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Selling, general, and administrative expense (SGA)-based metrics in marketing: conceptual and measurement challenges

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Abstract
Many studies use variables from the Compustat database to measure various marketing constructs, yet no clear guidelines detail which metrics correspond with which constructs. Justifications rest mainly on the ready availability of easy-to-use measures that seem related to a particular construct. As a result, various metrics have been utilized to capture the same construct, and the same metric—such as selling, general, and administrative expenses (SGA)—has been applied to capture vastly different constructs. But using SGA inappropriately can lead to biased estimates, questionable support for the hypotheses, and potentially misleading implications for research and practice. To test the validity of SGA for multiple relevant marketing and sales constructs, this study gathers data on benchmark variables from alternative data sources and applies a multitrait-multimethod (MTMM) approach. Results show that, in general, SGA has been applied too liberally in marketing contexts; SGA is an appropriate operationalization only for some constructs. This article provides guidelines for the proper conceptualization and operationalization of marketing constructs.

To understand the impact of marketing and sales force activities on firm performance, vast literature exists in marketing strategy and management that employs constructs ranging from simple advertising spending to complex strategic marketing capabilities. As the Marketing Science Institute (MSI 2016, p. 6)

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acknowledges, "making every dollar count is a marketing imperative for all organizations. To do so requires a keen understanding of all the different brand-building and sales-generating activities an organization may choose to engage in." This imperative is challenging though; few sources provide easy, cost-effective access to reliable data across companies that capture these activities in detail. Companies protect such data closely because they can reveal underlying strategies. Faced with this paucity of representative data, scholars are forced to overlook the complexity of marketing constructs and their conceptual and operational requirements in favor of achieving measurement objectives. But when studies do not fully define or conceptualize the marketing constructs they use, it results in ambiguity and contradiction in their meaning and measures (Varadarajan 2010).

Given the lack of alternatives, research has heavily relied on one particular source, Compustat, which has become the go-to source for scholars interested in studying and comparing brand-building and sales performance across organizations. This database reports on publicly traded companies that, due to fiscal regulations, must disclose their earnings and expenditures on various items. Compustat's reporting is based on more than 300 items from annual income statements, balance sheets, statements of cash flows, and supplemental data about publicly

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traded companies in the United States and Canada (Wharton 2016). There are, however, no clear guidelines on matching various marketing constructs to metrics from Compustat.

In particular, researchers have relied extensively on Compustat's selling, general, and administrative expense (SGA) metric to capture a diverse number of constructs including marketing spending, sales intensity, advertising intensity, and marketing assets. A reason for SGA's prolific use is its comprehensive nature—it "aggregates all costs incurred in the regular course of business except costs associated with the production of goods and services" (Standard and Poor's 2013, p. 269). As a result, it tends to have one or more items that may intuitively relate to the construct a researcher wants to capture. Nonetheless, this rationale rests on little more than the availability of an easy-to-use measure that appears intuitive. This characterization applies to several Compustat metrics, and thus, various metrics often serve to capture the same construct too. For example, in addition to SGA, some studies use advertising expense to assess marketing spending. Using these metrics to operationalize marketing constructs brings together two vastly different domains of accounting and marketing. These domains differ in the common knowledge of how various constructs should be defined and which variables can be applied, and in what ways, to measure them. Before using any such variable, one should conscientiously seek to deduce theoretical constructs, which is a prerequisite for empirical measurement, and then test the validity of their operationalization (MacKenzie 2003). Not doing so can lead to biased estimates, questionable support for hypotheses, and potentially misleading implications for research and practice.

Our objective is to provide a conceptual assessment of commonly used marketing and sales constructs and an empirical assessment of alternative measures. Specifically, we address the following 3 research questions:

RQ1: Which marketing and sales constructs have been measured using SGA?

RQ2: Is SGA a valid measure for these constructs? Are there alternative measures for these constructs that may be equally or more valid?

RQ3: What guidelines can be developed for choosing between SGA and these alternative measures?

In turn, we make several contributions to the literature. First, this article provides a structured overview of the widespread use of SGA in the marketing strategy literature. Considering the disparity in SGA-based operationalizations, this compilation of the status quo is overdue. Second, by spanning the boundary between the accounting and marketing domains, we integrate frequently neglected knowledge from accounting into marketing strategy. Specifically, we address the conceptual breadth of each marketing construct and its operationalization using accounting-based measures, which helps differentiate the constructs that can be measured optimally using SGA from those that cannot. We thus demonstrate the importance of proper conceptualization of a construct and the validation of its subsequent operationalization. Third, we add to marketing theory and practice by deducing guidelines for appropriate operationalization of several marketing and sales constructs. In so doing, we ensure a better understanding of the scope of Compustat for marketing research and accordingly generate guidelines for employing available information. These insights can improve the validity of research findings and their implications for managers. Table 1 provides an overview of our research process.

Conceptual framework

The misuse of SGA to capture various marketing and sales constructs has increased over the past two decades in both the marketing and management fields (Fig. 1). To find studies that have adopted this measure, we searched the EBSCO online research database after 1995, but limited our search to 22 well-recognized peer-reviewed journals in the fields of marketing and management such as *Academy of Management Journal*, *Academy of Management Review*, *Journal of Marketing*, *Journal of Marketing Research*, *Journal of the Academy of Marketing Science*, and *Strategic Management Journal* (see Web Appendix 1 for the complete list of journals). We also reviewed the reference lists of identified articles for other relevant sources. In total, we identified 87 articles that used SGA or its modifications to operationalize one or more marketing or sales constructs (see Table 2 for a summary of operationalizations; see Table 3 for construct-wise list of articles). The constructs differ in their contextual reference and complexity, explaining financial performance measures such as brand equity, (abnormal) stock market returns, market value, productivity, and profitability. In turn, these constructs have been used to perform benchmarking analyses, judge managerial ability, allocate resources, and study firm performance.

Our literature review revealed substantial variation in the emphasis placed on precise construct definitions, as well as the general lack of validation. Imprecise definitions increase the likelihood of misaligned or misspecified operationalizations, as manifest in the use of SGA to operationalize diverse, wide-ranging constructs, such as marketing assets, marketing resources, marketing capabilities, advertising intensity, sales intensity, and marketing spending. Considering that SGA comprises 29 cash outflow items (see Web Appendix 2), it would be difficult to draw a direct link between it and the various marketing and sales constructs. These outflow items reflect many different constructs but most of the items are irrelevant to any particular construct (Enache and Srivastava 2018). These items capture diverse firm activities, well beyond the functions of sales and marketing. If

Table 1 Research design and validation approach

Research question	Process step	Level of analysis
1. Which marketing and sales constructs have been measured using SGA?	1. Initial literature overview and analysis of the use of SGA	
	2. Integration of literature to link the domains of marketing and accounting	
2. Is SGA a valid measure for the constructs? Are there alternative measures for these constructs that are equally or more valid?	3. Measurement validity	
	I. Content validity	Conceptual level
	a) Domain of definition	Qualitative validation
	b) Level of abstraction	
	c) Time horizon	
	d) Level of objectivity	
	e) Business focus	
	II. Construct validity	Empirical level
	a) Multitrait-multimethod (MTMM) matrix	Quantitative validation
	b) Bivariate correlation matrix	
3. What guidelines can be developed for choosing between SGA and alternative measures?	4. Development of guidelines	

categorized according to Porter's value chain framework (Porter 1985), two-thirds of the items relate to support activities, such as infrastructure and human resource management. Only one-third of them pertain to primary activities, including marketing and sales functions. Furthermore, only 3 items—advertising expenses, commissions, and marketing expenses—directly relate to these functions (Standard and Poor's 2013), and they account for only a small proportion of SGA. For example, between 1997 and 2015, across all companies in Compustat, aggregate advertising expenses accounted for less than 12% of SGA, whereas rental expenses made up 13%, and R&D expenses accounted for 17%. Whereas the use of a composite variable to measure a marketing construct implies that the estimated effects and resulting strategies pertain to the relevant marketing items it contains,

the composition of SGA suggests that the effects instead could be related to one or more support activities required for operations. Firms with similar SGA values could differ wildly in the size of various items. Thus, a detailed analysis is needed to examine the validity of SGA for measuring marketing and sales constructs.

Table 2 summarizes the operationalizations of marketing and sales constructs based on SGA, revealing both the constructs and the multiple measures employed to capture them. Broadly, 11 major constructs have been operationalized using 3 key variables from Compustat: SGA, advertising expense (ADV), and research and development expense (R&D). This table also illustrates the arbitrary use of SGA. To take an example, SGA measures marketing spending in several studies (Dutta et al. 1999, 2005; Narasimhan et al. 2006; Sarkees

Fig. 1 Number of studies employing SGA as a measure in marketing research (from 1987 to 2017)

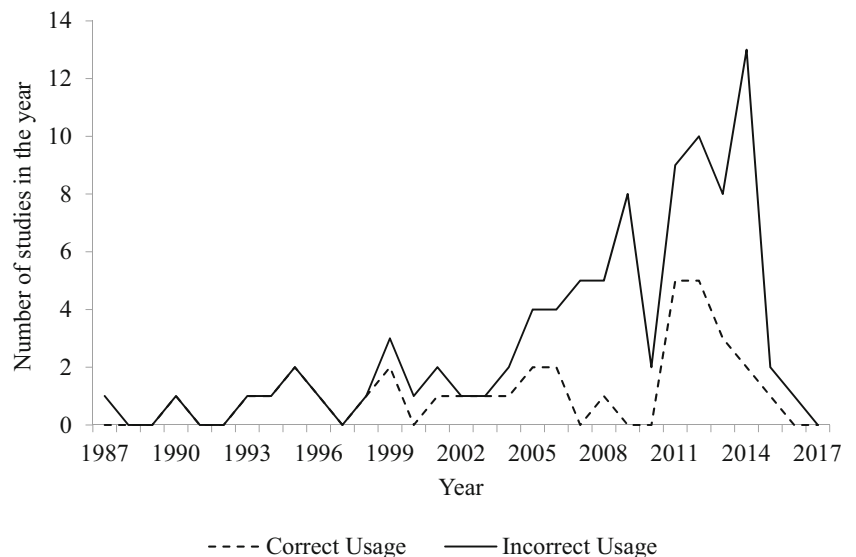- - - - Correct Usage   —— Incorrect Usage

