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How much can we learn from success?

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Executive Overview

Managers often wish to extract useful information from studies of successful companies, processes, products, personnel or other entities. In this article, we argue that unless a number of critical questions about study methodology are addressed, serious blunders may occur from using study results. This is especially true when studies are to be used as an aid in predicting success or developing guidelines for action. Studies may be useful in benchmarking levels of success or identifying new strategies but studies of successful firms can stumble, even when predicting short-run success.

Article

Teamwork! Reduced absenteeism and turnover! Employee empowerment and productivity gains! These are only a few of the benefits that Volvo, the Swedish car manufacturer, wished to experience after implementing a "team concept," in its new Uddevalla car assembly factory in 1988 Granting employees greater control over their jobs was supposed to reduce absenteeism and turnover and establish globally competitive levels of productivity.[1] It was bound to work! After all, *In Search of Excellence* and other studies of successful firms have touted teamwork and employee empowerment as "the primary source of productivity gains "[2]

Results at the Uddevalla plant are dismal In mid-1991, turnover was down, but short-term absenteeism remained a serious problem and productivity was anything but competitive. It takes fifty hours for each team to assemble a car at Uddevalla, compared to twenty-five hours at Volvo's "traditional" assembly line plant in Ghent, Belgium [3] And Volvo is not the only automobile manufacturer with disappointing results using this team concept. Both Saab and General Motors decided to close a team-concept assembly plant in Malmo, Sweden early in 1991 [4]

These examples show how one guideline ("productivity through people"), derived from observations of successful companies, was disappointing when applied to one type of process, (auto assembly) But consider Hewlett-Packard. The company followed *all eight* "commandments of excellence" cited in *In Search of Excellence* and was later "forced to abandon attributes of excellence for which it was praised."[5]

What types of studies of success exist, and what kind of entities do they involve? Is success defined in similar ways in such investigations? If a study identifies organizations which are successful, are these organizations likely to be successful in the future? And, how can managers tell whether or not particular success studies provide lessons which can be applied to their organization? The balance of this article addresses these and related questions

What Types of Success Studies Exist?

Many best-selling books, such as *In Search of Excellence*, *A Passion for Excellence*, *Vanguard Management*, and *The Winning Streak* define and summarize successful companies and their management characteristics.[6] Studies of success, however, are not just restricted to using companies as the unit of analysis Books such as *Leaders Strategies for Taking Charge*, *The Great*

American Success Story, and *Peak Performers: The New Heroes of American Business* present characteristics of successful individual managers and leaders.[7] Other studies examine the characteristics of successful companies' boards of directors

Management periodicals inundate the manager with summaries of the strategies used by the "most successful" portfolio manager, salesperson, CEO, marketing manager, and so on Methods as varied as MBO and matrix management often are reported to have worked in successful situations. Internally, managers often examine the best sales people, product lines, markets, or factories for the reasons behind exceptional performance. These empirical studies are neither isolated nor inconsequential

Shortly after publication, *In Search of Excellence* set a record as the largest selling management book ever. Reviewers hailed the book as "rich," "useful," "sensible," and "required reading for all management students and practitioners of management "[8] In all the book's cases, the authors gathered evidence from successful companies to identify their characteristics. Using observations of multiple companies is an improvement over other works which prescribe or recommend actions for success based on the authors' opinions, appeals to normative management theory, or individual anecdotes or examples. Still, empirical studies of successful or failing companies or other entities pose real problems. Thoughtful managers must be alert to the pitfalls inherent in applying lessons learned from such studies to avoid surprising negative outcomes.

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How much *can* we learn from success? The answer depends in part on how the results will be used Let's take a closer look at these uses, and then survey the inherent limitations of "success studies "

Principal Uses for Studies of Success

Studies of success provide at least three potential uses: as descriptions, predictors, and guidelines for action As *descriptions*, achievement levels in criteria for success such as growth or profitability, may be useful for "benchmarking." Descriptions of success can be inspiring and pave the way for further investigation Novel strategies associated with descriptions of success may also suggest alternative approaches. Thus, as descriptions, such studies often are legitimate and useful.

Success studies are also sometimes used to help *predict success*. People sometimes extrapolate results into the future for entities or processes based on studies For example, a set of mutual funds identified as "successful" might be predicted to continue to perform well There are pitfalls in this type of reasoning.

