ 1,191 | \$ -1,822 | \$ -2,419 | \$ -2,030 | \$ -4,864 | \$ 16 | \$ -759 | \$ -346 | \$ -532 |
| Cash flow from financial activities | \$ -4,333 | \$ -2,657 | \$ -3,343 | \$ -17 | \$ -2,582 | \$ -3,213 | \$ -3,351 | \$ -3,637 | \$ -463 | \$ -1,031 | \$ -1,033 | \$ 1,768 | \$ -4,157 | \$ -3,198 | \$ -2,980 | \$ -2,151 |
| Net cash flow | \$ -4,120 | \$ 743 | \$ -2,650 | \$ -293 | \$ 6,175 | \$ -217 | \$ -1,032 | \$ -630 | \$ 1,131 | \$ 98 | \$ -2,101 | \$ 2,318 | \$ 462 | \$ 476 | \$ 788 | \$ -225 |

Share Information

| | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 |
|-------------------------------------|---------|---------|---------|---------|---------|--------|---------|---------|---------|---------|---------|---------|---------|--------|---------|---------|
| Share Information | | | | | | | | | | | | | | | | |
| Year end stock price | 27.4327 | 28.5112 | 20.4487 | 18,8045 | 16,3835 | 17,438 | 16,6476 | 13,8816 | 14,7925 | 15,9528 | 12,3642 | 25,9529 | 36,9221 | 31,529 | 32,4385 | 22,6956 |
| Average shares outstanding (in Mio) | 1670 | 1700 | 1713 | 1974 | 1977 | 1970 | 1960 | 1952 | 1942 | 1937 | 1936 | 1940 | 1965 | 1984 | 1987 | 1992 |

Notes: All figures in Million US\$ except per share data / Net cash flow includes exchange rate effects / Stock price information from Macrotrends (n.d.b)

Table 17: Ratio Analysis Bristol-Myers Squibb

| | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | 2000 | 1999 | 1998 | 1997 |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|-------------|-----------|-----------|-----------|-----------|-------------|
| Activity ratios | | | | | | | | | | | | | | | | |
| Working capital turnover | 14.18760064 | 2.818254179 | 2.981940618 | 2.460170046 | 2.557680368 | 1.135446009 | 4.70677877 | 3.56146857 | 3.908834207 | 4.12213404 | 10.32421652 | 5.513199 | 4.3454198 | 5.4214477 | 6.1130057 | 6.176405325 |
| Coverage ratios | | | | | | | | | | | | | | | | |
| Cash flow to debt ratio | 0.311828923 | 0.282991288 | 0.290905558 | 0.250570178 | 0.214141297 | 0.201985906 | 0.133662731 | 0.108446545 | 0.156971285 | 0.198844978 | 0.059404073 | 0.3309846 | 0.5539414 | 0.5278073 | 0.473781 | 0.319154421 |
| Leverage ratios | | | | | | | | | | | | | | | | |
| Debt ratio | 0.620079672 | 0.518744313 | 0.496782083 | 0.523187564 | 0.585780996 | 0.5964338942 | 0.609345064 | 0.601677447 | 0.664793823 | 0.643471291 | 0.639543298 | 0.603208 | 0.4777563 | 0.494858 | 0.5344149 | 0.517994258 |
| Liquidity ratios | | | | | | | | | | | | | | | | |
| Current ratio | 1.15001818 | 1.968894602 | 1.969580056 | 2.210993189 | 2.200149031 | 1.197130958 | 1.585899015 | 1.782728592 | 1.503708219 | 1.607961399 | 1.21350365 | 1.3991616 | 1.7443182 | 1.67365 | 1.5164911 | 1.53736089 |
| Quick ratio | 0.949873173 | 1.791002571 | 1.790918534 | 1.987169333 | 1.937108793 | 0.947015271 | 1.265855911 | 1.483744557 | 1.317789292 | 1.393378904 | 1.022141119 | 1.2307954 | 1.4192116 | 1.2896876 | 1.1930582 | 1.179848967 |
| Profitability ratios | | | | | | | | | | | | | | | | |
| ROA (in percent) | 5.460066301 | 11.24962087 | 9.981979663 | 34.22342621 | 17.75514348 | 8.272199297 | 6.197458456 | 10.66173857 | 7.84622967 | 11.31594287 | 8.177213154 | 9.3395424 | 23.301855 | 24.348487 | 19.303097 | 21.3994792 |
| ROE (in percent) | 14.38743302 | 23.24517423 | 19.74161522 | 71.4949808 | 42.86414509 | 20.49801174 | 15.86427785 | 26.76659529 | 23.40717506 | 31.73921929 | 22.68317163 | 23.53763 | 44.618736 | 48.201272 | 41.459873 | 44.39673085 |
| Z-Score | | | | | | | | | | | | | | | | |
| Z | 3.382499794 | 4.892047621 | 4.446736671 | 4.39755888 | 3.938059886 | 3.772564623 | 3.68725215 | 3.516755714 | 3.15230112 | 3.586749854 | 3.218897367 | 4.4191279 | 9.4689158 | 8.657108 | 8.1806538 | 7.189026417 |
| X1 | 0.034598992 | 0.22863209 | 0.210258721 | 0.246549278 | 0.272502707 | 0.065107749 | 0.148817204 | 0.19166252 | 0.162904551 | 0.165257942 | 0.0705556 | 0.1302066 | 0.2384799 | 0.2179502 | 0.1838127 | 0.1805435 |
| X2 | 0.051185893 | 1.00300273 | 1.018020337 | 0.992002064 | 0.763027883 | 0.755081767 | 0.775933079 | 0.727272727 | 0.645671102 | 0.708211892 | 0.758221436 | 0.8177182 | 1.0115485 | 0.8764754 | 0.770649 | 0.731121052 |
| X3 | 0.065186506 | 0.211737944 | 0.195359763 | 0.180663055 | 0.185131294 | 0.135029803 | 0.103030303 | 0.160494705 | 0.14516182 | 0.170504226 | 0.106416338 | 0.1103596 | 0.3116395 | 0.3369756 | 0.2622911 | 0.299258864 |
| X4 | 2.058161148 | 2.833949599 | 2.268987116 | 2.28811459 | 1.87107501 | 2.200695708 | 2.093768994 | 1.600524702 | 1.419810952 | 1.749551217 | 1.504720342 | 3.0848984 | 8.6391911 | 7.3861774 | 7.412063 | 5.827485847 |
| X5 | 0.490876675 | 0.644343342 | 0.626979019 | 0.606555148 | 0.696974824 | 0.739263335 | 0.700449658 | 0.682600043 | 0.63676688 | 0.679575925 | 0.728431294 | 0.7178549 | 1.0362954 | 1.1816057 | 1.123648 | 1.115109835 |
| Logit Model | | | | | | | | | | | | | | | | |
| F | 95.79244% | 99.04113% | 98.74340% | 99.99999% | 99.86659% | 98.71122% | 90.33290% | 98.26055% | 90.65399% | 98.17330% | 97.23615% | 98.01812% | 99.99892% | 99.99916% | 99.98592% | 99.99662% |
| X1 | 0.362453687 | 0.474532624 | 0.45716952 | 0.440789474 | 0.480542772 | 0.50168186 | 0.467565982 | 0.471924088 | 0.439986857 | 0.482621685 | 0.471616949 | 0.5118084 | 0.7655592 | 0.8579526 | 0.8252212 | 0.817052814 |
| X2 | 0.054600663 | 0.112496209 | 0.099819797 | 0.342234262 | 0.177551435 | 0.082721993 | 0.061974585 | 0.106617386 | 0.078462297 | 0.113159429 | 0.081772132 | 0.0933954 | 0.2330185 | 0.2434849 | 0.193031 | 0.213994792 |
| X3 | 0.949873173 | 1.791002571 | 1.790918534 | 1.987169333 | 1.937108793 | 0.947015271 | 1.265855911 | 1.483744557 | 1.317789292 | 1.393378904 | 1.022141119 | 1.2307954 | 1.4192116 | 1.2896876 | 1.1930582 | 1.179848967 |
| X4 | 0.620079672 | 0.518744313 | 0.496782083 | 0.523187564 | 0.585780996 | 0.5964338942 | 0.609345064 | 0.601677447 | 0.664793823 | 0.643471291 | 0.639543298 | 0.603208 | 0.4777563 | 0.494858 | 0.5344149 | 0.517994258 |
| X5 | 0.516492266 | 0.903920236 | 0.882604055 | 0.870557185 | 0.827709784 | 0.667467139 | 0.654160938 | 0.700906339 | 0.65255213 | 0.633357064 | 0.601852473 | 0.7299429 | 1.1839051 | 1.1016949 | 1.011482 | 0.99696746 |
| Other ratios | | | | | | | | | | | | | | | | |
| Total market value | \$ 45.813 | \$ 48.469 | \$ 35.029 | \$ 37.120 | \$ 32.390 | \$ 34.353 | \$ 32.629 | \$ 27.097 | \$ 28.727 | \$ 30.901 | \$ 23.937 | \$ 50.349 | \$ 72.552 | \$ 62.554 | \$ 64.455 | \$ 45.210 |
| Working capital | \$ 1.242 | \$ 7.538 | \$ 6.534 | \$ 7.645 | \$ 8.053 | \$ 1.704 | \$ 3.806 | \$ 5.393 | \$ 4.958 | \$ 4.536 | \$ 1.755 | \$ 3.523 | \$ 4.192 | \$ 3.730 | \$ 2.991 | \$ 2.704 |
| e | | | | | | | | | | | | | | | | 2,71828 |

