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Business Failure Prediction Models : What is the Theory looking for ?

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by Didier Van Caillie [1]

Introduction [2]

This paper is essentially a conceptual reflection [3] on the true motivations of the many models or researches published in the specialized literature during the last three decades in the field of business failure.

Indeed, while ignored for a long time [4], business failure was very frequently studied during the last 30 years, due to 2 main factors :

1. corporate performance, and its origin, became one of the most investigated topics in the finance and strategic literature, due to an extremely fast moving environment that disturbed the conditions in which most companies had generated for a bng period relatively constant and high rates of return ; as a result, financial and organizational decline and failure perceived much attention from both researchers and economic authorities ;

2. an increased availability of credible data, coupled with a strong development of mathematical and statistical techniques and an exponential evolution of informatics, has resulted in a strong and steady flow of quantitative researches (Dimitras e.a., 1996), focusing essentially on the use of quantitative techniques applied in a research field where data are easily available.

This second factor has had a worrying consequence : indeed, most of these studies focused on the ability of some quantitative techniques to correctly predict business failure one to five years prior a legal bankrutpcy, considering almost systematically that managers of such companies were deterministically unaware of the problems these companies face and unable to take corrective decisions [5].

So, what is the true significance of the "performance" [6] of these models ? And, economically, is it

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[2] We appreciate helpful preparatory work from Aline Muller, Assistant at the School of Business Administration, University of Liège.

[3] This paper is a preliminary note aimed at supporting a more complex research ; this research is intended to develop a business failure detection model that is based upon value creation processes within the firm.

[4] "It was the mid 1960s before finance researchers systematically studied failure (Beaver, 1966) and developed multivariate failure prediction models (Altman, 1968)" (Sheppard, 1994).

[5] For example, amongst the 158 papers or articles considered by Dimitras e.a. (1996), Sharma and Mahajan (1980) are the only ones to consider explicitly that ineffective management together with unanticipated events lead to a systematic deterioration in performance indicators and that, in the absence of an effective corrective action, this deterioration leads to failure.

[6] i.e. their ability to correctly predict a failure 1, 2 or 5 years before a legal bankruptcy.

more interesting to correctly predict a bankruptcy or to prevent such a failure ? These two fundamental questions have too rarely been discussed.

Simultaneously, and rather curiously, only a few studies (Argenti, 1976) (Koenig, 1985) (Keasey, Watson, 1991) (Laitinen, 1991) (Sharma, Mahajan, 1980) have considered business failure as a process, whose bankruptcy is only the potential legal extremity and on which managers may act with some judicious strategic decisions.

So, in the late 1990s, we still do not have a strong theoretical and conceptual framework to understand how companies enter in a business failure process and why some companies go then bankrupt and some do not ; as stated by Dimitras, Zopounidis e.a. (1996), "a unifying theory of business failure has not been developed, in spite of a few notable efforts".

In this context, the aim of this paper is to briefly review the main results of both organizational and financial approach of business failure and to depict the framework in which a true contemporary theory of business failure could be developed.

I. Estimating the risk of business failure : the organizational approach

The organizational approach of business failure starts effectively in the mid-1970, when Argenti (1976) publishes a small book dedicated to "Corporate Collapse". In this book, for the first time, an author considers explicitly that the most important explanatory factors of corporate collapse have to be found inside the company, both (and essentially) in the person of the manager/founder [7] and in the inappropriate management processes he implements inside the company.

In fact, Argenti produces a three-stages dynamic model of business failure which relies on the fundamentals of the business and its management structure. He views the process of failure as being based on a number of inherent defects in the organization and financial structure of the company. These weaknesses in the 'structure' of a business allow changes in its macroeconomic environment and the occurrence of 'normal business hazards' (such as the loss of a large customer or a steep rise in interest rates) brings a firm to crisis.

However, Argenti remains very descriptive and does not deepen what we may consider as a conceptual approach of business failure : the existence of one or some "failing paths" through which companies are evolving and that lead to bankruptcy if corrective appropriate strategic and operational decisions are not taken.

