Assessing the validity of secondary data proxies for marketing constructs

Mark B. Houston*

Department of Marketing, College of Business, University of Missouri-Columbia, 216 Middlebush Hall, Columbia, MO 65211, USA

Abstract

This paper outlines alternative methods for assessing the validity of secondary data proxies for marketing constructs. By employing secondary data proxies, researchers can avail themselves to new sources of data and can shed new light on or provide important corroborating evidence to established streams of research that have relied on a limited variety of methodological approaches. Still, secondary data proxies are not heavily used for marketing constructs, appearing especially infrequently as independent variables in the extant literature. A key issue that reduces their attractiveness appears to relate to construct validity (Rindfleisch and Heide, 1997). Unlike multi-item scales, procedures for investigating the construct validity of a secondary data proxy are not well-defined or generally accepted. This paper argues that judicious selection of an appropriate proxy and careful assessment of the proxy’s performance within a theoretically specified nomological network of constructs can provide compelling evidence of construct validity.

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Keywords: Secondary data; Construct validity; Nomological validity; Triangulation

1. Introduction

Marketing scholars rarely employ secondary data indicators as proxies for marketing constructs, perhaps due to concerns over validity issues (Houston and Johnson, 2000). For example, in a major review of transaction cost economics (TCE)-based research in marketing, Rindfleisch and Heide (1997, p. 42) articulate this concern with secondary data proxies: “[I]ndicators such as these provide only an approximate specification of the construct, which leads to potential construct validity problems.” Since marketing constructs are most often measured with multi-item attitudinal or perception scales, another critique of secondary data proxies argues that these “single-item measures” lack reliability.

However, in other disciplines (e.g., finance, economics, health care administration) secondary data proxies are widely accepted and are strongly preferred over self-report scale measures. Day and Montgomery (1999, p. 10) note that the larger academic and managerial communities perceive that disciplines such as finance “have more rigorous metrics” than does marketing. In fact, it has been argued that “the influence of marketing, as both a discipline and a function, has been diminished because of the absence of conceptual linkages and a language that would enable it to engage in a meaningful dialogue with financial and top management” (Srivastava et al., 1999, p. 168). The mere inclusion of secondary data sources in marketing research seems unlikely to enhance our influence on top management and on scholars in other business disciplines. But carefully selected financial (e.g., research and development [R&D] expenditures; sales volatility), market position (e.g., share; industry concentration), and firm-level (e.g., number of new product introductions; patents) data from secondary sources relate directly to shareholder value concerns, and thus may provide a “linkage” that could enhance marketing researchers’ abilities to communicate effectively with these groups.

The purposes of this paper are to (1) explore the benefits and costs raised by the use of secondary data indicators as proxies for studies in marketing strategy and channel contexts and (2) to specify procedures by which the construct validity of these proxies can be assessed. The issues raised and procedures identified are also applicable in consumer contexts. In short, secondary data proxies are alternative methods that provide important triangulating evidence regarding theories that have been tested primarily with scale data. These proxies avoid some of the validity concerns raised by the use of self-report data and key informant samples, but face other challenges. While the procedures for assessing the validity of multi-item scales are well-established, similar standards do not exist for appraising a secondary data proxy (Churchill,
1979; Gerbing and Anderson, 1988). Thus, the key contribution of this paper is to isolate methods for assessing the construct validity of secondary data proxies while identifying areas of caution concerning their use.

After exploring the benefits and drawbacks of secondary data proxies, issues of construct validity and validation are discussed. Specific validity assessment methods that are applicable to secondary data proxies are then articulated. The paper concludes with research implications.

2. Secondary data proxies

Secondary data are data that have been collected from respondents (individuals or organizations), for purposes other than the research situation at hand (Lehmann, 1989; Parasuraman, 1986). Important sources of secondary data include government data (e.g., Bureau of Census; U.S. Department of Labor; Department of Commerce—providing data such as unemployment rates, income trends, population trends, economic conditions, etc.), financial databases (e.g., Standard & Poor's Compustat; University of Chicago's Center for Research in Security Prices [CRSP]—providing data such as company-specific financial information from annual 10-K reports, including sales, costs, various profit figures, lines of business, etc.), syndicated data (e.g., J.D. Power and Associates automotive quality ratings; Nielsen television viewership ratings; an IRI grocery scanner panel), industry association groups (e.g., National Automobile Dealers Association; the American Marketing Association), and data internal to a particular organization (e.g., scanner data, sales and cost figures, customer satisfaction ratings, warranty claims, etc.). These types of data are often used to indicate outcomes, such as sales rates, costs, consumer switching, and deal proneness. As such they are widely employed as dependent variables in marketing studies. However, when carefully selected and validated, secondary data sources can provide proxies for important marketing constructs, and can be conceptualized as dependent and/or independent variables.