7.6 Appendix VI: Analysis General Electric

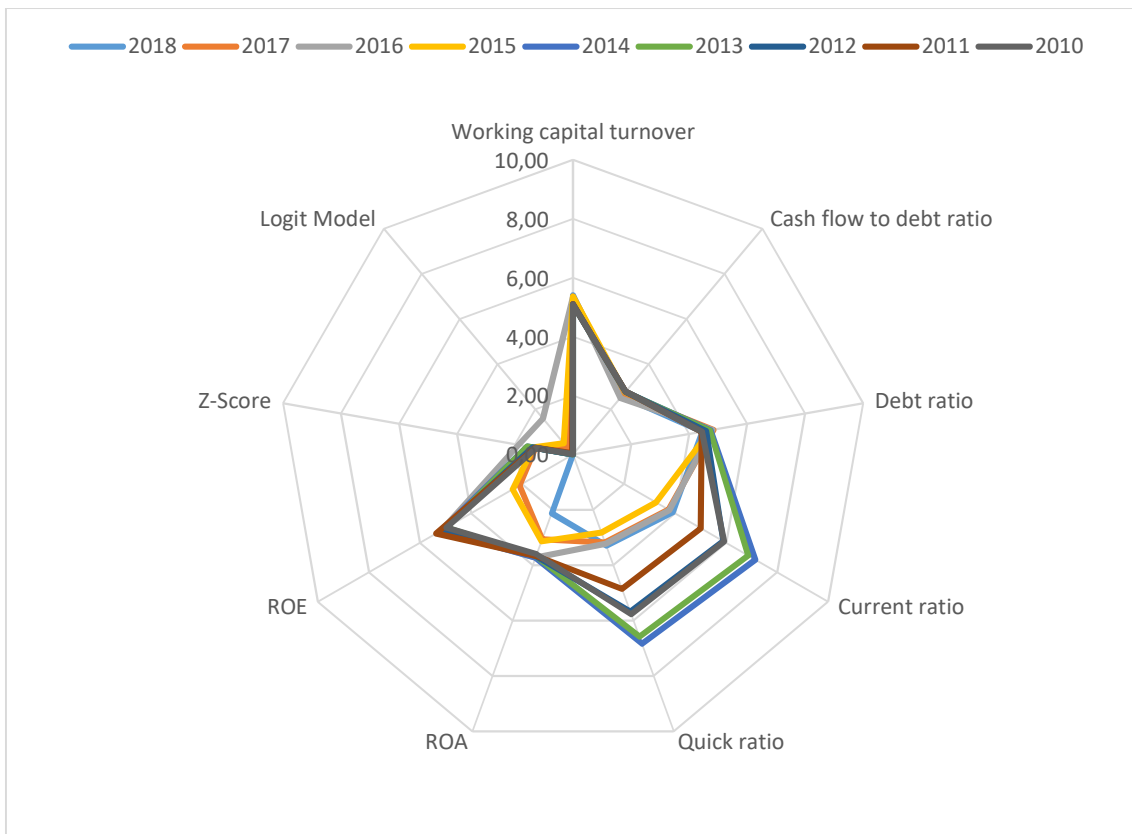


Figure 25: EWS Framework Complete Timespan General Electric

Table 18: EWS Values General Electric

Radar Chart

| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|--------------------------|-------------|------|------|------|------|------|------|------|------|
| Working capital turnover | 5,41 | 5,36 | 5,34 | 5,36 | 5,10 | 5,10 | 5,10 | 5,11 | 5,10 |
| Cash flow to debt ratio | 2,58 | 2,68 | 2,50 | 2,76 | 2,77 | 2,77 | 2,78 | 2,78 | 2,79 |
| Debt ratio | 4,45 | 4,84 | 4,80 | 4,73 | 4,74 | 4,72 | 4,58 | 4,43 | 4,44 |
| Current ratio | 3,91 | 3,74 | 3,77 | 3,25 | 7,14 | 6,86 | 5,89 | 5,01 | 5,92 |
| Quick ratio | 3,29 | 3,18 | 3,23 | 2,82 | 6,83 | 6,58 | 5,67 | 4,85 | 5,77 |
| ROA | 2,12 | 3,07 | 3,72 | 3,14 | 3,73 | 3,67 | 3,67 | 3,67 | 3,60 |
| ROE | 0,00 | 2,10 | 5,17 | 2,37 | 5,20 | 4,96 | 5,13 | 5,37 | 4,97 |
| Z-Score | 1,05 | 1,30 | 1,88 | 1,37 | 1,58 | 1,58 | 1,40 | 1,30 | 1,27 |
| Logit Model | 0,00 | 0,29 | 1,59 | 0,50 | 0,01 | 0,01 | 0,02 | 0,06 | 0,01 |

Notes: ROE for 2018 has been manually overridden because the value was outside of the established scale.

Table 19: Financial Data General Electric (adapted from General Electric 2012, 2013, 2014, 2015, 2016, 2017, 2018 & 2019)

| Balance Sheet | | | | | | | | | |
|-------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
| Non-current assets | \$ 187 212 | \$ 233 022 | \$ 211 125 | \$ 321 865 | \$ 235 397 | \$ 234 257 | \$ 258 843 | \$ 264 105 | \$ 284 182 |
| Inventories | \$ 19 271 | \$ 21 923 | \$ 22 354 | \$ 22 515 | \$ 17 689 | \$ 17 325 | \$ 15 374 | \$ 13 792 | \$ 11 526 |
| Current assets | \$ 121 917 | \$ 144 923 | \$ 154 058 | \$ 170 827 | \$ 412 952 | \$ 422 303 | \$ 426 156 | \$ 453 137 | \$ 463 611 |
| Total assets | \$ 309 129 | \$ 377 945 | \$ 365 183 | \$ 492 692 | \$ 648 349 | \$ 656 560 | \$ 684 999 | \$ 717 242 | \$ 747 793 |
| Non-current liabilities | \$ 194 929 | \$ 215 161 | \$ 203 025 | \$ 284 470 | \$ 395 853 | \$ 396 690 | \$ 411 731 | \$ 418 102 | \$ 466 879 |
| Current liabilities | \$ 62 337 | \$ 77 400 | \$ 81 643 | \$ 105 112 | \$ 115 663 | \$ 123 087 | \$ 144 798 | \$ 181 006 | \$ 156 716 |
| Total liabilities | \$ 257 266 | \$ 292 561 | \$ 284 668 | \$ 389 582 | \$ 511 516 | \$ 519 777 | \$ 556 529 | \$ 599 108 | \$ 623 595 |
| Retained earnings | \$ 93 109 | \$ 125 682 | \$ 139 532 | \$ 140 020 | \$ 155 333 | \$ 149 051 | \$ 144 055 | \$ 137 786 | \$ 131 137 |
| Total equity | \$ 51 481 | \$ 81 966 | \$ 77 491 | \$ 100 138 | \$ 136 833 | \$ 136 783 | \$ 128 470 | \$ 118 134 | \$ 124 198 |
| Total equity and liabilities | \$ 309 129 | \$ 377 945 | \$ 365 183 | \$ 492 692 | \$ 648 349 | \$ 656 560 | \$ 684 999 | \$ 717 242 | \$ 747 793 |
| Income Statement | | | | | | | | | |
| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
| Net Revenue/Sales | \$ 121 615 | \$ 122 092 | \$ 123 693 | \$ 117 386 | \$ 148 589 | \$ 146 045 | \$ 146 684 | \$ 147 300 | \$ 149 593 |
| COGS | \$ 92 671 | \$ 91 934 | \$ 87 483 | \$ 82 693 | \$ 81 311 | \$ 77 141 | \$ 74 310 | \$ 68 278 | \$ 71 713 |
| Gross profit | \$ 28 944 | \$ 30 158 | \$ 36 210 | \$ 34 693 | \$ 67 278 | \$ 68 904 | \$ 72 374 | \$ 79 022 | \$ 77 880 |
| EBIT | \$ -15 075 | \$ -3 922 | \$ 14 055 | \$ 11 649 | \$ 26 711 | \$ 26 267 | \$ 29 788 | \$ 34 704 | \$ 29 638 |
| Net income | \$ -22 443 | \$ -6 056 | \$ 8 540 | \$ -5 795 | \$ 15 345 | \$ 13 355 | \$ 13 864 | \$ 14 443 | \$ 12 179 |
| Cash Flow Statement | | | | | | | | | |
| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
| Cash flow from operating activities | \$ 4 246 | \$ 10 426 | \$ -244 | \$ 19 891 | \$ 27 710 | \$ 28 579 | \$ 31 331 | \$ 33 359 | \$ 36 124 |
| Cash flow from investing activities | \$ 18 239 | \$ 2 322 | \$ 49 202 | \$ 59 488 | \$ -5 030 | \$ 29 117 | \$ 11 302 | \$ 19 882 | \$ 32 436 |
| Cash flow from financing activities | \$ -31 033 | \$ -19 146 | \$ -89 131 | \$ -76 054 | \$ -16 958 | \$ -45 573 | \$ -51 074 | \$ -46 863 | \$ -61 586 |
| Net cash flow | \$ -9 176 | \$ -5 507 | \$ -41 319 | \$ -138 | \$ 2 230 | \$ 11 328 | \$ -7 163 | \$ 5 537 | \$ 6 641 |
| Share Information | | | | | | | | | |
| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
| Year end stock price | 7,57 | 16,969 | 31,6 | 31,15 | 25,27 | 28,03 | 20,99 | 17,91 | 18,29 |
| Average shares outstanding (in Mio) | 8 702,23 | 8 680,57 | 8 742,61 | 9 379,29 | 10 057,38 | 10 060,88 | 10 405,63 | 10 573,02 | 10 615,38 |

Notes: All figures in Million US\$ except per share data / Net cash flow includes exchange rate effects / Stock price information for 2017 and 2018 from Macrotrends (n.d.c) / Redeemable noncontrolling interests is not included in total equity figure. Same for 2016, 2017 and 2018

Table 20: Ratio Analysis General Electric

| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 |
|-----------------------------|-------------|--------------|--------------|--------------|-------------|-------------|-------------|--------------|-------------|
| Activity ratios | | | | | | | | | |
| Working capital turnover | 2,041205102 | 1,808154259 | 1,70811296 | 1,786289279 | 0,499813313 | 0,488092214 | 0,521342915 | 0,541283426 | 0,48744033 |
| Coverage ratios | | | | | | | | | |
| Cash flow to debt ratio | 0,016504318 | 0,035637012 | -0,000857139 | 0,051057287 | 0,054172304 | 0,054983195 | 0,056297156 | 0,0555681113 | 0,057928624 |
| Leverage ratios | | | | | | | | | |
| Debt ratio | 0,832228617 | 0,774083531 | 0,7795215 | 0,790721181 | 0,788951629 | 0,791667174 | 0,812452281 | 0,835294085 | 0,833913931 |
| Liquidity ratios | | | | | | | | | |
| Current ratio | 1,955772655 | 1,872390181 | 1,886971326 | 1,625190273 | 3,570303381 | 3,430930968 | 2,943106949 | 2,50343635 | 2,958287603 |
| Quick ratio | 1,646630412 | 1,589147287 | 1,613169531 | 1,410990182 | 3,417367698 | 3,290176867 | 2,836931449 | 2,427239981 | 2,88474055 |
| Profitability ratios | | | | | | | | | |
| ROA (in percent) | -7,26007589 | -1,602349548 | 2,338553547 | -1,176191211 | 2,366780854 | 2,034086755 | 2,023944561 | 2,013685757 | 1,628659268 |
| ROE (in percent) | -43,5947243 | -7,388429349 | 11,02063465 | -5,787013921 | 11,21440004 | 9,763640218 | 10,7916245 | 12,22594681 | 9,806116041 |
| Z-Score | | | | | | | | | |
| Z | 1,054443408 | 1,301044905 | 1,879125922 | 1,36916805 | 1,578714992 | 1,577252514 | 1,403974092 | 1,297893928 | 1,274320674 |
| X1 | 0,192735072 | 0,17865827 | 0,19829784 | 0,133379474 | 0,458532365 | 0,455732911 | 0,410742205 | 0,379413085 | 0,410401007 |
| X2 | 0,301197882 | 0,332540449 | 0,382087885 | 0,284193776 | 0,239582385 | 0,227018094 | 0,210299577 | 0,192105315 | 0,175365375 |
| X3 | -0,04876605 | -0,010377171 | 0,038487553 | 0,023643574 | 0,04119849 | 0,040007006 | 0,043486195 | 0,048385343 | 0,039633963 |
| X4 | 0,256061269 | 0,503486826 | 0,970487032 | 0,749944354 | 0,496856389 | 0,542552853 | 0,392457659 | 0,316074455 | 0,311348274 |
| X5 | 0,393411812 | 0,323041712 | 0,33871511 | 0,238254325 | 0,22918058 | 0,222439686 | 0,214137539 | 0,205370015 | 0,200046002 |
| Logit Model | | | | | | | | | |
| F | 0,04960% | 2,90522% | 15,93887% | 5,00244% | 0,06844% | 0,08097% | 0,23309% | 0,56283% | 0,11915% |
| X1 | 0,093630814 | 0,079794679 | 0,099155766 | 0,070415188 | 0,103768187 | 0,104946996 | 0,105655629 | 0,110174809 | 0,104146468 |
| X2 | -0,07260076 | -0,016023495 | 0,023385535 | -0,011761912 | 0,023667809 | 0,020340868 | 0,020239446 | 0,020136858 | 0,016286593 |
| X3 | 1,646630412 | 1,589147287 | 1,613169531 | 1,410990182 | 3,417367698 | 3,290176867 | 2,836931449 | 2,427239981 | 2,88474055 |
| X4 | 0,832228617 | 0,774083531 | 0,7795215 | 0,790721181 | 0,788951629 | 0,791667174 | 0,812452281 | 0,835294085 | 0,833913931 |
| X5 | 0,274987714 | 0,351752195 | 0,367038484 | 0,311118015 | 0,581286083 | 0,583901442 | 0,496324027 | 0,44729937 | 0,437036829 |
| Other ratios | | | | | | | | | |
| Total market value | \$ 65 876 | \$ 147 301 | \$ 276 267 | \$ 292 165 | \$ 254 150 | \$ 282 006 | \$ 218 414 | \$ 189 363 | \$ 194 155 |
| Working capital | \$ 59 580 | \$ 67 523 | \$ 72 415 | \$ 65 715 | \$ 297 289 | \$ 299 216 | \$ 281 358 | \$ 272 131 | \$ 306 895 |
| e | 2,71828 | | | | | | | | |

