



The Drucker intangibles measurement system: An academic perspective

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ABSTRACT

There is widespread agreement in the literature that intangible assets, particularly those of a relational nature, are key determinants of firm performance. Scholars also acknowledge that stakeholder relationships and innovation are inextricably connected. Conceptual support for these linkages is found in established management theories and evidence from empirical research. However, this research has been handicapped by various data limitations. The purpose of this study is to introduce and evaluate a new dataset that overcomes many of those limitations, allowing for a more comprehensive examination of the complex interplay of relationship-based assets, innovation, and financial performance. Based on this review, we conclude that the Drucker system of measuring customer satisfaction, employee satisfaction/engagement, innovation, and corporate social performance exhibits sufficient content and other types of validity to be suitable for academic research involving this set of intangibles.

1. Introduction

Four of the leading frameworks in strategic management and marketing share a mutual interest in stakeholders, innovation, and firm performance. The *resource-based view* conceives of the firm as a nexus of contracts with key stakeholders (e.g., employees, customers, suppliers, debtholders, and shareholders) who provide access to critical, co-specialized resources that, when bundled together, can create economic profit (and rents) and a sustainable competitive advantage (Barney, 1991; Barney, 2018; Barney et al., 2021). Firms gain access to these new resources by leveraging the resources and capabilities already in their possession. Innovation is one such capability that can be used to create new value by attracting and configuring resources from internal and external stakeholders, thus differentiating the firm and its offerings, cementing existing relationships, and building new ones. In addition, the *knowledge-based view* argues that the development of innovation capabilities depends on knowledge related to human capital, relational capital, and customer capital (Ferenhof et al., 2015; Grant, 1996; Quintane et al., 2011).

Stakeholder theory conceives of a firm as a network of stakeholder relationships that exists for the purpose of value creation (Freeman et al., 2021). This perspective casts a wider net of stakeholders (e.g., society at large) and views the network as bound together by informal

contracts in the form of shared values, norms, and ethics. According to Freeman et al. (2021), the aim is to build a sustainable cooperative advantage. Such stakeholder collaboration is thought to be particularly important in the contexts of open innovation, business model innovation, and sustainability-related innovation (Watson et al., 2018). Furthermore, innovation itself can serve to bind a network together by helping to resolve stakeholders' conflicting claims in a manner whereby everyone benefits (Freeman et al., 2007).

Stakeholder marketing is, to some degree, a blend of resource-based view, knowledge-based view, and stakeholder theory. According to this view, a firm's network of stakeholder relationships is a strategic resource that the firm can leverage through value-creating strategic actions that address stakeholders' demands (Kull et al., 2016). Such responsiveness leads to differentiation and/or cost advantages and superior financial performance. A key factor is thought to be stakeholder-focused organizational learning that supports stakeholder-focused action in the form of innovation (Mena & Chabowski, 2015).

The point of the discussion above is not to suggest that these four theoretical perspectives are redundant but to show that their common focus on stakeholders, innovation, and performance ensures continued attention to these domains. This, in turn, requires a solid data foundation to test the relevant hypotheses. Academic research in this domain has given considerable attention to firms' relationships with three

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stakeholder groups: customers, employees, and society. Meta-analyses and reviews attest to a vast extant literature dealing with customer satisfaction (Otto et al., 2020), employee satisfaction/engagement (Bailey et al., 2017), and corporate social performance (CSP) (Vishwanathan et al., 2020).² Work in these areas has examined the nomological nets of relational constructs, paying special attention to their antecedents and consequences. Financial performance, particularly in terms of profitability and firm value, has been a consequence of particular interest to researchers. There are positive results linking financial performance with customer satisfaction (Otto et al., 2020), employee engagement (Schneider et al., 2018), and CSP (Vishwanathan et al., 2020).

As researchers have noted, this work has tended to focus on one stakeholder group at a time (Hillebrand et al., 2015; Hult et al., 2011; Janani et al., 2022; Kull et al., 2016), which can lead to biased estimations and overlooks key dependencies in firms' relational networks (Kang et al., 2016). While research involving two or more stakeholder groups simultaneously is rare, it does exist (e.g., Haefner et al., 2021; Luo & Bhattacharya, 2006; Rubera & Kirca, 2017; Surroca et al., 2010; Wolter et al., 2019).

Scholars have also examined how relational constructs relate to innovation, including customer satisfaction (e.g., Rubera & Kirca, 2017), employee engagement (e.g., Kim & Koo, 2017; Kwon & Kim, 2020), and CSP (e.g., Luo & Bhattacharya, 2006). However, when it comes to interrelationships among these resources/capabilities, the majority of research relies on individual-level data, small sample sizes, and cross-sectional samples, which neglects the generalizability to the firm or industry levels, makes the results highly sensitive to outliers, and does not account for long-term effects, respectively (Saini & Jawahar, 2021; Schneider et al., 2018). In addition, several researchers have raised concerns regarding the use of a single index to measure firm capabilities (Berg et al., 2019; Shapiro, 2006).

These issues partly relate to proprietary data being either unavailable or unaffordable for academic purposes. Although a surprising amount of quality data exists that can help to overcome some of the aforementioned limitations, such data are collected for commercial purposes, and data owners are reticent to share this information, particularly on an identified basis (such identification is often necessary to merge the data with other information). Thus, although some results of such research may appear in academic journals, the authors tend to be employed by the data owner (e.g., Gallup Employee Engagement Survey: Harter et al., 2002), which can restrict opportunities for replication. However, exceptions do exist (e.g., Glassdoor Employee Satisfaction: Wolter et al., 2019), including the commendable release of the Drucker data as described herein.

Recently, the Drucker Institute has started publishing its measurement scores of customer satisfaction, employee engagement and development, innovation, and CSP.³ This database contains the performance scores of more than 800 US firms collected annually and is publicly available. As this dataset includes constructs of interest to different disciplines, the current research aims to investigate the validity of the measures presented by the Drucker Institute and their suitability for academic research.

² Although some authors refer to corporate social responsibility (CSR) as the measured construct in their research, we believe that corporate social performance (CSP) is a more adequate terminology. Rating services that evaluate CSP often refer to environment, social, and governance (ESG) performance.

³ Based on our content analysis reported in Section 5, we believe that the Drucker measure of Employee Engagement and Development might be better labelled Employee Satisfaction/Engagement. We also feel that the Drucker measure of Innovation approximates what is meant by Innovation Capabilities.

2. Measures in common use

Despite the challenges described above, academic researchers do have options for measuring relational assets and innovation. The measures of intangible assets favored by the academic community have their strengths; however, all are lacking in one or more of the following evaluative criteria: availability, coverage, cost to implement, multiple indicators, and validity (Table 1). This can limit their usefulness for generalizable, longitudinal, firm-level research.

