

Measuring New Venture Legitimacy: A Multi-dimensional Approach Using Computational Textual Analysis

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Legitimacy is critical for the growth, survival and performance of ventures, yet efforts to measure legitimacy empirically typically focus on a single dimension of this multi-dimensional construct. In this article, we develop a multi-dimensional framework for measuring legitimacy using computational text analysis. We begin by elaborating the theoretical foundations of our multi-dimensional approach, situating it in relation to influential multi-level perspectives on legitimacy. Using dyads as our unit of analysis, we show how our approach enables simultaneous measurement of multiple dimensions of legitimacy across multiple audiences at scale. This approach provides a methodological bridge between dominant uni-dimensional approaches to the empirical study of legitimacy, generating both a composite measure of legitimacy and indicators for each dimension individually, which can be incorporated into empirical analyses. We validate the measure using both expert evaluations and by demonstrating its predictive power for venture failure. Our study offers both a methodological advance for legitimacy research and a foundation for new theory building on how legitimacy emerges, evolves and influences outcomes not only across multiple levels but also across multiple dimensions.

Introduction

Legitimacy is foundational to management studies, with a rich collection of scholarship dating back to the origins of organizational theory (Dimaggio and Powell, 1983; Dowling and Pfeffer, 1975; Suchman, 1995). Legitimacy is recognized as a multi-dimensional, multi-level and dynamic concept (Fisher, 2020; Powell and Rerup, 2017; Suddaby, Bitektine and Haack, 2017). Faced with this complexity, researchers routinely privilege individual dimensions¹ both empirically and theoretically, yielding epistemologically and ontologically

distinct perspectives on how legitimacy is defined, theorized and measured (Suddaby, Bitektine and Haack, 2017). While recent studies have worked to capture this complexity within individual dimensions (e.g. Bitektine and Haack, 2015; Haack and Sieweke, 2018; Haack, Sieweke and Pfarrer, 2025), efforts to account for multiple dimensions have been absent largely due to measurement challenges. While most research acknowledges that legitimacy entails the qualities or characteristics of the organization, the evaluation of an audience, and a system of social expectations (e.g. collective norms, values or beliefs) that serve as a point of reference for both sides of this equation (see, e.g., Suchman, 1995), most measurement strategies focus either on the organization (i.e. the object), the audience or the systems in which those expectations are embedded (Suddaby, Bitektine and Haack, 2017). This has prompted calls from researchers to employ emerging methodological tools, notably computational analysis and natural language processing (NLP), in legitimacy studies (Vaara, Aranda and Etchanchu, 2024).

In this article, we advance research on legitimacy by developing a multi-dimensional framework for

¹We use the term *dimensions* to capture the notion that definitions of legitimacy imply multiple constitutive dimensions (see Goertz, 2020), namely audience evaluations, objects' behaviours, and the norms, values and beliefs that define what is or is not legitimate (as we discuss, these are each as privileged by the legitimacy-as-perception, legitimacy-as-process, legitimacy-as-propriety perspectives) (Suddaby, Bitektine and Haack, 2017; for elaborated discussion, see Schoon, 2022). These dimensions are distinct from levels of legitimacy (e.g. micro, meso and macro) (Bitektine and Haack, 2015; Haack, Schilke and Zucker, 2021), and types of legitimacy (e.g. cognitive, moral or pragmatic) (see Suchman, 1995).

measuring legitimacy using computational text analysis. Building on recent works that treats dyads (i.e. specific organization-audience pairs) as a productive point of departure for measuring multiple dimensions of legitimacy simultaneously (Schoon, 2022), we produce individual and integrable measures across multiple audiences and multiple organizations. Applying our method to textual data drawn from media coverage of a sample of French biotechnology small and medium enterprises (SMEs), we demonstrate how our approach enables the large-scale study of legitimacy, revealing patterns that cannot be identified using uni-dimension measures.

This paper contributes to the scholarship on legitimacy in two ways. First, we provide a theoretical foundation that bridges the *legitimacy-as-property*, *legitimacy-as-process* and *legitimacy-as-perception* perspectives (Suddaby, Bitektine and Haack, 2017), which have largely developed in parallel. By grounding our approach in the dyadic conceptualization of legitimacy (Schoon, 2022), we offer a measurement framework that accounts for legitimacy as both a multi-level and a multi-dimensional phenomenon. In doing so, we deepen the dyadic approach by demonstrating that legitimacy can be meaningfully operationalized at the level of relationships. Moreover, our measurement approach enables researchers to empirically account for variation in the ‘grey area’ of legitimacy (Siraz *et al.*, 2023), where organizations are neither fully legitimate nor fully illegitimate, creating further connections across disparate streams of literature. Second, we empirically demonstrate the relevance of the dyadic perspective by mobilizing computational textual analysis techniques to operationalize its core pillars. We provide empirical evidence of the measure’s validity, both through expert evaluation and by demonstrating its predictive power for venture failure, thereby offering a tool that can support robust inference and theory testing in future work.

Legitimacy: Conceptualization and measurement

What is legitimacy?

Most contemporary scholars define legitimacy as ‘a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions’ (Suchman, 1995; for a notable revision, see Deephouse [2017]). As this definition indicates, legitimacy is a multi-dimensional construct that entails perceptions or assumptions on the part of an audience, but is also linked to a particular entity that is being evaluated. Additionally, legitimacy depends upon the existence of some broader system of norms, values or beliefs that are used to establish expectations for what is or is not legitimate.

The multi-dimensional nature of legitimacy allows room for diverse orientations towards the construct, resulting in ontologically and epistemologically distinct approaches to the conceptualization and theorization of legitimacy. In an extensive review of scholarship on organizational legitimacy, Suddaby, Bitektine and Haack (2017) identify three such approaches, which they label *legitimacy-as-property*, *legitimacy-as-process* and *legitimacy-as-perception*. As the authors explain, each of these approaches offers distinct answers to fundamental questions about the basic nature of legitimacy (Suddaby, Bitektine and Haack, 2017). While the legitimacy-as-process perspective emphasizes the dynamic nature of legitimacy, the former two perspectives can each be understood as privileging different dimensions of legitimacy. Specifically, legitimacy-as-property privileges the object of legitimacy, theorizing how its actions and orientations influence its legitimacy. In contrast, legitimacy-as-perception perspective privileges audiences’ evaluations, theorizing the factors that influence audiences’ perceptions and judgements.

Within each of these perspectives, researchers routinely acknowledge the other dimensions of legitimacy. For instance, within the legitimacy-as-property perspective, researchers are acutely sensitive to the importance of audiences. Yet, researchers adopting each perspective theoretically (and methodologically) tend to anchor their work to one dimension in particular, thus privileging that dimension.