7.7 Appendix VII: Analysis Rieter

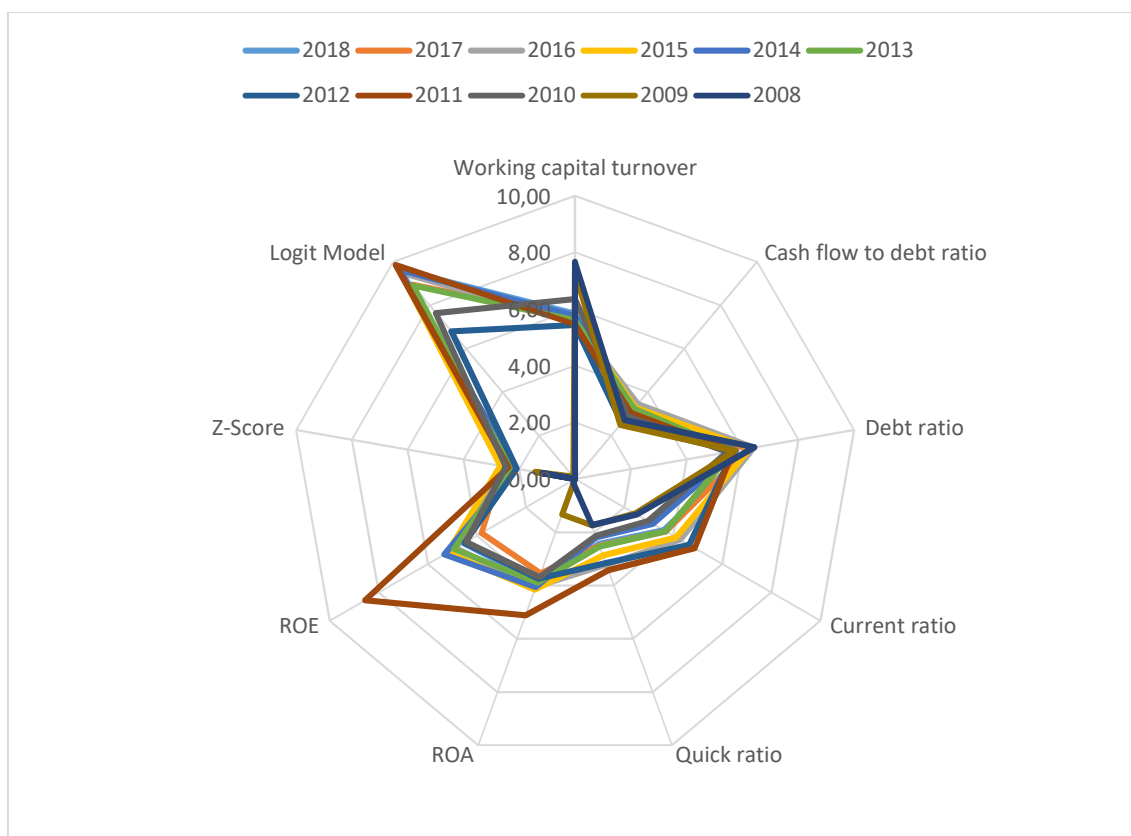


Figure 26: EWS Framework Complete Timespan Rieter

Table 21: EWS Values Rieter

| Radar Chart | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 |
|--------------------------|------|------|------|------|------|------|------|------|------|-------------|-------------|
| Working capital turnover | 5,84 | 5,70 | 5,54 | 5,64 | 5,76 | 5,61 | 5,44 | 5,46 | 6,35 | 7,32 | 7,67 |
| Cash flow to debt ratio | 3,21 | 2,67 | 3,45 | 3,30 | 3,08 | 3,24 | 2,57 | 3,06 | 2,90 | 2,49 | 2,71 |
| Debt ratio | 6,30 | 6,24 | 6,41 | 6,29 | 5,77 | 5,67 | 5,68 | 5,66 | 5,46 | 5,74 | 6,43 |
| Current ratio | 3,60 | 3,70 | 4,29 | 4,12 | 3,16 | 3,68 | 4,66 | 4,88 | 2,98 | 2,44 | 2,51 |
| Quick ratio | 2,44 | 2,51 | 3,22 | 2,87 | 2,19 | 2,53 | 3,16 | 3,43 | 2,14 | 1,74 | 1,73 |
| ROA | 3,87 | 3,54 | 4,05 | 4,16 | 4,06 | 3,89 | 3,75 | 5,12 | 3,69 | 1,34 | 0,17 |
| ROE | 4,53 | 3,82 | 4,88 | 5,20 | 5,33 | 4,93 | 4,51 | 8,56 | 4,44 | 0,00 | 0,00 |
| Z-Score | 2,21 | 2,60 | 2,54 | 2,68 | 2,13 | 2,34 | 2,09 | 2,39 | 2,48 | 1,43 | 1,18 |
| Logit Model | 9,66 | 8,96 | 9,50 | 9,72 | 9,63 | 8,92 | 6,80 | 9,86 | 7,65 | 0,10 | 0,00 |

Notes: ROE for 2009 has been manually overridden because the value was outside of the established scale.

Table 22: Financial Data Rieter (adapted from Rieter 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018 & 2019)

| Balance Sheet | | | | | | | | | | | | |
|-------------------------------------|--------------------|--------------------|------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--|
| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | |
| Non-current assets | CHF 424,5 | CHF 450,0 | CHF 344,3 | CHF 370,1 | CHF 387,3 | CHF 371,1 | CHF 356,3 | CHF 322,0 | CHF 802,2 | CHF 886,5 | CHF 929,3 | |
| Inventories | CHF 186,6 | CHF 192,4 | CHF 163,2 | CHF 191,5 | CHF 253,1 | CHF 233,0 | CHF 229,3 | CHF 234,8 | CHF 328,4 | CHF 266,0 | CHF 361,3 | |
| Current assets | CHF 577,8 | CHF 598,2 | CHF 653,8 | CHF 631,3 | CHF 822,1 | CHF 742,9 | CHF 713,8 | CHF 789,4 | CHF 1 166,9 | CHF 927,6 | CHF 1 159,6 | |
| Total assets | CHF 1 002,3 | CHF 1 048,2 | CHF 998,1 | CHF 1 001,4 | CHF 1 209,4 | CHF 1 114,0 | CHF 1 070,1 | CHF 1 111,4 | CHF 1 969,1 | CHF 1 814,1 | CHF 2 088,9 | |
| Non-current liabilities | CHF 235,1 | CHF 267,5 | CHF 232,5 | CHF 251,4 | CHF 247,5 | CHF 321,0 | CHF 386,7 | CHF 400,1 | CHF 557,1 | CHF 399,3 | CHF 418,9 | |
| Current liabilities | CHF 320,6 | CHF 323,2 | CHF 304,9 | CHF 306,2 | CHF 520,0 | CHF 403,3 | CHF 306,6 | CHF 323,6 | CHF 784,4 | CHF 759,0 | CHF 923,8 | |
| Total liabilities | CHF 555,7 | CHF 590,7 | CHF 537,4 | CHF 557,6 | CHF 767,5 | CHF 724,3 | CHF 693,3 | CHF 723,7 | CHF 1 341,5 | CHF 1 158,3 | CHF 1 342,7 | |
| Retained earnings / Reserves | | | | | | | | | | | | |
| Total equity | CHF 446,6 | CHF 457,5 | CHF 460,7 | CHF 443,8 | CHF 441,9 | CHF 389,7 | CHF 376,8 | CHF 379,3 | CHF 627,6 | CHF 655,8 | CHF 746,2 | |
| Total equity and liabilities | CHF 1 002,3 | CHF 1 048,2 | CHF 998,1 | CHF 1 001,4 | CHF 1 209,4 | CHF 1 114,0 | CHF 1 070,1 | CHF 1 103,0 | CHF 1 969,1 | CHF 1 814,1 | CHF 2 088,9 | |
| Income Statement | | | | | | | | | | | | |
| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | |
| Net Revenue/Sales | CHF 1 075,2 | CHF 965,6 | CHF 945,0 | CHF 1 036,8 | CHF 1 143,4 | CHF 1 035,3 | CHF 888,5 | CHF 1 060,8 | CHF 2 585,8 | CHF 1 956,3 | CHF 3 142,5 | |
| COGS | CHF 966,8 | CHF 866,4 | CHF 819,9 | CHF 907,7 | CHF 1 025,3 | CHF 961,7 | CHF 826,8 | CHF 896,0 | CHF 2 302,7 | CHF 1 892,2 | CHF 2 840,6 | |
| Gross profit/EBITDA | CHF 108,4 | CHF 99,2 | CHF 125,1 | CHF 129,1 | CHF 118,1 | CHF 73,6 | CHF 61,7 | CHF 164,8 | CHF 283,1 | CHF 64,1 | CHF 301,9 | |
| EBIT | CHF 43,2 | CHF 51,8 | CHF 56,5 | CHF 73,1 | CHF 84,6 | CHF 60,0 | CHF 33,6 | CHF 112,6 | CHF 98,0 | CHF -186,6 | CHF -312,1 | |
| Net income | CHF 32,0 | CHF 13,3 | CHF 42,7 | CHF 49,8 | CHF 52,9 | CHF 37,4 | CHF 26,5 | CHF 119,0 | CHF 41,6 | CHF -217,5 | CHF -396,7 | |
| Cash Flow Statement | | | | | | | | | | | | |
| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | |
| Cash flow from operating activities | CHF 78,4 | CHF 20,6 | CHF 102,2 | CHF 89,0 | CHF 89,6 | CHF 107,7 | CHF 9,3 | CHF 80,4 | CHF 106,1 | CHF -1,6 | CHF 57,2 | |
| Cash flow from investing activities | CHF -25,0 | CHF -121,9 | CHF -25,9 | CHF -7,0 | CHF -40,5 | CHF -46,6 | CHF -41,6 | CHF -0,9 | CHF -92,5 | CHF -33,2 | CHF -35,8 | |
| Cash flow from financial activities | CHF -36,3 | CHF -19,4 | CHF -34,4 | CHF -84,8 | CHF -77,3 | CHF -40,0 | CHF -31,8 | CHF -25,1 | CHF 129,3 | CHF -27,8 | CHF 8,8 | |
| Net cash flow | CHF 12,9 | CHF -122,3 | CHF 39,1 | CHF -10,4 | CHF -23,9 | CHF 18,2 | CHF -65,7 | CHF 56,4 | CHF 134,2 | CHF -64,9 | CHF 25,1 | |
| Share Information | | | | | | | | | | | | |
| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 | |
| Year end stock price | 128,8 | 237,8 | 177,1 | 188 | 165,5 | 205,6 | 159,4 | 141,1 | 339 | 233,5 | 16,4274 | |
| Average shares outstanding (in Mio) | 4,514846 | 4,524273 | 4,515861 | 4,550650 | 4,583909 | 4,602652 | 4,609778 | 4,625581 | 4,640220 | 4,392808 | 3,822929 | |