Many authors explore then some of the micro-aspects depicted by Argenti and a lot of papers and researches, often empirically grounded, focus on some organizational aspects of the management of failing companies.

[7] Apart from the usual lack of an adequate product and sufficient financial resource base, the major inherent organizational and management defect identified by Argenti is the presence of an autocratic entrepreneur that dominates all the management decisions and who rarely heeds the advice of others working within the enterprise.

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We consider that these studies highlight explanatory factors which may be classified into three main categories (Stuart, Abetti, 1988) :

1. *Factors linked to the "corporate governance" system :*

   The Entrepreneur, especially in Small and Medium-Sized Enterprises, plays a major role as both the owner and the manager of the company ; its personality and its objectives are thus strongly reflected in the management processes implemented within the company. A lack of technical ability, insufficient education, some weaknesses in management skills, a lack of motivation or of self-confidence or, on the contrary, too optimistic attitudes are factors that were highlighted as explaining many failure processes (Berryman, 1983) (Cromie, 1991) (Smallbone, 1990).

   An inadequate vision of the future of the company and inappropriate resulting strategies are also considered as explaining many bankruptcies : an excessive lifestyle, too high salaries, launching a new venture as the only solution to unemployment are such explanatory factors (Hall, Young, 1991) (Smallbone, 1990) (Cromie, 1991).

2. *Factors linked to strategic management :*

   Strategic management appears to have received too few attention from managers at the top of failing companies, while at the same time the environment in which any company evolves is developing faster and is becoming more and more complex. So, a gap appears between the low magnitude of strategic actions and decisions in failing company and the requirements of an always more complex environment.

   A weak understanding of the complexity of this environment, the absence of innovating strategies or actions, a lack of planification, a weak information system are, amongst others, factors depicted as critical to prevent bankruptcy (Ackelsberg, Arlow, 1985) (Robinson, Pearce, 1984).

   Relations between the firm and the major components of its environment have particularly been investigated. An intensive competition on the company's main markets, turnover depending excessively on one or a few failing clients, depending too much on some specialized suppliers, poor relations with the bank or the banker are then the main factors inducing a possible near bankrupt (Bamberger, 1980) (Hall, Young, 1991) (Smallbone, 1990).

   More specifically, weak adequacy between the products developed and the requirements of investigated markets and a poor marketing plan have also been pointed out as explaining failing strategies (Cromie, 1991) (Smallbone, 1990).

   But this approach, based on the value creation processes that meet needs and requirements of the client and on which the most recent developments in strategic or cost management are focused, remains curiously underdeveloped in the business failure literature and would probably lead to a better understanding of the logical imbrication of the different strategic factors that drive firms to bankruptcy and not to profitability.

3. *Factors linked to operational management :*

   A poor daily management of operations and strong weaknesses in some critical operational functions have largely been considered as the main explanatory factors that justify the death of a company.

As examples, a persistent lack of equities, excessive short-term borrowing, depending too much on bank credit and too few on commercial credit, a difficult access to credit and a weak bargaining position to negotiate the terms of this credit have been pointed out as major financial factors explaining bankruptcy (Hall, Young, 1991) (Walker, Petty, 1978) (Cromie, 1991).

Difficulties to master and calibrate production process, having too much stocks, depending too much on suppliers to gain access to critical supplies or raw materials, difficulties to master lead times, weak or unstable quality of some products, too high production costs are also operational factors frequently underlined in the specialized literature (Cromie, 1991) (Hall, Young, 1991).

As for the general management process at least, depending too much on some key people, a lack of responsibility delegation and difficulties to develop human skills are the main factors that justify bankruptcy (Strorey, 1985) (Watkins, 1982).

II. Estimating the risk of business failure : the financial approach

While organizational death was receiving relatively few attention from the scientific and academic community, financial death was on the contrary receiving a lot of attention from this community [8].