2.1. Potential benefits of secondary data proxies

Marketing researchers have a number of reasons to value the information that can gained by utilizing secondary data. First, secondary data, in general, represent "real" decisions that have been made by "real" decision-makers in "real" environments (Winer, 1999). As compared to laboratory or survey data collection methods, secondary data are collected in less obtrusive manners. For example, financial data are provided to the market in accordance with Securities and Exchange Commission (SEC) guidelines. Any research use is purely incidental to the main purpose for the reported data. Alternatively, scanner panel members simply provide a bar-coded panel membership card and then proceed normally with their shopping purchases (Winer, 1999).

Within this first benefit of "reality," for research purposes, it can be argued that secondary data are less likely to be influenced by self-report biases that may be present in data collected through attitudinal scales, particularly those that inquire about past events or attitudes that may be "reconstructed" to reflect positively on the respondent (Clapham and Schwenk, 1991; Moorman and Slotegraaf, 1999). "[S]elf reports can be influenced by a variety of factors, including self-presentational concerns or what has been termed "self-deception"" (Tomarken, 1995, p. 388). While this concern is often articulated and controlled for in studies of consumer behavior, Houston and Johnson (2000) articulate how retroactive-sensemaking (cf. Weick, 1979) and/or social desirability issues can bias survey results even in channels contexts. In short, the outcomes of behaviors or decisions are known, and even the most well-intentioned respondent is challenged to avoid having their memories shaped by this information (Jones et al., 1997).

Further, secondary proxies can avoid biases introduced by use of the key informant sampling approach that is prevalent in channels and strategy research. In short, key informants across firms within a study (often a certain position, e.g., "the sales manager" or the "marketing research director," is specified) typically share characteristics (position within the firm; functional training, etc.) that likely shape their perspectives on firm-related issues. A sample of informants that held different positions within their respective firms might view the same issues differently.

A second broad reason to value secondary data comes from the ease of collection for research use. The researcher bypasses the stages of instrument creation and primary data collection. Drawing data from existing sources will, in general, save the researcher time and costs. For example, assume that an automobile manufacturer desires to isolate potential markets for a new truck model. The firm could collect state vehicle registration data (e.g., from R.L. Polk) and determine per capita truck ownership by dividing truck registrations by the number of people in the state (gathered from Census Bureau data) instead of incurring the time and financial costs of creating, testing, revising, administering, and analyzing a consumer "truck ownership" survey of the magnitude needed to provide comparable data. Still, it should be noted that while secondary data are typically less expensive than comparable primary data, they may be costly in an absolute sense. For example, the new car initial quality data from J.D. Power and Associates is quite expensive, though the cost of collecting primary data on a similar scale would be prohibitive for a single firm.

In the context of channels or organization research, secondary data overcome concerns related to maintaining access to the research setting and gathering sensitive information (cf. Van de Ven, 1992; Workman, 1992). With survey or ethnographic research, firms may reconsider and unexpectedly halt their cooperation in the midst of data collection without regard for the research process. Regarding sensitive information, individuals within a firm may be
reluctant to share their true views on controversial issues, particularly if they fear some type of retribution if their beliefs are exposed. Similarly, firms may not share complete information regarding key technologies, investments, or customers if they fear that the information may be leaked to competitors, thus eroding some position of competitive advantage. Access to all but internal secondary data sources is more certain, and sources such as the Census Bureau or the SEC have legal authority to collect and disseminate specific types of data (e.g., sensitive financial data such as R&D spending) that might not be reported otherwise (Parasuraman, 1986). Given the economies of time and cost, researchers can often employ larger sample sizes when drawing data from secondary sources.