The "gold standard" for measuring customer satisfaction has been the American Customer Satisfaction Index (ACSI) (e.g., Anderson et al., 2004; Bhattacharya et al., 2021; Fornell et al., 1996; Fornell et al., 2016; Ivanov et al., 2013; Rubera & Kirca, 2017). The popularity of the ACSI stems from its availability, theoretical basis, rigorous development, and predictive power. Its most obvious limitation is that it covers business-to-consumer (B2C) brands/firms only. Within the B2C context, the ACSI has significant coverage (400 companies in 47 industries), but there are industry gaps (e.g., homebuilding and real estate), industries in which only one firm is reported (e.g., software), and industries in which only aggregate statistics are available (e.g., healthcare, credit unions, and gas stations). The ACSI and other satisfaction measures are discussed further in Section 5.1.1.

As for employee engagement, according to Bailey et al. (2017), the standard is the Utrecht Work Engagement Scale (UWES) (Schaufeli et al., 2002). However, there appears to be no firm-level database associated with this measure available for academic research. Academics can use this scale, but they need to administer it to a sufficient number of employees in a sufficient number of firms to have any claim of representativeness. In addition, doing this annually would require an immense budget. The UWES and other engagement measures are discussed further in Section 5.2.1.

The measures used by academics to assess firm-level innovation and innovation capability vary. One commonly used measure is research and development (R&D) expenditure/intensity, which is considered an input metric (e.g., Artz et al., 2010; Chauvin & Hirschey, 1993; Flammer & Ioannou, 2021; Hull & Rothenberg, 2008; Shaikh et al., 2018; Sridhar et al., 2014). Its popularity stems, in part, from its availability on databases, such as COMPUSTAT. However, the vast majority of service and retail firms do not report R&D expenses (Sridhar et al., 2014). Patents are often used as an output measure of innovation, but not all patents prove valuable. New product/service introductions are also commonly used but fail to assess process innovation. Innovation measures are discussed in more detail in Section 5.3.1., leading to the conclusion that multiple indicators are required to measure firm innovation.

In academic research, the go-to measure for assessing CSP/corporate social responsibility (CSR) is the Kinder Lydenburg Domini (KLD) rating system. This measure has a wide coverage of firms (over 8,500 firms) globally and provides performance scores for different aspects of CSP and corporate social irresponsibility (Chatterji et al., 2009; Kang, 2015). Although this measure is commonly used, a growing body of literature has raised questions regarding the KLD's construct and convergent validity, again calling for the use of multiple measures. The KLD and other CSP metrics are discussed in Section 5.4.1.

The Drucker Measurement System largely addresses issues related to existing measures. Five (and soon six) years of data are freely available on the Drucker Institute website. The data now include 800 firms per year in an attempted census of a defined population. All measures are based on multiple indicators from credible sources, including some of those discussed above (e.g., the ACSI). Moreover, as demonstrated in Sections 5 and 6, there is solid evidence regarding content and convergent validity.

3. A promising alternative

The Drucker Measurement System, developed by the Drucker Institute at Claremont Graduate University, is a pioneering effort to assess

Table 1
Comparison of the Drucker Measures and Prevalent Measures of Intangible Constructs.

Construct	Dominant Measures	Key Strength(s)	Key Limitation(s)	Drucker Measurement Strengths	
				Specifically	Generally
Customer Satisfaction	American Customer Satisfaction Index (ACSI) (Fornell et al., 1996).	<ul style="list-style-type: none"> Theory-based Rigorously developed Predictive Numerous B2C brands/companies Data publicly available from 1995 	<ul style="list-style-type: none"> Only includes B2C firms 	<ul style="list-style-type: none"> Includes B2C and B2B Includes ACSI and other proven customer satisfaction metrics 	<ul style="list-style-type: none"> Publicly available on Drucker Institute website Census of 800 + large US firms Covers a wide range of firms in different contexts Annual data back to 2017 Rigorous development using causal modeling All intangible measures based on multiple (diverse) indicators from different credible sources Many indicators have prior use in academic research Indicators tap the nomological nets of the constructs Evidence of acceptable convergent validity based on factor loadings and average variance extracted (AVE) scores
Employee Engagement	Utrecht Work Engagement Scale (UWES) (Schaufeli et al., 2002).	<ul style="list-style-type: none"> Theory-based Rigorously developed Predictive Scales published 	<ul style="list-style-type: none"> Researchers need to collect primary data Costly to do longitudinally and on a representative basis 	<ul style="list-style-type: none"> Provides a publicly available secondary data source of firm-level employee engagement scores 	<ul style="list-style-type: none"> Many indicators have prior use in academic research Indicators tap the nomological nets of the constructs Evidence of acceptable convergent validity based on factor loadings and average variance extracted (AVE) scores
Innovation Capabilities	Most commonly R&D expenditures, patents, or new product/service introductions	<ul style="list-style-type: none"> R&D expenditures available on COMPUSTAT Other measures also publicly available but with significant effort 	<ul style="list-style-type: none"> Majority of service and retail firms do not report R&D expenses Patents do not ensure value creation New p/s overlook process innovation No single metric can capture innovation capabilities 	<ul style="list-style-type: none"> Measures innovation capabilities based on 11 different aspects of firm innovation to provide a comprehensive and reliable measure 	<ul style="list-style-type: none"> Many indicators have prior use in academic research Indicators tap the nomological nets of the constructs Evidence of acceptable convergent validity based on factor loadings and average variance extracted (AVE) scores
Corporate Social Performance/Responsibility	Kinder Lydenburg Domini (KLD) rating system (Graves & Waddock, 1994; Deckop et al., 2006).	<ul style="list-style-type: none"> Publicly available Broad coverage of firms 25 + year history in academic research 	<ul style="list-style-type: none"> KLD measures notably diverge from scores from other rating agencies 	<ul style="list-style-type: none"> Measures CSR performance based on data from five different measurement systems to provide a reliable measure 	<ul style="list-style-type: none"> Many indicators have prior use in academic research Indicators tap the nomological nets of the constructs Evidence of acceptable convergent validity based on factor loadings and average variance extracted (AVE) scores

the key intangible assets of major US firms on a representative basis and at scale. This measurement system pays specific attention to customer satisfaction, employee satisfaction/engagement, innovation, and CSP. The system serves as the basis of the *Wall Street Journal's* annual Management Top 250 ranking. In addition, company ratings from the Drucker system are used as input for two stock indices: the S&P/Drucker Institute Corporate Effectiveness Index and Barron's Future Focus Stock Index. By combining metrics from different data providers, the Drucker Institute creates measures that broadly capture the effectiveness of firms in accruing key intangible resources. The system relies on objective data from reputable third parties that specialize in quantifying actual firm behavior, stakeholder responses, and expert evaluations using surveys and big data methods. Therefore, this dataset is not only unique but potentially critical for developing a better understanding of the interrelationships among intangible assets and their individual and collective contributions to firm performance. The development of the Drucker system was inspired by a content analysis of the lifelong works of the late Peter Drucker, which revealed his particular interest in the four intangible assets that the system seeks to quantify. The purpose of this study is to acquaint academic researchers with the key features of this system and its development. We also seek to provide a balanced appraisal of the system's merits for the purposes of academic research.