In addition to being multi-dimensional, most scholars recognize legitimacy as being multi-level (Dimaggio and Powell, 1983; Greenwood, Suddaby and Hinings, 2002; Stryker, 1994). The most robust efforts to theorize legitimacy as a multi-level phenomenon have emerged within the legitimacy-as-perception perspective (Bitektine and Haack, 2015; Haack, Schilke and Zucker, 2021; Haack, Sieweke and Pfarrer, 2025). The multi-level theory views legitimacy as being both an individual and a collective phenomenon, with perceptions operating differently at each of these levels. At the micro-level, individuals make *propriety* judgements, which reflect their personal evaluation of an object of legitimacy (Bitektine and Haack, 2015; see also Walker, Thomas and Zelditch, 1986; Zelditch, 2001; Zelditch and Walker, 2003). These propriety judgements can also operate in the aggregate, producing meso-level *consensus* (i.e. the aggregation of individual evaluations) (Haack, Schilke and Zucker, 2021). At the macro-level, *validity* signals ‘the extent to which there appears to be a consensus within a collectivity that the entity is appropriate for its social context’ (Tost, 2011, p. 689). While validity operates at the supra-individual level, individuals nevertheless have validity beliefs, which are individual judgements about what is generally valid (Bitektine and Haack, 2015).

Macro	Validity (see Tost 2011; Zelditch and Walker 2003; Bitektine and Haack 2015)	Fields (e.g., DiMaggio and Powell 1983; Greenwood, et al. 2002; Maguire and Hardy 2009)	Organizational Ecologies (e.g., Hannan and Carol 1992; Baum and Singh 1994)
Meso	Consensus (e.g., Haack, et al. 2021; Haack, Sieweke, and Pfarrer 2025)		Organizations (see Johnson, Dowd and Ridgeway 2006; Suddaby, et al. 2017)
Micro	Propriety (e.g., Bitektine and Haack 2015; Haack, Sieweke, and Pfarrer 2025)		Organizational Behavior (e.g., Dowling and Pfeffer 1975)
Perspective	Legitimacy-as-perception	Legitimacy-as-process	Legitimacy-as-property
(Empirical Focus)	(Beliefs/judgements)	(Fields/Social Environment)	(Object of Legitimacy)
Dyad Component	<i>Audience</i>	<i>Expectations</i>	<i>Object</i>

Figure 1. Intersection between levels and dimensions of legitimacy

Taken together, contemporary scholarship on organizational legitimacy highlights that legitimacy is both multi-dimensional and multi-level. It is useful to think of this in terms of horizontal and vertical axes of distinction within legitimacy as a larger construct, as illustrated in Figure 1. Horizontally, we see that legitimacy entails three distinct dimensions: an audience engaged in evaluation, an object that is being evaluated, and a social field or environment that is defined by the presence of shared norms, values and expectations (e.g. Fligstein and McAdam, 2012). Each of these dimensions reflect distinct aspects of Suchman's (1995) definition of legitimacy.

Vertically, legitimacy is understood as operating across the individual (micro), collective (meso) and supra-individual (macro) levels. In addition to the levels identified in the legitimacy-as-perception perspective, these levels are also evident in research traditions associated with the other two dimensions. In research centring, the object of legitimacy (legitimacy-as-property), these levels are not as explicitly differentiated in existing theory. Yet, it is clear that researchers study legitimacy in this way across multiple levels, with different theoretical implications. We suggest that these levels are evident in legitimacy research that focuses on organizational behaviours (micro), organizations (meso) and organizational ecologies (macro) (e.g. Baum and Singh, 1994; Chakravarthy and Gargiulo, 1998; Dowling and Pfeffer, 1975; Johnson, Dowd and Ridgeway, 2006; Thomas and Lamm, 2012).

Research focusing primarily on the emergence and evolution of the social expectations that define legiti-

macy tends to focus on field-level dynamics (see Suddaby, Bitektine and Haack, 2017). In this context, fields span micro-, meso- and macro-levels (DiMaggio and Powell, 1983). Within this context, researchers recognize the power of both individuals (e.g. organizational entrepreneurs) (see Maguire and Hardy, 2009; Rao, 1994) and collective actors (e.g. professional associations) (see Greenwood, Suddaby and Hinings, 2002) in relation to the broader (macro) field dynamics. Because this literature tends to treat these levels in an explicitly integrative way, we do not delineate levels for this perspective.

Measuring legitimacy

Given the multi-dimensional, multi-level nature of legitimacy, measuring legitimacy is challenging as each dimension of legitimacy generally implies a different unit of analysis. Within the legitimacy-as-property perspective, researchers typically treat organizations themselves as the unit of analysis (Bansal and Hunter, 2003; Baum and Oliver, 1992; Singh, Tucker and House, 1986). Within the legitimacy-as-perception perspective, the unit of analysis is a particular audience that is engaged in evaluation (Barraket, 2016; Bitektine, 2020; Pollock and Rindova, 2003). This is typically individuals but can also be evaluative entities such as regulators or news outlets. Researchers focused on systems of norms, values, beliefs or definitions tend to focus on an entire field or sector, looking at the dynamic interplay of actors and the norms, values and expectations that shape their interactions (e.g. Greenwood, Suddaby and Hinings, 2002).

Despite important efforts to improve the measurement of legitimacy across levels of legitimacy, there has been little such work aimed at spanning multiple dimensions of legitimacy. Because both empirical research and the resulting theoretical contributions are deeply influenced by measurement strategies (Schneiberg and Clemens, 2006), this has limited the degree to which insights developed within one approach to legitimacy can speak to other approaches or inform a broader understanding of legitimacy as a multi-dimensional phenomenon.

A dyadic approach to legitimacy

How, then, can we analytically account for legitimacy's multiple dimensions? Consistent with our discussion above, in his 2022 article on operationalizing legitimacy, Schoon makes the case that definitions of legitimacy consistently identify or imply three distinct empirical elements: an object of legitimacy, an audience and a set of social expectations that define the terms for legitimacy. Aiming to integrate these empirical elements, he identifies *dyads* as a basic unit of analysis. He argues that legitimacy can be understood as present when (1) expectations defining the relationship are present, (2) the object conforms to the expectations, and (3) the audience assents to the expectations (i.e. it is positively oriented towards its relationship with the object). Each of these conditions are treated as necessary. The basic logic of this approach is that, rather than legitimacy being solely a property of the object or a perception of observers, it exists in the relationship between the two that is shaped by the evolving expectations that operate within a given social field or environment.