It is common for studies to track not only the successes achieved, but also to identify characteristics associated with the successful entity, such as innovative management practices. In these cases, characteristics associated with success in one set of firms are used to predict success in a different set of firms with similar characteristics. Managers might do this, when assessing company futures before entering alliances, purchasing stock, or accepting a job with a different company. Caution is advised, however, since important circumstances such as the region, industry, state of technological change, or the world economy may differ when the predictions are made

A third important purpose of success studies is as *guide lines for action* or as evidence for normative principles For instance, executives may emulate characteristics such as organizational structures or customer relations of successful

firms Many studies imply that such generalizations can be made legitimately. In fact, the subtitle of *In Search of Excellence*, "Lessons from America's Best Run Companies," suggests that general lessons can be found

Within two years of the publication of In Search of Excellence, many of the forty-three "excellent" companies cited had failed to maintain their "excellent" status.

In the next section, we examine the disappointing track record of using success studies for prediction or as action guidelines.

The Track Record for Studies of Success

Studies of successful firms can stumble, even when predicting short-run success for the same firms In fact, exemplary companies and model mutual fund managers can lose their successful status rather quickly Within two years of the publication of *In Search of Excellence*, many of the forty-three "excellent" companies cited had failed to maintain their "excellent" status [9] Some of these "fallen" companies had indeed departed from the prescribed practices associated with success However, a number of "fallen" companies had also continued to follow rules prescribed in the book Thus, the characteristics identified with successful companies were not sufficient for continued success.

Nor, as it turns out, were the characteristics *necessary* to success "Excellent" companies such as Atari achieved initial success by breaking most of the "rules "[10] Companies such as Texas Instruments and Hewlett-Packard were successful following widely contrasting styles. For example, at Texas Instruments, the CEO was the strategist and the company pursued larger more standard markets At Hewlett-Packard, the CEO set underlying values and strategy was determined by lower levels of management. Hewlett-Packard pursued smaller high-value markets [11] Kodak's centralized management style, while not following the "autonomy and entrepreneurship" prescribed in *In Search of Excellence*," was nevertheless successful [12]

These examples indicate that studies of successful companies may not yield valid predictions of their future success even in the near term. The same goes for studies of boards, managers, or business units. The characteristics associated with success are sometimes insufficient or unnecessary in explaining success. If these limitations are true for companies studied in the short term, even more doubt is cast on the validity of long-term predictions or generalizing the findings to other entities.

In fact, studies that focus on success and its associated characteristics are *guaranteed* to contain methodological weaknesses. These weaknesses are often discussed in the research methodology, but are usually overlooked by managers Because of these inherent weaknesses, studies of successful entities, by their very nature, *cannot* be used to verify that any particular conditions are sufficient to produce success In addition, rarely can such studies conclusively ascertain even the associations between such conditions and success for prediction In other words, the study of success per se *cannot* reveal the paths to success!

Why are "Success Studies" So Unsuccessful?

A principal reason why many studies cannot identify characteristics sufficient for success lies in the nature of "sufficiency " In what follows, we explore the subject of sufficiency and what is required to detect it Even if a study fulfills the logical requirements for detecting sufficient conditions, small study size or lack of care in deciding what level of performance constitutes "success" can lead to distorted results Also, focus on successful situations usually provides evidence too narrow to establish clear relationships Characteristics which have been overlooked or omitted from a study can also inflate or deflate impacts of the characteristics

studied Changing conditions can also make study findings inappropriate or obsolete.

In fact, studies that focus on success and its associated characteristics are guaranteed to contain methodological weaknesses.

The balance of this article clarifies the nature and severity of these weaknesses. It also offers ways that users or study designers can detect, prevent, or reduce them.