Table 2   SGA-based operationalization of marketing and sales constructs and subconstructs

Construct/Subconstruct	Definition	Studies using the operationalization				
		SGA	ADV[a]	SGA – R&D	SGA – R&D – ADV	SGA + R&D + ADV
• SGA expense		12				
- Sales (force) spending[b]	The amount of money spent on sales force activities to stimulate purchases, such as "prospecting, defining needs, preparing and presenting proposals, negotiating contracts, and implementing the sale" (Kotler and Rackham 2006, p. 11).	7			1	
- Marketing & administrative spending		1				
- Coordination spending		2		2		
• Marketing spending[b]	"The total amount of money spent by a firm in all its marketing related activities" (Nath et al. 2010, p. 322).	13	1	5		
- Advertising spending		5				
- Promotional spending		1				
• Marketing assets[b,c]	"Customer-focused measures of the value of the firm (and its offerings) that may enhance the firm's long-term value" (Rust et al. 2004, p. 78).	5	1	1		
• Marketing intensity[b,d]	"Effects caused by marketing investments that, for instance, enable a firm to build a strong brand name and to intensify its relationship with its most valuable customers" (Raithel et al. 2012, p. 515).	2		4		
- Advertising intensity		1				
• Sales intensity		3				
• Marketing efficiency[b,d]	Represents a "performance outcome viewed relative to the resources consumed" (Katsikeas et al. 2016, p. 5); it features growth, including changes in cash inflows or outflows (Ambler et al. 2001; Carton and Hofer 2006).	3	1			
• Marketing resources[c]	"Tangible and intangible assets firms use to conceive of and implement their strategies" (Barney and Arikan 2001, p. 138 cf. Kozlenkova et al. 2014). They must be valuable, rare, inimitable, and non-substitutable (Barney 1991).	1		1		
• Marketing capability[c]	"Complex bundles of skills and collective learning, exercised through organizational processes that ensure superior coordination of functional activities" (Day 1994, p. 38). They differ from resources in that whereas resources are monetarily-driven assets (tangible or intangible) that determine the organization's input factors, capabilities are its skills to use these input factors.	6		1		
• Marketing exploitation[c,d]	Linked to capabilities, such that it refers to "the refinement and extension of existing competencies, technologies and paradigms" (March 1991, p. 85)	2				
• Discretionary spending[e]						1
• Fixed expense[e]		5				
• Customer relationship specific investment		1				

SGA is selling, general, and administrative expenses; ADV is advertising expenses; and R&D denotes research and development expenses

[a] Studies that use the variable along with SGA are counted

[b] Constructs ideally measured using accounting measures

[c] Constructs ideally measured using operating measures

[d] Intensity, efficiency, and exploitation represent higher-level constructs, comprised of one or more of baseline constructs (spending, assets, resources, and capabilities) and distinct only in their objectives. Their validation thus depends on the validation of the baseline constructs; no separate tests are conducted for them

[e] Discretionary spending and fixed expenses do not have a specific contextual meaning in terms of business operations. They are influenced less by changes in the firm's activity level (Hansen 1990); discretionary spending can even be eliminated without affecting organizational profitability immediately (Bragg 2010). Depending on the objective, they thus can be applied to various functions such as advertising and R&D

et al. 2014), but a modification of this metric, "SGA – R&D" has been applied for the same purpose in several other studies (Luo 2008; Dinner et al. 2009; Bharadwaj et al. 2011; Kurt and Hulland 2013). In addition to inconsistency in the operationalization of a particular construct, multiple constructs are often captured using the same operationalization. For example, in addition to marketing spending, marketing assets (Balsam et al. 2011), marketing intensity (Krishnan et al. 2009), marketing efficiency (Lin et al. 2014), and marketing capabilities (Luo et al. 2005) have been measured using SGA too. Yet these constructs are clearly distinct from one another, so SGA cannot possibly serve as a valid measure for all of them. This arbitrary use of SGA has led to multiple operationalizations of a single construct and similar operationalizations of multiple constructs. In each case, the operationalization may not sufficiently match the construct.[1]

In Fig. 2, we bring together marketing and sales constructs and accounting variables. The figure depicts how cash outflows are treated as per accounting standards in Compustat, and the various marketing constructs that have been measured using SGA. Accounting differs markedly from marketing in its treatment of cash outflows. Marketing usually treats them as generic, but accounting has a set of specific rules based primarily on the timing of returns from outflows (Hansen 1990). Cash outflows that do not generate future economic returns are treated as expenses in income statements; those that generate future economic returns are capitalized as assets in the balance sheet and depreciate over time. Expenses also can be divided further into broad subcategories, such as the cost of goods sold (COGS), SGA, and other expenses. Similarly, assets comprise two broad subcategories, tangible and intangible.

On the basis of their conceptual properties, we categorize the marketing constructs in Fig. 2 as either accounting or operating in nature, which ideally would be captured with accounting or operating measures, respectively. Accounting measures are "reflections of past or short-term financial" (Gentry and Shen 2010, p. 514) activity that "rely upon financial information reported in income statement, balance sheet and statements of cash flow" (Carton and Hofer 2006, p. 61). They are "generally expressed as values, ratios or

percentages" (Carton and Hofer 2006, p. 63). Constructs that are shorter-term, relatively more objective, and primarily concerned with financial activity, such as marketing spending, are conducive to such measures. Operating measures instead "represent how the organization is performing on nonfinancial issues.… Most of the measures in this category require primary data from management in the form of their assessment of own performance" (Carton and Hofer 2006, p. 62). They do not appear in the income statement, balance sheet, or cash flow statement. Constructs such as marketing capabilities, which are longer-term, relatively more subjective, and concerned with nonfinancial performance, are more appropriate for such measures (Moorman and Day 2016). This categorization provides a basis for relating the constructs to Compustat metrics and assessing their conceptual validity. Definitions of all constructs appear in Table 2.

Research design

To be valid, a measure should assess "the magnitude and direction of (1) all of the characteristics and (2) only the characteristics of the construct it is purported to assess" (Peter 1981, p. 134). Simply put, "a measure is valid if it measures what it is supposed to measure" (Heeler and Ray 1972, p. 361). We analyze the appropriateness and validity of SGA for each construct using a two-step approach for establishing content and construct validity (Table 1). Content validity pertains to the conceptual adequacy of the proposed measure for capturing the construct's domain characteristics (DeVellis 2012). We test the content validity of the baseline constructs (spending, assets, resources, and capabilities) with respect to SGA by deriving a set of decision criteria. Adequate fit between SGA and each construct, according to these decision criteria, is a *necessary* condition for validation. If content validity exists, we move on to further testing for construct validity at the operational level. Construct validity is "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). The tests for construct validity use the multitrait-multimethod (MTMM) approach. We test SGA against a set of benchmark variables that are relatively purer and obtained from other data sources (e.g., *Advertising Age*, S*elling Power*, and balance sheet information in Compustat): measured media spending, estimated unmeasured spending, number of salespeople, goodwill, and other intangible assets.

For our study, the differences between a concept, construct, and variable are critical (see Web Appendix 3). A *concept* is "a bundle of meanings or characteristics associated with certain events, objects, conditions, situations" (Emory and Cooper 1991, p. 51). *Constructs* combine two or more simple

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[1] Sometimes, use of SGA has been justified by intuitive reasoning. For example, because SGA budgets may be interpreted as a sign of financial resources of a firm, SGA appears to be a good proxy of marketing resources. Such operationalization suffers from lack of proper validation and can be hit or miss. Intuitively, there may be equally good or better proxies available within Compustat. For example, marketing resources which imply items such as cash, customer loyalty, brand equity, and patents could be measured using more direct and conceptually relevant measures such as "goodwill" or "total intangible assets." One could even employ "working capital" or "cash and short-term investments" or "cash," which are conceptually aligned to, and better capture, the resources a firm has available to cover its expenses. Of course, to choose the right operationalization one needs to establish content and construct validity, which we propose later.

Table 3 Use of SGA in marketing and management literature (1995–2016)

Concept/Construct	Operationalization	Authors
Marketing assets / investments	SGA	- Balsam et al. 2011 - Banker et al. 2014 - Borah and Tellis 2014 - Kotha et al. 2001 - Hornig and Fischer 2013
	SGA – R&D SGA – R&D – ADV SGA; ADV	- Lee and Chang 2014 - Enache and Srivastava 2018 - Hornig and Fischer 2013
Marketing expense	SGA	- Bentley et al. 2013 (Denominator: Sales) - Dinner 2011 - Dutta et al. 1999, Dutta et al. 2005 - Sarkees et al. 2014 - Corona 2009, 2014 - Cook et al. 2007 - Habib 2017 - Higgins et al. 2015 - Nam and Kannan 2014 - Narasimhan et al. 2006 - Nath et al. 2010 (as one operationalization variable) - Raassens et al. 2014 (Denominator: Assets) - Snyder 2009 - Swaminathan and Moorman 2009 - Kalaignanam et al. 2013
	SGA – R&D	- Dinner et al. 2009 - Luo 2008 - Kurt and Hulland 2013 - Bharadwaj et al. 2011 - Shin et al. 2008
Sales (force) expense	SGA	- Koku 2011 - Kumar 1999 - Wuyts et al. 2004 - Mhatre et al. 2014 - Achrol and Seo 2011 - Lin et al. 2006 - Sarkees and Luchs 2011
	SGA – ADV – R&D	- Kim and McAlister 2011
SGA expense	SGA	- Achrol 2012 - Ailawadi et al. 1995 - Bayus et al. 2003 - Bell and Gordon 1999 - Boulding and Christen 2008 - Efendi et al. 2013 - Foster and Gupta 1994 - Huang et al. 2011 - Kalwani and Narayandas 1995 - Moorman et al. 2005 - Mottner and Smith 2009 - Poston and Grabski 2001 - Rangan and Bell 1998 - Rego et al. 2013 - Rust and Huang 2012
Advertising expense	SGA	- Collins and Han 2004 - Demerjian et al. 2012 - Ding et al. 2007 - Wiles 2007
Promotional expense	SGA	- Vinod and Rao 2000
Marketing and administration expense	SGA	- Lévesque et al. 2012
Sales and general expense	SGA	- Mittal et al. 2005
Discretionary expense	SGA + ADV + R&D	- Ho et al. 2012