Theoretically, this dyadic approach does not explicitly distinguish between the micro- and macro-levels. This is because it focuses on audiences' assent to the relationship, which can be indicated by individual evaluators, collective (i.e. institutional) evaluators or the aggregation of collective evaluators. However, the dyadic approach does not account for supra-individual evaluations, as reflected in the taken-for-grantedness of an entity (i.e. validity) (see Tost, 2011; Zelditch, 2001).² Similarly, within the legitimacy-as-property perspective, we do not see a clear link between what we are doing and the focus of organizational ecology on population-level dynamics. Within the legitimacy-as-process framework, the linkages are less clear. While some scholars view fields as composed of systems of relationships (e.g.

Dimaggio and Powell, 1983), the degree to which dyads can or should be centred in this context is not immediately clear based on the existing literature. Thus, immediate applications of our approach are limited to the micro- and meso-levels. The scope of our approach is illustrated in Figure 2 with a dashed line outlining the dimensions of legitimacy it is capable of accounting for. Given these considerations, our approach is not intended to replace existing measurement strategies. Rather, we aim to facilitate greater depth of analysis and complement existing strategies.

Measuring legitimacy dyadically: Method for applying computational text analysis

The dyadic perspective conceptualizes legitimacy as embedded in the relationship between an audience and an object and, as noted above, identifies three necessary conditions for legitimacy. Here, we develop an empirical strategy for measuring each of these necessary conditions using computational textual analysis techniques. To briefly summarize our approach, because expectations reflect the perceptions that define the relationship between audiences and the object, we measure them using the latent topics uncovered in media outlets. As assent reflects the audiences' (positive) orientation towards the relationship, we measure it through the sentiment expressed in media texts, as the valence of media discourse provides a meaningful signal of collective approval or disapproval. Finally, given that conformity reflects the degree to which the object aligns with audience expectations, we measure it via the fit between representation of expectations in the public communications and the expectations of the audience.

Step 1: Identify the nodes of the dyad

A dyadic approach to measuring legitimacy requires two corpora of textual data: one that captures the audience's orientation towards the object, and one that captures the object's orientation towards the expectations. Thus, the specification of nodes entails 'rendering' the data, a process of curating the textual data to 'account for language, authoring, and document sources—ensuring a logical fit with the research questions being investigated...' (Hannigan, 2019, p. 591).

The process of identifying nodes of a dyad and corpora of data can be inductive or deductive, such that nodes are defined by available data, or data are selected based on pre-defined nodes. For instance, if a researcher is interested in studying the legitimacy of a particular set of corporations, they might use data from websites, meeting minutes, financial strategy documents and press releases, among others to assess the objects' behaviours (Barros, 2014; Erkama and Vaara, 2010; Lamin and

²We would note that we are unable to find empirical measurement strategies that explicitly measure validity, as most researchers instead measure validity *beliefs* (i.e. micro-level beliefs about collective judgements) (Bitektine and Haack, 2015) rather than validity.

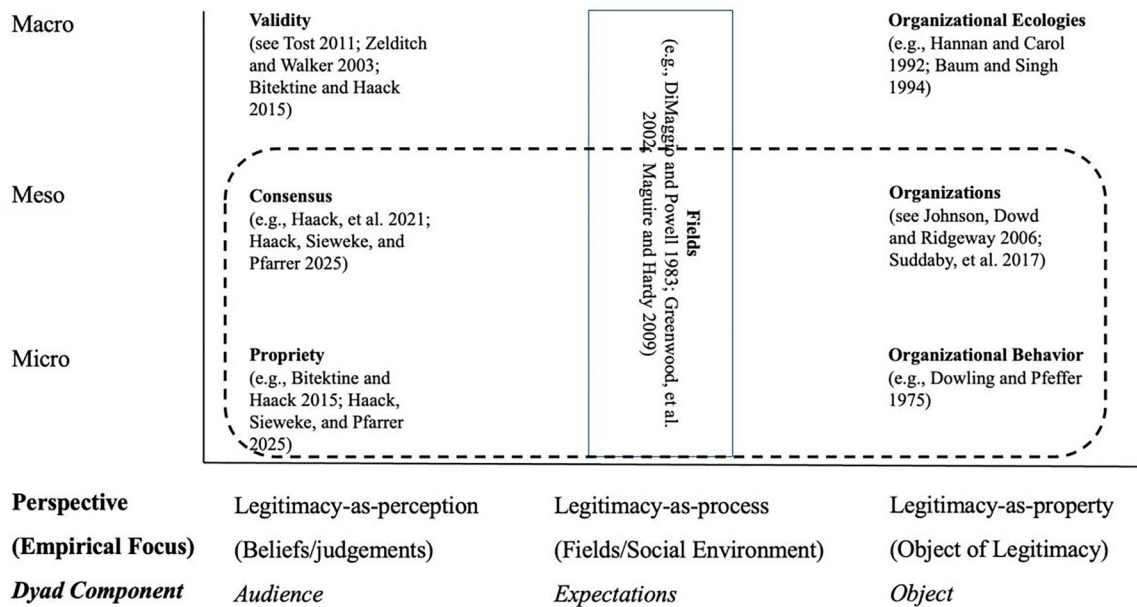


Figure 2. Delimiting scope of application for dyadic approach

Zaheer, 2011; Patala, 2019). The same is true for identifying the audience. For instance, a researcher interested in assessing legitimacy in the eyes of consumers might use customer reviews. In contrast, a researcher might have access to an extensive corpus of media coverage of the object and choose to focus on the media outlets themselves as the audience of interest (e.g. Deephouse, 1996).

One important consideration that applies specifically to the audience-side of this process is the need to define the boundaries of an audience. While audiences are generally defined in terms of preexisting categories, not all pre-defined audiences can be treated as unitary. For instance, customers who shop with a company because of low prices may have different criteria for evaluating legitimacy than customers who shop with a company because of labour practices or politics (e.g. King, 2008). These differences can be theoretically and substantively consequential for understanding the dynamics of legitimacy. As such, selecting the audience(s) is a two-step process. First, an audience must be defined in general terms that are, ‘guided by theoretical and empirical considerations’ (Hannigan, 2019, p. 591). Second, the researcher must allow for the possibility that there are distinct audiences—indicated by the presence of clear subsets among members of the audience that have distinct expectations—and assess this empirically. The first step is accomplished in the process of selecting a corpus of data. This second step is done in dialogue with the identification of expectations, which we discuss next.