A third, and perhaps most important, benefit to researchers employing secondary data is that alternative types of data can provide multimethod triangulation to other research findings (cf. Campbell and Fiske, 1959). The knowledge bases regarding many marketing constructs (consumer, channel, and strategy) have been built heavily through survey research approaches. Other theoretical areas rely predominantly on experimental approaches. While many alternative tools, contexts, and sample compositions have been employed within these broad method areas, maximally dissimilar methods are seldom brought into play. Alternative methods provide alternative perspectives. For example, channels research is often heavily based on TCE theory that argues that interfirms integration is an appropriate mechanism for dealing with risk and uncertainty. Marketing and management scholars commonly test modified-TCE variables (such as commitment, joint action, or continuity), but rarely test integration at the level where firms legally and financially combine (e.g., joint ventures and mergers). Houston and Johnson (2000) drew from secondary data sources a dependent variable that indicated the choice of a contract versus a joint venture that enabled them to conduct an explicit investigation of economic integration. If the goal of assessing the robustness and boundaries of theory or effects by garnering alternative perspectives is desirable, then employing secondary data proxies, an underused category of data, may be appropriate.

2.2. Potential limitations of secondary data proxies

Though secondary data allow researchers to observe how respondents "vote with their dollars" (i.e., actual behaviors), as opposed to reported attitudes or behavioral intentions that may or may not be carried out, these data have four important limitations. First, secondary proxies for many marketing constructs are simply unavailable. For example, Winer (1999) laments that while scanner data indicates actual purchasing behaviors, no process measures (e.g., attitudes) are provided. Second, secondary data that appear to proxy constructs of interest may not clearly align with the domain of the construct. For example, finance and economics studies that employ firm-level proxies (e.g., Titman and Wessels, 1988, use R&D spending as a proxy for asset specificity) to study interfirm transaction governance decisions are criticized by marketing scholars for employing variables with differing units of analysis (the firm vs. a transaction). Alternatively, financial data from an annual report may reflect accounting considerations and thus may mask the operating outcomes that are of interest (Srivastava et al., 1998). Tomarken (1995, p. 393) argues that secondary indicants "often reflect the influence of multiple processes," thus the relationship between the indicant and a construct is difficult to clearly specify.

Third, secondary data may be difficult to match to other types of data. Besides the unit of analysis concern, it may be difficult to employ a secondary data proxy as a complement to another type of data within the same study since secondary data often lag the events they report. A survey researcher may balk at waiting a long period of time for the availability of corroborating secondary data. A researcher who gathers multiple years of secondary financial data may express legitimate concern over the validity of collecting new survey data that asks consumers or managers to report attitudes towards objects or events from several years in the past. Retroactive-sensomaking biases (Weick, 1979) and/or simple forgetting would likely influence the results. Fourth, secondary data sources may suffer from other types of sample biases. "[T]here are always questions about the kind of people who agree to be on these [scanner] panels as well as the 'mortality' issue of panel dropouts" (Winer, 1999, p. 353).

3. Construct validity and validation

Construct validity refers to "the vertical correspondence between a construct which is at an unobservable, conceptual level and a purported measure of it which is at an operational level" (Peter, 1981, p. 134). Research results gain credibility when valid measures of relevant constructs are employed (cf. Gerbing and Anderson, 1988; Bagozzi et al., 1991; Churchill, 1979; Peter, 1981). Our confidence in an indicator is increased when the indicator is reliable (i.e., its measurements are consistent) and unidimensional (i.e., it measures only one construct). For multi-item scales, Cronbach's alpha is commonly used to evaluate reliability and confirmatory factor analysis (CFA) provides an accepted, powerful tool for assessing unidimensionality (Bollen and Lennox, 1991; Gerbing and Anderson, 1988).

However, while reliability and unidimensionality are critical, these facets alone do not ensure construct validity. Construct validation is a theory-laden concern (O'Leary-Kelly and Vokurka, 1998; Peter, 1981). We do not have absolute measures of objective reality, but instead develop theories that specify how marketing constructs interrelate. A construct is a careful specification of a concept designed for scientific use (Kerlinger, 1986), and "it is impossible to 'validate' a measure of a concept in this sense unless there exists a theoretical network that surrounds the concept. For
without this network, it is impossible to generate theoretical predictions which, in turn, lead directly to empirical tests involving measures of the concept" (Carmines and Zeller, 1979, p. 23). The degree to which theory and "reality" align is beyond the domain of this paper. Instead, this paper focuses on the degree to which a measure is consistent with theoretical specifications of a construct. Four aspects of construct validity (content, convergent, discriminant, and nomological validity) appear most relevant to the assessment of secondary data proxies.

