

A Behavioral Model of Diversification and Performance in a Mature Industry

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Introduction

Although system dynamics has long been applied to strategic business problems, there has been surprisingly little published work dealing with the topic of diversification and multi-business firms. Widely cited business models in the field typically deal with dynamics at the level of a single business or else at the level of an industry strategic group. Nevertheless, diversified firms are numerous and have been studied closely by academics working in the area of corporate strategy. Much debate surrounds the question of whether (and under what circumstances) diversified firms can outperform firms that focus on a single core business. Researchers in this area have principally concerned themselves with statistical analyses of the link between financial performance and portfolio relatedness (Markides and Williamson 1994, Robins and Wiersema 1995).

By contrast, this paper uses behavioral modeling and simulation to explore the link between financial performance and managerial perceptions influencing investment. Two system dynamics models are used to compare the fortunes and performance of two firms (A and B) facing an identical scenario in their traditional core industry, under identical starting conditions. Firm A focuses strictly on its core business while firm B diversifies. Simulations show how the firms' relative performance depends on the optimism, persistence and foresight of investment policy.

A Glimpse at the Motivation for Diversification

The managerial motivation for diversification often stems from dissatisfaction with the performance of the current business or the realization that opportunities for improved performance may exist in other areas of business in which the firm does not compete (see Penrose 1959 chapter VII, for a classic discussion of the economics of diversification). Central to management decision making is the judgement of whether existing markets are relatively less attractive (profitable) than new markets for any new investment the firm wants to undertake.

The tire industry in the 1980s provides a good example of an industry that came to be viewed by its own executives as unattractive, thereby prompting a wave of diversification (Ginsberg 1995, Ginsberg and Morecroft 1995). Between 1975 and 1985 total tire demand fluctuated in the range 160 to 210 million tires per year. There was very little growth. Severe capacity shortages and surpluses developed, caused by long lead times on capacity expansion and an overhang of old technology bias-ply capacity held by producers unwilling to exit the industry. The result was damaging peaks in rivalry that depressed prices and spoiled firm profitability. The persistence of such adverse trading conditions over many years (coupled with corporate mindsets shaped by the pessimism of the post oil-shock economy) was sufficient to cause leading producers such as Uniroyal, Goodrich and Goodyear to curtail investment in the core tire business and look for new businesses in which to invest.

Two models examine the aggregate policies that control investment in such situations.

Model of Firm A, the Focuser

Figure 1 shows the investment policy of firm A and the feedback loops in which it is embedded. Firm A, an imaginary tire maker, is assumed to focus strictly on the core business, rather like Goodyear in the 1970s and early 1980s. The firm invests according to

management's perception of return on the core business relative to an agreed benchmark return, as shown in bold on the right of the figure. The better the performance the more investment. If return exceeds the benchmark then resources in the core business grow (providing that the rate of investment exceeds the rate of resource depreciation). Conversely, if return is below the benchmark then the core business is starved of investment and resources fall. Return itself depends on a variety of factors that reflect the feedback consequences of past investment decisions and industry conditions. These additional factors are shown in the remainder of figure 1. There is an important balancing loop that results from the direct connection between resources and return. As resources grow then *ceteris paribus* return relative to those resources tends to fall. On the other hand, as resources fall, return tends to rise. The balancing loop represents management's efforts to keep return in line with the agreed benchmark. There is a long term reinforcing loop linking resources to tire attractiveness and to tire sales. Greater investment in core resources can lead to a better product, increased market share and more sales. Finally, overall industry conditions play through in their effect on total tire sales and industry rivalry.