Table 3 (continued)

Concept/Construct	Operationalization	Authors
Marketing capability	SGA	- Bahadir et al. 2008 - Patwardhan 2014 - Cheng et al. 2008 - Lee and Rugman 2012 - Luo et al. 2005 - Rugman and Sukpanich 2006
	SGA – R&D	- Darroch and Miles 2011
Sales capability	SGA	- Boyd and Brown 2012
Marketing resource	SGA	- Cook et al. 2007 (Denominator: Sales)
Marketing resource intensity	SGA – R&D	- Raassens et al. 2014 (Denominator: Assets)
Marketing intensity	SGA SGA – R&D	- Krishnan et al. 2009 (Denominator: Sales) - Raithel et al. 2012 (Denominator: Assets) - Dinner et al. 2009 (Denominator: Assets) - Mizik and Jacobson 2007 (Denominator: Assets) - Mizik 2010 (Denominator: Assets)
Sales intensity	SGA	- Berman et al. 1999 (Denominator: Sales) - Siddharthan and Kumar 1990 (Denominator: Sales) - Nair and Selover 2012 (Denominator: Sales)
Advertising intensity	SGA	- Grubaugh 1987 (Denominator: Sales)
Marketing efficiency	SGA	- Cook et al. 2007 (Denominator: Sales) - Lin et al. 2014 (Denominator: Sales)
	SGA; ADV	- Morgan and Rego 2009 (Denominator: Sales)
Marketing exploitation	SGA	- Sarkees et al. 2014 (Numerator: Sales) - Bentley et al. 2013 (Denominator: Sales)
Coordination expense	SGA SGA – R&D	- Lee and Chang 2014 - Lee et al. 2015 - Ray et al. 2009 - Im et al. 2013
	SGA – ADV – R&D – software – bad debt – pension and retirement	- Shin 1999 (for manufacturing industries)
	SGA – ADV – bad debt – pension and retirement	- Shin 1999 (for non-manufacturing industries)
	SGA – ADV– pension and retirement	- Shin 1999 (for finance industry)
Fixed expense	SGA	- Bruton et al. 2002 - Gaspar and Massa 2006 - Mitra and Chaya 1996 (Denominator: Sales) - Bharadwaj 2000 (Denominator: Sales) - Haleblian and Finkelstein 1993 (Denominator: Sales)
Customer relationship-specific investments	SGA	- Irvine et al. 2016

concepts, especially if the idea "to convey is not directly subject to observation" (Emory and Cooper 1991, p. 51). Concepts and constructs operate at the theoretical level; variables, on the other hand, operate at an empirical level. A *variable* "is a symbol to which numerals or values are assigned" (Kerlinger 1986, p. 27, cf. Emory and Cooper 1991). Multiple labels sometimes are used across different contexts to refer to the same entity though. For example, when referred to as a construct, SGA conveys a broader sense of operating expenses measured by several manifest variables. When referred to as a variable, it represents the measure within Compustat, manifest in nature and applied to approximate, either partly or fully, one or more constructs.

Testing for content validity

To start, a "clear and concise conceptual definition of the focal construct" (MacKenzie 2003, p. 323) is required to capture the characteristics of its domain. A set of decision criteria can specify the nature of a construct and demarcate it from other, related constructs. In line with academics' call for rigor and relevance (Kumar 2016), we suggest five decision criteria to determine each construct in terms of its theoretical and managerial aspects. These criteria encompass 3 dimensions of a construct—conceptual, operational, and managerial. Two criteria capture a construct's *conceptual* properties in terms of the domain of its definition and level of its abstraction.
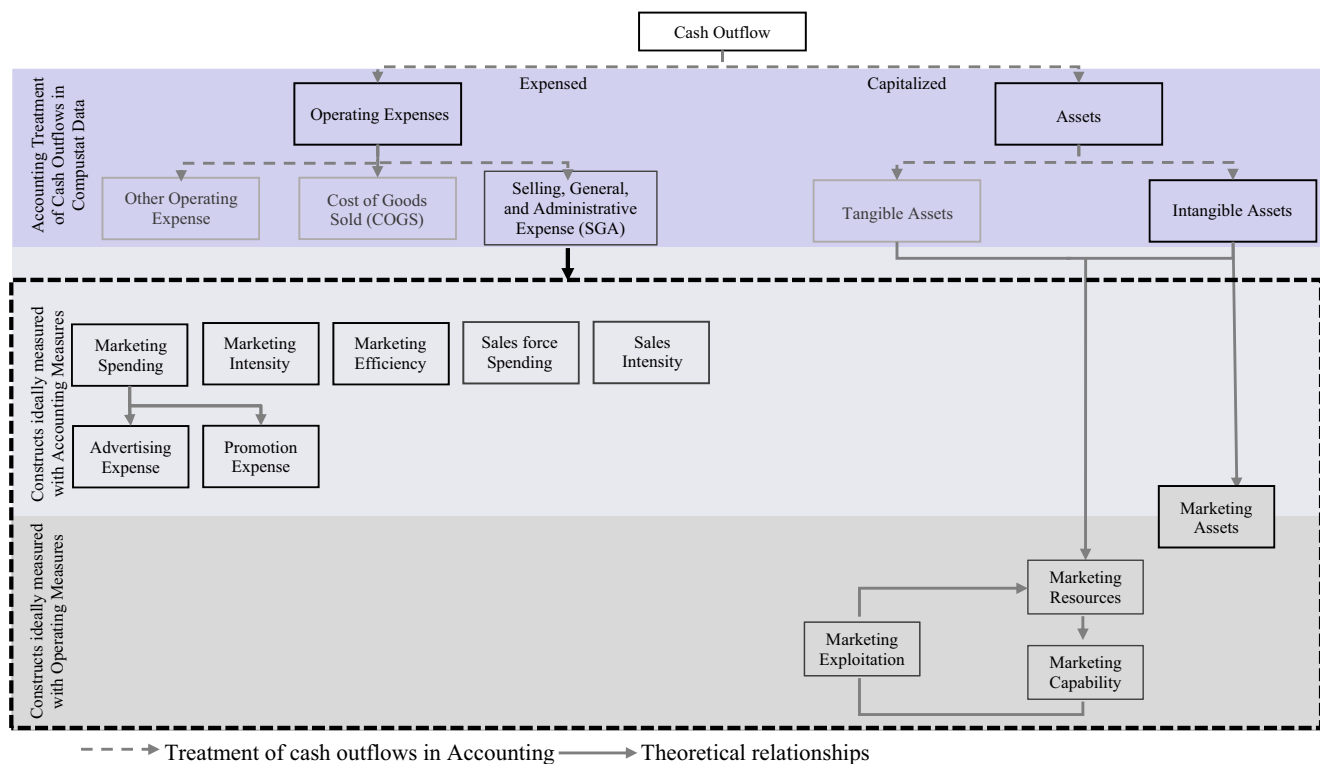
Fig. 2 Treatment of cash outflows in Compustat and accounting vs. operating nature of marketing constructs. Notes: All constructs and subconstructs in the rectangle with dashed bold lines have been measured using SGA in one or more studies

Two other criteria define a construct's *operational* or measurement requirements according to the time horizon and level of objectivity or subjectivity. The last criterion places the construct in the overall *managerial* context reflecting its business focus. We consider fit on the two criteria capturing a construct's conceptual properties to be necessary for content validity; fit on any one of the 3 dimensions of a construct though is not sufficient by itself to establish content validity.

In our framework, the *domains* of the constructs' definitions enable us to categorize them as either accounting or operating. As we noted earlier, constructs that are shorter-term, relatively more objective, and primarily concerned with financial performance (e.g., marketing spending) are accounting in nature, whereas those that are longer-term, relatively more subjective, and concerned with non-financial performance (e.g., marketing capabilities) are operating in nature. The *level of abstraction* of a construct denotes the divergence between its conceptual and operational scope and influences the ease with which it can be measured (Nunnally 1978; Viswanathan 2005). Constructs vary from low abstraction (simple to measure, e.g., advertising spending) to high abstraction (difficult to measure, e.g., marketing capability). *Time horizon* is the degree to which a construct is attributable to a specific operating period (Katsikeas et al. 2016). For example, marketing spending is short-term, but marketing assets, which generate future economic value beyond a

particular period, are long-term. The *level of objectivity* classifies the construct at an operational level according to the type of measures needed, that is, manifest or latent (Katsikeas et al. 2016). Constructs such as marketing capabilities include high proportions of subjective judgment, so they have relatively low objectivity; their measurement depends largely on qualitative assessments. Constructs such as marketing spending, which primarily depend on the level of expenses, instead have high objectivity. Finally, the *business focus* of a construct determines whether it is strategic (broader and abstract in scope; longer timeframe; higher involvement of senior management) or tactical (narrow and specific in scope; shorter timeframe; lower involvement of senior management) (Shapiro 1989; Brink et al. 2006; Casadesus-Masanell and Ricart 2010). Marketing spending might be considered tactical, because it aims to achieve specific, short-term subgoals that contribute to the ultimate business goal (e.g., firm performance). Marketing capabilities instead would be more strategic in nature.