The Logic of "Sufficient" Conditions

Consider the characteristics of "successful" companies listed in Exhibit 1, they are the familiar ones cited in *In Search of Excellence* Can it be concluded that the emulation of these characteristics, associated with success, will lead to success for another firm? The answer is unquestionably no and the reason is very simple. To support characteristics associated with success, there cannot be instances in which firms possessing the characteristics are *unsuccessful*. Thus, the demonstration rests on a *lack* of observed instances where the characteristics in question are associated with *unsuccessful* enterprises

"Success studies," however, seldom examine unsuccessful firms! There are most certainly firms with a bias toward action, a lean staff, and so on, that are unsuccessful Studies limited to "successful" companies can never uncover characteristics sufficient for success

Studies may also uncover trivial characteristics. For example, imagine a study restricted to successful managers which reveals that in all cases, the managers wore wrist watches and used the telephone It would, of course, be ludicrous to suggest that any manager that does the same should be successful. There are managers with these characteristics who are *not* successful. However, evidence to this effect can only be obtained from observing *unsuccessful* managers! *To identify characteristics of firms that are sufficient for success, we must include unsuccessful firms in the study*

Can it be concluded that the emulation of these characteristics, associated with success, will lead to success for another firm? The answer is unquestionably no . . .

Studies restricted to successful firms may uncover characteristics *necessary* to success When the evidence shows that no successful firms lacked the characteristics, it lends credence to the characteristics being labelled necessary." Even here, however, caution should be used If the study involved a small number from the total population of successful firms, it may simply fail to uncover any which lack a certain characteristic Thus, an absence of cases may mean that such cases actually do not exist or that they do exist, but none were uncovered Consider a population of 100 successful firms, ten percent of which meet the criteria used for success despite a lack of "operational autonomy." In other words, the characteristic "operational autonomy" really is not necessary for success; some firms in the population are successful despite a lack of operational autonomy Basic statistics can be used to show that if a study was made of 10 randomly

- A bias toward action
- Simple form, lean staff
- Continued contact with customers
- Productivity improvement via people
- Operational autonomy
- Stress on one key business value
- Emphasis on what they know best
- Simultaneous loose-tight controls

Exhibit 1 Characteristics of Excellent Companies
Source: T J. Peters and R.H. Waterman, In Search of Excellence· Lessons from America's Best Run Companies, New York Harper & Row, 1982

selected firms from the successful 100, the chances are 1 in 3 that the study would show no firms which lack operational autonomy.[13] Studies often declare a characteristic as being associated with success even when exceptions do exist! *Characteristics which actually are not necessary for success have a good chance of appearing to be necessary in small sample studies.*

Managers must also be wary of combinations of characteristics. Are all eight characteristics in Exhibit 1 necessary for success? Any five? Some particular combinations? *Studies which simply observe one set of common characteristics cannot reveal the relative importance of successful attributes.*

It is also important to apply the same logic to studies of *un*successful firms or ventures. Conditions necessary to success cannot be discovered from these studies. Caution should be used in concluding that any uncovered common characteristics are sufficient in predicting success or failure, especially if the study sample is small.

Managers need to compare both successful and unsuccessful entities to minimize the chances of these logical pitfalls. The book *Vanguard Management* conducts such a comparison.[14] Characteristics that this book uncovers as being common to most of the "best-managed companies" (top grouping) as well as those associated with failure (bottom grouping) are summarized in Exhibit 2. The fourth and sixth items in the bottom grouping suggest that success breeds complacency. Clinging to past successful practices and being insensitive to environmental changes can help sow the seeds of failure.

Within the same study, however, characteristics associated with success must have opposing characteristics associated with failure. For example, if a long-term view is associated with success, a short-term view must be associated with failure. A lack of such opposites weakens the logic of the study. One is hard-pressed to see clear opposites in most of the characteristics associated with success and failure cited in Vanguard Management.

Characteristics of Best-Managed Companies

- People-oriented
- Leaders are visible
- Plan for employment stability
- Have a consumer orientation
- Future-oriented [long-term]
- Provide a sense of ownership
- A link with entrepreneurial small businesses

Characteristics of Failing Companies

- Insensitive to external realities
- Move away from expertise, lose sight of basics
- Make facile assumptions about the future
- Become smug and complacent
- Overly action-oriented, insufficiently thoughtful
- Repeat past successes, ignore the need for change
- Think short term
- Focus only on maximizing shareholder wealth

Exhibit 2. Characteristics cited in *Vanguard Management*
Source: J. O'Toole, Vanguard Management, New York: Doubleday & Co., Inc., 1985

Note, too, that the characteristics of successful firms differ between *In Search of Excellence* and *Vanguard Management* (Exhibits 1 and 2). The eight Vanguard companies included only one company, Levi Strauss, from the "excellent" firms found in *In Search of Excellence* One explanation might be that the two studies used different criteria for defining success The Vanguard companies included companies selected from an early '80's survey of well-informed people. The companies were cited as being the places where the survey participants most wanted to work. James O'Toole, author of *Vanguard Management*, believes that the evaluators incorporated criteria which included personal, social, technological, and economic measures Conversely, Peters' and Waterman's criteria focused on growth, long-term wealth, return on investment, and sales from 1961-1980. This contrast underscores the point that differences in success criteria and the time periods can lead to different selections and sets of characteristics.