Notes: All figures in Million CHF expect per share data / Net cash flow includes exchange rate effects / Stock price information from Six Group (n.d.)

Table 23: Ratio Analysis Rieter

| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2008 |
|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|-------------|--------------|--------------|
| Activity ratios | | | | | | | | | | | |
| Working capital turnover | 4,180404355 | 3,511272727 | 2,708512468 | 3,189172562 | 3,784839457 | 3,048586572 | 2,18197446 | 2,277372263 | 6,760261438 | 11,60320285 | 13,32697201 |
| Coverage ratios | | | | | | | | | | | |
| Cash flow to debt ratio | 0,141083318 | 0,034873878 | 0,190174916 | 0,159612626 | 0,116742671 | 0,148695292 | 0,013414106 | 0,111095758 | 0,07909057 | -0,001381335 | 0,04260073 |
| Leverage ratios | | | | | | | | | | | |
| Debt ratio | 0,554424823 | 0,563537493 | 0,538423004 | 0,556820451 | 0,634612204 | 0,650179533 | 0,647883375 | 0,651160698 | 0,68127571 | 0,638498429 | 0,642778496 |
| Liquidity ratios | | | | | | | | | | | |
| Current ratio | 1,802245789 | 1,850866337 | 2,14430961 | 2,061724363 | 1,580961538 | 1,842053062 | 2,328114808 | 2,439431397 | 1,48763386 | 1,222134387 | 1,255250054 |
| Quick ratio | 1,220212102 | 1,255569307 | 1,609052148 | 1,436316133 | 1,094230769 | 1,264319365 | 1,580234834 | 1,713844252 | 1,068969913 | 0,871673254 | 0,864148084 |
| Profitability ratios | | | | | | | | | | | |
| ROA (in percent) | 3,1927 | 1,2688 | 4,2781 | 4,9730 | 4,3741 | 3,3573 | 2,4764 | 10,7072 | 2,1126 | -11,9894 | -18,9909 |
| ROE (in percent) | 7,1652 | 2,9071 | 9,2685 | 11,2213 | 11,9710 | 9,5971 | 7,0329 | 31,3736 | 6,6284 | -33,1656 | -53,1627 |
| Z-Score | | | | | | | | | | | |
| Z | 2,213554217 | 2,601194978 | 2,535293226 | 2,678451736 | 2,128399513 | 2,335205091 | 2,090048327 | 2,386961726 | 2,484439559 | 1,434927529 | 1,177659706 |
| X1 | 0,256609797 | 0,262354512 | 0,349564172 | 0,324645496 | 0,249793286 | 0,304847397 | 0,380525185 | 0,4191111031 | 0,194251181 | 0,092938647 | 0,112882378 |
| X2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| X3 | 0,043100868 | 0,04941805 | 0,056607554 | 0,072997803 | 0,069952042 | 0,053859964 | 0,031398935 | 0,101313658 | 0,04976893 | -0,102860923 | -0,14940878 |
| X4 | 1,04644982 | 1,821351142 | 1,488200564 | 1,534293759 | 0,988452038 | 1,30651008 | 1,059856647 | 0,901850876 | 1,172593798 | 0,885539729 | 0,046772014 |
| X5 | 1,072732715 | 0,921198245 | 0,946798918 | 1,035350509 | 0,945427485 | 0,92935368 | 0,830296234 | 0,954471837 | 1,313188766 | 1,078385977 | 1,504380296 |
| Logit Model | | | | | | | | | | | |
| F | 96,62854% | 89,59251% | 95,01033% | 97,15915% | 96,32372% | 89,20908% | 67,99845% | 98,59629% | 76,49902% | 1,03590% | 0,01490% |
| X1 | 0,108151252 | 0,094638428 | 0,125338142 | 0,128919513 | 0,097651728 | 0,066068223 | 0,057658163 | 0,148281447 | 0,143771266 | 0,035334326 | 0,144525827 |
| X2 | 0,031926569 | 0,012688418 | 0,042781284 | 0,049730377 | 0,043740698 | 0,033572711 | 0,024764041 | 0,107072161 | 0,021126403 | -0,119894162 | -0,189908564 |
| X3 | 1,220212102 | 1,255569307 | 1,609052148 | 1,436316133 | 1,094230769 | 1,264319365 | 1,580234834 | 1,713844252 | 1,068969913 | 0,871673254 | 0,864148084 |
| X4 | 0,554424823 | 0,563537493 | 0,538423004 | 0,556820451 | 0,634612204 | 0,650179533 | 0,647883375 | 0,651160698 | 0,68127571 | 0,638498429 | 0,642778496 |
| X5 | 1,052061249 | 1,016666667 | 1,338077258 | 1,199135369 | 1,140975988 | 1,050121261 | 1,057535784 | 1,177950311 | 0,782348542 | 0,739763113 | 0,802969977 |
| Other ratios | | | | | | | | | | | |
| Total market value (in Mio) | CHF 582 | CHF 1 076 | CHF 800 | CHF 856 | CHF 759 | CHF 946 | CHF 735 | CHF 653 | CHF 1 573 | CHF 1 026 | CHF 63 |
| Working capital | CHF 257 | CHF 275 | CHF 349 | CHF 325 | CHF 302 | CHF 340 | CHF 407 | CHF 466 | CHF 383 | CHF 169 | CHF 236 |
| e | 2,71828 | | | | | | | | | | |

7.8 Appendix VIII: Analysis Rolls-Royce

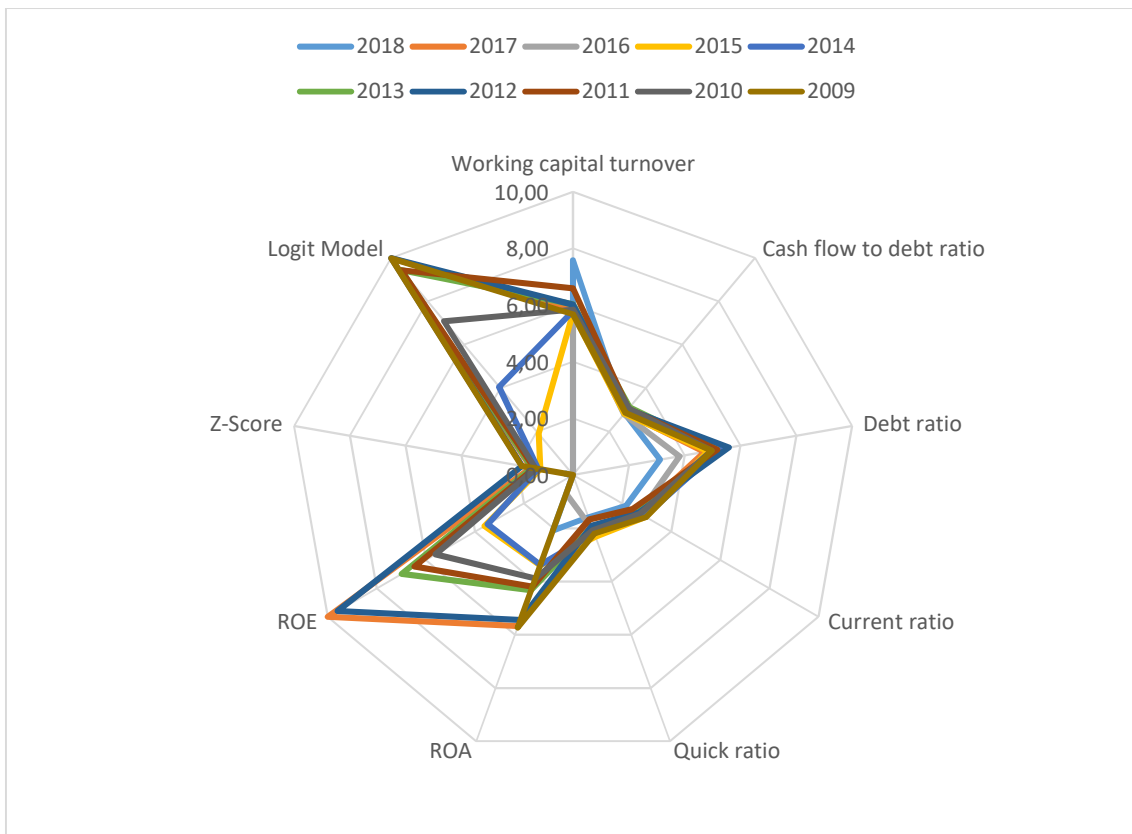


Figure 27: EWS Framework Complete Timespan Rolls-Royce

Table 24: EWS Values Rolls-Royce

Radar Chart

| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 |
|--------------------------|-------------|--------------|-------------|------|------|------|------|------|------|-------------|
| Working capital turnover | 7,58 | 5,89 | 5,90 | 5,70 | 5,78 | 6,02 | 6,01 | 6,59 | 5,84 | 5,68 |
| Cash flow to debt ratio | 2,84 | 2,88 | 2,80 | 2,82 | 2,91 | 3,11 | 3,02 | 3,05 | 3,06 | 2,87 |
| Debt ratio | 3,11 | 4,70 | 3,82 | 4,83 | 5,25 | 5,16 | 5,58 | 5,17 | 4,97 | 4,97 |
| Current ratio | 2,16 | 2,67 | 2,70 | 2,96 | 2,91 | 2,62 | 2,67 | 2,40 | 2,74 | 2,97 |
| Quick ratio | 1,59 | 2,00 | 2,05 | 2,32 | 2,19 | 1,94 | 1,91 | 1,66 | 2,06 | 2,20 |
| ROA | 2,08 | 5,67 | 0,70 | 3,40 | 3,38 | 4,33 | 5,44 | 4,19 | 3,89 | 5,73 |
| ROE | 0,00 | 10,00 | 0,00 | 3,61 | 3,48 | 6,98 | 9,60 | 6,46 | 5,61 | 0,00 |
| Z-Score | 0,27 | 1,51 | 0,21 | 1,18 | 1,25 | 1,48 | 1,83 | 1,39 | 1,34 | 1,85 |
| Logit Model | 0,00 | 9,98 | 0,00 | 1,90 | 4,06 | 9,45 | 9,99 | 9,44 | 7,09 | 9,99 |

Notes: Debt ratio for 2018 has been manually overridden because the value was outside of the established scale. ROE for 2018, 2017, 2016 ad 2009 has been manually overridden because the values were outside of the established scale.