Step 2: Identify expectations

After identifying the corpora of texts, the corpus representing audiences’ orientations are used to identify expectations that define the relationship between the audience and the object. This step is accomplished through the use of topic modelling. Topic modelling is a well-established technique for analysing textual datasets in management research (Hannigan, 2019), and has been productively used to analyse systems of meaning and social representations (DiMaggio, Nag and Blei, 2013; Hannigan, 2019; Mohr and Bogdanov, 2013) which can in turn be used to identify the expectations associated with legitimacy (see Croidieu and Kim, 2018). Latent Dirichlet allocation (LDA) (Blei, Ng and Jordan, 2003) is a widely applied algorithm in management research (see Hannigan, 2019). The Bayesian LDA assumes that each document is composed of a mixture of topics and each topic is represented as a distribution of co-occurring words (Reisenbichler and Reutterer, 2019; Schmiedel, Müller and vom Brocke, 2019). Topic modelling relies on numeric vectors for their input, formatted from the content. To derive these vectors, the whole document is converted to the complete list of written words (i.e. tokenization), duplicates are removed and dictation errors are corrected (Jo, 2019). All tokens are then mapped to their roots (stemming). For example, with different variations of verbs that have the same root, all are manipulated as the same word to avoid redundancy. Then, prepositions or other irrelevant tokens (stopwords) are removed. Finally, all tokens must be

normalized to lowercase (or uppercase) format (Kang, 2020). This step ensures the quality of the data before running the analysis. The indexing process follows the stages of tokenization.

Once topics are generated, the researcher must interpret them. This interpretation is done iteratively, moving between the word members in the topic and samples of the complete text. As Mohr and Bogdanov (2013, p. 560) clarify, topic models do not simply produce ready-made outputs. Rather, they require interpretation, and situations may arise where ‘there are no well-organized topics in the corpus’. As such, it is important to clarify that topic models are a valuable aid for identifying relevant expectations; they are not a replacement for iterative and substantively informed interpretation.

After identifying expectations, we can use those expectations to empirically explore the boundaries of our audiences. To do this, researchers should determine the distribution of topics in each document, and which audiences are assigned to each document. As we demonstrate below, in the preparation of the dataset, the columns are ‘audience’, ‘date of publication’ and ‘content’. Finding the overall expectations over the column ‘content’ will lead us to find the distribution of topics over each row of the dataset. Audiences can then be hierarchically clustered based on the dominance of topics that have been determined to suggest meaningful expectations. In some cases, distinct subsets will not emerge, indicating that the theoretically or substantively defined audience is unitary. If distinct topics (and inductively identified expectations) are associated with distinct subsets of the audience specified in step one, then each subset should be separated, and their textual data treated as separate corpora.

Step 3: Measure assent

Assent captures the notion that legitimacy is a ‘reaction of observers’ (Suchman, 1995, p. 574), dependent on their positive orientation towards the relationship they have with the object of legitimacy. Audience-oriented approaches to measuring legitimacy typically only capture assent (e.g. Etter, 2017). For our approach, we apply sentiment analysis to the corpus of text representing the audiences’ perceptions of the object of legitimacy. If more than one empirically distinct audience is identified in Step 2, the sentiment analysis must be run separately for each corpus of text representing each of the audiences.

Sentiment analysis is a family of techniques in computational textual analysis by which we evaluate the expressed sentiments of texts in terms of polarity (Liu, 2015). The output of the algorithm can be a score ranging from -1 to $+1$ or labels like positive, negative, or neutral (Pang, Lee and Vaithyanathan, 2002). Sentiment analysis can be designed as an unsupervised algorithm

using pre-compiled lexicon dictionaries like WordNet for English terms (Strapparava and Valitutti, 2004), and WOLF and FEEL for French terms (Abdaoui, 2017). Previous research has used sentiment analysis to measure legitimacy (conceptualized as a perception of audiences) (Etter, 2017). As Etter (2017, p. 74) succinctly summarize, ‘through the detection of affective orientations in large amounts of texts, the advanced techniques of sentiment analysis can be considered as a valid method for the measurement of citizens’ judgement...’.

Step 4: Measure conformity

To measure conformity, we rely on the second corpus of textual data compiled in Step 1: text representing relevant dimensions of the object of legitimacy. By using independent data produced by the object of legitimacy—such as website data, blog posts or fiscal reports—and analysing it in reference to empirically identified expectations produced by the audience, we are able to capture the inherently relational dynamics implied by dyads. Measuring conformity first requires systematically measuring the presence of the topics (identified in Step 2) that represent audiences’ expectations in the corpus of textual data that represents the activities or behaviours of the organization. To do this, we first remove the stop words and chunk the textual data into tokens (Pandey and Pandey, 2019). Second, we vectorize the tokens and convert it to a numerical representation. Third, we use the trained topic model from the audience to infer the topics for representation documents. For each document, we obtain the probabilities of the document belonging to each topic and the degree of this presence. If a document has a high probability for a specific topic, it is considered to contain that topic and the objects that are representing the topic(s) are understood as conforming to the expectation(s) of the audience.

Integrating indicators

This four-step method is designed to facilitate the construction of quantitative measures of multiple dimensions of legitimacy, with Steps 2 and 3 detailing how to generate measures of assent and conformity between audience(s) and objects. Each of these measures provides valuable data on its own, and can be used independently. However, they can also be integrated to generate a composite legitimacy score for each empirically delineated audience. There is debate in the literature as to whether legitimacy should be treated as dichotomous (i.e. an organization is either legitimate or not) or measured on a relative scale (e.g. Deephouse, 2017). Here, we follow Deephouse and Suchman’s (2008) recommendation that it be measured dichotomously. However, it is entirely possible to develop a scaled measure using the three indicators produced by our method.

Following the logic outlined by Schoon (2022), a composite measure of legitimacy must indicate the combined presence of each of the three necessary conditions. For the first condition—expectations—a failure to derive meaningful results from the topic model (a distinct possibility, see Mohr and Bogdanov, 2013) would indicate the absence of clear audience expectations. In this case, the legitimacy score would automatically be 0. Regarding measures of assent, we suggest rounding the sentiment score to 0 or 1. Here, 0 indicates the absence of assent, while 1 indicates the presence of assent. If assent is 0, then the legitimacy score is 0. Similarly, we can binarize the measure of conformity, where a score of 0 automatically indicates the absence of legitimacy. If expectations, assent and conformity are all present, then the composite legitimacy score will equal 1. If any of these measures equal 0, then the composite score will be zero.

Importantly, a composite score of 0 indicates the absence of legitimacy but does not necessarily indicate illegitimacy (Siraz *et al.*, 2023). The absence of any single condition does not necessarily mean that legitimacy is absent. Rather, it leaves open the possibility that measurement strategies are empirically capturing something other than legitimacy. Conversely, the co-occurrence of these three conditions is sufficient for establishing legitimacy's presence (see Schoon, 2022). Often, however, researchers are interested in measuring legitimacy versus *illegitimacy* (as opposed to legitimacy versus its absence). In this case, we recommend one minor adjustment, wherein the assent score is made trichotomous and rounded to -1 , 0 or 1. Following the logic that the absence of expectations indicates the absence of a relationship, we assume that expectations must still be present for illegitimacy. However, we treat misalignment between audience assent and object conformity as illegitimacy. This allows for a tripartite composite index, scored from -1 to 1, where 1 indicates legitimacy, 0 indicates the absence of legitimacy or illegitimacy, and -1 indicates illegitimacy.