Content validity refers to the degree to which the measure samples adequately the domain of the construct (Churchill, 1979). There is no objective statistical test to evaluate content validity. Instead, the researcher must utilize a carefully specified theoretical description of the construct to judge (1) whether the measure "appears" to be appropriate for the construct and the particular assessment purpose (Haynes et al., 1995; Nevo, 1985) and (2) the degree to which the measure relates to various facets (i.e., the domain) of the focal construct (Carmines and Zeller, 1979; Haynes et al., 1995; Kerlinger, 1986; Schriesheim et al., 1993).

Convergent validity refers to the degree to which a measure of a construct is appropriately consistent with other validated measures of the same construct. Discriminant validity refers to the degree to which the measure assesses the construct of interest and not other constructs (Churchill, 1979, Peter, 1981). Within studies that employ multi-item scales, convergent and discriminant validity are rigorously assessed using multitrait-multimethod (MTMM) assessments (cf. Campbell and Fiske, 1959), often through a series of nested models within CFA (cf. Bagozzi et al., 1991).

Finally, nomological validity refers to the degree to which the measure of the construct relates to measures of other constructs in a manner that is consistent with theory. To evaluate nomological validity, the theoretical relationships among relevant constructs first must be carefully specified, empirical tests that measure the relationships among the constructs must be conducted, and the empirical results must be interpreted (Carmines and Zeller, 1979). If the results are consistent with theory, then confidence in the construct validity of the measure is increased (see Lastovicka, et al., 1999, for an example of a thorough, programmatic approach to establishing the nomological validity of a new scale).

4. Assessing the construct validity of secondary data proxies

Reviewing the extant literature on construct validity, it is argued that thorough construct validation follows the process illustrated in Fig. 1. The starting point of construct validation is the careful specification of the construct, its domain, and its interrelationships to other relevant constructs (Churchill, 1979). Next, the quality of the indicator is evaluated by assessing its measurement properties (reliability and unidimensionality) and its adequacy to measure the domain of the construct (content validity), and the degree to which it measures only the specified construct (convergent and discriminant validity). Finally, the degree to which the indicator appears to fit properly into the theoretically specified network of constructs (i.e., nomological validity) provides the concluding evidence of construct validity.

4.1. Stage 1

The construct validation process for secondary data proxies should follow the same logic outlined in Fig. 1. As an example, Table 1 reconciles the three validation stages with the procedures reported in Houston and Johnson (2000) in their validation of a financial ratio as a construct proxy. The process begins with the careful theory specification, just as it would when evaluating the construct validity of a multi-item scale. This stage involves the definition of the construct, an explicitation of its domain, construction of a nomological network of related constructs, and selection of an appropriate measure or proxy. Knowledge from this stage plays a critical role in each of the other two stages.

4.2. Stage 2

If secondary data proxies are used as single indicators of a construct, traditional methods for assessing reliability (Cronbach's alpha) and unidimensionality (CFA) are not applicable. Thus, the initial burden for demonstrating the quality of the indicator as a proxy for the specified construct lies with an evaluation of content validity. Content validity is often an area of major concern with a secondary data proxy (Rindfleisch and Heide, 1997), specifically whether the indicator will fully represent the domain of the construct. For many constructs, clear secondary proxies can be specified (e.g., brand choice, price paid, or coupons used in scanner data; sales growth or number of patents from annual reports). However, in other cases, the secondary proxy is clearly not as domain-encompassing as a multi-item scale. The construct must be unidimensional and adequately measured by the proxy or the construct must be multidimensional with the proxy relating specifically to one theoretically justified dimension. For example, Houston and Johnson (2000) employed a firm's R&D-to-sales ratio...
Table 1
The construct validation process illustrated: Houston and Johnson's (2000) validation of a financial ratio as a construct proxy

Stage 1: Theoretical specification

<table>
<thead>
<tr>
<th>Goal: Identify a proxy for asset specificity from data in the Compustat database.</th>
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<tbody>
<tr>
<td>Procedure:</td>
</tr>
<tr>
<td>1. Define asset specificity.</td>
</tr>
<tr>
<td>&quot;...specialized, nonredeployable assets&quot; (p. 2)</td>
</tr>
<tr>
<td>2. Identify a potential proxy.</td>
</tr>
<tr>
<td>&quot;Because there are no direct secondary measures of asset specificity, we searched for an externally observable proxy. A firm's investments in research and development (R&amp;D) clearly reflect efforts to develop specialized assets. ... Following studies in finance and economics, we use a firm's R&amp;D-to-sales ratio. ...&quot; (p. 6)</td>
</tr>
<tr>
<td>Issues:</td>
</tr>
<tr>
<td>* Asset specificity is multidimensional (e.g., transaction-, human-asset-, firm-specific, etc.)</td>
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</tbody>
</table>