Readers should note that the Drucker Institute website contains detailed information concerning the system's methodology and the data sources.⁴ At the time of writing, the website also provides five waves of annual data (2017–2021) that are available for download by interested researchers. These datasets contain firm-level *t*-scores ($T = (Z \times 10) + 50$) on the four intangible dimensions plus a financial performance score and an overall score. In this review, we are concerned only with the four

intangible scores.⁶

4. Measurement methods and system development

The target population of the Drucker system consists of large, publicly traded US companies. The population frame is an annual pull from the S&P Capital IQ database of all companies that meet certain size and location criteria. For the period of 2014–2017, the population was defined using the following symbolic logic: [publicly traded on the NYSE or NASDAQ] and [[market cap > \$10B] or [component of the S&P 500] or [component of the Fortune 500]]. This formula generated a target population of approximately 700 firms per year. Starting in 2018, to further homogenize the population, the qualifying logic was amended to the following: [[component of the Dow Jones US Stock Index] or [component of the S&P 1500]] and [[component of the S&P 500] or [market cap > \$10B] or [revenue > \$3B]]. One effect of this change was the elimination of a small group of firms that were US traded but technically not US domiciled. It also placed more emphasis on revenue. This formula generated a target population of 800 + firms per year. On a year-over-year basis, a certain number of firms enter the Drucker population based on growth. Likewise, a certain number exit the population because their numbers slipped, their stock was no longer traded, they merged, or they went private.

On an annual basis, the Institute shares the population list with its data providers, who attempt to match their most current data with each firm. They then provide a rollup of their data on those firms collected over the previous 12 months. In this measurement effort, the Institute serves as “an aggregator of aggregators.” The data providers aggregate information from various sources using their own well-developed methods, involving surveys, expert ratings, web research, database searches, and other approaches. The Institute then aggregates the

⁴ The information regarding the methodology is available at <https://www.drucker.institute/company-rankings/>.

⁵ This review is based largely on information found on the Drucker website. Other sources include articles published in the *Wall Street Journal*, the websites of the Drucker Institute's data providers, and reviews of those data sources.

⁶ When it comes to financial performance, it is likely that academic researchers will choose their own metrics based on the particular issues being addressed.

providers' data into higher-level measures of customer satisfaction, employee engagement, innovation, and CSP.⁷ See Tables 1–4 for a description of the providers' metrics and the data collection methods they use. In 2021, for example, the Institute created composite scores for the four intangible dimensions by combining over 30 specific performance metrics from 17 different data providers. In the parlance of structural equation modeling (SEM), the provider inputs serve as indicators of the intangible dimensions. Some of these indicators could be interpreted as reflective and some as formative (Jarvis et al., 2003). A firm's score on each dimension is computed by averaging its scores on the underlying indicators.⁸ These averages are then standardized. As noted in Tables 1–4, some indicators are measured on an industry-relative basis using the global industry classification standard (GICS).

As described on the Institute's website, the Drucker system was developed over a four-year period, culminating in the first public release of company ratings in 2017. Provider data covering earlier years was added retroactively. The construction of the system followed classical test theory principles. The starting point was a literature review examining how intangible resources had been conceptualized and operationalized in past academic research. Based on that review and a deep investigation of potential data providers, a candidate pool of 169 metrics was identified, each aligned with a particular intangible resource. The rigor of the providers' data collection and aggregation procedures was also examined by reviewing their methodology statements. The pool of candidate indicators was then reduced through a series of exploratory factor and reliability analyses. An internal–external consistency check was also performed.⁹ To help ensure construct validity, the final step involved building and testing a SEM based on the 2017 data. In this step, each metric was treated as a reflective indicator of one (and only one) of the intangible dimensions. Common source effects were controlled for by introducing latent variables or allowing correlated errors when doing so made logical sense (e.g., between absolute and relative metrics from the same provider). Recognizing the lack of multivariate normality and the wide diversity of the metrics, the model was judged to have acceptable fit (goodness-of-fit index = 0.92, adjusted goodness-of-fit index = 0.91, normed fit index = 0.90).¹⁰ These results were taken as evidence of convergent and discriminant validity.

Beginning in 2018, some adjustments were made to the operationalization of the constructs after confirming that the changes had a neutral impact on the factor structure (see Table 2–5, Years Used column). Some metrics were deleted based on excessive redundancy or insufficient coverage of the population. New metrics were added only if they had a solid conceptual connection to the underlying construct and helped flesh out its meaning. Moreover, new metrics were required to have a stronger correlation with the existing metrics of the same

construct than with the metrics of other constructs. Any concerns that changes to the sets of indicators may have induced measure instability were mitigated by high observed autocorrelations.¹¹ For the period 2017–2021, the Drucker website reports the following average principal component factor loadings for the intangible dimension indicators: customer satisfaction = 0.69, employee engagement = 0.71, innovation = 0.63, and CSP = .82.

5. Content validity assessment

The question we seek to address in this section is that of content validity: “Is the substance or content of this measure representative of the content or the universe of content of the property being measured?” (Kerlinger, 1973, p. 458). Kerlinger (1973) noted that content validity is always a matter of judgment and often hinges on the definition of the universe of content. Therefore, it is important to recognize that the Drucker system intends to provide a reasonable representation of the “nomological net” of each of the intangible assets. The domain of content includes the immediate antecedents, direct indicators, and immediate outcomes of the intangible resource. This was deemed necessary because all four of the intangible dimensions have been broadly interpreted in the literature with indistinct boundaries separating the constructs from their antecedents and outcomes. Tables 2–5 provide our classification of the metrics based on what appears to be their most common treatment(s) in the literature; in other words, distal antecedent, proximal antecedent, direct indicator, proximal outcome, or distal outcome of the intangible resource. Based on our judgment, there are only two metrics in the system that would be considered “distal.” The classifications are discussed in more detail in the following sections.

Given the judgment-based nature of content validity, there is merit in knowing that a particular metric has appeared in prior academic research dealing with the same domain of interest. Tables 2–5 include examples of prior use and/or discussion. Many of the metrics have exact prior use. Prior “discussion” is meant to imply that either (a) the same concept was discussed in past research but operationalized in a slightly different manner or (b) there is a high alignment between a metric and a concept discussed theoretically in the literature. Examples of (a) include the same performance attribute expressed in different words, while examples of (b) include specific recommendations for firm action that the authors discussed only conceptually. It is clear from the tables that there is solid precedent for the use of almost all the metrics in the Drucker system.

5.1. Customer satisfaction dimension

5.1.1. Conceptual overview

Customer satisfaction has been a topic of considerable interest to marketers for over half a century (e.g., Cardozo, 1965). Its importance as an intangible asset stems from its influence on future customer loyalty behavior. Cumulative (versus transactional) satisfaction has been defined as “an overall evaluation based on the total purchase and consumption experience with a good or service over time” (Anderson et al., 1994, p. 54). Satisfaction is typically conceived as an intermediate construct in a hierarchy or a causal chain of related constructs culminating in actual loyalty behaviors, such as repurchasing and/or recommending the product/service to others (Keiningham et al., 2007). Early versions of this chain focused on expectations, perceived performance (or quality), and expectation disconfirmation as the primary antecedents of satisfaction, which, in turn, leads to loyalty (Anderson & Sullivan, 1993; Oliver, 1980). Over the years, this core chain has been refined and

⁷ As a matter of policy, the Institute does not share the metrics provided by its suppliers. Therefore, data are available only at the intangible dimension level.