In addition to simply contrasting characteristics of a sample of successful and unsuccessful firms, *one must be sure that any differences between the two are statistically significant* (i.e , be sure that differences observed are not accidental.) For example, Ramanujam and Venkatraman matched, in terms of industry and size, different firms to forty-one of the "excellent" companies from *In Search of Excellence* [15] Half of the comparison group were "Low Effectiveness Benchmark" firms, unsuccessful in that they performed below the median in sales and income growth, market share changes, and ROI The balance of the group were above average The authors measured ten characteristics of firms in each pair, where the characteristics reflected four of Peters' and Waterman's eight traits for excellence ("staying close to the customer," "sticking to knitting," "autonomy and entrepreneurship," and "simultaneous loose-tight properties"). They found that there were *no* statistically significant differences for nine of the ten characteristics between the above average "excellent" companies and their "low effectiveness" counterparts! In other words, there was no convincing evidence of differences in nine out of ten characteristics between above average and below average firms.

Setting Thresholds for "Success"

Despite the widespread use of the terms "necessary" and "sufficient," a number of writers have questioned the use of these adjectives in relation to causal conditions [16] The criticism can occur, in part, when analysts divide quantitative variables into two categories (such as "successful" or "not successful," "present" or "absent") Variables do not always fall into two mutually exclusive and exhaustive categories For example, "success" might be measured by an indicator of profitability, such as return on equity or a return/risk ratio having many possible values. A dichotomy is created by the investigator: firms scoring above a particular value are judged to be "successful" and those at or below the value "not successful " In such cases, the underlying measure of success is not a dichotomy, but one has been created by arbitrarily dividing the profitability scale into two parts Similarly, a firm's characteristics could be variables such as degree of "closeness to customer" or "extent of diversification," where again, some arbitrary "cut point" is used to classify the characteristic as "significant" or "insignificant," "high" or "low " Virtually all measures of success (for example, return on equity) and associated characteristics (diversity, autonomy, future orientation) are actually quantitative variables which are not inherently dichotomous, but rather are variables which have been arbitrarily divided into two categories

How does the selection of an arbitrary cut point affect the study of paths to success? The point is relevant since, in cases where variables are divided by researchers' judgment, it is possible for two observers to perform standard analyses on the *same data* and reach very different conclusions. In fact, one observer could conclude that a characteristic is sufficient to success, but not necessary, while the other concludes that the same characteristic is necessary but not sufficient!

How does the use of arbitrary cut points for introducing dichotomy into quantitative variables produce a problem in uncovering characteristics which are sufficient or necessary conditions? Consider Exhibit 3, with scatter diagrams showing, for example, the hypothetical relationship between return/risk ratio on the vertical axis and degree of diversification on the horizontal. If we ignore the cut point lines, Exhibit 3a suggests a fairly strong, direct relationship between degree of diversification and a return/risk ratio Here, the higher the diversification, the higher the return/risk ratios Suppose an investigator chose levels of each variable to define "successful" and "high diversification," those intersecting at point "A." In this case, all companies classified as successful also fall in the high diversification category Thus, it would appear that diversification is "necessary" to high return-to-risk (since no firms with "low diversification" were "successful"). If instead the researcher used slightly different cut points intersecting at point B, diversification would appear *not* to be a "necessary" condition. By employing these second cut points, our researcher would "discover" some successful firms with low diversification, "verifying" with the same data that high diversification is not necessary to success.