Empirical application of the dyadic approach: An illustration

Step 1: Identify the nodes of the dyad

To illustrate how our proposed method works in an empirical setting, we apply it to a dataset on a geographically defined cluster of 67 French biotechnology SMEs (the object of legitimacy) and the media outlets that provide evaluative coverage of those companies (the audiences). We focus on media outlets in our initial audience specification because of the critical role that these outlets play in the growth and failure of biotech SMEs. As previous research has shown, the media represent a distinct audience unto themselves, serving the dual

purposes of communicating the elements of ventures strategies (Lamertz and Baum, 1998) and evaluating the outcomes of those strategies (Rao, 1998). We focus on established media firms (e.g. online and offline newspapers, TV and radio programmes) specializing in disseminating information about ventures (Rao, 1998). While there are a variety of relationships that news outlets might have with ventures—ranging from informal ties between shareholders to commercial ties rooted in spending on advertisement—our focus is on the evaluative role that news outlets play through their coverage of media outlets.

For the first corpus representing the audience perspective on the object, we collected 426 articles published by media outlets in France that reference the 67 SMEs. We focused specifically on French media sources, and selected sources using a combination of global news databases (i.e. Factivia and Europresse) and standard internet search engines. The decision to retain an outlet was based on a combination of criteria, including visibility (in terms of the total number of words published about the industry studied) and expertise (i.e. a qualitative analysis of the outlet's expertise regarding the industry). Once we identified relevant outlets, we retrieved articles published by these outlets on each of the 67 ventures. To ensure that the articles were relevant to our analysis, we checked them manually for homonyms, and filtered out commercial content. The final corpus of 426 articles included both news coverage and opinion articles but excluding paid-for partnership articles.

Our second corpus of text was drawn from the SMEs' websites. SME's websites provide an account of each organization's actions and activities that is independent of the evaluations made by relevant news outlets, thereby allowing us to compare the extent to which organizations' self-presentation conforms to audience expectations. Our use of data produced by the companies themselves to measure conformity follows prior research (e.g. Barros, 2014; Erkama and Vaara, 2010; Lamin and Zaheer, 2011; Patala, 2019). We used web scraping techniques to compile textual content from the websites of each of the ventures in our analysis. In total, we collected 1,661,971 words for the collection of 67 objects of legitimacy.

Step 2: Identify expectations

We applied topic modelling to our first corpus of text, consisting of 426 articles published about the 67 biotech SMEs. The total number of words in all documents was 1,944,548. To identify expectations in the media outlet content, we first ran the topic modelling LDA algorithm using the programming language Python, selecting the number of topics based on their perplexity and log-likelihood scores. After searching various combinations of two, three, four and five topics, we pinpointed two

Table 1. Topics and the vocabulary associated with them in the traditional media

LDA topic modelling (unsupervised)	
Topic 1	Topic 2
Patient—research—permission—enterprise—company—develop—clinical power—new trial—cancer—development phase—test vaccine—measure—treatment—medical results—molecule—startup—first—laboratories—cellule	Group—company—percent—first solution—new medical—market—financial turnover—activity—development—bet—action—capital—biotech—imagery—technology—price index—medical—health—Euronext
Guided LDA (semi-supervised)	
Topic 1: Cognitive	Topic 2: Pragmatic
Patient—research—new—permission—company—development—enterprise—efficacy—clinical development—first try—cancer—phase—measure—test vaccine—maladies—treatment—results medicine—project—molecule—program—startup—laboratories—scientific	Group—company—market percent—solution—first medical—financial turnover—activity—first group—development—diagnostic—bet—action—capital—biotech—imagery—technology

topics that gave the optimum number for log-likelihood (giving a score of -5.21×10^5) and model perplexity (giving a score of 19.71×10^2) (Buntine, 2009). In other words, the scores for more than two topics got bigger, and thus more perplexing. Table 1 presents a summary of the content of these two topics. As an author team, we individually and collectively interpreted the results from the first round of analyses to identify meaningful themes among the vocabulary (Croidieu and Kim, 2018). We then decided to apply LDA semi-structured algorithm to ensure the accuracy and consistency of vocabulary in each topic. Following Kaplan and Vakili (2015), we presented the results to two external evaluators who are the scholars in the field of the management studies to validate the semantic relevance of the identified topics.

The two topics that resulted from our topic modelling were fortunately both coherent, and, in dialogue with the actual text of the articles, reveal meaningful expectations for biotech SMEs. The first topic from the semi-supervised technique emphasizes the technological qualifications of an SME, reflecting expectations that these companies will be engaged in research and development and pursuing scientific innovation (Golant and Sillince, 2007). This first topic reflects firms' cognitive legitimacy (Suchman, 1995). The second topic emphasizes ventures performance, reflecting the expectation that SMEs will engage in effective business practices, maximizing their market percentage, having good rates of financial turnover, and being at the vanguard of their industry (i.e. first out of the gate), all of which are common expectations of organizations (Ruef and Scott, 1998). This second topic reflects firms' pragmatic legitimacy (Suchman, 1995).

After identifying these two sets of expectations, we assessed whether there were multiple distinct audiences represented among the media outlets included in our

analysis. To do this, we identified the topic distribution across all documents for each media outlet by employing hierarchical clustering. This step revealed the distinct expectations expressed by each media outlet. As depicted in Figure 3, we observe the presence of three distinct subgroups within the media. The first subgroup primarily focuses on the scientific aspect, while the second subgroup emphasizes the pragmatic aspect. The third subgroup expresses a combination of cognitive and pragmatic expectations. Our analysis reveals that the media outlets exhibit heterogeneity (Roulet and Clemente, 2018; Zavyalova, Pfarrer and Reger, 2018).

Following our method, after identifying these distinct audiences, we measured assent and conformity for each audience separately. However, due to space constraints, we present our illustration of Steps 3 and 4 of our method for the complete dataset rather than presenting six separate analyses (i.e. one per construct for each of three audiences).