⁸ Not every provider can match every case, but the missing data are modest (estimated to average approximately 15% across the metrics). A few metrics would be expected to have higher levels of missing data due to their nature. For example, Patent Value cannot be computed if a firm has no patents granted in the last year. A dimensional average is computed only if a firm has two valid scores on the underlying metrics for that dimension.

⁹ The consistency check involved an internal survey of employees of 41 firms for which external performance metrics had been obtained regarding the intangibles. This survey asked about the firm's strategic orientation with respect to customers, employees, innovation, and CSR. Using the firm as the unit of analysis, the strategic orientation questions correlated well with external metrics, suggesting the latter were useful performance indicators.

¹⁰ The lack of multivariate normality makes the model fit statistics overly conservative.

¹¹ During the period 2017–2021, the average t+1 autocorrelation for customer satisfaction was 0.75, and 0.68 for the average t+2 autocorrelation. Comparable figures for the other dimensions were: employee engagement = 0.84 and 0.78, innovation = 0.87 and 0.84, CSP/ESG = 0.94 and 0.90.

Table 2
Metrics Composing the Drucker Customer Satisfaction Measure.

Data Sources	Metrics	Nature*	Absolute or Relative	Years Used	Reported Average Factor Loading (since 2017)	Primary Classification	Secondary Classification	Prior Use and/or Discussion
American Customer Satisfaction Index	ACSI score	Survey-based brand satisfaction index aggregated to the firm level	Absolute	2014–21	0.85	Mix of proximal antecedents, direct indicators, and proximal outcomes	Direct indicator	Fornell et al. (1996); Sorescu & Sorescu (2016)
Temkin Group (now part of Qualtrics XM)	Temkin index score	Survey-based index combining ratings of customer experience, customer service, online experience, trust, and forgiveness	Relative Absolute	2014–17 2014–18	Not reported 0.84	Mix of proximal antecedents and proximal outcomes	Direct indicator	No known prior use but concepts discussed in connection with customer journey (Lemon & Verhoef, 2016) and relationship perspective (Morgan & Hunt, 1994)
Satmetrix then JD Power	Net promoter	Survey-based rating of the “likelihood to recommend,” subtracts % of detractors from % of promoters	Relative Absolute	2014–17 2014–21	Not reported 0.88	Proximal		
JD Power	Customer satisfaction index	Survey-based predicted score of overall satisfaction by weighting attributes	Absolute	2019–21	0.92	Mix of proximal antecedents and direct indicator	Direct indicator	Reichheld (2003); Keiningham et al. (2007) Pooser & Browne (2018)
CSRHub	Product rating ¹	Aggregates third-party data related to products, marketing, and sales practices	Absolute	2014–21	0.27	Proximal antecedent	Proximal antecedent	Majláth & Ricordel (2021)
wRatings	Quality gap score	Survey-based measure of the gap between expected quality and perceived quality	Absolute	2014–21	0.39	Proximal antecedent	Proximal antecedent	Hu et al. (2009); Parasuraman et al. (1988)

¹ Modified for one year (2019) to include brand strength and Sustainalytics measures related to data privacy.

* See the Drucker Institute website for details.

augmented to include other satisfaction antecedents and consequences. For example, within services, a notable refinement on the antecedent side was the development of the SERVQUAL instrument for measuring service quality ([Parasuraman et al., 1988](#)). Consistent with the disconfirmation framework, SERVQUAL assesses quality as the difference (i.e., gap) between perceived performance and expectations across the following five dimensions: tangibility, reliability, responsiveness, assurance, and empathy. In a related work, [Zeithaml \(1988\)](#) considered quality and price combining to affect perceived value. Taken together, these ideas have resulted in a variety of studies, which seemingly demonstrated that perceived service quality impacts perceived value, that both influence satisfaction, and that some combination of these variables drives behavioral intentions, possibly via mediators (e.g., [Hu et al., 2009](#)).

Building on work conducted in Sweden ([Anderson et al., 1994](#)), the model underlying ACSI offers a similar formulation, whereby customer expectations influence perceived quality, both combine to affect perceived value, and all three variables impact customer satisfaction, which, in turn, influences complaining behavior and loyalty ([Fornell et al., 1996](#)). The ACSI model, unlike SERVQUAL, indicates quality by three direct (i.e., non-gap) evaluations: overall quality, customization experience, and reliability experience. Disconfirmation constitutes one of the three ACSI “satisfaction” indicators, along with overall satisfaction and performance vis-à-vis the customer’s ideal. The weights of these three ACSI indicators are based on the overall model solution, including all six latent variables and their respective indicators.

Independent of the expectancy disconfirmation paradigm, there is reason to believe that justice perceptions play a role in shaping the satisfaction response, even in the absence of product/service failures

([Martínez-Tur et al., 2006; Oliver & Swan, 1989a, 1989b](#)). The idea is that customers evaluate their consumption experiences (in part) based on the degree to which they are perceived as “fair.” Justice perceptions fall into the following three dimensions: distributive, procedural, and interactional. Controlling for expectancy disconfirmation and perceived performance, all three types of justice perceptions were found to influence satisfaction ([Martínez-Tur et al., 2006](#)).

In a literature review, [Agrawal et al. \(2012\)](#) noted other augmentations to the loyalty chain involving the consequences of satisfaction, particularly those reflecting a relationship perspective. In line with [Morgan and Hunt \(1994\)](#), trust and commitment were posited as intervening between satisfaction and loyalty behavior. Research conducted by [Garbarino and Johnson \(1999\)](#) supported the mediating role of trust and commitment but only for relationship-oriented customers.

Perhaps the biggest controversy in the last 20 years concerning the measurement of customer satisfaction has revolved around the Net Promoter Score™ (NPS) and the claim that this single-item measure of the likelihood to recommend is the best predictor of actual future loyalty behavior ([Reichheld, 2003](#)).¹² Follow-up research has confirmed the usefulness of the metric in predicting recommending behavior ([Keiningham et al., 2007](#)). However, [Keiningham et al. \(2007\)](#) concluded

¹² The score is based on the following question: “How likely is it that you would recommend [company X] to a colleague or friend?” Responses are captured on a 10-point rating scale where 1 = extremely likely and 0 = not at all likely. The NPS is computed by subtracting the percentage of “detractors,” who responded 0 to 6, from the percentage of “promoters,” who provided a rating of 9 or 10.

Table 3
Metrics Composing the Drucker Employee Satisfaction/Engagement Measure.