Two authors play an invaluable role in the elaboration of a true conceptual financial framework allowing to understand how a company enters in a failing path : Beaver (1966) and Altman (1968). Most of the papers published since these two fundamental works have only refined this conceptual framework or have focused on the application of new statistical or mathematical tools to the problem of bankrupcty prediction ; and most of them have in fine validated the models proposed by Beaver and Altman.

II.1. Beaver and the fund flow approach :

Conceptually, Beaver (1966) considers the firm as a pool of liquid assets which is drained and fed by the activities of the firm. He derives from his cash flow model four propositions concerning failure, that lead to a first attempt to build a theoratical and conceptual business failure model :

1. the larger the reservoir, the smaller the probability of failure ;
2. the larger the net liquid asset flow from the operations (i.e. cash flow), the smaller the probability of failure ;
3. the larger the fund expenditures from operations, the greater the probability of failure ;
4. the larger the amount of debt held, the greater the probability of failure.

This fund flow approach was largely developed in the literature ; some refinements have been put forward, notably in the definition of the cash flow concept (Gombola, Ketz, 1983) (Casey, Bartczak, 1985) (Aziz, Lawson, 1989) (Aziz, Kenyon, 1989). However, the main results of these studies

[8] *In 1932, Fitz Patrick was, as an example, the first one to study, in three successive papers, financial profile of failing companies.*

remain consistent with Beaver's results, so that this fund flow approach appears to be a fundamental conceptual framework to understand financial business failure.

But, as Bulow and Shoven (1978) have shown, there is unlikely to be any simple, mechanical relationship between cash flows and failure. "So, the eventual fate of a financially distressed firm largely depends upon the relative claims, economic interests and power of the different shareholders. Hence, for the user interested in explaining why and how firms fail, there is a clear need to understand the following two issues :

1. the process whereby firms become insolvent
2. how the agents (bankers, creditors, …) whose actions determine the firm's fate, actually decide that a firm's monetary position and prospects are insufficient to justify continued support" (Keasey, Watson, 1991).

Once again, the process whereby firms become insolvent and thus the concept of "failing path" is stressed, but remains unexplored.

II.2. Altman and the interaction between some key financial factors

Almost simultaneously, Altman (1968) proposes a financial multivariate approach of business failure. Using discriminant analysis, he validates a discriminant predicitive model associating five financial ratios :

$$Z = 0.717 * X1 + 0.847 * X2 + 3.107 * X3 + 0.420 * X4 + 0.998 * X5$$ [9]

where : X1 = Working Capital / Total Assets

X2 = Retained Earnings / Total Assets

X3 = Earnings Before Interest and Taxes / Total Assets

X4 = Equities / Total Debt

X5 = Sales / Total Assets.

This function strongly associates five key financial dimensions : a balanced capital structure, long-term investment largely financed by long-term financial resources, a strong ability to self-finance activity with retained earnings [10], a good turnover of assets and important operational earnings are factors that characterize wealthy firms.

But the most important in this function is certainly that these key dimensions interact and that a deficit on one or some aspects may be compensated by performance on some other aspects. In other words, business failure doesn't come from one particular financial weakness, but comes from an association between some financial key dimensions and this association evolves over time : this model validates implicitly the existence of a financial "failure path", through which firm evolves when going to bankrupcty.

A lot of authors, everywhere in the world, have then developed such models, using discriminant

[9] *This formula is once again validated by Altman in his fundamental book in 1983.*

[10] *Which means thus that the firm has a history characterized by positive earnings.*

analysis or testing some other statistical or mathematical [11] techniques [12] ; many controversial disputes have also emerged [13], but most of them focused onsome statistical or mathematical aspects of the techniques in use in the scientific community and not on the financial aspects of these researches. And the main results of all these studies are remarkably consistent with the Altman's model ; some authors have surely used other financial indicators or have used more refined ratios, but all, through their results and comments, validate findings already presented by Altman in 1968.