Stage 2: Assess measurement properties

<table>
<thead>
<tr>
<th>Goal: Assess the ability of the R&amp;D-to-sales ratio to measure the asset specificity construct.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure:</td>
</tr>
<tr>
<td>1. Specify dimensions of construct/define domain of measure.</td>
</tr>
<tr>
<td>&quot;Suppliers invest in other specialized assets (e.g., technical and knowledge-based) that are not dedicated to a particular transaction partner but are used to create unique products that are differentiated from those of competitors. The underlying asset was supplier firm-specific and unique in the market.&quot; (p. 4).</td>
</tr>
<tr>
<td>&quot;Because one aspect of our discussion of specialized assets focuses on unique, firm-specific technology- and knowledge-based assets, a measure of supplier R&amp;D intensity is particularly relevant.&quot; (p. 6).</td>
</tr>
<tr>
<td>2. Evaluate appropriateness of measure.</td>
</tr>
<tr>
<td>&quot;We cannot measure supplier R&amp;D-to-sales at the transaction level, but it can be argued that firm-level measures are likely highly correlated with the characteristics of a given transaction for that firm. ... We explored this assumption for the firms in the Compustat database. ... As a firm's sales were more heavily concentrated in important buyers, they spent a significantly higher proportion of their revenues on R&amp;D, a result that suggests investments in customer-specific R&amp;D.&quot; (p. 7).</td>
</tr>
<tr>
<td>&quot;The lack of transaction-level secondary data precludes efforts to relate the independent variables more closely to specific transactions. However, we explore the stability of our results across transactions that involve diversified versus less-diversified supplier firms to gain additional insights. ... Therefore, the proxies appear robust as the effects of R&amp;D-to-sales and market-to-book on the probability of forming a JV do not differ across diversified and less-diversified firms.&quot; (p. 9–10).</td>
</tr>
<tr>
<td>Issues:</td>
</tr>
<tr>
<td>* A unit-of-analysis concern (firm-level proxies related to specific transactions) was addressed by two empirical approaches.</td>
</tr>
<tr>
<td>* Primary scale data was not available (precluding statistical tests of reliability and unidimensionality).</td>
</tr>
</tbody>
</table>

Stage 3: Assess nomological validity

<table>
<thead>
<tr>
<th>Goal: Assess the performance of proxy within a nomological network for firm-specific assets.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure:</td>
</tr>
<tr>
<td>1. Investigate literature.</td>
</tr>
<tr>
<td>&quot;...we searched the marketing, economics, finance, accounting, law, and management literature, examining more than 60 studies that empirically assessed asset specificity.&quot; (p. 7).</td>
</tr>
<tr>
<td>2. Specify nomological network.</td>
</tr>
<tr>
<td>&quot;Our goal was to identify discriminant constructs with unique and theoretically specified relations to asset specificity that had been empirically verified. We selected three constructs that met these criteria: secured debt [-], industry concentration [+], and employee intensity [+]. ... A fourth nomological link relates R&amp;D-to-sales to integration [+].&quot; (p. 7).</td>
</tr>
<tr>
<td>3. Conduct empirical test.</td>
</tr>
<tr>
<td>&quot;To assess nomological validity, we analyze all firms in Compustat for our sample years. ... We calculate Spearman correlation coefficients because the variables have nonnormal distributions. ... These results suggest that R&amp;D-to-sales is a usable measure of asset specificity.&quot; (p. 8).</td>
</tr>
<tr>
<td>Issues:</td>
</tr>
<tr>
<td>* Used correlational analysis rather than a more powerful structural model.</td>
</tr>
<tr>
<td>* Not clear from discussion if studies cited related to firm-specific assets, human-specific assets, or a more general asset specificity.</td>
</tr>
</tbody>
</table>

as a proxy for asset-specificity, but limited the proxy’s interpretation to firm-specific knowledge- and technology-based assets versus transaction-specific assets, in general. Without careful specification of the domain of the measure, their results would be less meaningful. Further, they specify as a limitation the restricted domain of the proxy, and acknowledge that other interpretations of the proxy could be argued.