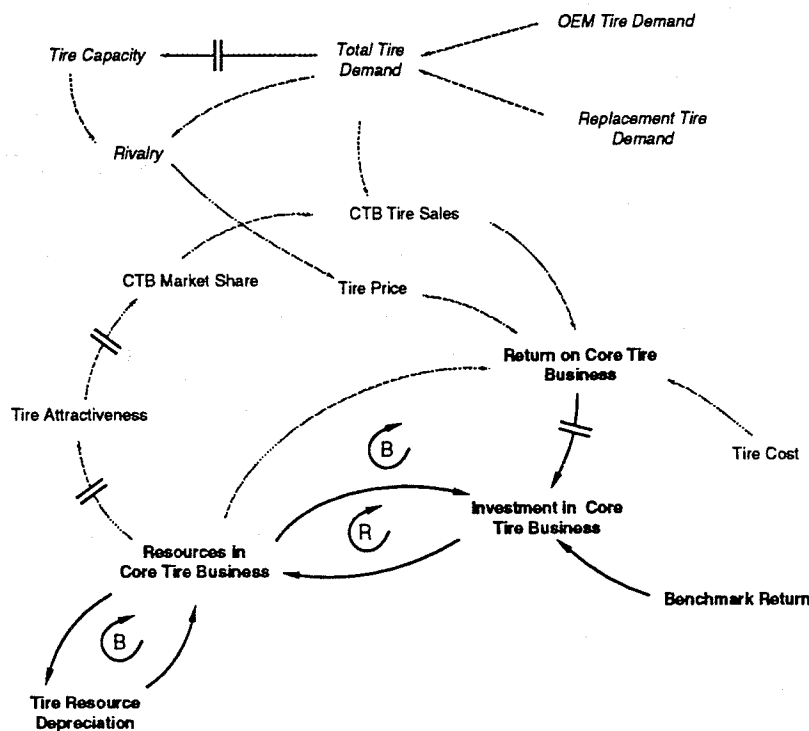


Figure 1: Investment in the Core Business by Firm A, The Focuser

Model of Firm B, the Diversifier

Figure 2 shows the investment policy of firm B as it diversifies into non-core business. Firm B still runs its core business (represented by the box at the top of the figure labelled 'core tire business & market'), but also invests in the non core when its financial performance exceeds the core, rather like Goodyear in the mid 1980s. At the heart of the map is a reinforcing loop, shown in bold, connecting investment to assets in the non-tire business. This loop will generate growth in assets providing that the performance of the non-tire business is judged as superior to the core - a relative judgement. However, the dilemma facing managers is that they don't know for certain how well the new business will perform when it is integrated into the diversified portfolio. Instead they must make do with a judgement of expected performance that blends their initial performance assumption (as originally foreseen at the time of diversification) and reported performance. The blend will differ from company to company depending on the optimism, persistence and foresight of the management team. Moreover, the reported performance of the non-tire business can be distorted in the short to medium term by disruption

caused by heavy new demands on management. The faster the rate of diversification, the greater the disruption. The same temporary disruption can also upset the performance of the core business, thereby further confusing the judgement of relative performance.