Data Sources	Metrics	Nature*	Absolute or Relative	Years Used	Reported Average Factor Loading (since 2017)	Primary Classification	Secondary Classification	Prior Use and/or Discussion
Glassdoor	Engagement index	Survey-based index combining employees' overall ratings of their firms and their willingness to recommend their firms as a place to work	Absolute	2014–21	0.9	Mix of direct indicator and proximal outcome	Direct indicator	Wolter et al. (2019); Eisenberger et al. (1997)
	Practices index	Survey-based index combining ratings of culture and values, career opportunities, and compensation and benefits	Absolute	2014–21	0.93	Proximal antecedents	Direct indicator	Wolter et al. (2019); Bailey et al. (2017); Saks (2019); Bakker & Albrecht (2018); Schneider et al. (2018)
	Confidence index	Survey-based index combining employees' ratings of their firm's CEO and employees' positive business outlook	Absolute	2014–21	0.83	Proximal antecedents	Direct indicator	Wolter et al. (2019); Bailey et al. (2017); Saks (2019); Schneider et al. (2018)
Payscale	Pay differential	Percentage difference between employee-reported pay and comparable pay in the broader market	Relative	2014–21	0.58	Proximal antecedent	Proximal antecedent	Ushakova & Boychenko (2018); Schneider et al. (2018)
	Job satisfaction	Survey-based rating of overall job satisfaction	Absolute	2014–21	0.72	Direct indicator	Proximal outcome	Saks (2019); Kumar & Pansari (2016)
CSRHUB	Compensation and benefits	Aggregates third-party data related to fair and equal compensation and benefits	Absolute	2014–21	0.44	Proximal antecedent	Proximal antecedent	Thanetsunthorn & Wuthisatian (2018); Schneider et al. (2018); Saks (2019)
HIP Investor	Employee satisfaction	Analyzes public disclosures regarding engagement and retention efforts	Absolute	2014–17	Not reported	Mix of proximal antecedents, direct indicator, and proximal outcomes	Direct indicator	Wolter et al. (2019); Bailey et al. (2017); Saks (2019); Bakker & Albrecht (2018); Schneider et al. (2018); Larcker & Watts (2020)
Kinunu	Workplace rating	Survey-based index of 18 job-related attributes	Absolute	2018–19	0.6	Proximal antecedents	Direct indicator	Koncar et al. (2022); Bailey et al. (2017); Saks (2019)

* See the Drucker Institute website for details.

that a multivariate set of predictors is needed to fully assess loyalty because loyalty-based behaviors are multidimensional.

5.1.2. Drucker customer satisfaction metrics

The Drucker customer satisfaction measure gauges cumulative satisfaction. Given the intent to reasonably represent the nomological net of the intangible assets, the Drucker customer satisfaction measure contains metrics operationalizing many of the variables in the loyalty chain, albeit not for all firms and years. Consistent with prior use (e.g., Sorescu & Sorescu, 2016), the inclusion of ACSI scores accounts for much of the chain, including proximal antecedents (e.g., expectations, perceived quality, and value), direct indicators (e.g., satisfaction itself), and proximal outcomes (e.g., loyalty behavior). In line with the disconfirmation paradigm and the gap model of quality, all firms receive a wRatings Quality Gap Score, which is considered a proximal antecedent of satisfaction (Gotlieb et al., 1994; Hu et al., 2009). This survey-based metric sums the difference between perceived performance and expectations across a wide variety of functional and emotional performance dimensions that would generally be of interest to customers of any type of firm. Consistent with research on the customer experience and journey (Lemon & Verhoef, 2016), the Drucker customer satisfaction measure includes a variety of non-gap performance quality metrics that are classified as antecedents: Temkin Customer Experience Rating, Temkin Customer Service Rating, Temkin Online Experience Rating, and the weighted attributes that compose the JD Power Customer Satisfaction Index (Pooser & Browne, 2018). Among the satisfaction antecedents, the CSRHub Product Rating can be construed as dealing with justice perceptions, given its focus on product integrity and sales practices, including labeling and marketing. In connection with the 2015 Volkswagen emissions scandal, Majláth and Ricordel (2021) demonstrated the negative effects of a firm's "unfair" greenwashing behavior on the CSRHub Product Rating.

Direct indicators of customer satisfaction in the Drucker system include the aforementioned ACSI indicator of overall satisfaction and the JD Power overall satisfaction variable, which serves as a criterion in the calculation of the JD Power Customer Satisfaction Index. Furthermore, the Drucker system contains five customer satisfaction outcomes. The outcome that reflects a relationship perspective is the Temkin Trust Rating (Morgan & Hunt, 1994). The Temkin Forgiveness Rating builds on a survey asking customers how likely they would be to forgive a firm if it made a mistake. This could be considered an expression of commitment (Tsarenko & Tojib, 2011). The Satmetrix/JD Power Net Promoter Score is a loyalty intention (Keiningham et al., 2007), as is the customer loyalty (repurchase) variable in the ACSI model. Self-reported complaining behavior in the ACSI model is considered an outcome of dissatisfaction.

5.2. Employee satisfaction/engagement dimension

5.2.1. Conceptual overview

Employee engagement is a recent addition to a progression of related concepts concerning the bond between employees and their jobs and the organizations they work for (Rossides, 2022). Predecessor concepts include employee satisfaction, involvement, and commitment. As discussed by Macey and Schneider (2008), there is considerable overlap between these concepts in terms of how they tend to be defined and measured in the literature. Some frequently cited definitions include the following:

- Employee job satisfaction: "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences" (Locke, 1976, p. 1304).
- Employee involvement: "the degree to which an employee psychologically relates to his or her job and the work performed therein" (Cooper-Hakim & Viswesvaran, 2005, p. 244).

Table 4
Metrics Composing the Drucker Innovation Measure.

Data Sources	Metrics	Nature*	Absolute or Relative	Years Used	Reported Average Factor Loading (since 2017)	Primary Classification	Secondary Classification	Prior Use and/or Discussion
Clarivate Analytics	Number of inventions	Counts publication of first patent applications filed annually	Relative	2014–21	0.8	Direct indicator	Proximal outcome	Smith (2005); Furman et al. (2002); Hagedoorn & Cloudt (2003)
	Rate of patent abandonment	Counts annual rate at which patent applications are abandoned	Relative	2014–21	0.67	Proximal antecedent	Proximal antecedent	Nagji & Tuff (2012); Klingebiel & Rammer (2014)
	Trademark applications	Counts number of trademark application filed annually	Relative	2014–21	0.75	Direct indicator	Proximal outcome	Block et al. (2022); Gotsch & Hipp (2014); Flikkema et al. (2019)
	Trademark registers	Counts different registers where trademarks have been filed annually	Relative	2014–21	0.69	Direct indicator	Proximal outcome	Block et al. (2022); Gotsch & Hipp (2014); Flikkema et al. (2019)
	R&D expenditures	Trailing 12 months R&D Expenditures	Relative	2014–21	0.78	Direct indicator	Proximal antecedent	Surroca et al. (2010); Hull & Rothenberg (2008); Hagedoorn & Cloudt (2003)
wRatings	Innovation index	Survey-based index of 7 items related to perceived innovation	Absolute	2014–21	0.22	Distal outcome	Distal outcome	Carayannis & Provance (2008); Kunz et al. (2011)
Various publications	Most Innovative listings	Whether firm appears in at least one reputable Most Innovative firms list	Absolute	2014–21	0.44	Distal outcome	Distal outcome	Carayannis & Provance (2008); Kunz et al. (2011)
Supply Chain Resource Cooperative	Innovation rating	Aggregates public and survey information on innovative supply-chain practices	Absolute	2014–21	0.4	Proximal antecedent	Proximal antecedent	Jajja et al. (2017); Handfield (2020)
Profs. Papanikolaou & Seru	Patent value	Stock market reaction to patents granted over the past year	Relative	2018–21	0.81	Direct indicator	Proximal outcome	Kogan et al. (2017)
Burning Glass Technologies	Cutting-edge job postings	Number of job postings in the last year in 10 cutting-edge fields	Relative	2018–21	0.66	Proximal antecedent	Proximal antecedent	Weber & Heidenreich (2018); Lawson & Samson (2001)
	R&D job postings	Number of job postings in the last year for R&D positions	Relative	2018–21	0.7	Proximal antecedent	Proximal antecedent	Weber & Heidenreich (2018); Lawson & Samson (2001)

* See the Drucker Institute website for details.

