

# Engaging Opportunities in the Context of COVID-19 Equivocality: The Role of Frame Structure

Yu-Ching Cheng<sup>1</sup>

<sup>1</sup>Affiliation not available

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## Abstract

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# **Engaging Opportunities in the Context of COVID-19 Equivocality: The Role of Frame Structure**

**Julia (Yu-Ching) Cheng**

**Visiting Assistant Professor of Sociology**

**Illinois Wesleyan University**

**[ycheng@iwu.edu](mailto:ycheng@iwu.edu)**

## **Abstract**

How does information interpretation influence entrepreneurial action when the market is uncertain? This article reveals the role of frame structure through a topic modeling analysis of over 2900 financial news items about 444 newly public firms in 2021, when COVID-19 brought the greatest market uncertainty and, meanwhile, record breaking IPOs. It is the structure of the alignment of primary frames, the foundations of interpretative frames upon which information about financial market and individual firms rest; secondary frames, the positioning of other frames toward primary frames through congruence or incongruence; and socio-cognitive content clusters, the grouping of frequent terms that supply information. The analysis showed that information about successful IPOs has a flatter structure with a higher ratio of alignment than that of unsuccessful ones, regardless of firm age. It suggests a negative association between frame structure and entrepreneurial action outcome when the market is uncertain.

**Keywords:** entrepreneurial action, frame alignment, information interpretation, newly public firms, initial public offerings (IPOs)

## **1. Introduction**

The COVID-19 crisis was a market shock and upended the entrepreneurial venture world. But as it turned out, the pandemic only marked the beginning of a wave of IPOs that would sweep the U.S. stock market. Thousands of individual firms sought public status following the pandemic crisis. There were 480 IPOs in 2020, which was an all-time record at that time. The number went 120% higher in 2021, which was also a record. Since issuing an IPO represents an entrepreneurial milestone (Shane 2003), the picture of an exponential increase in IPOs depicted firms capitalizing on the opportunity that came with the pandemic crisis. On the other hand, the fact that several of 2021 IPOs were broken indicates the vulnerability of exercising entrepreneurial opportunities; small entrepreneurial new ventures generally faced with a high probability of failure, low survival chances and deficient financial performance (Gimeno, Folta, Cooper, & Woo, 1997). Therefore, the picture of meteoric rise in newly public firms in fact shows that engaging entrepreneurial opportunities is at variance with actual outcomes. The empirical tension between opportunity and vulnerability thus gives entrepreneurship scholars a research opportunity, too, because “[t]he good and the bad, the bright and the dark sides are inextricably linked and clearly visible under the prism of entrepreneurship” (Dushnitsky, Graebner, & Zott, 2020: 537; see also Alvarez & Barney (2020) in the same special issue of COVID-19 crisis at Strategic Entrepreneurship Journal).

To fully understand what leads to variance in IPO performance as the outcomes of engaging opportunities requires an inquiry into how equivocal information is interoperated in the equivocality-ridden context. The externally business environment of newly public firms during

the pandemic was highly equivocal, because the empirical setting fitted into what Daft and Lengel (1986) called a Cell 2 situation where cause-effect relationships are unanalyzable due to equivocal cues generated by rapid technological development and the emergence of nascent industries or new products. In these equivocal and ambiguous situations, information interpretation plays a more important role than information acquisition in firm evaluation (Rindova, Ferrier, & Wiltbank, 2010; for reviews see Cornelissen & Werner, 2014 and Snihur et al., 2021). Additionally, information about newly public firms tend to be equivocal (Hubbard, Pollock, Pfarrer, & Rindova, 2018: 1980). Their information equivocality leads to varying interpretations (Rothman, Pratt, Rees, & Vogus, 2017) and the interpretations are influenced by a variety of factors (Higgins & Gulati, 2003; Pollock et al., 2010; Hubbard, Pollock, Pfarrer & Rindova, 2018).

While prior research has shown the impact of information interpretation on stakeholders' assessment and use of other information, access to resources, and strategic alliance (Podolny, 2001; Fiss & Hirsch, 2005; Pfarrer, Pollock & Rindova, 2010; Smith, 2011; Hubbard, Pollock, Pfarrer, & Rindova, 2018), little is known about how interpretative frames of information are connected, and whether they have differing effects on investors' perceptions of newly public firms. The only exception is a recent article by Hubbard, Pollock, Pfarrer, & Rindova (2018). Grounded upon Weber and Mayer's (2014) concept of misalignment, the authors demonstrated the differing and interactive effects of frame incongruence among different interpretative frames of information. However, the analysis indicates a dual model of information interpretation and that duality reflects a static boundary between frame congruence and incongruence, between

frame alignment and misalignment. Additionally, it suggests that the relationship among interpretative frames can only be horizontal.