But, rather curiously, relatively few comments have been made on these financial results and relatively rare are the papers that try to build a conceptual financial framework based upon these results to understand how and why a company fails ; it is notably rather curious to see that Laitinen (1992) and Ooghe and Van Wymeersch (1995) are almost the only ones to explore the "failure path" approach, empirically for Laitinen and rather conceptually for Ooghe and Van Wymeersch.

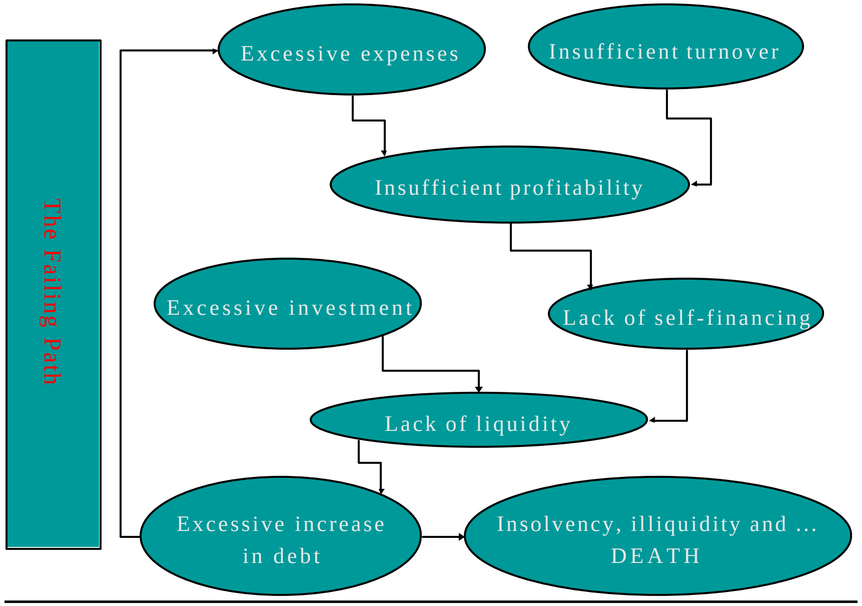

Figure 1 : The usual "Failing Path" (Ooghe, Van Wymeersch, 1995)

In such an approach, business failure is considered as the final result of an evolving and possibly long

[11] *Including non linear or non parametric approaches.*

[12] *See for example Altman (1984), Berryman (1983), Dimitras e.a. (1996) or Ooghe e.a. (1995) for a large survey of these studies.*

[13] *See for example Eisenbeis (1977).*

process, that starts with excessive operating expenses, insufficient turnover and/or excessive investment and ends with high insolvency and a major liquidity crisis that leads to legal bankrutpcy.

But this approach only identifies the different steps of the process and does not explain why and how a company enters and evolves through these different phases.

III. Estimating the risk of business failure : what are we still looking for ?

In 1994, Sheppard recalls that "because an organization's existence is a prerequisite for its accomplishments, one would expect that researchers would be intensely interested in those factors which could lessen the likelihood of organizational decline and failure. Yet, until recently, little research appeared regarding this topic and very little of it focused on the effectiveness of strategy on the likelihood of corporate bankruptcy".

Keasey and Watson (1991) are even more incisive when they consider that "it's not too much of an exaggeration to state that the overwhelming majority of empirical work on failure prediction has produced 'garbage can' models, that is the model's development has been data driven rather than theory led" and they conclude that little consideration has been given to the interests and motivations of the agents involved in the failing process.

In such a context, a clear and urgent need for a systematic and dynamic approach of failure path appears. And this need is reinforced by the true revolution that characterizes the evolution of economic environment in which any company evolves.

As Kaplan and Norton (1996) have shown, "companies are in the midst of a revolutionary transformation : industrial age competition is shifting to information age competition". And the information age environment requires new capabilities for competitive success : "the ability of a company to mobilize and exploit its intangible or invisible assets is becoming far more decisive than investing and managing physical, tangible assets."