Step 3: Measure assent

To calculate assent, we use sentiment analysis to evaluate the media outlets' affective orientation towards the SMEs. As all the articles in the sample were gathered from reputable media and used formal language, we decided to use unsupervised techniques (Liu, 2015). To this end, we first needed to find a substantively and linguistically appropriate lexicon. Abdaoui (2017) built a robust lexicon comprising 14,127 French-language descriptors of polarity (positive and negative) and emotion (joy, surprise, anger, disgust, sadness, fear etc.). Using this lexicon, we measured the polarity of the documents for each SME and for the documents as a whole (available by request to the authors). The mean polarity score of the whole sample of documents (i.e. the total sum of the

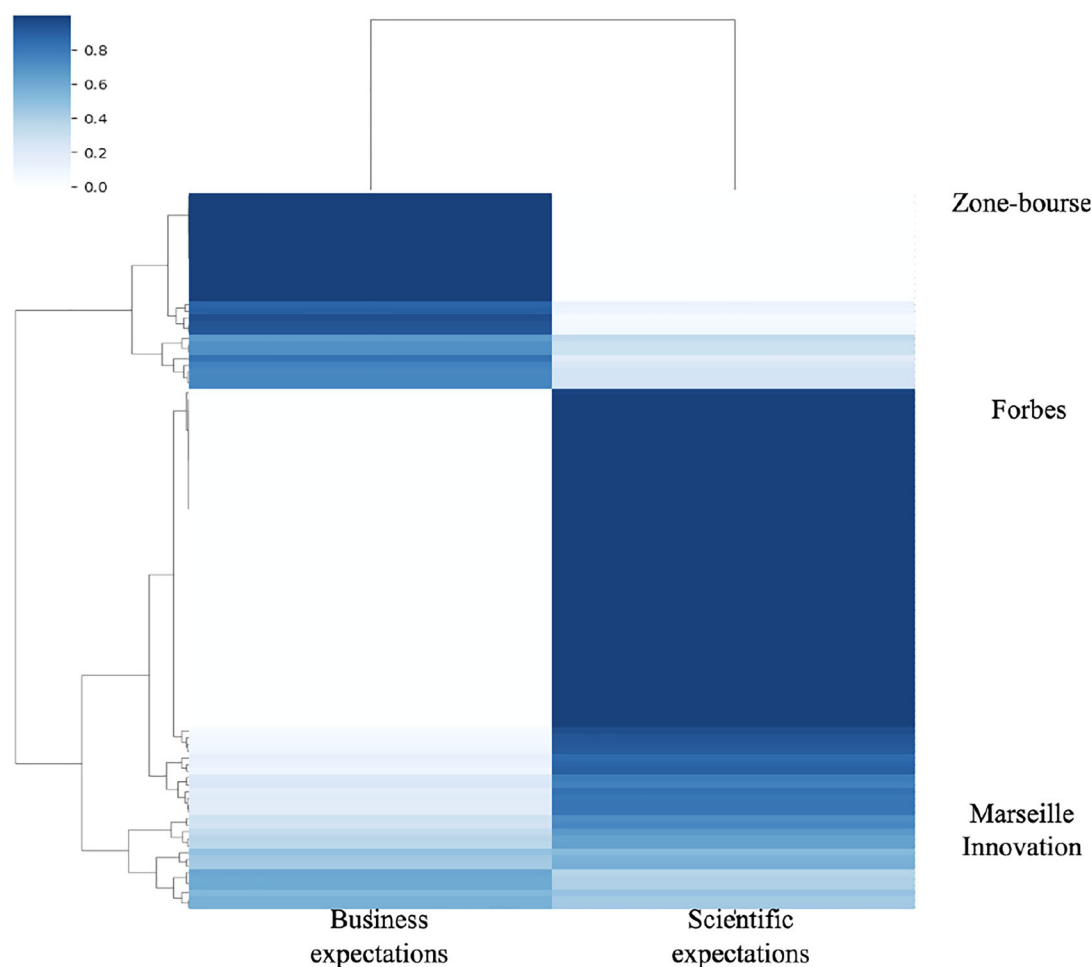


Figure 3. Hierarchical clustering of audience groups (for a better presentation, we show one media outlet per group)

Table 2. Descriptive analysis of assent

	Cognitive	Pragmatic
Mean	0.31	0.20
SD	0.19	0.21
Max (Min)	0.78 (0.0)	0.65 (0.0)

documents) was 0.83. Summary statistics of the results are presented in Table 2.

Step 4: Measure conformity

To calculate the observed conformity of the SMEs towards the expectations of the media outlets, we turned our analysis to the second corpus of data drawn from ventures' websites. After processing and vectorizing the data using bag of words technique (Jo, 2019), we took the trained model with the two topics generated in Step 2 and, for each website's content, obtained the distribution of topic. This distribution represents the probability of the website's content belonging to each topic. We then assessed the extent to which the topic is prevalent

on the website of each object. The result is a continuous 0–1 score for each SME-audience dyad. Table 3 provides summary statistics for the resulting conformity scores.

Integrating indicators

The results of the preceding analyses allow us to construct an overall measure of legitimacy for each venture in our data. As Schoon (2022) argues, legitimacy is distinguished from related constructs by the co-occurrence of expectations, assent and conformity. Because we found two coherent sets of expectations, we have determined that expectations are, in fact, present for all organizations. In our analysis of the audience boundaries, we found one audience that was predominantly associated with pragmatic expectations, one that was largely associated with cognitive expectations, and one that was associated with both sets of expectations. If we were constructing our composite index by audience subgroup, we would use the predominant expectations associated with each audience to calculate assent and conformity. For this third group, we see two options: (1)

Table 3. Descriptive analysis of conformity

	Sentiments towards expectation 1 (cognitive)	Sentiments towards expectations 2 (pragmatic)
Mean	0.76	0.39
SD	0.39	0.28
Max (Min)	0.99 (0.0)	0.99 (0.0)

compute a composite index requiring assent and conformity to both expectation sets (e.g. pragmatic and cognitive) and (2) compute assent and conformity separately for each set to yield pragmatic and cognitive legitimacy. As we do not partition results by audience subgroups, we adopt option (2) and report separate measures for each type.

To determine whether each set of expectations co-occurs with assent and conformity, we first classify the objects into three groups: those with a negative assent score (coded as -1), those with an assent score lower than the overall average for each expectation (coded as 0), and those with an assent score higher than the average (coded as $+1$). As a result, we assign a $+1$ code to 49 enterprises for cognitive assent and 50 enterprises for pragmatic assent. In the third step, we assign a $+1$ code to enterprises with a conformity score higher than the population average. This resulted in 46 enterprises coded as conforming to cognitive expectations, and 30 enterprises to pragmatic expectations. Finally, enterprises were coded as having legitimacy when they were coded as $+1$ code for both assent and conformity scores. The result is 35 enterprises categorized as having cognitive legitimacy, and 22 enterprises categorized as having pragmatic legitimacy.

Assessing measure validity

Given that there is no existing gold standard for measuring legitimacy across multiple dimensions for us to compare our approach against, we adopt two different approaches to assessing whether our measurement strategy is valid. First, we measure the face validity of our measurement strategy by comparing our composite index for legitimacy with the subjective evaluations of a panel of industry experts who were asked to evaluate a random sample of 10 of the 67 ventures included in our analysis. We opted to focus on a sample of organizations to reduce survey fatigue and increase respondent engagement. This allows us to provide at least a basic assessment of whether our measurement strategy yields a meaningful measurement of legitimacy.