Table 25: Financial Data Rolls-Royce

| Balance Sheet | | | | | | | | | | |
|-------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 |
| Non-current assets | £ 15 037 | £ 15 407 | £ 12 680 | £ 10 208 | £ 11 036 | £ 10 245 | £ 8 522 | £ 8 108 | £ 6 410 | £ 6 048 |
| Inventories | £ 4 287 | £ 3 660 | £ 3 086 | £ 2 637 | £ 2 768 | £ 3 319 | £ 2 726 | £ 2 561 | £ 2 429 | £ 2 432 |
| Current assets | £ 16 070 | £ 14 595 | £ 12 858 | £ 12 116 | £ 11 188 | £ 12 818 | £ 9 593 | £ 8 315 | £ 9 824 | £ 9 374 |
| Total assets | £ 31 857 | £ 30 002 | £ 25 538 | £ 22 324 | £ 22 224 | £ 23 063 | £ 18 115 | £ 16 423 | £ 16 234 | £ 15 422 |
| Non-current liabilities | £ 17 682 | £ 12 907 | £ 14 140 | £ 9 135 | £ 8 152 | £ 6 980 | £ 4 816 | £ 4 988 | £ 5 077 | £ 5 328 |
| Current liabilities | £ 14 851 | £ 10 925 | £ 9 534 | £ 8 173 | £ 7 685 | £ 9 780 | £ 7 194 | £ 6 916 | £ 7 178 | £ 6 312 |
| Total liabilities | £ 32 909 | £ 23 832 | £ 23 674 | £ 17 308 | £ 15 837 | £ 16 760 | £ 12 010 | £ 11 904 | £ 12 255 | £ 11 640 |
| Retained earnings | | £ 4 881 | £ 445 | £ 4 457 | £ 5 671 | £ 4 804 | £ 5 294 | £ 3 590 | £ 2 769 | £ 2 635 |
| Total equity | £ 1 052 | £ 6 170 | £ 1 864 | £ 5 016 | £ 6 387 | £ 6 303 | £ 6 105 | £ 4 519 | £ 3 979 | £ 3 782 |
| Total equity and liabilities | £ 33 961 | £ 30 002 | £ 25 538 | £ 22 324 | £ 22 224 | £ 23 063 | £ 18 115 | £ 16 423 | £ 16 234 | £ 15 422 |

| Income Statement | | | | | | | | | | |
|--------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 |
| Net Revenue/Sales | £ 15 729 | £ 16 307 | £ 14 955 | £ 13 725 | £ 13 736 | £ 15 513 | £ 12 161 | £ 11 125 | £ 11 085 | £ 10 414 |
| COGS | £ 14 531 | £ 13 134 | £ 11 907 | £ 10 459 | £ 10 533 | £ 12 197 | £ 9 416 | £ 8 676 | £ 8 885 | £ 8 303 |
| Gross profit | £ 1 198 | £ 3 173 | £ 3 048 | £ 3 266 | £ 3 203 | £ 3 316 | £ 2 745 | £ 2 449 | £ 2 200 | £ 2 111 |
| EBIT | -£ 2 855 | £ 4 961 | -£ 4 552 | £ 218 | £ 130 | £ 1 817 | £ 2 757 | £ 1 155 | £ 767 | £ 3 023 |
| Net income | -£ 2 393 | £ 4 208 | -£ 4 032 | £ 84 | £ 58 | £ 1 379 | £ 2 295 | £ 848 | £ 543 | £ 2 217 |
| <i>Interest paid</i> | 92 | 64 | 84 | 58 | 63 | 58 | 52 | 50 | 65 | 66 |

| Cash Flow Statement | | | | | | | | | | |
|-------------------------------------|----------------|--------------|---------------|--------------|-----------------|----------------|----------------|-----------------|---------------|--------------|
| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 |
| Cash flow from operating activities | £ 2 226 | £ 1 810 | £ 1 411 | £ 1 094 | £ 1 301 | £ 2 040 | £ 1 255 | £ 1 306 | £ 1 378 | £ 859 |
| Cash flow from investing activities | -£ 975 | -£ 1 509 | -£ 1 363 | -£ 995 | -£ 1 966 | -£ 740 | £ 424 | -£ 2 207 | -£ 759 | -£ 606 |
| Cash flow from financial activities | £ 702 | -£ 70 | £ 739 | £ 221 | -£ 468 | £ 136 | -£ 331 | -£ 655 | -£ 743 | £ 384 |
| Net cash flow | £ 1 953 | £ 231 | -£ 691 | £ 320 | -£ 1 133 | £ 1 436 | £ 1 348 | -£ 1 556 | -£ 124 | £ 637 |

| Share Information | | | | | | | | | | |
|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 |
| Year end stock price | 830 | 847 | 668 | 575 | 870 | 1275 | 873.5 | 746.5 | 623 | 483.5 |
| Average shares outstanding (in Mio) | 1,859 | 1,834 | 1,832 | 1,839 | 1,874 | 1,866 | 1,851 | 1,850 | 1,846 | 1,845 |

Table 26: Ratio Analysis Rolls-Royce (adapted from Rolls-Royce 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018 & 2019)

| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2000 |
|-----------------------------|-------------|-------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------|
| Activity ratios | | | | | | | | | | | |
| Working capital turnover | 12,90319934 | 4,443324251 | 4,499097473 | 3,480852143 | 3,921210391 | 5,106319947 | 5,069195498 | 7,952108649 | 4,189342404 | 3,401045069 | |
| Coverage ratios | | | | | | | | | | | |
| Cash flow to debt ratio | 0,067641071 | 0,075948305 | 0,05960125 | 0,063207765 | 0,082149397 | 0,121718377 | 0,104496253 | 0,109711022 | 0,1124439 | 0,073797251 | |
| Leverage ratios | | | | | | | | | | | |
| Debt ratio | 1,03302257 | 0,794347044 | 0,927010729 | 0,775309084 | 0,712607991 | 0,726705112 | 0,662986475 | 0,724837119 | 0,754897129 | 0,754765919 | |
| Liquidity ratios | | | | | | | | | | | |
| Current ratio | 1,082082015 | 1,335926773 | 1,348646948 | 1,482442188 | 1,455823032 | 1,310633947 | 1,333472338 | 1,202284558 | 1,368626358 | 1,485107731 | |
| Quick ratio | 0,793414585 | 1,000915332 | 1,024963289 | 1,159794445 | 1,095640859 | 0,971267894 | 0,954545455 | 0,831983806 | 1,030231262 | 1,099809886 | |
| Profitability ratios | | | | | | | | | | | |
| ROA (in percent) | -7,51169288 | 14,02573162 | -15,78823714 | 0,376276653 | 0,260979122 | 5,979274162 | 12,66905879 | 5,163490227 | 3,344831834 | 14,37556737 | |
| ROE (in percent) | -227,471483 | 68,20097245 | -216,3090129 | 1,674641148 | 0,908094567 | 21,87847057 | 37,59213759 | 18,76521354 | 13,64664489 | 58,6197779 | |
| Z-Score | | | | | | | | | | | |
| Z | 0,274856589 | 1,506778665 | 0,212095181 | 1,178819108 | 1,251710667 | 1,47600334 | 1,830475588 | 1,394312335 | 1,335061335 | 1,850172073 | |
| X1 | 0,038264746 | 0,122325178 | 0,130158979 | 0,176626053 | 0,15762239 | 0,131726141 | 0,132431686 | 0,085185411 | 0,162991253 | 0,19854753 | |
| X2 | 0 | 0,162689154 | 0,017425014 | -0,1996506 | 0,255174586 | 0,208299007 | 0,292243997 | 0,218595872 | 0,170567944 | 0,170859811 | |
| X3 | -0,08961924 | 0,165355643 | -0,178244185 | 0,009765275 | 0,008849532 | 0,0787842 | 0,152194314 | 0,070328198 | 0,04724652 | 0,196018675 | |
| X4 | 0,046885958 | 0,065181185 | 0,051692828 | 0,061094581 | 0,102947528 | 0,141954057 | 0,134625187 | 0,116013525 | 0,093843982 | 0,076637242 | |
| X5 | 0,49373764 | 0,543530431 | 0,585597932 | 0,614809174 | 0,618070554 | 0,672635824 | 0,671322109 | 0,677403641 | 0,682826167 | 0,675269096 | |
| Logit Model | | | | | | | | | | | |
| F | 0,03980% | 99,78939% | 0,00079% | 18,95070% | 40,64982% | 94,45139% | 99,93511% | 94,37234% | 70,85259% | 99,85213% | |
| X1 | 0,03760555 | 0,105759616 | 0,119351555 | 0,146299946 | 0,14412347 | 0,143780081 | 0,15153188 | 0,149120136 | 0,135518049 | 0,136882376 | |
| X2 | -0,07511693 | 0,140257316 | -0,157882371 | 0,003762767 | 0,002609791 | 0,059792742 | 0,126690588 | 0,051634902 | 0,033448318 | 0,143755674 | |
| X3 | 0,793414585 | 1,000915332 | 1,024963289 | 1,159794445 | 1,095640859 | 0,971267894 | 0,954545455 | 0,831983806 | 1,030231262 | 1,099809886 | |
| X4 | 1,03302257 | 0,794347044 | 0,927010729 | 0,775309084 | 0,712607991 | 0,726705112 | 0,662986475 | 0,724837119 | 0,754897129 | 0,754765919 | |
| X5 | 0,069960763 | 0,40046732 | 0,147003155 | 0,49137931 | 0,578742298 | 0,61522694 | 0,716381131 | 0,557350765 | 0,62074883 | 0,625330688 | |
| Other ratios | | | | | | | | | | | |
| Total market value | £ 1 543 | £ 1 553 | £ 1 224 | £ 1 057 | £ 1 630 | £ 2 379 | £ 1 617 | £ 1 381 | £ 1 150 | £ 892 | |
| Working capital | £ 1 219 | £ 3 670 | £ 3 324 | £ 3 943 | £ 3 503 | £ 3 038 | £ 2 399 | £ 1 399 | £ 2 646 | £ 3 062 | |
| e | 2,71828 | | | | | | | | | | |