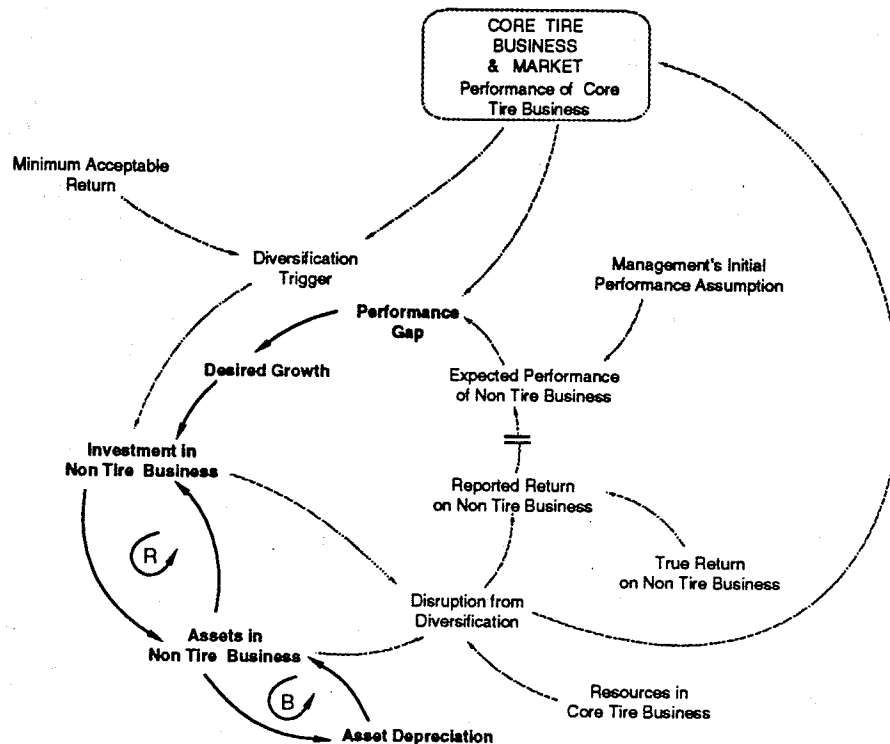


Figure 2: Investment in the Non Core Business by Firm B, The Diversifier

The overall feedback model of diversification as depicted in figures 1 and 2 embodies four specific assumptions about managerial behavior that can influence the relation between diversification and performance:

1. Diversification takes place when existing markets become *relatively* less profitable for any new investment the firm's managers want to undertake - a Penrosian view.
2. Relative performance (core versus non core) depends on a complex managerial judgement that compares a perception of the performance of the core business with a perception about the future possible performance of the targeted non-core business(es).
3. Management's perception of the future possible performance of the non-core business depends on a blend of optimism, persistence and foresight.
4. The faster the rate of diversification, the lower the performance of both the core and non core businesses due to disruption.

Design of Simulation Experiments on Diversification

There is not the space in this short conference paper to present a full set of simulations that explore the implications of the behavioral model described above. Instead I will outline the simulation experiments conducted so far and report a few of the findings.

Experiment 1: Firm A Faces a Drop in Industry Demand

In Experiment 1 Firm A, the focuser, faces a 20 percent drop in industry demand, starting in year 2 of the simulation and extending to year 20. The benchmark return on the core business is initially 6 percent per annum and by definition firm A has no option to diversify. The simulation reveals clearly the sensitivity of firm revenue and profit to recessions in a mature capital intensive industry with high exit barriers. The simulation also shows a trade-off between market share and return that is characteristic of single business firms in mature

industries. In order to maintain high returns in a declining market it is necessary to squeeze resources, which tends to lower market share.

Experiment 2: Firm B Faces a Drop in Industry Demand and Finds a Superior Investment Opportunity

Firm B, the diversifier, faces an identical 20 percent drop in industry demand. But management diversify (by acquisition then organic growth) when return on the core falls below a threshold of 4 percent per annum. The benchmark return on the core business is initially 6 percent per annum. The expected return on the non core business is set at 8 percent per year and is assumed to be an accurate estimate of the true underlying return. Under these conditions there is steady growth in the size of the non core business. Meanwhile the core business loses share by comparison with firm A, the focuser. This share loss comes partly from the disruption caused by diversification and partly from extra downsizing of the core business in an effort to meet the return target. Interestingly, the overall performance (return) on firm B is almost identical to firm A, even though firm B's non core business has the potential to outperform the core. Drifting performance standards in the core coupled with disruption from growth of the non core conspire to nullify performance advantages from diversification, or at least defer the advantages for many years. Only in the case where the non core has a very large and sustainable return advantage over the core (say 5 percent or more) are early relative performance advantages likely to accrue.

Experiment 3: Firm B Faces a Drop in Industry Demand and is Lured into Diversification by Over Optimism

Once more Firm B, the diversifier, faces a 20 percent decline in industry demand with the option to diversify. In this case however, management's initial performance assumption for the non core is much too optimistic at 12 percent per annum rather than the 'true' underlying return of 6 percent. The true return of 6 percent is deliberately chosen to be no better than the average expected from the core. Under these conditions, there is excessive growth of the non core. Investment in the non core is four times as high as it would have been had the initial performance assumption been accurate. The core business is squeezed more than necessary causing loss of market share. Meanwhile, overall returns from the whole adventure are virtually identical to firm A.

Areas for Further Work

The existing model views the diversifying firm as a simple binary investor, choosing whether to favour investment in the core or non core business, based on relative financial performance. The policy implications of this view need to be drawn from further simulations. More work is needed to relate the binary investor view (and its policy implications) to established strategy work on performance and relatedness in diversification. The experiments conducted so far make no assumption one way or the other about the relatedness of the core and non core businesses, though the two are assumed to be coupled through the disruption effect.

References

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