Table 5
Metrics of the Drucker Corporate Social Performance Measure.

Data Sources	Metrics	Nature*	Absolute or Relative	Years Used	Reported Average Factor Loading (since 2017)	Primary Classification	Secondary Classification	Prior Use and/or Discussion
CSRHub	Overall ESG score	Combines 12 ESG indicators aggregated from third-party sources	Absolute Relative	2014–21 2014–21	0.92 0.89	Direct indicator	Direct indicator	Matakanye et al. (2021)
Sustainalytics	Total ESG score	Analyst assessments based on public filings, company websites, and news reports	Absolute Relative	2014–21 2014–21	0.87 0.86	Direct indicator	Direct indicator	Auer (2018)
HIP Investor	ESG rating	Analyzes public disclosures related to ESG risk, return, and social impact	Absolute	2014–21	0.86	Direct indicator	Direct indicator	Larcker & Watts (2020)
	SDG rating	Analyzes alignment of company practices with the UN Sustainable Development Goals	Absolute	2021	0.92	Direct indicator	Direct indicator	No known academic applications
Korngold and HIP Investor	Shared value index	Combines HIP Vision rating with Korngold ESG index based on company disclosures	Absolute	2014–21	0.82	Direct indicator	Direct indicator	Larcker & Watts (2020)
Supply Chain Resource Cooperative	Social responsibility rating	Aggregates public and survey information on socially responsible supply-chain practices	Absolute	2014–21	0.45	Proximal antecedent	Proximal antecedent	Handfield (2020)

* See the Drucker Institute website for details.

- Employee commitment: “a strong belief and acceptance of the organization’s goals and values; a willingness to exert considerable effort on behalf of the organization; and a definite desire to maintain organizational membership” (Porter et al., 1974, p. 604).
- Employee engagement: “a positive, fulfilling, work-related state of mind characterized by vigor, dedication, and absorption” (Schaufeli et al., 2002, p. 74).

What these concepts generally share is the notion of a strong positive affect toward the job and/or firm.

Similar to customer satisfaction, there has been considerable discussion and research regarding the “chain” of employee engagement that includes key antecedents and consequences (i.e., the nomological net). Work involving the engagement chain has applied a variety of theories, including the job demands-resources framework, social exchange theory, and broaden-and-build theory (see Bailey et al., 2017). Although the mechanisms in these theories differ, the common thread is that employees are more engaged to the extent they have access to organizational and personal resources. Notable in this regard is the work of Saks (2006, 2019), whose revised model includes a variety of antecedents (job characteristics, perceived support, rewards and recognition, justice perceptions, fit perceptions, leadership, opportunities for learning and development, job demands, and dispositions and personal resources) affecting two types of engagement (job and organizational). Consequently, these engagements lead to a variety of outcomes (job satisfaction, commitment, intentions to quit, organizational citizenship/extra-role performance, task performance, and well-being/stress/burnout).

In their synthesis of 214 engagement-related studies, Bailey et al. (2017) pointed out similar antecedents and outcomes, discussing the widespread academic use of the UWES as a direct measure of engagement.¹³ They divided engagement antecedents into the following five groups: individual psychological states (e.g., dispositions and personal resources), experienced job-design-related factors (e.g., autonomy, support, and development), perceived leadership and management (e.g., trustworthy, authentic, and transformational), individual perceptions of organization and team factors (e.g., climate and teamwork), and organizational interventions and activities (e.g., mindfulness training). Bailey et al. (2017) characterized the psychological state of optimism as a positive disposition/personal resource. Among the organizational factors, they also discussed values congruence, which can be considered a fit issue. Bakker and Albrecht (2018) echoed similar themes. Schneider et al. (2018) found that workforce engagement was most strongly predicted by organizational practice antecedents, including leadership, compensation, and the fair treatment of employees.

In terms of consequences, Bailey et al. (2017) confirmed that most studies treat satisfaction as an engagement outcome, as in the Saks (2006) model. However, they cited research in which satisfaction appears to be an antecedent (Yalabik et al., 2013) and other work that challenges the discriminant validity of the UWES compared to job satisfaction (Viljevac et al., 2012). Macey and Schneider (2008) concluded that although job satisfaction is a facet of engagement, it may depend on how the question is asked. Other scholars have found that dedication and job satisfaction are closely linked (Cole et al., 2012) and that dedication is a stronger driver of engagement consequences than absorption or vigor (Saks, 2019). In the marketing literature, job satisfaction has been treated as an engagement dimension (Kumar & Pansari, 2016).

5.2.2. Drucker employee satisfaction/engagement metrics

There is precedent in the marketing literature for using Glassdoor ratings to operationalize employee engagement (Wolter et al., 2019).

Seven of these ratings have been in continuous use in the Drucker system since 2014. Five of them address important antecedents identified in the research discussed in Section 5.2.1: culture & values (relates to fit perceptions), career opportunities (relates to learning & development), compensation & benefits (relates to reward & recognition), CEO rating (relates to leadership), and positive business outlook (relates to optimism). The Payscale Pay Differential Rating also taps reward & recognition (Ushakova & Boychenko, 2018), as do aspects of the HIP Investor Employee Satisfaction metric, which was used in 2014–2017 (for an application of HIP ratings, see Larcker & Watts, 2020). The CSRHub Compensation & Benefits Rating (Thanetsunthorn & Wuthisatian, 2018) stresses fairness, which is related to distributive justice. The 18 attributes that compose the Kununu Workplace Rating, used in the Drucker system in 2018 and 2019, cover virtually all of the categories of engagement antecedents found in the Saks (2006, 2019) model (see Koncar et al., 2022). This rating also includes the attribute of work-life balance, which Saks (2019, p. 34) acknowledged as an aspect of growing interest with respect to job design. The Kununu metrics also align with the five attribute groupings described by Bailey et al. (2017).

The Drucker system does not directly assess the three facets of employee engagement advanced by Schaufeli et al. (2002). However, the close dependence and/or conceptual overlap with satisfaction suggests that the Glassdoor Overall Rating (Wolter et al., 2019), the Payscale Job Satisfaction Rating (Kumar & Pansari, 2016), and the HIP Investor Overall Employee Satisfaction metric may serve as direct indicators or engagement surrogates.