7.9 Appendix IX: Analysis Starbucks

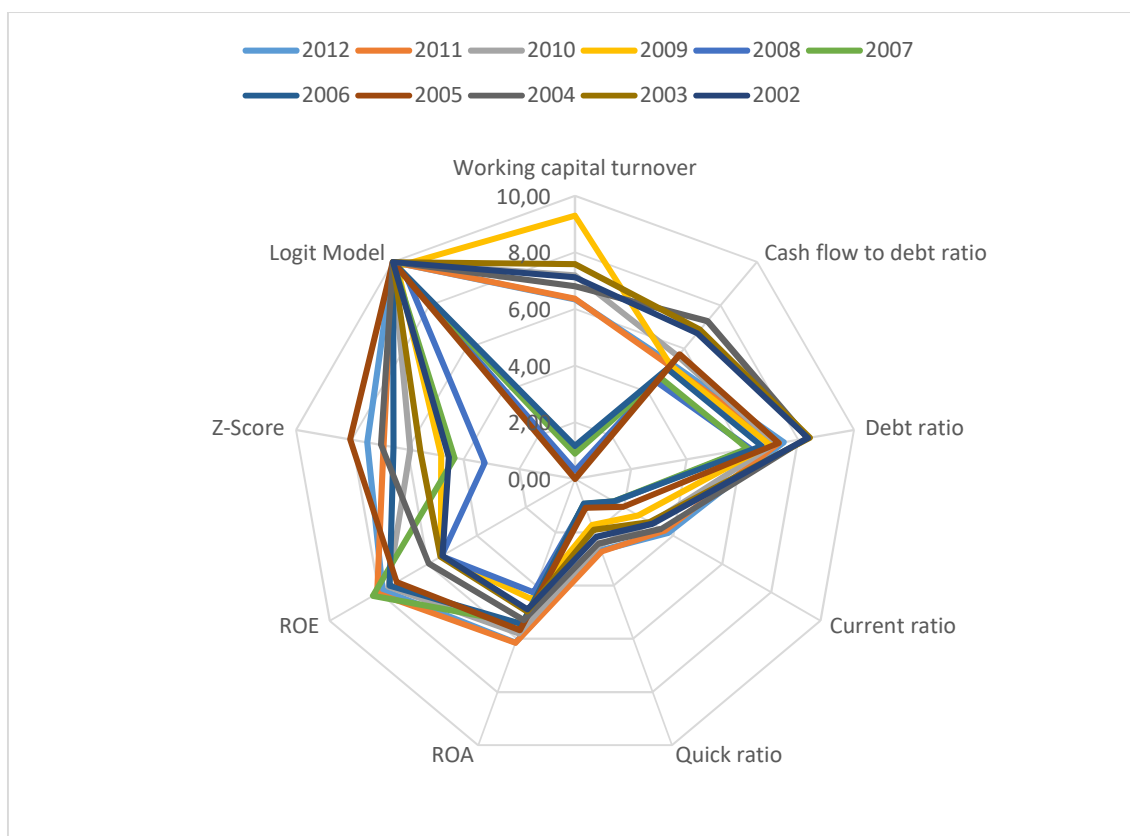


Figure 28: EWS Framework Complete Timespan Starbucks

Table 27: EWS Values Starbucks

| Radar Chart | | | | | | | | | | | |
|--------------------------|-------|-------|------|------|------|------|------|-------------|-------|-------|-------|
| | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 |
| Working capital turnover | 6,34 | 6,36 | 7,19 | 9,30 | 0,30 | 0,90 | 1,16 | 0,00 | 6,81 | 7,58 | 7,12 |
| Cash flow to debt ratio | 5,32 | 5,21 | 5,65 | 5,24 | 4,48 | 4,68 | 5,07 | 5,74 | 7,27 | 6,88 | 6,72 |
| Debt ratio | 7,48 | 7,31 | 7,18 | 6,97 | 6,26 | 6,18 | 6,69 | 7,30 | 8,33 | 8,42 | 8,35 |
| Current ratio | 3,80 | 3,66 | 3,10 | 2,58 | 1,60 | 1,57 | 1,58 | 1,97 | 3,51 | 3,04 | 3,15 |
| Quick ratio | 2,68 | 2,73 | 2,49 | 1,73 | 0,96 | 0,93 | 0,92 | 1,08 | 2,42 | 1,91 | 2,17 |
| ROA | 6,14 | 6,15 | 5,80 | 4,50 | 4,26 | 5,43 | 5,46 | 5,68 | 5,30 | 4,97 | 4,90 |
| ROE | 7,84 | 8,07 | 7,61 | 5,47 | 5,44 | 8,24 | 7,55 | 7,28 | 5,96 | 5,48 | 5,41 |
| Z-Score | 7,45 | 6,86 | 5,91 | 4,80 | 3,24 | 4,31 | 6,51 | 8,06 | 6,96 | 5,55 | 4,53 |
| Logit Model | 10,00 | 10,00 | 9,99 | 9,78 | 9,19 | 9,98 | 9,99 | 10,00 | 10,00 | 10,00 | 10,00 |

Notes: Working capital turnover for 2005 has been manually overridden because the value was outside of the established scale.

Table 28: Financial Data Starbucks (adapted from Starbucks 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012 & 2013)

| Balance Sheet | | | | | | | | | | | | |
|-------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|--|
| | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | |
| Non-current assets | \$ 4 020 | \$ 3 566 | \$ 3 630 | \$ 3 541 | \$ 3 925 | \$ 3 647 | \$ 2 899 | \$ 2 305 | \$ 1 960 | \$ 1 806 | \$ 1 445 | |
| Inventories | \$ 1 242 | \$ 966 | \$ 543 | \$ 665 | \$ 693 | \$ 692 | \$ 636 | \$ 546 | \$ 423 | \$ 343 | \$ 263 | |
| Current assets | \$ 4 200 | \$ 3 795 | \$ 2 756 | \$ 2 036 | \$ 1 748 | \$ 1 696 | \$ 1 530 | \$ 1 209 | \$ 1 359 | \$ 924 | \$ 848 | |
| Total assets | \$ 8 219 | \$ 7 360 | \$ 6 386 | \$ 5 577 | \$ 5 673 | \$ 5 344 | \$ 4 429 | \$ 3 514 | \$ 3 319 | \$ 2 730 | \$ 2 293 | |
| Non-current liabilities | \$ 895 | \$ 897 | \$ 925 | \$ 950 | \$ 992 | \$ 904 | \$ 265 | \$ 196 | \$ 58 | \$ 39 | \$ 29 | |
| Current liabilities | \$ 2 210 | \$ 2 076 | \$ 1 779 | \$ 1 581 | \$ 2 190 | \$ 2 156 | \$ 1 936 | \$ 1 227 | \$ 774 | \$ 609 | \$ 537 | |
| Total liabilities | \$ 3 105 | \$ 2 973 | \$ 2 704 | \$ 2 531 | \$ 3 182 | \$ 3 060 | \$ 2 200 | \$ 1 423 | \$ 832 | \$ 647 | \$ 566 | |
| Retained earnings | \$ 5 046 | \$ 4 297 | \$ 3 471 | \$ 2 793 | \$ 2 402 | \$ 2 189 | \$ 2 151 | \$ 1 939 | \$ 1 461 | \$ 1 070 | \$ 805 | |
| Total equity | \$ 5 115 | \$ 4 387 | \$ 3 682 | \$ 3 046 | \$ 2 491 | \$ 2 284 | \$ 2 229 | \$ 2 091 | \$ 2 487 | \$ 2 082 | \$ 1 727 | |
| Total equity and liabilities | \$ 8 219 | \$ 7 360 | \$ 6 386 | \$ 5 577 | \$ 5 673 | \$ 5 344 | \$ 4 429 | \$ 3 514 | \$ 3 319 | \$ 2 730 | \$ 2 293 | |

| Income Statement | | | | | | | | | | | | |
|--------------------------|------------------|------------------|------------------|-----------------|------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|--|
| | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | |
| Net Revenue/Sales | \$ 13 300 | \$ 11 700 | \$ 10 707 | \$ 9 775 | \$ 10 383 | \$ 9 411 | \$ 7 787 | \$ 6 369 | \$ 5 294 | \$ 4 076 | \$ 3 289 | |
| COGS | \$ 5 813 | \$ 4 949 | \$ 4 459 | \$ 4 325 | \$ 4 645 | \$ 3 999 | \$ 3 179 | \$ 2 605 | \$ 2 199 | \$ 1 686 | \$ 1 350 | |
| Gross profit | \$ 7 486 | \$ 6 751 | \$ 6 249 | \$ 5 450 | \$ 5 738 | \$ 5 412 | \$ 4 608 | \$ 3 764 | \$ 3 096 | \$ 2 390 | \$ 1 939 | |
| EBIT | \$ 1 997 | \$ 1 729 | \$ 1 419 | \$ 562 | \$ 504 | \$ 1 054 | \$ 894 | \$ 781 | \$ 610 | \$ 425 | \$ 319 | |
| Net income | \$ 1 384 | \$ 1 246 | \$ 946 | \$ 391 | \$ 316 | \$ 673 | \$ 564 | \$ 494 | \$ 392 | \$ 268 | \$ 215 | |

| Cash Flow Statement | | | | | | | | | | | | |
|-------------------------------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|--------------|---------------|--------------|--|
| | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | |
| Cash flow from operating activities | \$ 1 750 | \$ 1 612 | \$ 1 705 | \$ 1 389 | \$ 1 259 | \$ 1 331 | \$ 1 132 | \$ 924 | \$ 794 | \$ 566 | \$ 478 | |
| Cash flow from investing activities | \$ -974 | \$ -1 020 | \$ -790 | \$ -421 | \$ -1 087 | \$ -1 202 | \$ -841 | \$ -221 | \$ -632 | \$ -499 | \$ -485 | |
| Cash flow from financing activities | \$ -746 | \$ -608 | \$ -346 | \$ -642 | \$ -185 | \$ -172 | \$ -155 | \$ -674 | \$ -67 | \$ 31 | \$ 67 | |
| Net cash flow | \$ 41 | \$ -16 | \$ 564 | \$ 330 | \$ -12 | \$ -31 | \$ 139 | \$ 29 | \$ 98 | \$ 101 | \$ 61 | |

| Share Information | | | | | | | | | | | | |
|-------------------------------------|---------|---------|---------|--------|--------|--------|---------|---------|---------|--------|--------|--|
| | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | |
| Year end stock price | 24,2009 | 20,4605 | 14,0716 | 9,9624 | 4,0869 | 8,8434 | 15,3021 | 12,9649 | 12,4704 | 7,1629 | 4,4023 | |
| Average shares outstanding (in Mio) | 754,4 | 748,3 | 744,4 | 738,7 | 731,5 | 749,8 | 766,1 | 789,6 | 397,2 | 390,8 | 385,6 | |