We selected experts based on evidence of their experience in the biotech industry, their insertion in the ecosystem and their media visibility. We asked those industry experts to simply evaluate the legitimacy of all SMEs in our sample using a five-point Likert scale, ranging from ‘totally illegitimate’ to ‘totally legitimate’. Such broadly

defined subjective evaluations provide an effective measure of the legitimacy of organizations within the field they are operating in. We collected 41 responses from a total of 65 experts identified (response rate = 63%), and used Kendal’s tau to evaluate the convergence between the average of experts’ rating and total legitimacy score for all audiences (Clark-Carter, 2004). For cognitive legitimacy $\tau = 0.65$ (p -value < 0.01), and for pragmatic legitimacy $\tau = 0.62$ (p -value < 0.01). These scores represent a high degree of correlation, indicating that our measurement strategy does well compared with the evaluations of those with holistic knowledge of the industry field and organizations.

In addition to assessing the face validity of our measure, we also assessed its predictive validity. In order to assess the predictive validity of our legitimacy measure, it is necessary to establish an empirical association with a relevant criterion (Geringer, 1998). For this purpose, we choose the failure rate of ventures as a criterion. There is a large body of studies that supports the positive link between the legitimacy of an organization and its survival (Delmar and Shane, 2004; Lu and Xu, 2006; Meyer and Rowan, 1977; Singh, Tucker and House, 1986; Zimmerman and Zeitz, 2002). Delmar and Shane (2004, p. 387) suggest that new ventures ‘need to create the external perception that they are legitimate to garner resources and survive competition with established firms’.

Following the existing research, we investigated if our measure of legitimacy can predict the failure rate of the SMEs in our database. Doing that, we tracked the information of the enterprises and found that in 2023, 14 enterprises in our database had failed and exited the business. We created a table and coded the failure rate of a SME in 2023 as a dummy variable, we also added the expectation, assent and conformity, age and size of the SME in 2019.

Due to the binary nature of our dependent variable (survival-failure), we employed logistic regression as the suitable approach to examine our hypothesis that legitimate SMEs are more likely to survive and used the legitimacy scores generated above. All analyses were conducted in R. Table 4 reports the descriptive statistics and correlation.

Table 5 reports the results of our analysis. Model 1 includes the two control variables. This model shows that there is no significant relation between age and size on the failure rate of firms, which is in line with the find-

Table 4. Descriptive analysis and correlations

	Mean	SD	Failure	Cognitive assent	Pragmatic assent	Cognitive conformity	Pragmatic conformity	Cognitive legitimacy	Pragmatic legitimacy	Size	Age
Failure	0.79	0.40	1	0.10	0.20	0.41***	0.27*	0.39**	0.12	−0.04	0.10
Cognitive assent	0.31	0.19		1	0.32*	0.31	0.09	0.47***	0.31	0.03	0.13
Pragmatic assent	0.20	0.21			1	0.13	0.19	0.32	0.33**	0.32	0.26
Cognitive conformity	0.71	0.28				1	0.24	0.61***	0.25*	−0.10	−0.13
Pragmatic conformity	0.35	0.26					1	0.16	0.60***	0.11	0.07
Cognitive legitimacy	0.52	0.50						1	0.48***	−0.07	−0.14
Pragmatic legitimacy	0.32	0.31							1	0.09	0.04
Size	24.26	38.28								1	0.43***
Age	10.25	7.80									1

Note: $N = 67$ for all variables. This table presents Pearson correlation coefficients with pairwise deletion.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 5. Logistic regression results on failure of SMEs

	Model 1	Model 2
Constant	0.95 (0.06)	−0.07 (0.01)*
Age	0.05 (0.31)	0.07 (0.19)
Size	−0.005 (0.53)	−0.003 (0.71)
Cognitive legitimacy		2.96 (0.006)**
Pragmatic legitimacy		1.05 (0.07)

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

ings in the literature (see, e.g., Zhao *et al.*, 2020). Model 2 shows that there is a significant relation between cognitive legitimacy and failure rate. We then established the confusion matrix of our logistic regression to calculate the accuracy of our model, we arrived at the accuracy of 0.7.

Importantly, while we present analyses that use only the composite measures of legitimacy, our approach to measuring legitimacy introduces the possibility of analysing the effects of legitimacy as a unified construct and exploring the effects of each dimension individually. By including audience- and/or expectation-specific measures of assent and conformity in an analysis of legitimacy's effects, researchers can gain a far more granular understanding of how legitimacy and its multiple dimensions affect key outcomes for organizations.

Complementary analyses

To assess the distinctiveness and the strength of the dyadic perspective, we conducted a series of additional

analyses where we compared the composite measure of legitimacy with the uni-dimensional audience side of legitimacy (e.g. Illia, 2022; Vergne, 2011). We evaluated model performance using two complementary approaches. First, we compared Akaike information criterion (AIC) values, where lower values indicate better model fit after penalizing for model complexity (Burnham and Anderson, 2002). Second, we conducted bootstrap resampling ($n = 200$ iterations) to assess the stability of coefficient estimates and generate bias-corrected confidence intervals, ensuring our results are not artefacts of sample-specific variations. Results are presented in Table 6.

As shown in Table 6, both evaluation methods converge on consistent findings: the dyadic model demonstrates superior performance, with the lowest AIC value indicating better predictive accuracy despite the additional parameter. Bootstrap results confirm the robustness of this advantage.

Discussion

While legitimacy is widely recognized as being a multi-level and multi-dimensional construct, most scholarship on legitimacy focuses on one dimension at a time. The challenges of accounting for the multi-dimensionality of legitimacy are intimately linked to challenges of measuring across dimensions. To address this challenge, we follow the lead of pathbreaking scholars who have advanced novel strategies for measuring legitimacy across multiple levels and introduce a novel framework for measuring legitimacy across multiple dimensions using computational text analysis. Treating dyads as our unit of analysis, we incorporate measurement of the social expectations that define legitimacy, audiences' evalua-

Table 6. Comparison between the composite variable and traditional models

	Composed index of legitimacy without assent	Composed index of legitimacy without expectations	Composed index of legitimacy
D_{xy}^a	0.1741	0.2519	0.4395
AIC ^b	81.50	78.51	76.96

^a Cross-validation (bootstrapping) and comparison between the models (composed index vs. assent): (Sommer's D index [-1 to +1]) (D_{xy} near to +1 means the model's predictions are correct).

^b AIC (relative quality of models) = lower is better.

tions and the conformity of objects to those social expectations which can be analysed independently or combined into a single dimension of legitimacy that spans across all three dimensions.