Turning to convergent and discriminant validity, methods for assessing these types of validity of a secondary data proxy are contingent upon the design of the study and the availability of other validated measures of the construct. If the design of the study is such that only secondary indicators of a construct can be employed, then convergent validity cannot be assessed. In these cases, prior literature, when available, should be identified to support the use of the data as a construct proxy. However, examinations of the proxy’s correlations with other constructs measured with similar methods within the study can still offer clues regarding discriminant validity.
Two alternative approaches can be employed when survey data are collected to complement data from secondary sources. First, the primary data can be employed simply to assist in providing evidence of the construct validity of a secondary data proxy. With this approach, a researcher collects survey (or other) data from a subset of the secondary sample (e.g., a subset of consumers from a scanner panel; a subset of firms from the Compustat database). The data are then included in traditional MTMM or CFA (nested model) approaches to assessing convergent and discriminant validity. Drawbacks to this approach include the time and effort investments required to collect the primary data (counteracting one of the advantages of a study using secondary data) and the potential inability of researchers to match the primary and secondary data (due to time lags or differences in units of analysis). However, if primary data can be collected and if the secondary data proxies perform as predicted, then the researcher can proceed with greater confidence in interpreting results that come from the full secondary samples.

A second approach involves the use of secondary and primary data from the full sample of consumers or firms to be included in the study. In these cases, the researcher can include primary measures of constructs for which proxies are being collected from secondary sources. Since these types of data come from highly dissimilar methods, evidence of convergent and discriminant validity from MTMM or CFA (nested model) analyses would be very compelling (Churchill, 1979).

4.3. Stage 3

Since construct validation is a theory-laden process, the final stage—assessing the fit of the measure within a theoretically specified network of constructs, i.e., nomological validity—is critical (Carmine and Zeller, 1979; O'Leary-Kelly and Vokurka, 1998; Peter, 1981). The importance of nomological validity to a secondary data proxy is particularly important since the measurement properties of these proxies often cannot be assessed in Stage 2 with the same conventional techniques used for multi-item scale measures. As indicated in earlier discussion, nomological validity can only be established when (1) the relationships among the focal construct and other relevant constructs have been properly identified and specified, and (2) valid measures of these other constructs can be employed. Even if correct analytical techniques are employed, if the theory underlying the test of nomological validity is incorrect or the measures of the other constructs are not valid, then we gain no useful information regarding the construct validity of the focal proxy.

However, once the theoretical network of constructs has been specified, valid measures identified, and data collected, the researcher analyzes the data to assess whether the measure (in this case, a secondary data proxy) of the focal construct relates in the manner specified to the other constructs. If the goal of a research study is methodological, to provide compelling evidence of construct validity for a secondary proxy that can then be employed by researchers in further applications, then the recent study by Lastovicka et al. (1999) can provide an example of a systematic approach for assessing nomological validity, using a variety of methods and employing CFA. In more exploratory work, or in work in which theory testing is the focus, researchers have examined simple correlations (e.g., Houston and Johnson, 2000), though the power of such tests pales in comparison to a structural modeling approach.

Inconsistent empirical evidence, though, raises concerns that require further consideration. Four alternative conclusions can be reached when a measure does not relate empirically as expected theoretically with other constructs. First, the measure does not measure what it purports to measure (i.e., the measure lacks construct validity) and thus should not be employed. This may not, however, be the only reasonable conclusion. Second, the specification of expected interrelations among constructs is incorrect (i.e., the theory application is faulty). Third, an inappropriate statistical technique was employed or an appropriate procedure was performed incorrectly. Fourth, the measures of the other constructs within the nomological network may lack construct validity or reliability (Carmine and Zeller, 1979; Peter, 1981). Since tests of nomological validity test the construct validity of all included constructs, to reduce the likelihood of this fourth explanation, Carmine and Zeller (1979) argue that the nomological network should only include measures of other constructs for which previous evidence of construct validity exists.

