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**Article**

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# Research Note: Venture Capitalists' Investment Criteria: A Replication

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This study replicates substantial portions of a study entitled “Criteria Used by Venture Capitalists to Evaluate New Ventures Proposals” by MacMillan, Siegal, and SubbaNarasimha. Results were similar to the earlier work. The differences observed can be attributed to history effects caused by the passage of six years between the studies. Venture capitalists have become more concerned over market acceptance and less demanding of high potential rates of return and quick exit. These changes represent a more realistic view of venture potential.

The confirmation of research findings through replication by other researchers is an essential part of scientific methodology. William Broad and Nicholas Wade in *Betrayers of Truth* [1] present examples wherein the inability of other researchers to replicate published scientific findings revealed both inadvertent errors and outright fraud. Replications in the physical and social sciences are attempted infrequently, however [2].

While written by Dewald, Thursby, and Andersen to introduce an article in *American Economic Review* and specifically discussing research in money and banking, the statement above is certainly applicable to research in small business finance. DeWald, et al. provide the following explanation.

Thomas Kuhn [3] emphasized that replication—however valuable in the search for knowledge—does not fit within the “puzzle-solving” paradigm which defines the reward structure in scientific research. Scientific and professional laurels are not awarded for replicating another scientist's findings. Further, a researcher undertaking a replication may be viewed as lacking imagination and creativity, or of being unable to allocate his time wisely among competing research projects. In addition,

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replications may be interpreted as reflecting a lack of trust in another scientist's integrity and ability, as a critique of the scientist's findings, or as a personal dispute between researchers. Finally, ambiguities and/or errors in the documentation of the original research may leave the researcher unable to distinguish between errors in the replication and in the original study. Months of effort may yield the replicator only inconclusive results regarding the validity of the original study, and thus no foundation for his future research in the area. These circumstances nurture a natural reluctance to undertake replication studies.

Replications may produce different results for a variety of causes. First is the occasional incidence of outright fraud on behalf of a researcher [1]. Second is the potential for data entry and computational errors. DeWald, et al. [2] attempted to replicate studies that had appeared in the *Journal of Money, Credit, and Banking*. They ran into significant problems even though they attempted to use exactly the same data and analytic methods.

Small business finance research is subject to error for both of the above reasons. However, the greatest potential for error is caused by its use of quasi-experimental design. Validity is a major concern for quasi-experiments. Cook & Campbell [4] argue that "in the last analysis, external validity—like construct validity—is a matter of replication."

Cook and Campbell point to three significant causes of differences occurring in replications. One is the investigator. Different investigators may report the same phenomena differently. The other two relate to the data analyzed. First, differences may occur when data is gathered at different times from the same subjects. Second, differences may occur when the subjects differ.

Replication provides a means for overcoming these problems. As a result, replications are important to small business finance research.

In this study, we attempt to replicate substantial portions of a study entitled "Criteria Used by Venture Capitalists to Evaluate New Venture Proposals" by MacMillan, Siegel, and SubbaNarasimha (hereafter referred to simply as MacMillan [5]). It is one of the most significant studies examining how venture capitalists (VCs) allocate money among entrepreneurial ventures. This is an important topic both because of the significance of the venture capital market to small business finance, and also because the venture capitalist provides an expert's observations on the venture creation process [6].

MacMillan gathered data via a mail questionnaire sent to all member firms in the National Venture Capital Association (NVCA). A date for the mailing is not given in the study. However, since the firms selected for the

mailing were listed in a 1983 membership directory and the article was published in a Winter 1985 edition, data collection likely occurred in 1984.

The questionnaire provided the venture capitalists with 24 criteria for analyzing an investment, e.g., "the entrepreneur is capable of sustained intense effort." The venture capitalist was asked to weigh the importance of each criteria on a four point scale, with one being irrelevant and four being essential.

In our study, we constructed a questionnaire utilizing the same criteria and wording similar to that used by MacMillan. Based upon the results of the earlier study, we reduced the number of criteria studied to 14.

This questionnaire was sent to 491 firms listed in the 1989 edition of *Pratt's Guide to Venture Capital Sources*. The Pratt's directory includes both NVCA and non-NVCA members. In addition, it includes listings for various service providers to the venture capital industry, e.g., investment bankers, "deal packagers," etc. Service providers were excluded from the mailings since they do not make the actual investment decision. Two mailings of the survey were made in late 1990 and early 1991, resulting in 143 usable responses.

Due to the nature of the MacMillan study and our replication, we did not expect any differences between the two to be the result of different investigators. Both studies utilized similar, closed response, mail questionnaires that left little, if any, room for the results to be affected by the investigator.