With these five decision criteria, we define and demarcate the constructs, according to both research and practice perspectives. Only when an adequate fit on these criteria establish content validity do we proceed with the process of establishing construct validity. We consider fit on the two necessary criteria capturing conceptual properties alone, or with additional criteria, adequate for content validity. However, if the

Fig. 3 Decision criteria for content validation
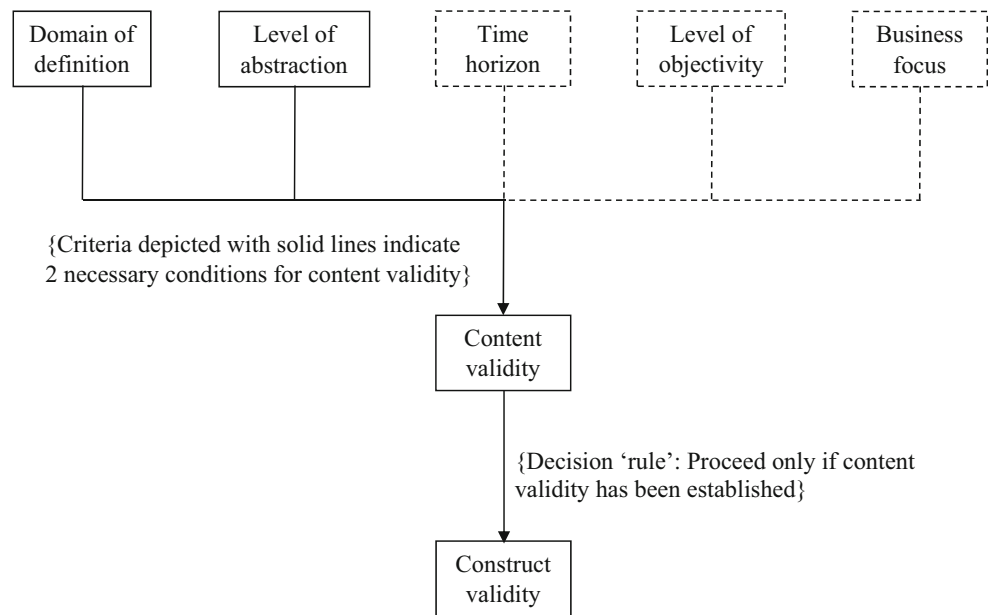
two necessary criteria are not met then content validity is not established and there is no justification to conduct a construct validation exercise (see Fig. 3). This "decision rule" is not confined to this research domain alone; rather, this rule should apply to testing the validity of any metric—whether in marketing or in other disciplines.

Testing for construct validity

We test whether an operationalization corresponds to the underlying construct it aims to measure. Construct validity consists of convergent and discriminant validity. Convergent validity indicates the degree to which different measures of the same construct are in agreement whereas discriminant validity indicates the degree to which measures of different constructs are distinct (Bagozzi 1994). We assess construct validity using the MTMM matrix (Campbell and Fiske 1959; Churchill 1979; Bagozzi 1994). The MTMM matrix offers a "framework for developing measure validation from available or easily obtainable generated data" (Heeler and Ray 1972, p. 363), relying on the analysis of correlations among several variables measured by different techniques. Thus, alternative operationalizations can be compared to see how well they measure the same construct (e.g., SGA from Compustat vs. a benchmark metric obtained from an alternative source) (Table 4). The alternative data source should provide relatively purer and less biased information about the construct of interest.

The main diagonal of the MTMM matrix (labeled I in Table 4) consists of the reliability correlations, derived from the correlation of a measure of trait (construct) with itself in a test–retest situation. In our study context, this diagonal consistently takes a value of 1, because all the data were obtained from secondary sources that are subject to consistent,

regulated accounting data reporting standards (Carton and Hofer 2006).

For construct validity, the MTMM method includes several requirements. Specifically, convergent validity requires that the entries in the validity or, monotrait-heteromethod (measures of the same trait obtained by different methods) diagonal (labeled III in Table 4) are significantly different from zero and sufficiently large. Discriminant validity is demonstrated by the divergence of the measure of interest from other measures not "measuring the same variable or concept" (Heeler and Ray 1972, p. 362). For this consideration, the MTMM approach uses 3 criteria. First, correlations in each cell of diagonal III should be greater than the correlations in its column and row in the heterotrait-heteromethod (measures for different traits obtained by different methods) cells (labeled IV in Table 4). This minimum requirement simply means that the correlation between 2 different measures of the same variable "should be higher than the correlations obtained between that variable and any other variable having neither trait nor method in common" (Bagozzi 1994, p. 22). Second, the correlations in diagonal III should be greater than those in the heterotrait-monomethod (measures for different traits obtained by the same method) cells (labeled II in Table 4). This more stringent requirement suggests that the correlations of different measures of a trait should be greater than correlations among traits that have methods in common. That is, "a variable correlates higher with an independent effort to measure the same trait than with measures designed to get at different traits which happen to employ the same method" (Bagozzi 1994, p. 22). Third, if the matrix contains information on more than two traits, the same pattern of trait interrelationship should appear in all heterotrait triangles, for both the monomethod and the heteromethod blocks.

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Table 4 Multitrait-multimethod (MTMM) matrix

			Method 1 (Data Source 1)		Method 2 (Data Source 2)	
			Trait 1 Variable 1	Trait 2 Variable 2	Trait 1 Variable 3	Trait 2 Variable 4
Method 1 (Data Source 1)	Trait 1	Variable 1	I: 1.00			
	Trait 2	Variable 2	II: Heterotrait-monomethod	I: 1.00		
Method 2 (Data Source 2)	Trait 1	Variable 3	III: Monotrait-heteromethod	IV: Heterotrait-heteromethod	I: 1.00	
	Trait 2	Variable 4	IV: Heterotrait-heteromethod	III: Monotrait-heteromethod	II: Heterotrait-monomethod	I: 1.00

For convergent validity, correlation coefficients in III should be significantly different from 0 and should be sufficiently large

For discriminant validity, correlation coefficients in III should be larger than in IV and correlation coefficients in III should be larger than in II

Data

Data sources

We obtained data from 3 sources: Compustat, *Advertising Age*, and *Selling Power*. Compustat provides data for companies publicly listed in the United States or Canada; the "Compustat North America Fundamentals Annual" data set comprises annual, worldwide, company-level information on expenses such as SGA, advertising, and R&D, as well as on assets such as goodwill and intangible assets. We obtained 19 years of data (1997–2015) from Compustat. To ensure proper application of the validation approach, we excluded all observations with zero or missing values for our key variables of interest. It is unlikely that any company has zero annual expenses on SGA and advertising expenses; a zero value likely implies that either the company did not disclose the value or Compustat failed to register it. Compustat reports a missing value (blank cell) if it is unable to obtain a value (Standard and Poor's, personal correspondence).

Advertising Age and *Selling Power* provide benchmark data to judge the validity of the SGA-based metrics.[2] *Advertising Age* provides annual, company-level data on the marketing expenses of 200 leading companies in the U.S. and 100 leading companies worldwide. *Selling Power* tracks the 500 U.S.-based companies that employ the largest sales forces. It provides annual, company-level information on the number of salespeople in the United States. These two sources thus offer purer and less biased benchmark information on the variables of interest.[3]

For construct validation, we needed to match data across the different sources. We started with 20,365 observations from Compustat and 1900 observations from *Advertising Age* (100 observations per year for 1997–2015). More than half of the companies listed in *Advertising Age* (worldwide dataset) are not listed in the U.S. or Canada and thus not included in Compustat, even though they advertise in these countries. Due to missing or zero values on focal variables in Compustat, matching the data from these two sources left us with 506 observations. After removing extreme outliers, we retained 499 observations, which constitute Sample 1.[4,5] Almost two-thirds of the observations are from companies earning their revenue predominantly from B2C market, 5% of observations are from predominantly B2B firms, and the remaining are from firms that cater significantly to both markets. It represents 73 unique companies all of which spend heavily on marketing communication (a key criterion for their inclusion in the *Advertising Age* database). The data range from one to 19 years for individual companies, with an average of about 7 years for each company. In this sample of active advertisers with high spending, advertising expenses account for about 23% of SGA.

Next, we matched the data from Compustat with data from *Selling Power* to obtain Sample 2. We started with 3500 observations (500 observations per year for 2009–2015) from *Selling Power*. When matched with 7539 observations from Compustat for this time period, and after excluding outliers and observations with missing or zero values, we were left

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[2] We also considered other data sources (e.g., Ebiquity, PIMS, Hoover) of benchmark variables but found them unsuitable. For example, Ebiquity reports data at the country level only, and its consultants advised us against aggregating these country-level data to obtain worldwide data. PIMS provides information at the strategic business unit level for participating companies, so it likewise is unsuitable. Hoover does not include any information related to marketing spending but rather provides qualitative information about big players only.

[3] We empirically validated the benchmark measures from these alternative sources by collecting data from annual reports of public and private companies. We thank an anonymous reviewer for this suggestion. We note here that these benchmark measures provide purer information on the three focal variables only: advertising expense, promotional expense, and salesforce expense. Whether these measures are also better than SGA at capturing any particular marketing construct depends on both content and construct validity.

[4] Outliers can have significant influences on correlation coefficients, so extreme outliers should be removed (Schwertman et al. 2004). We used Tukey's (1977) formula: lower fence: Quartile 1–3*(Quartile 3 – Quartile 1); upper fence: Quartile 3 + 3*(Quartile 3 – Quartile 1). All values outside the fences were removed, which reduced the number of observations to 499. As we explain with our robustness checks, including these extreme outliers still provided similar results.

[5] There could be a potential sample selection bias as certain firms/industries may be overly represented in *Advertising Age* than in Compustat. We conducted propensity score matching to check if the smaller sample size used in the empirical analysis is representative of the broader sample drawn from Compustat. The results present no evidence of sample selection bias. The details of the matching procedure are available in Web Appendix 4. We thank an anonymous reviewer for this suggestion.

with 409 observations, which constituted Sample 2. Almost 43% of the observations are from companies earning their revenue predominantly from B2B markets. The rest are divided almost evenly between predominantly B2C firms and firms that cater significantly to both markets. Interestingly, a large number of B2C firms are in the pharmaceutical industry that is known to employ large salesforces to target physicians. It represents 86 unique companies with the largest sales forces (the key criterion for their inclusion in the *Selling Power* database). These data range over time periods from one to 7 years for individual companies, with an average of about 5 years for each company.

Variables

The set of variables from Compustat used for construct operationalization includes selling, general, and administrative expenses (SGA), advertising expenses (ADV), and research and development expenses (R&D). These variables are the most frequently employed in marketing literature, so they represent variables of interest in terms of construct validation. We test them against the benchmark variables derived from *Advertising Age*, *Selling Power*, and Compustat itself. The benchmark variables, as reliable alternative measures of specific constructs, consist of measured media spending, estimated unmeasured spending, the number of people employed in sales functions, total intangible assets, goodwill, and other intangible assets. Variables and their data sources are listed in Table 5.