The number of constructs needed within the network to establish nomological validity varies according to the specificity of the theory. If a "contextual" variable is theoretically important to the relationship between the focal construct and another, it is an important part of the theory and cannot be left out (Calder et al., 1982). However, "all possible" relationships cannot and do not need to be enumerated. A compromise between the need for specificity and a need for parsimony can be achieved. The distinctiveness of the focal construct is more fully represented when both positive and negative relationships can be specified within the network of constructs. DeVellis (1991) suggests that the inclusion of a theoretically unrelated construct can be informative. If the likelihood of detecting a significant relationship of the correct sign between two constructs by chance is 50%, then the likelihood of correctly predicting four (six) specified relationships by chance is only 6.25% (1.56%). Thus, as a rule of thumb, the inclusion of four to six other constructs should provide adequate evidence to suggest nomological validity. For example, in validating a secondary data proxy with no prior use in the marketing literature, Houston and Johnson (2000) specified a nomological network of four other constructs, three with predicted positive relationships to the focal construct and one with a predicted negative relationship. Still, researchers
should also give careful thought to alternative interpretations of other constructs that a particular proxy could indicate. Identifying these alternatives provides insights for further investigation by researchers within the discipline. Carmine and Zeller (1979) argue that the ultimate degree of nomological validity ascribed by scholars to a measure (scale or proxy) builds over time as the measure is employed by diverse researchers in diverse contexts, each offering a piece of evidence regarding validity.

5. Implications for researchers

A goal of this article is to encourage studies that employ secondary proxies. Besides providing new tools to aid researchers following the admonitions of various thought leaders (e.g., Srivastava et al.'s, 1998, call for investigating the impact of marketing decisions on shareholder wealth), secondary proxies can provide important and needed corroboration for theories that have been tested with a limited range of primary methods. For example, the role of knowledge and knowledge sharing is key to our understanding of the learning organization (cf. Sinkula, 1994). Marketing scholars have contributed to this important stream of research with studies that typically employ survey methods (e.g., Hurley and Hult, 1998). However, studies within this context can be designed to utilize secondary data sources. DeCarolis and Deeds (1999) studied the knowledge "stocks" of a sample of biotechnology firms, the flow of knowledge among the firms, and the performance outcomes. They utilized geographic location, interfirm alliances, and R&D expenditures as secondary proxies for knowledge flows, while using products in pipeline, firm citations, and patents as proxies for knowledge stocks. Firm performance was measured by the firm's market value of equity at the end of the first day that the firm's stock was offered to the public. The construct validity of these proxies can, some would argue should, be debated. The results of studies of this type should be carefully scrutinized and compared to results from more traditional studies. As the findings from alternative methods converge or contrast, we gain insights into the robustness and generalizability of theory in this topic area.

A number of other channels and strategy constructs could be addressed with carefully validated secondary data proxies. Within studies of relationship governance, Houston and Johnson (2000) used the R&D-to-sales ratio to proxy one type of firm-specific assets and the market-to-book ratio to proxy "performance ambiguity." The Compustat financial database, University of Chicago's CRSP stock return files, the annual Directory of Corporate Affiliations, and other sources also provide data that could proxy channel and strategy constructs such as "uncertainty" or "turbulence" (e.g., calculating sales volatility from annual revenues), "resource availability" (e.g., free cash flow), or "innovativeness" (e.g., number of new product introductions, number of patents), market position proxies (share, industry concentra-

...
proxies rely so heavily on the theory for evidence of validity (content/nomological), the inclusion of marginal measures of other constructs introduces a bias that increases the likelihood of rejecting a secondary proxy that is actually quite valid.

6. Conclusion

This paper began with the goal of encouraging researchers to consider the use of secondary data proxies for marketing constructs. In so doing, marketing scholars (1) avail themselves to new sources of data and methods, and (2) incorporate measures and metrics that have the potential to increase perceptions of the rigor of the discipline (Day and Montgomery, 1999; Srivastava et al., 1999). The validation procedure outlined here provides a usable starting point. In a sense, the methodological benefits that accrue from the use of secondary proxies offset weaknesses in primary scale data, while scale data, in turn, have strengths not present in secondary proxies. Thus, there appear to be potential research complementarities between the types of data. Multi-item attitude and perceptual scales can be rigorously examined for reliability, unidimensionality, and other aspects of construct validity. However, even with this analytical evidence of validity (e.g., Cronbach's alpha and CFA), the intrinsic construct validity of these primary scales still rests on consistency with theory. This article has argued that rigorous investigations of the construct validity of a secondary data proxy can be undertaken and that these indicators can be used to provide important initial or corroborating evidence to test theories.

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