While there is always the potential for errors in data entry and analysis, the amount of data used and the analysis employed are much more manageable than those of the economic studies that DeWald, et al. attempted to replicate. In addition, an examination of the results reported by MacMillan did not reveal any sign of inconsistencies.

Therefore, the likely sources of difference are differences in subjects and history effects. Our sample included both NVCA and non-NVCA members, whereas MacMillan used only members. Arguably NVCA members may have different criteria from non-members. Significant history effects may also be present since approximately six years elapsed between the data collection phases of the two studies.

## I. FINDINGS

In order to test for differences based upon NVCA membership, we split our sample in two based upon NVCA membership. Means for each of the criteria were computed and the groups compared using T-tests. Only one

**Table 1**  
Criteria

	<i>MacMillan Study</i>	<i>Replication Study</i>
<i>The entrepreneur...</i>		
is capable of sustained intense effort	3.60	3.71
is thoroughly familiar with the market	3.58	3.65
is able to evaluate and react well to risk	3.34	3.50
has demonstrated leadership ability	3.41	3.47
is articulate in discussing the venture	3.11	3.16
has a track record relative to the venture	3.24	3.10
<i>The product...</i>		
is proprietary	3.11	3.11
has demonstrated market acceptance	2.45	2.87*
<i>The market...</i>		
enjoys a significant growth rate	3.34	3.34
will be free of significant competition for the next three years	2.33	2.44
<i>The investment...</i>		
will return at least ten times my investment in 5-10 years	3.42	3.15*
can easily be made liquid	3.17	2.04*

Notes: 4 = essential, 3 = important, 2 = desirable, 1 = irrelevant  
\* $p > .05$

variable, which will be discussed later, had statistically significant differences at the 0.10 level.

Because of the insignificant differences between NVCA and non-NVCA members in our sample, we compared the MacMillan results with our full sample. Table 1 indicates the various criteria, the mean value attached to the criteria, and its standard deviation. Comparisons were made between the two studies using T-tests.

Of the 12 variables tested, no statistically significant (at the  $> 0.05$  level) differences were found on nine. In only one case, market acceptance, were VCs more demanding in our study than in MacMillan's. The most notable differences were in what MacMillan referred to as financial considerations. VCs in our study were less demanding on both potential return and liquidity.

## II. DISCUSSION

Our findings were in general agreement with those of MacMillan. The entrepreneur variables were almost the same. Since there was little difference between the NVCA and non-NVCA groups in our sample, it appears

that the differences we observed between our study and MacMillan's were due to history effects.

The higher need for market acceptance is likely due to a shift in investment stage of interest to many venture capital firms. In the early 1980s great attention was given by venture capitalists to creating major new high-tech industries. In some cases this led to major disappointments, the Winchester disc drive industry being among the most dramatic [7]. As a result, more VCs began to focus on later stage investments and management buy-outs. However, many venture capital firms continue to make early stage investments. In our study only 29% of the firms said market acceptance of a product was essential.

This shift towards late stage investing may also explain the decreased importance attached to returning 10X the VC's investment. (A return on 10X investment in seven years produces an IRR of 39%.) Because there is less business risk associated with later stage investments, a VC may be able to receive a lower return on successful ventures and still keep the portfolio rate of return high.

This drop may also be due to a lowering of expectations by VCs as to what rate of return is feasible. At the time of the MacMillan study, VCs were in the liquidation phase of partnerships formed in the mid to late 1970s. These partnerships were extremely successful, with several yielding returns in excess of 40%. However, at the time of our study, VCs were liquidating partnerships formed in the early 1980s, with average returns having plummeted [8]. Recently industry experts have said that a return of 25% on investments (18% to limited partners) is a reasonable target for a venture capital partnership [9].

The most pronounced difference was in the need to easily liquidate the investment. In MacMillan's study, 44% of the respondents said that it was essential that the investment could be exited quickly. However in our study only two percent termed it essential.

This was the only variable where there were statistically significant differences in our study based upon NVCA membership. In our sample the response of non-NVCA members (mean = 2.24) was closer to MacMillan's results (3.17) than was the response of NVCA members (1.83). Thus the difference between our overall sample and MacMillan's is due to a history effect.

In the early 1980s, many VCs viewed an initial public offering as their likely exit vehicle. However, the IPO market weakened substantially, leaving the VC with many investments that could not be sold or taken to market [8]. This appears to have substantially changed VCs expectations about the likely holding period for their investments. In addition, many VCs now

invest in companies that are unlikely IPO candidates even in a good IPO market. This may necessitate the use of a put back to the company as an exit mechanism. Generally these puts can not be exercised immediately.

### III. CONCLUSION

The results of our study were very similar to MacMillan's. The differences observed can be attributed to changes in the industry. VCs have become more concerned over market acceptance and less demanding of high potential rates of return and quick exit. These changes represent a more realistic view of venture potential.

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