Beyond the definitions in Table 5, a few additional notes are necessary in relation to selected variables. Specifically, *measured media spending* spans 19 media channels and is reported at both the worldwide level (100 companies every year) and the U.S. level (200 companies every year). A company must have "measured-media spending in at least 3 of the four major regions—defined as the US and Canada; Asia Pacific; Europe, Middle East, and Africa; and Latin America" to qualify for entry in the worldwide list (*Advertising Age* 2016a). In addition, *estimated unmeasured spending*, or the estimate of spending on sources that are not included in the measured media category (*Advertising Age* 2016b), is reported only for the U.S. market (200 companies). To compare it against the global Compustat data, we needed to obtain a worldwide measure of estimated unmeasured spending. For this we calculated the ratio of measured media spending of 100 companies at the worldwide level to their measured media spending in the United States. With the assumption that this ratio should hold for estimated unmeasured spending too, we applied it to obtain worldwide estimated unmeasured spending from the information available for the 100 U.S. companies. As we explain with our robustness checks subsequently, we allowed for divergence of ±33% from these calculated values. Finally, the information on the estimated *number of*

salespeople refers to 500 U.S. companies (*Selling Power* 2016). This variable is reported at the U.S. level only. To compare it with Compustat data at the worldwide level, we referred to each company's annual reports and other business publications between 2009 and 2015 to get information on their total sales (in U.S. dollars) worldwide and in the United States. We calculated this ratio, then multiplied the number of U.S. salespeople with this number to impute the number of salespeople worldwide. Similar to estimated unmeasured spending, we again allowed for a divergence of up to ±33% from these calculated values.

The descriptive statistics for all the variables are in Table 6, Panels A (Sample 1) and B (Sample 2).

Results

Our validation approach consists of both conceptual and empirical assessments.

Conceptual assessment (content validity)

We apply the five decision criteria to identify constructs that are conceptually aligned with SGA (Table 7). As a construct, SGA provides a period-defined expense and thus could be categorized as accounting in its domain and short-term in nature. The ease of tracking the various components of SGA indicates a low level of abstraction and a high level of objectivity. Moreover, SGA is relatively tactical in business focus; its primary role is to support the firm's overall business activities.

The baseline construct *spending* thus is conceptually well-aligned with SGA, in that it represents expenses and is composed of cash outflows on several items.[6] However, SGA has only moderate fit with *assets*. Tangible assets include property, plants, and equipment; intangible assets refer to items such as customer loyalty, brand equity, and patents. Both types can have tremendous impacts on firm performance. Although SGA and assets align on the necessary decision criteria (domain of definition and level of abstraction), they exhibit less alignment on the other 3 (time horizon, objectivity, and business focus). Nonetheless, we apply an empirical analysis to validate SGA as a measure of *spending* and *assets*. Regarding the five benchmark variables, similar to SGA, three of the benchmark variables (measured media spending, estimated

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[6] Marketing spending, as used in the study for validation of SGA as a measure, has two subconstructs: advertising spending and promotional spending. Arguably, marketing spending on some activities such as advertising bestow relatively longer-term benefits compared with spending on other activities such as promotions. However, considered in a comparative perspective, the spending construct is relatively short-term when compared with, say, the assets construct. Also, marketing literature that has used SGA—a short-term accounting variable—to measure spending has implicitly considered it short-term.

Table 5   Data sources, variables, and descriptions

Variable	Description
Data source: Compustat	
SGA (Selling, general, and administrative expense)	All operating expenses (other than those directly related to production) incurred in the regular course of business.
ADV (Advertising expense)	The cost of advertising media (radio, TV, newspapers, and periodicals) and promotional expenses. It does not include other selling and marketing expenses.
R&D (Research and development expense)	All costs related to the development of new products or services. It does not include market research or market testing activities, or routine or periodic alterations to existing products, manufacturing processes, and other ongoing operations.
Goodwill	Value assigned to long-term perceptual assets (e.g., brand name, client relationships, and employee morale), which increase the earning potential of the company.
Other intangible assets	Intellectual assets such as patents and rights, which have a monetary value for the company.
Total intangible assets	Sum of goodwill and other intangible assets
Data source: *Advertising Age* (2016a, 2016b)	
Measured media spending	Estimated annual spending across 19 media: TV (broadcast network TV, spot TV, syndicated TV, and network cable TV), radio (network, national spot, and local), magazines (consumer magazines, Sunday magazines, local magazines, and B2B magazines), newspapers (local and national), Spanish-language media (magazines, newspapers and TV networks), outdoor, internet (excluding paid search and broadband video), and free-standing inserts.
Estimated unmeasured spending	Estimates of spending on direct marketing, promotion, co-operative marketing, coupons, catalogs, product placement, events, and unmeasured forms of digital media (e.g., display, paid search, video, and social media).
Total marketing spending	Sum of measured media spending and estimated unmeasured spending
Data source: *Selling Power* (2016)	
Number of salespeople	Estimated number of people employed in sales functions

These measures are in millions of dollars, except for the number of salespeople, which is measured in thousands. Definitions of the Compustat variables are available in Standard and Poor's (2003)

unmeasured spending, and number of salespeople) seem conceptually well-aligned with *spending*. Therefore, we use these variables to check the construct validity of *spending*. Two benchmark variables (goodwill and other intangible assets from balance sheet information in Compustat) instead are conceptually well-aligned with assets and thus serve as the benchmark variables for the construct validity assessment of *assets*.

Resources and *capabilities* (as well as *exploitation*, a subconstruct of marketing capability; Vorhies et al. 2011) are not aligned with SGA. They differ consistently on the conceptual, operational, and managerial dimensions. Resources and capabilities address operating performance whereas SGA is an accounting indicator. The greater intangibility of resources and capabilities also demands qualitative and subjective judgments, or a high level of abstraction and low level of objectivity. Resources and capabilities are strategic and develop over time, such that they are longer-term in their time horizon. All the decision criteria thus reiterate the incongruence of these constructs with SGA. Because the necessary condition for content validity is not satisfied, we establish that SGA is an

inadequate operationalization for resources and capabilities. In stark and worrisome contrast, many studies have used SGA for this purpose.

In summary, SGA seems conceptually aligned with *spending* and *assets* (and thus with *efficiency* and *intensity*), and it fulfills the necessary condition for content validation. However, SGA comprises 29 items that cover a broad range of distinct activities, so we still need to test for construct validity. Only 3 of the 29 items—ADV, commissions, and marketing expenses—relate directly to selling and marketing cash outflows. Thus, we empirically examine the suitability of SGA to measure these and other constructs next.[7]

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[7] We note the difference between marketing and sales functions, which are often organized and executed in different organizational departments and treated differently. *Marketing* involves activities to start and maintain a customer relationship (van Triest et al. 2009), such as advertising and promotional efforts, which generate customer awareness and establish brand preference. *Sales* seeks to stimulate actual purchases through sales force activities such as negotiations over price and delivery (Kotler and Rackham 2006).

Table 6 Descriptive statistics and correlations

A. Sample 1: Match of Compustat and *Advertising Age* data sets (N = 499)

	Variable[a]	Mean	S.D.	Min.	Max.	1	2	3	4	5	6	7	8	9	10	11	12
1	SGA	11,197	9421	11	56,733	1											
2	SGA – ADV	9161	8617	10	55,133	.99	1										
3	SGA – R&D	8515	7375	11	56,733	.96	.96	1									
4	SGA – ADV – R&D	6787	6889	10	55,133	.93	.95	.99	1								
5	ADV	1773	1309	1	8000	.52	.41	.45	.29	1							
6	R&D	2815	3223	0	12,540	.71	.70	.51	.44	.51	1						
7	Total intangible assets	12,455	22,431	0	225,278	.46	.41	.44	.40	.37	.22	1					
8	Goodwill	7081	11,697	0	104,568	.44	.39	.43	.39	.32	.21	.94	1				
9	Other intangibles	6250	13,074	0	120,710	.39	.35	.40	.35	.33	.15	.94	.77	1			
10	Total marketing spending	2165	1439	277	8554	.40	.32	.34	.22	.79	.48	.24	.20	.22	1		
11	Measured media spending	1263	910	43	4984	.38	.30	.32	.20	.74	.45	.21	.18	.18	.93	1	
12	Estimated unmeasured spending	902	674	20	3723	.34	.28	.31	.20	.69	.43	.22	.17	.22	.88	.64	1

B. Sample 2: Match of Compustat and *Selling Power* data sets (N = 409)

	Variable[b]	Mean	S.D.	Min.	Max.	1	2	3	4	5	6
1	SGA	5296	7759	70	39,697	1					
2	SGA – ADV	4712	6924	68	36,425	.99	1				
3	SGA – R&D	3750	5695	59	37,967	.97	.96	1			
4	SGA – ADV – R&D	3166	4870	58	34,695	.95	.96	.98	1		
5	ADV	584	1384	.30	9729	.68	.56	.70	.54	1	
6	Number of salespeople	5617	7024	.46	31,401	.67	.69	.63	.65	.33	1

Correlations greater than .09 (absolute value) are significant at the .05 level. Extreme outliers were removed before obtaining these statistics (Schwertman et al. 2004). We identified values far outside the data set using the Tukey (1977) formula – lower fence: Quartile 1–3*(Quartile 3 – Quartile 1); upper fence: Quartile 3 + 3*(Quartile 3 – Quartile 1). All values outside the fences were eliminated from the data set

Correlations greater than .10 (absolute value) are significant at the .05 level. Extreme outliers were removed before obtaining these statistics (Schwertman et al. 2004). We identified values far outside the data set using the Tukey (1977) formula – lower fence: Quartile 1–3*(Quartile 3 – Quartile 1); upper fence: Quartile 3 + 3*(Quartile 3 – Quartile 1). All values outside the fences were eliminated from the data set

[a] Measured in millions of U.S. dollars

[b] Measured in millions of U.S. dollars except the number of salespeople which is measured in thousands

Empirical results

Construct validity of marketing spending In prior literature, spending on marketing communication (often referred to simply as marketing spending) has been measured using different variables available in Compustat, such as ADV, SGA, and its modifications (SGA – ADV, SGA – R&D). This spending consists of two distinct subconstructs (or traits, in MTMM nomenclature): advertising spending and promotional spending. We thus consider two different scenarios for construct validation. In the first, we assume advertising spending is measured by ADV whereas promotional spending is measured by SGA or one of its modifications. In the second scenario, we switch them such that promotional spending is measured by ADV whereas advertising spending is measured by SGA or one of its modifications. We test these measures against two benchmarks from *Advertising Age*, measured media spending and estimated unmeasured spending. On the basis of its composition, measured media spending clearly captures advertising spending, whereas estimated unmeasured spending

captures promotional spending. We correlate these two benchmark measures with ADV and SGA (or one of its modifications) in an MTMM format, which yields 4 MTMM matrices in each scenario.[8] In all these matrices, the Compustat data represent method 1 for obtaining data, and the *Advertising Age* data represents method 2. The results for the first MTMM matrix (ADV measures advertising spending whereas SGA measures promotional spending) are in Table 8, Panel A.