Problems with dichotomization occur also when a study focuses on unsuccessful cases or even when it extends to both unsuccessful and successful cases. Thus, arbitrary cut points for defining categories for quantitative variables' can produce arbitrary evidence concerning "necessity" and "sufficiency" of the characteristics measured by the variable

Exhibit 3b shows another serious pitfall of using cut points. Suppose a quantified variable such as degree of diversification is in fact completely unrelated to success, as depicted by a roughly circular scatter. Such a variable could nevertheless appear to be a necessary condition for success simply because the two variables were dichotomized for the study as shown in Exhibit 3b. A high degree of diversification might be reported as necessary to success since in no case was low diversification associated with success

These examples show that an executive who reads such studies must be aware of the pitfalls of quantitative variables which are dichotomized even when the

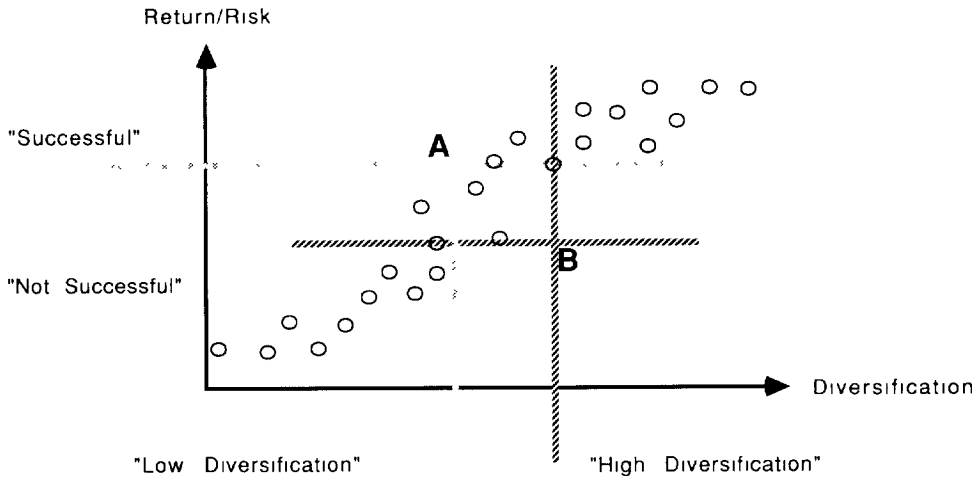

Exhibit 3a Success (Return/Risk) vs Diversification with Arbitrary Cut Points for Each Variable

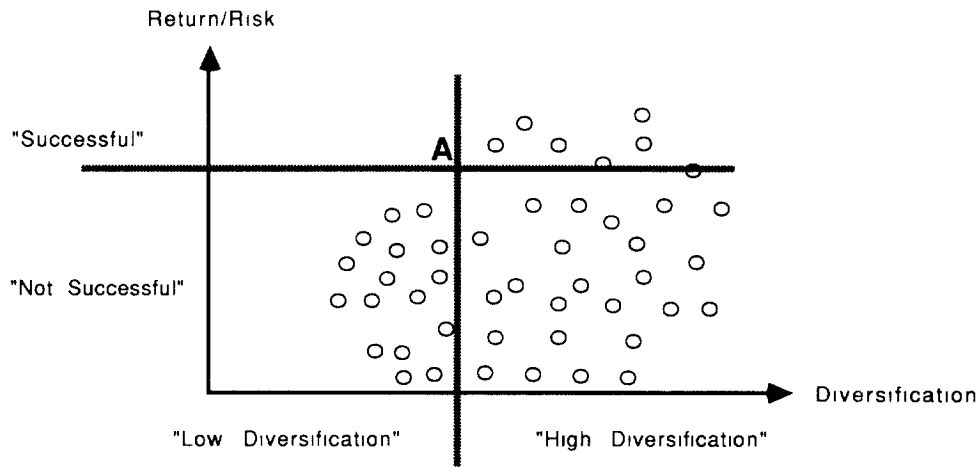

Exhibit 3b Success (Return/Risk) vs Diversification with Arbitrary Cut Points for Each Variable

analysis extends to both successful and unsuccessful cases. Conclusions regarding sufficiency and necessity are as arbitrary as the cut points used!

To avoid these pitfalls, managers should steer clear of studies which dichotomize quantitative variables, unless the studies use less arbitrary cut points, such as median values for each variable

Restricted Ranges of Observation on Quantitative Variables
Even when a study uses numerical values instead of dichotomies to measure success and its associated characteristics such as diversification, examining only the successful entities results in distortion For example, in Exhibit 3a one would observe only cases above the "success" threshold, giving the false appearance of a flat, weak relationship between diversification and return/risk. In this example the relationship is actually positive over the full range of both variables.