Indeed, intangible assets enable an organization :

- to develop customer-oriented strategies and management processes ;
- to shorten lead time ;
- to increase overall quality of its products and services, at each stage of its management processes ;
- to increase its innovating and learning capabilities ;
- to focus management decisions on a long-term perspective.

If these aspects (i.e. customer-oriented strategies, shortened lead times, innovation and learning capabilities, focus on long-term management) are largely explored in strategic and general management literature since the late 80's [14], they are, until now, largely unexplored in the business failure literature, while some of their micro-aspects are at the same time considered as partly

[14] *With the fundamental works of Michaël Porter (1985) on competitive strategies or of Robert Kaplan on Activities Based costing and management, for example.*

explaining some failing processes [15].

So, it is clearly interesting to develop an analytical approach of business failure, integrating all the different strategic and operational aspects identified [16] during the last three decades as partly explaining bankruptcy and based on the existence of many potential failure paths amongst firms.

To remain consistent with the "Information Age Enterprise" approach [17], this conceptual reflection has to integrate that successful companies :

- develop customer-oriented strategies ;

- focus essentially on intangible assets while simultaneously using efficiently tangible assets ;

- develop capabilities to constantly innovate ;

- focus management processes on customer satisfaction and on learning capabilities.

On the contrary, failing companies encounter problems to develop such strategies and to adapt their management processes to take into account a more and more competitive and aggressive environment.

But how to develop such an approach ?

A management tool, such as the "Balanced Scorecard" proposed by Kaplan and Norton (1992 and 1996), could be useful to identify key dimensions in the different failure processes in which a firm may enter.

This model tracks the key elements of a company' strategy by allowing managers to look at their business from four important perspectives :

1. a customer perspective (how do customers see us ?)
2. an internal perspective (what must we excel at ? what are the critical management processes to succeed in our business ?)
3. an innovation and learning perspective (can we continue to improve and create value ?)
4. a financial perspective (how do we look to shareholders ?).

For each of these four perspectives, key performance indicators are identified and dynamic and interactive links are established between them.

But if this conceptually interesting approach is clearly a management tool really suitable to a single Information Age company in order to prevent bankruptcy, how can we use its findings to build a complete analytical framework allowing to understand :

- why firms fail and others do not, i.e. the fundamental factors that lead a firm to enter in a failing process

- and how firms fail, i.e. the dynamics of the many failure paths in which a company may enter ?

This methodological question is still to be developed.

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[15] As shown in Section 1.

[16] Only summarized in Section 1.

[17] Which is clearly a conception that dominates the current strategic research.

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Conclusion

During the last three decades, business failure was one of the most investigated topic in financial and management literature. But these investigations focused essentially on how to predict bankpructcy (an external vision of this phenomenon) and rarely on how to prevent failure (an internal vision of this phenomenon). Economically, this last approach remains however essential if we consider the dramatic economic, financial or human consequences of any bankruptcy.

Organizational research has identified a lot of factors partly explaining why company fail ; these factors are respectively linked to the corporate governance system of the firm, to its strategic decisions or actions and to its operational decisions or actions. But the dynamics of these factors and their evolution over time remains relatively rarely explored.

Financial research has stressed the role of fund flows generated and drained by the firm and has pointed out the strong imbrication between key financial dimensions (capital structure, profitability, insolvency, liquidity and investment structure essentially). But, once again, the dynamics of these factors have rarely been explored.

Simultaneously, as Kaplan and Norton (1996) have stressed, economic environment has largely evolved and companies are now in the midst of a revolutionary transformation : "Industrial Age competition is shifting to Information Age competition". Successful companies are now those that :

- develop customer-oriented strategies ;
- focus essentially on intangible assets while simultaneously using efficiently tangible assets ;
- develop capabilities to constantly innovate ;
- focus management processes on customer satisfaction and on learning capabilities.

So, it appears interesting and urgent to develop a dynamic and conceptual business failure approach that would integrate explicitly these new performance requirements and that would lead to identify some key failure processes ; such an identification would then facilitate an active prevention of business failure.

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