This paper makes two important contributions to scholarship on organizational legitimacy. First, we have articulated the relationship between the multiple dimensions of legitimacy that are reflected in dominant definitions of the construct. In doing so, this work provides a foundation for bridging disparate approaches to legitimacy, as reflected in the *legitimacy-as-property* and *legitimacy-as-perception* perspectives (Suddaby, Bitektine and Haack, 2017). This is an important step in the literature to connect theory with the measurement of legitimacy. By providing a framework for measuring legitimacy across multiple dimensions, our work complements important efforts to theorize and study legitimacy as not only a multi-level phenomenon, but a multi-dimensional phenomenon as well.

Given the tight-coupling between theory and method (see Haack, Schilke and Zucker, 2021), the development of this methodological framework represents an important step towards productively bridging long-standing divisions within scholarship on legitimacy. In doing so, this work deepens the theoretical foundations of Schoon's (2022) dyadic model, situating it in relation to established scholarship on legitimacy. The ability to measure legitimacy in the context of dyads provides the necessary empirical foundation for exploring the possibility that legitimacy operates at the level of relationships. Moreover, our approach to constructing measures of legitimacy also allows researchers to empirically account for variation in the 'grey area' of legitimacy (Siraz et al., 2023), creating further connections across the literature. We contend that the ability to not only conceptualize legitimacy at the level of dyads, but to measure it, is suggestive of a possible fourth perspective on legitimacy—*legitimacy-as-relationship*—that is distinct from the three dominant perspectives identified by Suddaby, Bitektine and Haack (2017) with the potential to integrate key insights across all of them.

Second, we empirically demonstrate the relevance of the dyadic perspective. Our article allows us to address suggestions from Vaara, Aranda and Etchanchu (2024) to implement automated textual analysis to further understand the antecedents and consequences of legitimacy through communication. By mobilizing the tex-

tual analysis techniques, we provide an empirical explanation to the foundation of discursive legitimacy. Specifically, we showed that expectations (from topic modelling), assent (from sentiment analysis) and conformity (from topic modelling) form a relevant composite index of legitimacy expected by various authors (Siraz et al., 2023; Vaara, Aranda and Etchanchu, 2024).

Additionally, we provide empirical evidence of the measure's validity—both through expert evaluation and by showing its predictive power for venture failure—thereby offering a tool that can support robust inference and theory testing in future work. Previous empirical papers used textual data to measure legitimacy through one component of the dyadic model (Deephhouse and Carter, 2005; Elsbach, 1994; Illia, 2022; Vergne, 2011). However, our results indicate that relying solely on one component has a lower explanatory power. While there are of course meaningful limitations to our methods—for instance, it can only be applied to textual data—we believe that it represents a meaningful advance towards accounting for the multi-level and multi-dimensional nature of legitimacy in research on organizations. By developing a new method for measuring one of the hot constructs in recent research, our work stands to advance both substantive and theoretical scholarship on this topic. While recent developments in this area have largely emphasized experimental approaches to measuring new venture legitimacy, the dyadic perspective on legitimacy address the growing collection of scholarship that uses textual data to measure legitimacy by providing a framework that captures the complex multi-dimensionality of new venture legitimacy in observational research. In doing so, we advance a growing stream of research advancing efforts to improve theory and substantive scholarship on venture legitimacy by improving measurement (Haack and Sieweke, 2020).

Limitations and future research

Before concluding, we want to highlight three limitations, each of which highlights exciting directions for future research. First, our reliance on topic modelling and lexicon-based sentiment analysis introduces boundary conditions regarding the types of expectations and judgements that can be detected. Textual data,

by nature remains an incomplete source of information (Kobayashi *et al.*, 2018), meaning that implicit or non-verbally conveyed expectations and judgements fall outside the reach of our approach. Topic modelling, while effective in uncovering thematic structures, requires subjective decisions regarding the number of topics and their interpretation, which may result in the aggregation or omission of nuanced expectations that do not fit within dominant topics (Schmiedel, Müller and vom Brocke, 2019). Besides, lexicon-based sentiment analysis is insensitive to contextual factors such as irony, sarcasm, domain-specific language and tonal nuance, thereby limiting the detectable judgements to those expressed through overtly positive or negative vocabulary while leaving subtle or mixed sentiments unrecognized (Van der Veen and Bleich, 2025). These constraints mean that our framework is best suited to detecting linguistically explicit evaluations rather than tacit, affective or contextually embedded forms of evaluations. This leaves room for future research that complements computational textual analysis with methods such as transformer-based sentiment models capable of capturing multi-dimensional sentiment patterns, as well as employing multimodal data sources.

The second limitation concerns the measurement of assent through sentiment analysis. We theorized that the sentiment expressed by an audience towards a given expectation can serve as an indicator of assent which is understood as 'agreement with, approval of, or support for a relationship' (Schoon, 2022, p. 21). However, we acknowledge that sentiment does not always equate to assent. Despite this constraint, sentiment remains a reasonable proxy in our research. First, the textual data we analyse are produced by formal media outlets in direct reference to the objects, which increases the likelihood that the expressed sentiment reflects evaluative judgement rather than just a simple enthusiasm. Additionally, prior research has successfully employed sentiment as a proxy for recommendation in similar contexts (e.g. Guerreiro and Rita, 2020), supporting its validity as an aggregate indicator of audience reception. Future research should seek to refine the measurement of assent by incorporating more nuanced approaches, such as aspect and intent sentiment or multimodal sentiment analysis.

A third limitation stems from our choice to integrate the legitimacy indicators into a single trichotomous variable ranging from -1 through 0 to 1 . Although this operationalization is theoretically motivated and enhances interpretability by providing a clear categorical distinction aligned with the conceptual boundaries of legitimacy, dichotomizing or trichotomizing continuous variables can underestimate effect size and reduce explained variance in the observations (Cohen, 1983), which in turn reduces the statistical power available to test hypotheses (Fitzsimons, 2008). It can also under-

mine meaningful differences across observations that a granular measure would have preserved (Fitzsimons, 2008). This should partly account for one of the insignificant results obtained in our survival analysis. This highlights the importance of future research exploring the use of scaled or continuous legitimacy measures, for instance, by employing weighted scoring schemes or fuzzy-set qualitative comparative analysis.

Conclusion

In this paper, we have introduced a novel approach to measuring legitimacy that accounts for the multidimensionality of the construct. Using dyads as the unit of analysis, our measurement strategy accounts for audiences' assent, object's conformity and the social expectations that serve as a referent for each. Our empirical application demonstrates the framework's face validity, as well as its superior predictive power compared to traditional uni-dimensional measures in an illustrative analysis of new venture survival. In doing so, this paper provides researchers with a tool to capture the complex, relational nature of legitimacy, but it also opens new pathways for large-scale, observational research into how organizations navigate and survive within their social environments.

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