Usually, Outstanding Performance is Unusual
Still another problem arises when results from studies which focus on unusual entities are generalized It does not matter whether the focus is on successful entities, failures or both. Outstanding entities are unusual by their very nature. What makes them unusual *may* reside in the entities' characteristics, such as management practices (a typical focus of success studies), or important characteristics which were not considered in the study, such as the competitive or regulatory environment, or an interaction between the organizational culture and technological advances.

Firms that are successful in terms of return on equity, for example may succeed because of patent ownership, their industry, or protective trade barriers. Thus, in studies which focus on managerial practices, a successful firm may be successful in spite of its management practices, not because of them. Investigators should try to incorporate all plausible internal and external, success prediction factors, into explanatory studies.[17]

Even when a study omits characteristics which are individually unimportant determinants of success, problems can arise in trying to predict success based on the study For instance, consider the practice of studying track records of mutual

funds using some criterion of success such as total annual rate of return, to determine the best performance records. Methodological problems arise when readers infer that stellar performances are likely to continue, or that the trading strategies of the "best" funds' managers should be imitated. (One is reminded of the story of the golf pro who immediately praised his students' unusually good shots and was equally quick to criticize the extremely bad ones The pro found that almost always, an extremely good shot was followed by shots less praiseworthy, and vice versa for poor shots. The pro concluded that praise lowers performance while criticism raises it!) The point is simply that unusual performance which happens by chance is seldom maintained.

In the mutual fund example, a problem exists since such successful performances could have occurred not because of a superior investment strategy but rather completely by chance! ("Chance" here refers to all factors which vary having some chance of taking on values near the ends of their value ranges.) Even in a group of 1,000 investment managers each spinning a roulette wheel to determine their selections, some would be "top performance " Of course, it would be fallacious to emulate their "spinning styles" to try to duplicate their performances! The problem with trying to use track records which may have occurred by chance is that sooner or later, usually sooner, the performance "regresses" toward the average.

In the mutual fund example, a problem exists since such successful performances could have occurred not because of a superior investment strategy but rather completely by chance!

Users need to ask whether any observed unusual performances (either successes or failures) could have reasonably occurred by chance. Plotting time series graphs of performance variables can often assist a manager in identifying whether extreme performance is part of a trend or cycle resulting from some systematic causes, or simply due to chance

Finally, even if all the previous pitfalls can be avoided so that clear and valid relationships can be established, managers must be careful not to ignore changes in environmental conditions or differences between applications which could deem past associations or practices inappropriate [18] Follow-up studies of the companies in *In Search of Excellence* by *Business Week*, McKinsey, and Standard & Poor's Compustat Services showed that twelve of the fourteen firms that "lost

FOR PREDICTING SUCCESS
Does the study .

- include both successful and unsuccessful entities?
- avoid arbitrary cut points in variables which define success (in terms of distinguishing "successful" from "unsuccessful" entities) or other characteristics (such as "highly diversified" or "not highly diversified")?
- use a large number of entities or long enough period to make results statistically significant and not due to chance?
- include conditions that are directly relevant to the user such as
  - —appropriate criteria for defining success
  - —a recent and relevant time frame
  - —applicable situational conditions such as industry and geographic location

* * *

FOR CREATING GUIDELINES FOR ACTION

- The manager needs to be certain that the answer to all of the previous questions is yes
- Does the study include all of the characteristics of the entity and environment that could influence success or failure?
- Can all of the characteristics associated with success be satisfied simultaneously?

Exhibit 4 Characteristics of relevant studies

their luster" within two years of that book's publication "were inept in adapting to a fundamental change in their markets."[19] For example, Delta used a close-knit culture, but failed to react to deregulation and was slow to use computers for pricing in various markets. Both Avon and Dart and Kraft stayed close to the customer, but when markets shifted found themselves close to the wrong customer.[20] *Business Week* concluded that "... strict adherence to the eight commandments [of *In Search of Excellence*]—which do not emphasize reacting to broad economic and business trends—may actually hurt a company."[21]

Conclusions

Managers often try to extract useful information from studies of successful companies, processes, products, personnel or other entities. I have concluded that such studies may be useful in benchmarking levels of success, and in identifying novel strategies for further exploration. However, when such studies are to be used to help predict future success or to develop guidelines for action, a number of crucial questions need to be addressed. If the answer to any of these questions is no, serious blunders may occur by using study results.