Notes: All figures in Million US\$ except per share data / Net cash flow includes exchange rate effects / Stock price information from Macrotrends (n.d.d)

Table 29: Ratio Analysis Starbucks

| | 2012 | 2011 | 2010 | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 |
|-----------------------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|-------------|-------------|-------------|
| Activity ratios | | | | | | | | | | | |
| Working capital turnover | 6,683837572 | 6,806119481 | 10,95610355 | 21,49208443 | -23,50690514 | -20,5008223 | -19,18759979 | -360,6216736 | 9,042189221 | 12,92478895 | 10,60773816 |
| Coverage ratios | | | | | | | | | | | |
| Cash flow to debt ratio | 0,563758173 | 0,542329555 | 0,63060364 | 0,548773261 | 0,395606123 | 0,435073524 | 0,51427695 | 0,648860394 | 0,953912632 | 0,875101766 | 0,843820328 |
| Leverage ratios | | | | | | | | | | | |
| Debt ratio | 0,377737493 | 0,403931852 | 0,423370238 | 0,45386243 | 0,560889187 | 0,572573139 | 0,496830958 | 0,405066782 | 0,250742025 | 0,23713525 | 0,246909369 |
| Liquidity ratios | | | | | | | | | | | |
| Current ratio | 1,900443479 | 1,828162636 | 1,549322691 | 1,287666034 | 0,79828287 | 0,787026238 | 0,79033488 | 0,985605495 | 1,756692243 | 1,518029318 | 1,57684422 |
| Quick ratio | 1,33862793 | 1,362896233 | 1,243943567 | 0,867109424 | 0,481892497 | 0,466155525 | 0,461643298 | 0,540372585 | 1,21045299 | 0,954628119 | 1,087209064 |
| Profitability ratios | | | | | | | | | | | |
| ROA (in percent) | 16,83618844 | 16,92435194 | 14,80762304 | 7,007602926 | 5,561823502 | 12,58707628 | 12,74026906 | 14,07108292 | 11,80416016 | 9,830804771 | 9,380626465 |
| ROE (in percent) | 27,05640825 | 28,39331707 | 25,67960242 | 12,83120465 | 12,66610462 | 29,44849147 | 25,32005747 | 23,65153346 | 15,75446717 | 12,88669423 | 12,45617205 |
| Z-Score | | | | | | | | | | | |
| Z | 7,451223032 | 6,861081384 | 5,911990703 | 4,803312911 | 3,243137702 | 4,312710544 | 6,510533666 | 8,058618912 | 6,957986363 | 5,547421069 | 4,525916217 |
| X1 | 0,242091688 | 0,233560676 | 0,153040292 | 0,081552145 | -0,077865529 | -0,085907463 | -0,091631837 | -0,005026088 | 0,176412349 | 0,115514777 | 0,135230572 |
| X2 | 0,613952696 | 0,583854138 | 0,543572558 | 0,500860709 | 0,423509502 | 0,409696105 | 0,485688114 | 0,551884783 | 0,440336527 | 0,391861734 | 0,351015555 |
| X3 | 0,243016352 | 0,234837781 | 0,222270941 | 0,100774638 | 0,088830519 | 0,19722475 | 0,201843285 | 0,222140171 | 0,183827931 | 0,155587003 | 0,139015133 |
| X4 | 5,880490534 | 5,149706418 | 3,874426335 | 2,907520398 | 0,93961321 | 2,166984321 | 5,327652505 | 7,191564672 | 5,951567263 | 4,323872254 | 2,998450485 |
| X5 | 1,618101518 | 1,589641867 | 1,676725285 | 1,752725577 | 1,830377605 | 1,761173627 | 1,758195018 | 1,812516274 | 1,595153839 | 1,493004111 | 1,434490495 |
| Logit Model | | | | | | | | | | | |
| F | 99,98817% | 99,98150% | 99,92716% | 97,76442% | 91,89505% | 99,75759% | 99,91868% | 99,98485% | 99,97992% | 99,98330% | 99,96839% |
| X1 | 0,910818571 | 0,917219173 | 0,978530826 | 0,977209152 | 1,011476219 | 1,012817471 | 1,040463397 | 1,071149225 | 0,932700544 | 0,875390604 | 0,845669541 |
| X2 | 0,168361884 | 0,169243519 | 0,14807623 | 0,070076029 | 0,055618235 | 0,125870763 | 0,127402691 | 0,140710829 | 0,118041602 | 0,098308048 | 0,093806265 |
| X3 | 1,33862793 | 1,362896233 | 1,243943567 | 0,867109424 | 0,481892497 | 0,466155525 | 0,461643298 | 0,540372585 | 1,21045299 | 0,954628119 | 1,087209064 |
| X4 | 0,377737493 | 0,403931852 | 0,423370238 | 0,45386243 | 0,560889187 | 0,572573139 | 0,496830958 | 0,405066782 | 0,250742025 | 0,23713525 | 0,246909369 |
| X5 | 1,272390288 | 1,230486608 | 1,014547458 | 0,860124259 | 0,634688885 | 0,626233107 | 0,768674851 | 0,907105428 | 1,268957786 | 1,153241067 | 1,194741482 |
| Other ratios | | | | | | | | | | | |
| Total market value | \$ 18 257 | \$ 15 311 | \$ 10 475 | \$ 7 359 | \$ 2 990 | \$ 6 630 | \$ 11 723 | \$ 10 237 | \$ 4 953 | \$ 2 799 | \$ 1 697 |
| Working capital | \$ 1 990 | \$ 1 719 | \$ 977 | \$ 455 | \$ -442 | \$ -459 | \$ -406 | \$ -18 | \$ 586 | \$ 315 | \$ 310 |
| e | | 2,71828 | | | | | | | | | |

7.10 Appendix X: Analysis Under Armour

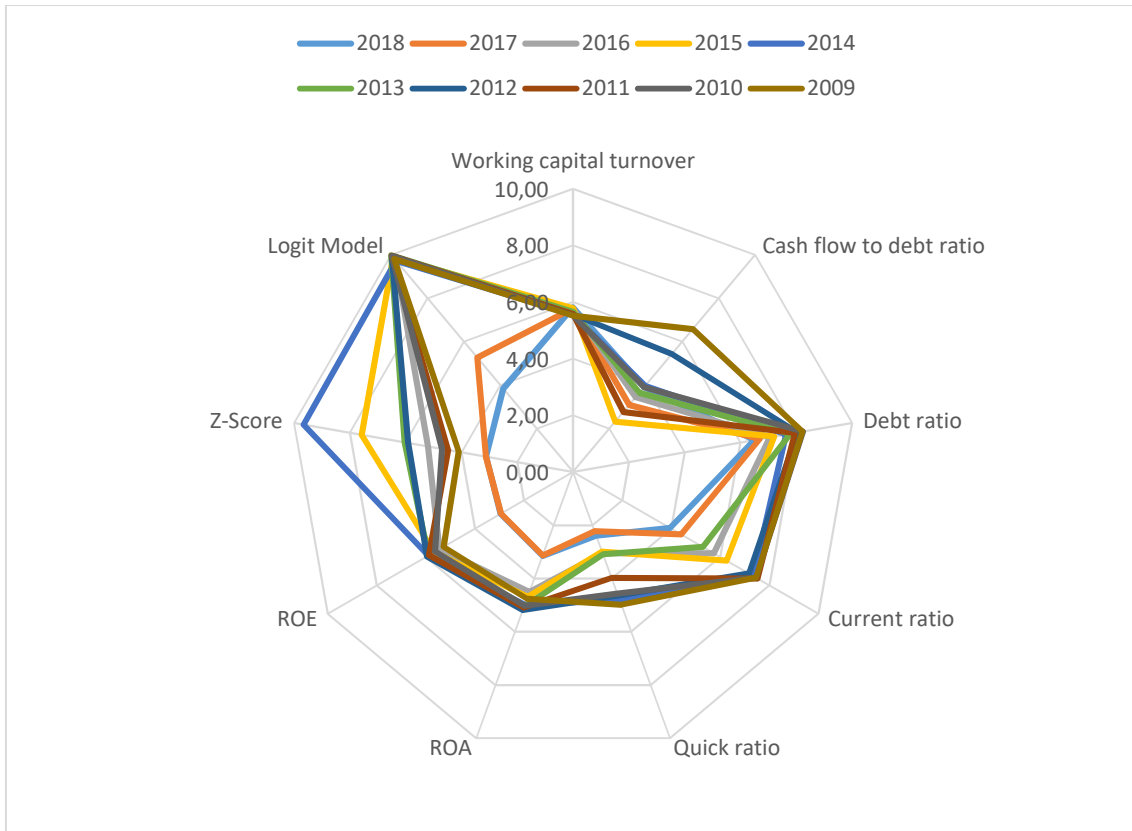


Figure 29: EWS Framework Complete Timespan Under Armour

Table 30: EWS Values Under Armour

Radar Chart

| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 |
|--------------------------|------|------|------|------|------|------|------|------|------|------|
| Working capital turnover | 5,81 | 5,78 | 5,75 | 5,78 | 5,55 | 5,66 | 5,56 | 5,58 | 5,52 | 5,52 |
| Cash flow to debt ratio | 3,91 | 3,09 | 3,44 | 2,32 | 3,97 | 3,64 | 5,44 | 2,77 | 3,90 | 6,59 |
| Debt ratio | 6,50 | 6,69 | 7,05 | 7,21 | 7,63 | 7,78 | 8,04 | 7,95 | 8,24 | 8,22 |
| Current ratio | 3,94 | 4,41 | 5,73 | 6,26 | 7,35 | 5,29 | 7,16 | 7,51 | 7,45 | 7,46 |
| Quick ratio | 2,39 | 2,22 | 3,06 | 2,99 | 4,80 | 3,09 | 4,63 | 3,98 | 4,57 | 4,99 |
| ROA | 3,15 | 3,13 | 4,51 | 4,68 | 4,99 | 5,05 | 5,19 | 5,09 | 5,02 | 4,76 |
| ROE | 2,95 | 2,93 | 5,44 | 5,66 | 5,90 | 5,90 | 5,96 | 5,87 | 5,63 | 5,28 |
| Z-Score | 3,12 | 3,12 | 5,21 | 7,58 | 9,66 | 6,04 | 5,91 | 4,48 | 4,69 | 4,10 |
| Logit Model | 3,84 | 5,26 | 9,76 | 9,89 | 9,73 | 9,99 | 9,95 | 9,97 | 9,95 | 9,82 |