For convergent validity, coefficients in the validity diagonal should be significantly different from zero and high enough to

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[8] In addition to the two common modifications of SGA (SGA – ADV, SGA – R&D), we test another modification (SGA – ADV – R&D) to check if SGA has any significant marketing-related component, beyond ADV and R&D, which may justify its use as a measure of marketing constructs. Thus, scenario 1 includes four MTMM matrices: advertising spending measured using ADV whereas promotional spending measured using SGA, SGA – ADV, SGA – R&D, or SGA – ADV – R&D, respectively. Scenario 2 also uses four matrices, with promotional spending measured as ADV whereas advertising spending measured using each of the four SGA-based metrics.

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Table 7 Conceptual analysis results

Construct/Variable	Conceptual dimension		Operational dimension		Managerial dimension
	Domain of definition	Level of abstraction	Time horizon	Level of objectivity	Business focus
Spending	Accounting	Low	Short-term	High	Strategic/Tactical
Assets	Accounting/Operating	Medium	Long-term	Medium	Strategic
Resources	Operating	High	Long-term	Low	Strategic
Capabilities	Operating	High	Long-term	Low	Strategic
SGA expense	Accounting	Low	Short-term	High	Tactical
Measured media spending	Accounting	Low	Short-term	High	Strategic/Tactical
Estimated unmeasured spending	Accounting	Low	Short-term	High	Strategic/Tactical
Salespeople	Quantitative (Accounting)	Low	Short-term	High	Strategic/Tactical
Goodwill	Accounting	Medium	Long-term	Medium	Strategic
Other intangible assets	Accounting	Medium	Long-term	Medium	Strategic

warrant further investigation. In MTMM 1, although both coefficients are statistically significant, the coefficient for trait 1, measured using ADV (.74), is much higher than the one for trait 2, measured using SGA (.34). For discriminant validity, a validity coefficient should be higher than the values in its column and row in the heterotrait-heteromethod cells. For example, the correlation between ADV and measured media spending should be higher than the correlations between ADV and estimated unmeasured spending or SGA and measured media spending (which have neither traits nor methods in common). This condition is fulfilled for trait 1 measured using ADV (.74 > .69; .74 > .38) but not for trait 2 measured using SGA (.34 < .38; .34 < .69). Furthermore, the validity coefficient should be higher than all coefficients in the heterotrait-monomethod cells. For example, the correlation between ADV and measured media spending should be higher than the correlations between measured media spending and estimated unmeasured spending or ADV and SGA. This condition is again fulfilled only for trait 1 measured using ADV (.74 > .64; .74 > .52) and not for trait 2 measured using SGA (.34 < .52; .34 < .64). Overall, the results suggest that only ADV fulfills the conditions of convergent and discriminant validity for measuring advertising spending; SGA does not fulfill these conditions for measuring promotional spending. The similar MTMM matrices for the modifications of SGA (i.e., SGA – ADV, SGA – R&D, SGA – ADV – R&D) provide similar results (see Table 8, Panel B for results of all four matrices 1–4). That is, none of the SGA-based measures fulfill conditions of construct validity to measure promotional spending.

In the second scenario, we switched the measures so that ADV measures promotional spending whereas SGA measures advertising spending. Neither ADV nor SGA, or any of its modifications, fulfills the conditions this time. Thus, ADV offers a good measure of advertising spending and a partial measure of total marketing spending, but SGA fails to capture

marketing spending or any of its subconstructs. The conceptual relationship of *spending* with *intensity* and *efficiency* allows us to extrapolate the results for marketing communication spending to marketing intensity and efficiency too.

Construct validity of marketing assets In line with our adopted definition of a marketing asset (i.e., as noted previously, a "customer-focused measure of the value of the firm (and its offerings) that may enhance the firm's long-term value"; Rust et al. 2004, p. 78), marketing usually focuses on intangible forms, such as customer relationships, brand equity, and patents. We therefore subsume marketing investments under assets. Following accounting standards, assets are recorded on the balance sheet, but commonly used measures of investments or assets, such as ADV and SGA and its modifications (SGA – ADV, SGA – R&D), appear in the income statement. We thus validate the measures from the income statement against two entries from the balance sheet that capture intangible assets: goodwill and other intangible assets.

For validation purposes, the two subconstructs of assets are perceptual assets, such as customer relationships and brand equity, and intellectual assets, such as property rights, including "patents, trademarks, registered designs and copyrights" (Kristandl and Bontis 2007, p. 1519). Similar to our tests of the validity of marketing spending measures, we consider two scenarios. In the first, we assume perceptual assets are measured by ADV whereas intellectual assets are measured by SGA or one of its modifications. In the second, we switch them, such that intellectual assets are measured by ADV whereas perceptual assets are measured by SGA or one of its modifications. We test these measures against goodwill and other intangible assets, as reported in the balance sheet. Goodwill captures perceptual assets well; other intangible assets capture intellectual assets. We correlate these two benchmark measures with ADV and SGA (or one of its

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Table 8 Construct validation for marketing communication spending

A. MTMM 1 results

MTMM 1 (Suitability of SGA to measure promotional spending)			Method 1 (Compustat)		Method 2 (Advertising Age)	
			Trait 1 (Advertising spending)	Trait 2 (Promotional spending)	Trait 1 (Advertising spending)	Trait 2 (Promotional spending)
			ADV	SGA	Measured media spending	Estimated unmeasured spending
Method 1 (Compustat)	Trait 1	ADV	1			
	Trait 2	SGA	.52**	1		
Method 2 (Advertising Age)	Trait 1	Measured media spending	.74**	.38**	1	
	Trait 2	Estimated unmeasured spending	.69**	.34**	.64**	1

B. Overview of results from MTMM matrices 1–4

	Trait 1 (Advertising spending)		Trait 2 (Promotional spending)	
MTMM 1	ADV		SGA	
Convergent validity	.74**	✓	.34**	X
Discriminant validity				
1st condition	.74 > .69	✓	.34 < .38	X
2nd condition	.74 > .38	✓	.34 < .69	X
	.74 > .64	✓	.34 < .52	X
	.74 > .52	✓	.34 < .64	X
MTMM 2	ADV		SGA – ADV	
Convergent validity	.74**	✓	.28**	X
Discriminant validity				
1st condition	.74 > .69	✓	.28 < .30	X
2nd condition	.74 > .30	✓	.28 < .69	X
	.74 > .64	✓	.28 < .41	X
	.74 > .41	✓	.28 < .64	X
MTMM 3	ADV		SGA – R&D	
Convergent validity	.74**	✓	.31**	X
Discriminant validity				
1st condition	.74 > .69	✓	.31 < .32	X
2nd condition	.74 > .32	✓	.31 < .69	X
	.74 > .64	✓	.31 < .45	X
	.74 > .45	✓	.31 < .64	X
MTMM 4	ADV		SGA – ADV – R&D	
Convergent validity	.74**	✓	.20**	X
Discriminant validity				

Table 8 (continued)

A. MTMM 1 results

1st condition	.74 > .69	✓	.20 ≈ .20	X
2nd condition	.74 > .20		.20 < .69	
	.74 > .64	✓	.20 < .29	X
	.74 > .29		.20 < .64	

As shown in the table, neither SGA nor any of its modifications is a good measure of promotional spending. If the measures were switched, still neither SGA nor any of its modifications will be a good measure of advertising spending

**p < .01 (two-tailed)

modifications) in an MTMM format, yielding a total of 3 MTMM matrices for each scenario.[9] In all these matrices, the income statement is designated method 1 for obtaining data, and the balance sheet is method 2. The results of the first MTMM matrix (ADV measuring perceptual assets, SGA measuring intellectual assets) are in Table 9, Panel A. Then in Panel B, we report the results for all 3 matrices (5–7) in scenario 1. Convergent and discriminant validity analyses indicate that neither ADV nor SGA-based measures from the income statement are valid measures of the two subconstructs of marketing assets.

Construct validity of sales force spending Sources of data on sales force spending usually do not split this construct into multiple traits, which makes it difficult to apply an MTMM approach (which needs a minimum of two traits from each data collection method) to validate this construct. We rely instead on bivariate correlations, which "describe the degree of relationship between two variables" (Nunnally 1978, p. 121). Correlation of the number of salespeople with SGA (0.67) is positive and statistically significant (see Table 6, Panel B). This correlation stays significant when we exclude ADV and R&D from SGA; in fact the correlation increases when we exclude ADV from SGA (0.69). Thus SGA, and especially its modification SGA – ADV, seems to represent sales force spending relatively well.

Table 10 provides a summary of all the constructs, their operationalizations, benchmark variables used for construct validation, and empirical tests.

Robustness checks

We conducted several checks to test the robustness of our results. First, the MTMM methodology relies on arithmetic differences in the magnitudes of the correlation coefficients. One might question the statistical significance of these differences. Using a method proposed by Steiger (1980), we thus test for the statistical equality or inequality of correlation coefficients. To check equality, we considered pairs of correlation coefficients in which two pairs share one variable in common (Steiger 1980). These correlation coefficients were converted into z-scores, using Fisher's r-to-z transformation, which we applied to compute the asymptotic covariance of the estimates. These quantities were then used in an asymptotic z-test. The results for marketing spending from Sample 1 indicate that ADV and SGA are not equally correlated with measured media spending (z = 11.31, $p < .01$) or estimated unmeasured spending (z = 9.91, $p < .01$). In addition, ADV

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[9] For the three MTMM matrices in scenario 1, perceptual assets are measured using ADV in each case, whereas intellectual assets are measured using SGA, SGA – ADV, or SGA – R&D. Scenario 2 also includes three matrices in which intellectual assets are always measured using ADV whereas perceptual assets use the three SGA-based metrics.