How much can we learn from success? The answer, if we study only successful entities, is "very little," except to glean information for benchmarking. However, studies that gather characteristics spanning a full range of success and failure may assist the manager in making predictions and serve as sources of action guidelines, but only if the answers to the questions in Exhibit 4 can all be answered "yes!"

Endnotes

[1] "Edges Fray on Volvo's Brave New Humanistic World," *New York Times*, July 7, 1991, F 5.

[2] "Productivity through people" is the 4th attribute of successful companies cited in T J Peters and R.H Waterman, *In Search of Excellence: Lessons from America's Best Run Companies* (New York: Harper and Row, 1982). Page 238 states "Treat [people] as partners, treat them with dignity, treat them with respect. Treat them—not capital spending and automation—as the primary source of productivity gains."

[3] See Edges Fray, endnote 1.

[4] Ibid.

[5] See "Who's Excellent Now?," *Business Week*, Nov. 5, 1984, 76-78.

[6] T J Peters and R.H Waterman, op. cit., J O'Toole, *Vanguard Management* (New York: Doubleday and Company, Inc., 1985), T. Peters and N. Austin, *A Passion for Excellence* (New York: Random House, 1985); and W. Goldsmith and D. Clutterbuck, *The Winning Streak*, (New York: Random House, 1985).

[7] See W. Bennis, and A. Nanus, *Leaders: Strategies for Taking Charge* (New York: Harper & Row, 1985), G. Gallup, Jr. and A.M. Gallup, *The Great American Success Story* (Homewood, Ill.: Dow-Jones Irwin, 1986), and C. Garfield, *Peak Performers: The New Heroes of American Business* (Fairfield, N.J.: William Morrow, 1986).

[8] Such statements were found in *Business Horizons*, May-June 1983, *the Atlantic*, Dec. 1982, and *The New York Times Book Review*, March 6, 1983, with similar statements found in a number of other reviews of this and comparable works.

[9] See endnote 5.

[10] Ibid.

[11] S.C. Wheelwright, "Strategy, Management and Strategic Planning Approaches," *Interfaces*, 1984, *14*, 19-33.

[12] See "Kodak Has Arduous Struggle Ahead to Regain its Edge," *Wall Street Journal*, April 2, 1987.

[13] The probability in this example can be derived from a hypergeometric distribution or a binomial approximation found in most statistics texts, using N = 100, p = 0.1, n = 10 and X = 0. A sample larger than ten would reduce the probability of erroneously finding no such firms.

[14] See J. O'Toole in endnote 6.

[15] V. Ramanujan and N. Venkatraman, "Excellence, Planning and Performance," *Interfaces*, 1988, *18*, 12-31.

[16] See H.M. Blalock Jr., *Causal Inferences in Nonexperimental Research* (Chapel Hill: The University of North Carolina Press, 1964), 30-35; and Y.S. Lincoln and E.G. Guba, *Naturalistic Inquiry* (Beverly Hills: SAGE Publications, 1985), ch. 6.

[17] A number of studies have included many explanatory factors. See, for example, S. Schoeffler, R.D. Buzzell, and D.F. Meany, "Impact of Strategic Planning on Profit Performance," *Harvard Business Review*, March-April 1974, 137-145. For more on problems created by correlations among explanatory variables, see C.R. Anderson and F.T. Paine, "PIMS: A Reexamination," *Academy of Management Review*, July 1978, 602-612; See especially 605-606.

[18] See W.H. Starbuck et al. "Responding to Crises," *Journal of Business Administration*, 1978, 9(2), 114-115, and T. Peters, *Thriving on Chaos: Handbook for a Management Revolution* (New York: Alfred A. Knopf, 1988).

[19] See endnote 5, p. 78.

[20] Ibid.

[21] Ibid.

About the Author

James N. Vedder has been academic director of the Executive MBA program in the School of Management at Syracuse University since its inception in 1985, and was recently appointed academic director for all Masters Programs in the school. As professor of statistics and management science, his interests focus on planning and problem solving processes, and on evaluation designs. He has served as advisor to a number of organizations, including Carrier Corporation, Oneida Ltd., NASA, the US Agency for International Development and the World Bank, in the United States and ten other countries.