Preventing Corporate Turnarounds

Table 31: Financial Data Under Armour (adapted from Under Armour 2010, 2011, 2012, 2013, 2014, 2105, 2106, 2017, 2018 & 2019)

| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 |
|---|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|-------------------|-------------------|-------------------|
| Balance Sheet | | | | | | | | | | |
| Non-current assets | \$ 1 651 394 | \$ 1 668 688 | \$ 1 679 178 | \$ 1 370 137 | \$ 545 684 | \$ 448 930 | \$ 253 485 | \$ 229 547 | \$ 119 528 | \$ 97 588 |
| Inventories | \$ 1 019 496 | \$ 1 158 548 | \$ 917 491 | \$ 783 031 | \$ 536 714 | \$ 469 006 | \$ 319 286 | \$ 324 409 | \$ 215 355 | \$ 148 488 |
| Current assets | \$ 2 593 628 | \$ 2 337 679 | \$ 1 965 153 | \$ 1 498 763 | \$ 1 549 399 | \$ 1 128 811 | \$ 903 598 | \$ 689 663 | \$ 555 850 | \$ 448 000 |
| Total assets | \$ 4 245 022 | \$ 4 006 367 | \$ 3 644 331 | \$ 2 868 900 | \$ 2 095 083 | \$ 1 577 741 | \$ 1 157 083 | \$ 919 210 | \$ 675 378 | \$ 545 588 |
| Non-current liabilities | \$ 912 174 | \$ 927 350 | \$ 927 615 | \$ 721 868 | \$ 323 156 | \$ 97 757 | \$ 87 933 | \$ 99 171 | \$ 29 265 | \$ 25 429 |
| Current liabilities | \$ 1 315 977 | \$ 1 060 375 | \$ 685 816 | \$ 478 810 | \$ 421 627 | \$ 426 630 | \$ 252 228 | \$ 183 607 | \$ 149 147 | \$ 120 162 |
| Total liabilities | \$ 2 228 151 | \$ 1 987 725 | \$ 1 613 431 | \$ 1 200 678 | \$ 744 783 | \$ 524 387 | \$ 340 161 | \$ 282 778 | \$ 178 412 | \$ 145 591 |
| Retained earnings | \$ 1 139 082 | \$ 1 184 441 | \$ 1 259 414 | \$ 1 076 533 | \$ 856 687 | \$ 653 842 | \$ 493 181 | \$ 366 164 | \$ 270 021 | \$ 202 188 |
| Total equity | \$ 2 016 871 | \$ 2 018 642 | \$ 2 030 900 | \$ 1 668 222 | \$ 1 350 300 | \$ 1 053 354 | \$ 816 922 | \$ 636 432 | \$ 496 966 | \$ 399 997 |
| Total equity and liabilities | \$ 4 245 022 | \$ 4 006 367 | \$ 3 644 331 | \$ 2 868 900 | \$ 2 095 083 | \$ 1 577 741 | \$ 1 157 083 | \$ 919 210 | \$ 675 378 | \$ 545 588 |
| Income Statement | | | | | | | | | | |
| Net Revenue/Sales | \$ 5 193 185 | \$ 4 976 553 | \$ 4 825 335 | \$ 3 963 313 | \$ 3 084 370 | \$ 2 332 051 | \$ 1 834 921 | \$ 1 472 684 | \$ 1 063 927 | \$ 856 411 |
| COGS | \$ 2 852 714 | \$ 2 737 830 | \$ 2 584 724 | \$ 2 057 766 | \$ 1 572 164 | \$ 1 195 381 | \$ 955 624 | \$ 759 848 | \$ 533 420 | \$ 443 386 |
| Gross profit | \$ 2 340 471 | \$ 2 238 723 | \$ 2 240 611 | \$ 1 905 547 | \$ 1 512 206 | \$ 1 136 670 | \$ 879 297 | \$ 712 836 | \$ 530 507 | \$ 413 025 |
| EBIT | \$ -25 017 | \$ 27 843 | \$ 4 17 471 | \$ 408 547 | \$ 353 955 | \$ 265 098 | \$ 208 695 | \$ 162 767 | \$ 112 355 | \$ 85 273 |
| Net income | \$ -46 302 | \$ -48 260 | \$ 256 979 | \$ 232 573 | \$ 208 042 | \$ 162 330 | \$ 128 778 | \$ 96 919 | \$ 68 477 | \$ 46 785 |
| Cash Flow Statement | | | | | | | | | | |
| Cash flow from operating activities | \$ 628 230 | \$ 234 063 | \$ 304 487 | \$ -44 104 | \$ 219 033 | \$ 120 070 | \$ 199 761 | \$ 15 218 | \$ 50 114 | \$ 119 041 |
| Cash flow from investing activities | \$ -202 904 | \$ -282 987 | \$ -381 139 | \$ -847 475 | \$ -152 312 | \$ -238 102 | \$ -46 931 | \$ -89 436 | \$ -41 785 | \$ -19 880 |
| Cash flow from financing activities | \$ -189 868 | \$ 106 759 | \$ 205 995 | \$ -440 078 | \$ 182 306 | \$ 126 795 | \$ 12 297 | \$ 45 807 | \$ 7 243 | \$ -16 467 |
| Net cash flow | \$ 247 925 | \$ 62 013 | \$ 120 618 | \$ -463 323 | \$ 245 686 | \$ 5 048 | \$ 166 457 | \$ -28 486 | \$ 16 573 | \$ 85 255 |
| Share Information | | | | | | | | | | |
| Year end stock price | 17.67 | 14.43 | 29.05 | 40.305 | 33.95 | 21.825 | 12.1325 | 8.9738 | 6.855 | 3.4088 |
| Average shares outstanding (in thousands) | 224 814 | 221 475 | 218 623 | 215 498 | 213 227 | 105 348 | 104 343 | 51 570 | 50 798 | 49 848 |

Notes: All figures in Thousands of US\$ expect per share data / Net cash flow includes exchange rate effects / Stock price information from Macrotrends (n.d.e)

Table 32: Ratio Analysis Under Armour

| | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 | 2011 | 2010 | 2009 | 2000 |
|-----------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|-------------|---------|
| Activity ratios | | | | | | | | | | | |
| Working capital turnover | 4,064635022 | 3,896138272 | 3,771746616 | 3,885780031 | 2,734923371 | 3,321153663 | 2,817017977 | 2,910120619 | 2,615980212 | 2,612299367 | |
| Coverage ratios | | | | | | | | | | | |
| Cash flow to debt ratio | 0,281951268 | 0,117754217 | 0,188720187 | -0,036732579 | 0,294089688 | 0,228972114 | 0,587254271 | 0,053816068 | 0,280889178 | 0,817639827 | |
| Leverage ratios | | | | | | | | | | | |
| Debt ratio | 0,524885619 | 0,496141517 | 0,442723507 | 0,418515111 | 0,355490928 | 0,332365705 | 0,293981503 | 0,307631553 | 0,264166141 | 0,266681544 | |
| Liquidity ratios | | | | | | | | | | | |
| Current ratio | 1,970876391 | 2,204577626 | 2,865423087 | 3,130183162 | 3,674809725 | 2,645878161 | 3,582465071 | 3,756191213 | 3,726860078 | 3,728300128 | |
| Quick ratio | 1,196169842 | 1,111994342 | 1,527613821 | 1,494814227 | 2,401850451 | 1,546550875 | 2,316602439 | 1,989325026 | 2,282949037 | 2,492568366 | |
| Profitability ratios | | | | | | | | | | | |
| ROA (in percent) | -1,091 | -1,205 | 7,051 | 8,107 | 9,930 | 10,289 | 11,130 | 10,544 | 10,139 | 8,575 | |
| ROE (in percent) | -2,296 | -2,391 | 12,653 | 13,941 | 15,407 | 15,411 | 15,764 | 15,228 | 13,779 | 11,696 | |
| Z-Score | | | | | | | | | | | |
| Z | 3,11743193 | 3,122727406 | 5,205143626 | 7,577785118 | 9,663126242 | 6,04064921 | 5,909515633 | 4,484904004 | 4,694814923 | 4,095665492 | |
| X1 | 0,300976296 | 0,318818521 | 0,351048519 | 0,355520583 | 0,538294664 | 0,44505467 | 0,562941466 | 0,55053361 | 0,602185739 | 0,600889316 | |
| X2 | 0,268333592 | 0,295639666 | 0,345581672 | 0,375242427 | 0,408903609 | 0,414416561 | 0,426227851 | 0,398346406 | 0,399807219 | 0,37058733 | |
| X3 | -0,00589326 | 0,006949688 | 0,114553535 | 0,142405452 | 0,168945574 | 0,168023776 | 0,180363034 | 0,177072704 | 0,166358691 | 0,156295593 | |
| X4 | 1,782851961 | 1,607810059 | 3,936330807 | 7,233951892 | 9,719685667 | 4,384586384 | 3,721594914 | 1,636544802 | 1,95177617 | 1,167117902 | |
| X5 | 1,223358795 | 1,24216104 | 1,324066063 | 1,381474781 | 1,472194658 | 1,478094947 | 1,585816229 | 1,602119211 | 1,575305977 | 1,569702779 | |
| Logit Model | | | | | | | | | | | |
| F | 38,40888% | 52,64931% | 97,63614% | 98,90227% | 97,27288% | 99,87704% | 99,51643% | 99,65319% | 99,54800% | 98,21765% | |
| X1 | 0,551344846 | 0,558791294 | 0,614820937 | 0,664208233 | 0,721788111 | 0,720441441 | 0,759925606 | 0,775487647 | 0,785496418 | 0,757027281 | |
| X2 | -0,01090736 | -0,012045826 | 0,070514725 | 0,081066959 | 0,099300123 | 0,10288761 | 0,111295387 | 0,105437278 | 0,101390629 | 0,085751519 | |
| X3 | 1,196169842 | 1,111994342 | 1,527613821 | 1,494814227 | 2,401850451 | 1,546550875 | 2,316602439 | 1,989325026 | 2,282949037 | 2,492568366 | |
| X4 | 0,524885619 | 0,496141517 | 0,442723507 | 0,418515111 | 0,355490928 | 0,332365705 | 0,293981503 | 0,307631553 | 0,264166141 | 0,266851544 | |
| X5 | 1,221314235 | 1,209718054 | 1,20946082 | 1,217558536 | 2,474509057 | 2,346365803 | 3,222762688 | 2,772556383 | 4,157737099 | 4,098833873 | |
| Other ratios | | | | | | | | | | | |
| Total market value | \$ 3 972 463 | \$ 3 195 884 | \$ 6 350 998 | \$ 8 685 647 | \$ 7 239 057 | \$ 2 299 220 | \$ 1 265 941 | \$ 462 779 | \$ 348 220 | \$ 169 922 | |
| Working capital | \$ 1 277 651 | \$ 1 277 304 | \$ 1 279 337 | \$ 1 019 953 | \$ 1 127 772 | \$ 702 181 | \$ 651 370 | \$ 506 056 | \$ 406 703 | \$ 327 838 | |
| e | | | | | | | | | | | 2,71828 |