On the consequences side of engagement, the concept of commitment is addressed by an aspect of the HIP metric that deals with retention/turnover. Regarding Glassdoor’s “recommend to a friend” item, theorists would likely categorize it as organizational citizenship behavior, which Saks (2019) regards as an engagement outcome. However, Wolter et al. (2019) and Eisenberger et al. (1997) used similar statements as indicators of job satisfaction. Clearly, recommending a company and/or job to a friend is discretionary/extra-role behavior that involves a high level of social risk. Therefore, whether it is an example of organizational citizenship behavior or a component of job satisfaction or engagement, the willingness to recommend conveys a strong emotional bond.

5.3. Innovation dimension

5.3.1. Conceptual overview

Current perspectives on firm-level innovation typically conceive a progression of inputs, processes, and outputs embedded in a network of intra- and inter-organizational relationships (Mendoza-Silva, 2021). There is increasing interest in the notion of innovation capability (IC), which refers to a trait-like capacity of a firm to “continuously transform knowledge and ideas into new products, processes, and systems for the benefit of the firm and its stakeholders” (Lawson & Samson, 2001). As IC is highly abstract and complex, the tendency is to rely on objective measures of inputs, such as R&D expenditure (e.g., Hull & Rothenberg, 2008; Surroca et al., 2010), and outputs, such as new products/services (e.g., Dotzel & Shankar, 2019; Rubera & Kirca, 2017). Patents are the most widely used measure of innovation and are considered an intermediate output (Furman et al., 2002; Smith, 2005). One limitation of the (exclusive) reliance on R&D expenditures is that in many industries, firms do not have R&D departments and/or do not separately report their innovation-related investments. Metrics based on new product/service introductions are commonly used (e.g., Sorescu & Spanjol, 2008; Srinivasan et al., 2009). However, a narrow reliance on product/service introductions overlooks process innovations and, on a data availability basis, tends to restrict the analysis to B2C industries. One strength of patent measures is that patents can involve both product/service and process innovations, but having a patent does not guarantee value creation. The combination of these three correlated metrics into a single composite score is considered to represent innovation performance (at

¹³ The UWES operationalizes the Schaufeli et al. (2002) three-facet definition of engagement (see above).

least in a technical sense) because it covers the overall invention trajectory (Hagedoorn & Cloudt, 2003).

Although the input–output metrics described above may be indicative of innovation performance, a broader set of indicators is required to assess a firm’s IC more fully (Mendoza-Silva, 2021). Regarding strategic determinants or antecedents, managing the innovation portfolio is thought to be of critical importance given finite resources (Nagji & Tuff, 2012). While portfolio breadth can be beneficial for transformational innovation, culling deteriorating projects prevents an escalation in the costs of breadth (Klingebiel & Rammer, 2014). Other IC determinants pertain to a firm’s ability to continuously acquire, assimilate, and transform novel knowledge and ideas into new products, processes, and systems (Lawson & Samson, 2001; Weber & Heidenreich, 2018). From an intra-organizational perspective, employees are a key source of novel ideas. Nevertheless, that knowledge base needs to be constantly refreshed through training and hiring. In addition, other entities in a firm’s stakeholder network contribute knowledge resources to the innovation process. Their willingness to do so, however, depends on the quality of their relationships with the firm (Mena & Chabowski, 2015). Drawing on resource dependence theory, Jajja et al. (2017) confirmed that supportive buyer–supplier relationships positively impact product innovation. Lastly, a proper IC assessment must also consider longer-term outcomes, such as a firm’s status as a top innovator in an industry (Carayannis & Provan, 2008). This links to the notions of corporate reputation and perceived firm innovativeness (PFI), which influences customer behavior (Kunz et al., 2011). PFI is defined as a “consumer’s perception of an enduring firm capability that results in novel ... solutions for the market” (Kunz et al., 2011, p. 817).

5.3.2. Drucker innovation metrics

Based on the literature summarized above, we believe that the Drucker measure of innovation captures key aspects of what the construct means from a resources and capabilities perspective (Barney, 1991). Much like the Drucker measures of customer satisfaction and employee engagement, it includes key antecedents, direct indicators, and outcomes along the innovation capability chain. Moreover, by using 11 wide-ranging metrics from different providers, this measure overcomes a frequently voiced concern about past innovation research – namely, the reliance on single indicators to measure a diffuse and multi-faceted concept (Carayannis & Provan, 2008).

The Drucker innovation measure includes both R&D expenditures and patents but not new product/service introductions. Recognizing the limitations of raw patent counts, the Drucker measure also assesses patent value (Kogan et al., 2017). This metric captures the stock market reaction to patent grants as an indicator of the economic value of innovations.¹⁴ In lieu of new product/service introductions, the Drucker innovation measure includes trademark applications and registers, which are receiving increased attention as innovation indicators (Block et al., 2022; Gotsch & Hipp, 2014). Trademarks are considered effective in the measurement of “soft” nontechnical innovation (i.e., service, organizational, and business model innovations). Trademarks protect a firm’s marketing assets and come into play during the commercialization phase of innovation (Flihkema et al., 2019). The Drucker measure incorporates the rate of patent abandonment, a portfolio-related metric focused on “the optimal allocation of resources” (Drucker & Maciariello, 2018, p. 82). In terms of refreshing the knowledge base, the Drucker innovation measure contains metrics dealing with a firm’s efforts to hire talent in cutting-edge fields and R&D. The Drucker measure also covers a firm’s efforts to build supporting relationships with suppliers to

¹⁴ This measure also has a strong positive relation with forward patent citations.

enhance innovation (Handfield, 2020).¹⁵ Finally, the Drucker measure of innovation includes both reputational (i.e., the Most Innovative List) and PFI metrics (i.e., wRatings Innovation Index and the use of the American Innovation Index as a sub-indicator).

5.4. Corporate social performance dimension

5.4.1. Conceptual overview

In the literature, the terms CSR and CSP are often used interchangeably. However, CSR is more about a firm’s societal obligations, whereas CSP is more about how a firm behaves toward those obligations. In fact, most CSR measures used in research are actually CSP measures as provided by rating agencies. It is common to refer to such rating systems as environmental, social, and governance (ESG) measures.

Although CSR has many definitions, it generally refers to a firm’s ethical obligations beyond making a profit and increasing shareholder wealth (Carroll, 1999). Based on a review of 37 CSR definitions found in the literature, Dahlsrud (2008) characterized a firm’s obligations and accountability along the following five dimensions: voluntariness (taking action based on ethics and not just what is legally required), social (contributing to a better society, improving quality of life, and considering community impacts), stakeholders (acting in the interests of all stakeholders and treating them ethically and fairly), environmental (respecting and preserving the natural environment and contributing to sustainability), and economic (operating a profitable business).

Measurement-wise, concerns have been expressed about relying on a single indicator of CSP from a single source, even if the indicator is multi-faceted. Notably, tools that gather ESG data to assess social performance, social consumption, and investing often fail to converge at the individual firm-level due to differences in scope, measurements, and/or weights. Berg et al. (2019) argued that the results obtained based on an ESG rating may not be reproducible when using ESG ratings from other agencies. In addition, they indicated that the divergence is most noticeable for the KLD metric, which is used in much of the existing academically oriented CSR research. Other criticisms of the KLD rating system claim that it does not accurately measure firms’ environmental performance (Chatterji et al., 2009; Kang, 2015), that it actually gauges social irresponsibility (Lenz et al., 2017), and that it does not aggregate historical data appropriately (Chatterji et al., 2009). One alternative is to include several ESG ratings in the analysis if the goal is to measure a consensus form of social performance.