Table 9 Construct validation for marketing assets

A. MTMM 5 results

MTMM 5 (Suitability of SGA to measure intellectual assets)			Method 1 (Income statement from Compustat)		Method 2 (Balance sheet from Compustat)	
			Trait 1 (Perceptual assets) ADV	Trait 2 (Intellectual assets) SGA	Trait 1 (Perceptual assets) Goodwill	Trait 2 (Intellectual assets) Other intangible assets
Method 1 (Income statement from Compustat)	Trait 1	ADV	1			
	Trait 2	SGA	.48**	1		
Method 2 (Balance sheet from Compustat)	Trait 1	Goodwill	.31**	.45**	1	
	Trait 2	Other intangible assets	.36**	.42**	.77**	1

B. Overview of results from MTMM matrices 5–7

	Trait 1 (Perceptual assets)	Trait 2 (Intellectual assets)
MTMM 5	ADV	SGA
Convergent validity	.31**	.42**
Discriminant validity	✓	✓
1st condition	.31 <.36 (X)	.42 <.45 (X)
	.31 <.45	.42 >.36
2nd condition	.31 <.77 (X)	.42 <.48 (X)
	.31 <.48	.42 <.77
MTMM 6	ADV	SGA – ADV
Convergent validity	.31**	.39**
Discriminant validity	✓	X
1st condition	.31 <.36 (X)	.39 <.40 (X)
	.31 <.40	.39 >.36
2nd condition	.31 <.77 (X)	.39 >.31 (X)
	.31 ≈.31	.39 <.77
MTMM 7	ADV	SGA – R&D
Convergent validity	.31**	.42**
Discriminant validity	✓	✓
1st condition	.31 <.36 (X)	.42 <.43 (X)
	.31 <.43	.42 >.36
2nd condition	.31 <.77 (X)	.42 <.33 (X)
	.31 <.33	.42 <.77

None of the measures from the income statement are good measures of marketing assets. This finding is consistent even if measures were switched, such that ADV measured intellectual assets and SGA measured perceptual assets. The sample size of this analysis is 395 data points, because we excluded observations with missing values for other intangible assets

**$p < .01$ (two-tailed)

Table 10 Summary of construct validation

Construct category	Construct and operationalization	Benchmark variables	Empirical test for SGA or modifications[a]
Spending	Construct: Marketing Spending (Subconstructs: Advertising Spending; Promotional Spending)	Measured media spending, Estimated unmeasured spending	MTMM 1 MTMM 2 MTMM 3
	1. SGA 2. SGA – ADV 3. SGA – R&D		
	Robustness check SGA – ADV – R&D		MTMM 4
	Construct: Sales Force Spending		
	1. SGA 2. SGA – ADV – R&D	Number of salespeople	Bivariate correlations Bivariate correlations
	Robustness check SGA – ADV		Bivariate correlations
Assets	Construct: Marketing Assets (Subconstructs: Perceptual assets; Intellectual assets)		
	1. SGA 2. SGA – R&D 3. SGA; ADV[b]	Goodwill, other intangible assets	MTMM 5 MTMM 6 MTMM 5
	Robustness Check SGA – ADV		MTMM 7
Efficiency	Construct: Marketing Efficiency (based on Marketing Spending) 1. SGA; ADV[b]		MTMM 1
Intensity	Construct: Marketing Intensity (Subconstruct: Advertising intensity) (based on Marketing Spending) 1. SGA 2. SGA – R&D		MTMM 1 MTMM 3
	Construct: Sales Intensity (based on Sales Force Spending) 1. SGA		Bivariate correlations

For each construct, we show only subconstructs or measures that have been employed in previous literature. If an operationalization had been expressed as a ratio, our analysis focuses only on the component (numerator or denominator) that explicitly includes the measure of interest

[a] Only MTMM matrices under scenario 1 have been depicted. There are 4 matrices under scenario 2 for marketing spending and 3 matrices under scenario 2 for marketing assets which have not been included in the table

[b] We used SGA along with ADV to measure a specific construct in this case

and the various modifications of SGA were not equally correlated with measured media spending or estimated unmeasured spending. Considering their pairwise correlation coefficients, ADV appears to be an appropriate measure for marketing spending, but SGA and its modifications are not. The results for sales force spending from Sample 2 further indicate that ADV and SGA are not equally correlated with salespeople ($z = 10.91$, $p < .01$); ADV and the various modifications of SGA are not equally correlated with salespeople either. The pairwise correlation coefficients suggest that SGA – ADV represents sales force expenses well.

Second, we had removed extreme outliers from our samples (i.e., values above or below 3 times the interquartile range; Dattero et al. 1991). To check whether retaining the outliers would have led to different conclusions, we re-estimated all the MTMM matrices with the full data set. The results remained substantively similar. Another argument

suggests that even moderate outliers might bias the conclusions, so we also re-estimated the matrices after removing the moderate outliers (i.e., 1.5 times the interquartile range). The results again were substantively similar.

Third, differences in companies' performance might influence how well the metrics from Compustat reflect various constructs. Thus, we performed several median splits of our data set, according to high and low values of the ratios of various variables of interest: SGA to sales, ADV to sales, R&D to sales, goodwill to sales, other intangibles to sales, and assets to sales. The results across both high and low groups for all these splits remain substantively similar to those based on the entire data set and strongly support our initial MTMM findings (see Web appendix 5).

Fourth, our data did not provide worldwide values for estimated unmeasured spending or number of salespeople, so we had to impute these values, and the imputations might

not capture the true values. To check the robustness of these results, as we noted previously, we allowed for a divergence of up to ±33% of the calculated values. For both variables, we generated 3 additional series, at 20%, 25%, and 33% divergence levels. For example, for estimated unmeasured spending, we allowed the imputed values to vary randomly in either direction by 20%, which produced the first series. Then we used this series in our analysis, to determine if the results changed significantly. We repeated this exercise for 25 and 33% for both variables. The results were substantively similar.

Fifth, in addition to our validity analysis, we considered the reasoning used in prior studies to justify the use of SGA and its modifications to measure marketing constructs. A high correlation between ADV and SGA is the most common justification, yet without appropriate conceptual and empirical assessment, this reasoning is not based on sound logic. Web Appendix 6 provides an overview of correlations between SGA and some of its components, available separately in the income statement. This comparison shows that SGA is highly correlated not only with ADV (.70) but also with other expenses, such as R&D (.65), rental expenses (.74), and pension and retirement expenses (.66). Even if these components were removed from SGA, the remainder still correlates highly with these components. It even is highly correlated with unrelated variables reported in the income statement; for example, the correlation between SGA and the cost of goods sold (COGS), which provides information about a company's expenses for producing goods and services, is .80. Going solely by the size of the correlations, if SGA is an appropriate operationalization for advertising spending, it would be an even better operationalization of COGS. The two have little conceptual overlap though. Thus, SGA cannot be considered an adequate proxy for every item represented by its 29 components. Conceptual validity is necessary to establish before correlation should even be considered.

Discussion

A broad literature review of marketing and management journals reveals that SGA from Compustat has been used to operationalize several marketing- and sales-related constructs. This widespread, inconsistent use of SGA points to potential problems related to an inadequate conceptualization and operationalization. With a measurement validation approach, we seek to assess the level of congruence between the constructs and measures, using data from Compustat, *Advertising Age*, and *Selling Power*.

Although a conscientious conceptualization is a prerequisite of construct validation, research studies that rely on SGA frequently overlook this crucial step. Such gaps arise in other areas of research too; for example, nine out of 10 studies of marketing performance fail to provide clear conceptual definitions before attempting their operationalizations (Katsikeas et al. 2016).

Operationalization without proper conceptualization, or without proper empirical validation, can result in over- or underestimation of the effects of focal constructs. The inconsistent use of SGA across multiple constructs also challenges the validity of their estimated effect sizes. Identical operationalizations of different constructs imply that the attribution of estimated effects to specific constructs may be erroneous and lead to inaccurate managerial implications that hinder decision-making effectiveness. For example, an erroneous allocation of budget to marketing and sales activities could hinder the effective use of various marketing and sales levers to improve firm performance.

Our empirical analysis shows that SGA is inadequate for a number of constructs that it is commonly used to operationalize. Although a focal construct, marketing spending, is conceptually aligned with SGA, our empirical results show that SGA and its modifications are not valid operationalizations of marketing spending or its subconstructs. Marketing-related cash outflows are only a small component of SGA. Thus, studies using SGA to measure marketing communication spending or its subconstructs might have inferred incorrect influences of these expenditures. Our results suggest that ADV from Compustat, which is equally easily available, is a satisfactory measure of advertising spending and at least a partial measure of total marketing spending. Furthermore, SGA is ill-suited to measure complex constructs such as marketing capabilities, which instead require multidimensional, latent variable approaches to capture the transformation of cash outflows into competitive advantages.

Regarding marketing assets, our conceptual and empirical results indicate that neither ADV nor SGA (or any of its modifications) is satisfactory. Goodwill and other intangible assets, two variables equally easily available from Compustat, are better measures. For sales force spending, the results provide evidence of a strong overlap between the benchmark measure, number of sales force employees, and SGA-based metrics, especially SGA – ADV. Therefore, SGA appears valid for measuring sales force spending, in line with the general nature of selling, general, and administrative cash outflows. The proportion of sales expenses, in terms of commissions and salaries, constitutes a large component of SGA. Beyond validation, the results affirm the expected distinction between marketing and sales constructs. Sales force spending does not have a significant overlap with advertising or promotional spending, which are key components of marketing communication spending. Thus, SGA is not an appropriate operationalization for marketing and sales at the same time. We summarize the construct and measure fits in Fig. 4.

Guidelines for using SGA

From our theoretical and empirical analysis, we derive guidelines for researchers interested in using SGA to operationalize
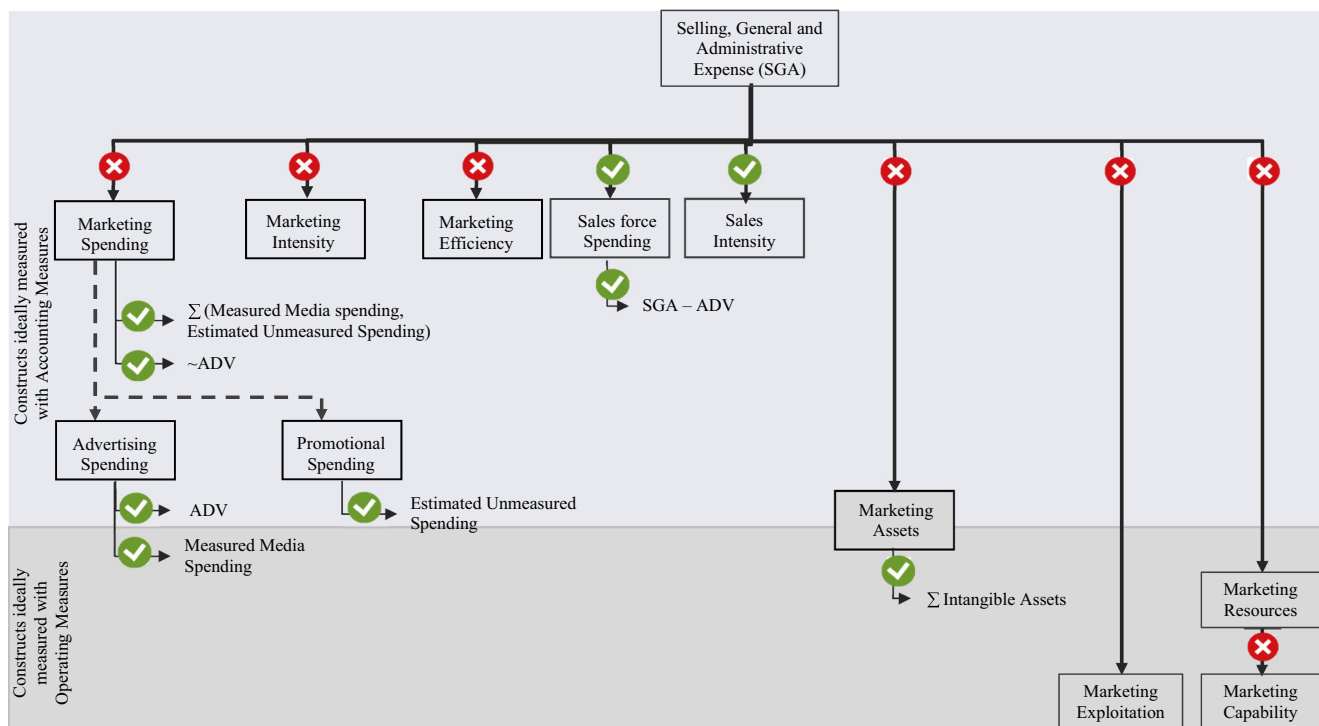
Fig. 4 Decision tree. Notes: A checkmark in the top line means that SGA is a valid measure for the construct; a cross means that it is not a valid measure. A checkmark below the marketing and sales constructs indicates which alternative measures are valid or better suited. Marketing intensity, marketing efficiency, sales intensity, and marketing exploitation are constructs comprised of one or more of the baseline constructs (expenses, assets, resources, and capabilities), differing only in their measurement objective. The validation of these constructs thus follows from their respective baseline constructs. Marketing resources and marketing capability require industry-specific or even firm-specific measurement approaches, predominantly based on qualitative operationalizations. Finally, both operating and accounting measures are needed to capture marketing assets in total

marketing and sales constructs. These guidelines can help build coherent knowledge about the conceptualization of constructs in general and their operationalization using SGA in particular.

Ascertain conceptual congruence between construct and measure Our review of marketing and management literature reveals frequent subpar construct definitions. Studies often fail to define or delineate constructs before operationalizing them, often based solely on cross-references or contextual examples. The use of ambiguous definitions (for example, defining a construct as a consequence or cause of other concepts and constructs) or pseudo-definitions (i.e., specifying a construct merely with an enumeration of examples) can lead to misspecifications (MacKenzie 2003). Imprecise or insufficient specification of the construct domain and content also may lead to their over- or underestimation, causing potential errors in the effect estimates due to incongruence between the construct and its measure. This problem also makes the results incomparable across studies and inhibits their synthesis, which is critical for cumulative knowledge building (Katsikeas et al. 2016). Both the complexity of a construct and the required adequacy of the measure to fit that complexity should be taken into account and be reflected in the measurement variable. Any dissonance can severely bias the

estimation results and their inferences. Researchers thus would do well to derive precise definitions, embedding their focal constructs into a broader (organizational) context. Then they can develop evaluative frameworks to assess the validation of constructs on conceptual and operational levels. Such frameworks help reveal which facets of a construct should be considered when choosing variables for its operationalization in empirical research.

Avoid using SGA as an all-encompassing measure and test for construct validity Many of the 29 cash outflow items that occur over the regular course of business and constitute SGA have little direct link to marketing functions. At a conceptual level, using SGA as a measure of a construct reduces the multifaceted variable to one component; at an operational level though, it necessarily remains an aggregate of 29 disparate items. This clear discrepancy somehow takes a backseat when researchers use SGA or any of its modifications as an all-encompassing measure for so many distinct constructs. Still, our results suggest that SGA can be adapted to match some constructs relatively well, by removing certain outflow items such as ADV and R&D. The key is to remove unrelated cash outflow items to increase the variance explained and reduce estimation errors related to the focal construct. Even

in this case, SGA and its modifications should be tested for validity with respect to a benchmark variable before being used to operationalize a construct. The benchmark variable can be obtained from a distinct data source that provides relatively purer and unbiased information, sometimes even from Compustat itself. For example, a benchmark variable that measures marketing assets already is available in the balance sheet.

Avoid justifications based on data unavailability by considering alternative sources Compustat in general and SGA in particular are popular sources, because of their clear advantages: easy availability and cross-industry, firm-specific data across several time periods. However, scholars cannot ignore their limitations. The variables are too broad to provide precise measures, so they introduce measurement error, potential model misspecification, and biased estimates. To suggest SGA is adequate for construct operationalization solely because valid measures are not available is not appropriate or accordant with a measurement philosophy that seeks to reduce errors and obtain precise estimates. Following precedents of inadequate operationalizations in existing research simply passes on the measurement biases from one study to the next. Instead, researchers should either redefine the construct, to bring it more in line with available measures, or obtain an adequate measure from other data sources that provide less noisy variables and better capture the focal construct. Either approach is preferable to forcing an inadequate variable on a construct with which it is not sufficiently aligned. Admittedly, these approaches may reduce sample sizes; compared with Compustat, the alternative sources such as *Advertising Age* and *Selling Power* are limited in their coverage. However, their measures can explain more of the variance of the focal construct, which leads to more precise measurements. Overall, we believe that SGA has been utilized too liberally in marketing. Of course, researchers have to trade-off the generalizability of findings from publicly available data against the precision and specificity of findings from private data, based on their research goals. As we show though, for several marketing-related constructs, more valid measures may be available within Compustat.

Following these guidelines can help improve measurement validity on both conceptual and operational levels. Current literature is characterized by different operationalizations for the same construct, as well as the same operationalization for different constructs. Our proposed guidelines may help researchers determine the appropriateness of measures for underlying constructs, which would improve conceptual completeness, operational consistency, estimations of true effect sizes, and comparison and replication of results. Overall, this study is a first step toward establishing common knowledge about the use of accounting-based variables in marketing research.

Considering the critical importance of marketing and sales force–related decisions, this study has implications for managers too. Marketing spending is a small component of SGA, so decisions based on its use as a measure might lead to inappropriate marketing strategies and misdirected budget allocations. The use of proper measures will provide true effect sizes and help assess crucial performance indicators that provide a basis for strategic decisions. By using proper measures, managers can better allocate their budgets and justify their decisions. They also gain a reliable approach for benchmarking their performance, according to appropriately aligned measures.

Limitations and further research

Although this research contributes to an enhanced understanding of the use of SGA-based metrics to measure marketing and sales constructs, our empirical analysis has a few limitations that suggest avenues for further study. First, our data come from multiple industries, but we did not consider potential industry-specific differences. Compustat reveals some differences in the composition of items included in SGA for specific industries. Continued research could explore these differences, in terms of the construct validity across industries. Studies that classify operating constructs using industry-specific characteristics would also enrich fundamental marketing knowledge. Second, our study highlights several performance-related constructs, such as capabilities and marketing exploitation that remain under-researched and insufficiently defined, in terms of their conceptualization and operationalization. We confined our study to baseline constructs and their accounting-based measures, but further research should define more complex constructs and derive valid operationalizations for them too. Third, it would be interesting to study if a certain portion of R&D spending could be considered as contributing to brand building especially in industries such as technology and healthcare. Empirically, research in this domain has taken an all-or-none approach to R&D—either using SGA as is or removing R&D from SGA. Future research may attempt to arrive at, say, a proportion of R&D expense that could be considered as related to marketing when measuring marketing constructs. Fourth, recent work has looked at obtaining required measures from SGA by employing the relationships of its components with some aggregate measures such as revenues and then apportioning SGA on that basis (Enache and Srivastava 2018). Future research may consider replicating such an approach in a marketing context. Fifth, we validated measured media spending and number of salespeople as benchmark variables based on actual data from annual reports of companies but were not able to do so for estimated unmeasured spending due to data unavailability. Future research could consider collecting data on promotional spending directly from firms

to validate this benchmark variable from *Advertising Age*. Sixth, results indicate that sales force spending is better captured by SGA – ADV compared with SGA – ADV – R&D. This could imply heavier representation of firms that may have relatively lower R&D expense. Also, the use of *Advertising Age* data may make the findings more relevant for B2C settings. Seventh, we relied on an MTMM approach for our empirical validation. This approach has some limitations though such as absence of clear standards to determine when a particular criterion has been met. Future research may consider other alternative techniques. Finally, the common use of accounting data sources by marketing researchers suggests the need to build more knowledge at the interface of these two domains. Variables from accounting need to be linked clearly with marketing constructs. For example, coordination spending is a manifest construct applied in marketing, but it is not consistently derived from Compustat. Additional research might build on our approach to establish guidelines for establishing strong reasoning to support such constructs and improve the consistency of their measurement. Relatedly, scholars that have used SGA as a measure in the past should replicate their studies with benchmark or alternative measures. Besides helping clarify any mixed results or bringing expected theoretical relationships of interest to surface, doing so could provide another means of empirical validation.

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