5.4.2. Drucker CSP metrics

The Drucker composite CSP measure avoids concerns related to using a single measure of CSR performance, whether from KLD or another provider. The Drucker measure includes ESG scores based on the Sustainability, CSRHub, and HIP Investor systems, all of which have appeared in previous academic research (e.g., Matakanye et al., 2021; Auer, 2018; Larcker & Watts, 2020). The Drucker CSP measure also includes metrics related to supply-chain sustainability as provided by the Supply Chain Resource Cooperative, which could be categorized as an antecedent. Companies are increasingly being held responsible for the social and environmental performance of their suppliers, who are often located in developing countries. A recent addition (2021) to the Drucker CSP measure tracks a firm’s alignment with the UN Sustainable Development Goals. Although varying in scope, measures, and weights, the Drucker CSP indicators exhibited a solid average factor loading (0.82).

¹⁵ This metric sourced from the Supply Chain Resource Cooperative at North Carolina State University is based on the application of a machine learning algorithm (Huang, 2017).

6. Convergent validity assessment

As stated earlier, the Drucker intangible dimension measures consist of both reflective and formative indicators. It is common practice to look at factor loadings and average variance extracted (AVE) scores to assess the convergent validity of a measure (Hulland, 1999). In evaluating the strength of the individual loadings (see Tables 2–5), we adopted the standards proposed by Hair et al. (1998), whereby + 0.30 is the cutoff for determining whether a loading is “salient” and loadings greater than + 0.50 should be considered “practically significant.” We also noted the meta-analysis by Peterson (2000), which found an average loading of 0.32 across 803 factor analyses reported in 568 articles in marketing and psychology journals and conference proceedings. With only two exceptions, all the loadings in Tables 1–4 exceed 0.30, and two-thirds are 0.70 or higher.¹⁶ Recognizing that some researchers favor higher cutoff values, we believe it is important to consider the special nature of the Drucker data. First, unlike most applications of factor analysis in the social sciences, which involve tests or surveys administered to the same person at the same time, the Drucker data come from multiple providers using widely divergent methods. Second, the Drucker intangible measures are based on both reflective (i.e., outcome) and formative (i.e., antecedent) indicators (Bagozzi & Fornell, 1982). The inclusion of formative indicators accounts for more variance in the latent variable than does reflective specification (Fornell et al., 1991), providing a more inclusive measurement index. It is important to note that five of the seven metrics in Tables 2–5 with average loadings of less than 0.50 are classified as antecedents. To the best of our knowledge, there are no benchmarks regarding the magnitude of formative weights. Two of the seven metrics with lower loadings concern distal outcomes of innovation that are purely reputational (i.e., wRatings Innovation Index and On a Most Innovative Listing).

Although convergent validity is a conventional approach to assess construct validity using reflective indicators, this approach is technically not meaningful in the case of formative indicators (Bagozzi, 1994). Diamantopoulos and Winklhofer (2001) indicated that four issues are critical to successful index construction using formative indicators: content specification, indicator specification, indicator collinearity, and external validity. We discussed the content and indicator specifications earlier, but it is not possible to properly assess formative indicator collinearity due to a lack of access to indicator-level data. External validation is likely to be established over time as the Drucker measures gain traction in academic research and are used in a variety of theory-based models in different contexts. Although not entirely meaningful in the case of formative indicators, Table 6 reports AVE scores using both reflective and formative indicators, as well as reflective indicators only, to assess how well these indicators relate to one another.

Table 6
AVE by Intangible Dimension.

AVE	Customer Satisfaction	Employee Satisfaction/Engagement	Innovation	CSP
Reflective and formative indicators	0.544	0.538	0.427	0.700
Reflective indicators only	0.760	0.648	0.587	0.771

Note: We calculated the AVE scores based on the average factor loadings from 2017 to 2021.

¹⁶ The two exceptions are the CSRHub Product Rating, which is classified as a proximal antecedent (average $r = 0.27$), and the wRatings Innovation Index, which is classified as a distal outcome (average $r = 0.22$).

Despite the lower factor loadings of formative indicators, the AVE scores for customer satisfaction, employee engagement, and CSP all exceeded the acceptable level of 0.5 (Fornell & Larcker, 1981). The only index with a score below 0.5 was innovation, which reached above 0.50 when formative and distal outcome indicators were excluded.¹⁷ These scores indicate an acceptable level of convergent validity of the indices developed by the Drucker Institute. The lower score for innovation was related to the inclusion of reputational innovation indicators (i.e., wRatings Innovation Index and most innovative listings), which are categorized as distal outcomes. Nevertheless, we believe that the addition of these reputational indicators is beneficial because impactful innovation capabilities should influence customers’ perceptions of firm innovativeness (Kunz et al., 2011; Srinivasan et al., 2010).

7. Conclusions and recommendations

Given the reliance on multiple diverse metrics from different reputable providers who use rigorous methods, the evidence of construct validity confirmed by causal modeling during the scale development phase, the acceptable factor loadings (especially for the reflective indicators), and the alignment of the content of the measures with the extant literature, we believe that the Drucker data offer a solid foundation for firm-level academic research. In addition, the measurement system addresses all the data and method limitations identified by previous research.

However, we advise researchers to closely examine the distributions of the Drucker variables prior to use, as several are skewed by outliers. Consideration should be given to appropriate transformations, such as winsorization or normalization.

Based on this review, we have several recommendations for how the Drucker Institute could further refine this measurement system over time. Based on the information provided on the Institute’s website, it does not appear that the underlying model has been revalidated using SEM since the system was originally developed. In the meantime, some metrics have been added and some deleted. As the Institute does not release data at the metric (i.e., indicator) level, only the Institute can conduct and report on this revalidation. This may call for a MIMIC model rather than a conventional SEM model, given that some of the metrics are formative while others are reflective (Diamantopoulos & Winklhofer, 2001; Jöreskog & Goldberger, 1975).

Consideration should also be given to breaking out the metrics that pertain to supplier relationships and to constructing a separate dimensional score specific to this stakeholder group. As discussed earlier, in academic research, the UWES is becoming the reference standard for measuring employee engagement, although various methods are in use. It is possible that one of the Institute’s data providers could expand their employee survey with three items from this scale tapping vigor, dedication, and absorption (Schaufeli et al., 2002). Finally, attention should be given to further augmenting the customer satisfaction metrics that are applicable to firms primarily serving business-to-business markets. Possible solutions may include purchasing executive surveys, sentiment analysis, contracts renewed or expanded, and supplier awards earned.

CRedit authorship contribution statement

Lawrence A. Crosby: Writing – review & editing, Writing – original draft, Investigation, Conceptualization. **Tohid Ghanbarpour:** Writing – review & editing, Writing – original draft, Formal analysis.

Declaration of Competing Interest

The authors declare that they have no known competing financial

¹⁷ The AVE for innovation when excluding only formative indicators was 0.455.

interests or personal relationships that could have appeared to influence the work reported in this paper.

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