Yet it is possible that there is hierarchical differentiation across interpretive frames. Social movement literature has suggested that master frames could promote cycles of protests in the absence of political opportunities structure (Snow & Benford, 1992). Master frames are defined as “a generic type of collective action frame that is wider in scope and influence than run-of-the-mill social movement frames”; they are not context specific and their attributions are “elastic, flexible, and inclusive” (Benford, 2013: 1, emphasis original). Empirical studies have described how the interpretative frame of U.S. civil right movement, equal rights and opportunities, has become so influential since 1960s that it serves as a master frame for the claim-making of later social movements involving LGBT minorities and animal rights (Benford, 2013; Gerhards & Rucht, 1992; Noonan, 1995; Carrol & Ratner, 1996).

The theoretical insights into the relationality of frames lead to two related questions not addressed in prior research on information interpretation of IPOs. First, how does frame differentiation influence IPO performance? Second, given market reactions to firm value are social constructs (Zajac & Westphal, 1995, 2004) and that stock evaluations are an outcome of investors’ perceptions of IPOs (Bell, Filatotchev, & Aguilera, 2014), how does differences in media construction influence interpretative frames of stock evaluations about newly public firms? This article answers these questions by exploring the role of frame structure, defined as the end result of a framing process where the alignment of interpretative frames and socio-

cognitive content gives information a specific set of properties through congruence and incongruence. Grounded upon Goffman's (1964) framing analysis, frame structure offers a continuum model of frame alignment where the boundary between frame congruence and incongruence are changeable and dynamic.

Drawing from 2950 pre-IPO news items with a sample size consisting of 444 newly public firms, the analysis of topic modeling revealed a hierarchical differentiation among interpretative frames from the 2021 IPO corpus. The analysis showed a negative association between frame structure and IPO performance and suggests that flatter structure of interpretative frames of information can mitigate information equivocality of IPOs and facilitate the positive outcome of engaging entrepreneurial opportunities.

By exploring the role of frame structure in influencing IPO performance, this article makes theoretical, empirical, and methodological contributions to the understanding of information interpretation and entrepreneurial opportunities. First, although interpretation mechanisms underpin stakeholder behavior in entrepreneurship and organizations (reviews see Snihur, Thomas, Garud, 2021 and Cornelissen and Werner, 2014), different outcomes can occur at the firm level. More specially, it addresses the issue by considering the effects of interpretative frame of information about newly public firms, and whether the effects influence the outcomes of the firms' engagement of entrepreneurial opportunities. Hence, this article focuses on the relationality of frames that shows how different types of differentiation in the frame structure of newly public firms may lead to different outcomes of engaging entrepreneurial opportunities. It

extends the nascent body of theorization of frame incongruence (Weber & Mayer, 2014; Hubbard, Pollock, Pfarrer, & Rindova, 2018) by showing the influence of hierarchical differentiation on perceptions of newly public firms and their IPO performance.

Second, this article sustains the view that, to newly public firms, “No News Is Bad News” (Petkova, Rindova, & Gupta, 2013). That is, due to the lacking of publicly trading records and history of price changes, the firms particularly rely on media coverage to give impressions on investors (Pollock & Rindova, 2003; Pollock, Rindova, & Maggitti, 2008); signal board prestige to prevent their newness from becoming liability (Certo, 2003); and gain, maintain, and repair organizational legitimacy (Suchman, 1995; Petkova, Rindova, & Gupta, 2013). This article thus provides empirical support for and an extension to prior research on IPOs and media influence by showing how information amounts and IPO success is positively related when financial markets and information are both highly equivocal.

Lastly, because this article’s theoretical approach addresses differentiation within and across interpretative frames, traditional methods used by most information interpretation studies are less suitable for answering its research questions. Thus, this article also makes a methodological contribution to entrepreneurial framing research by exploring the effects of frame differentiation using topic modeling. Topic modeling is a great tool to study meanings and other measures of culture (DiMaggio, Nag, & Blei, 2013: 571). This advance in methodology has allowed this article to dive into the structure that underlies the social construction of firm value, stock evaluations, and market reactions. More importantly, this article can illustrate that the

information equivocality of a newly public firm can be captured not only by the horizontal differentiation but also by the hierarchical differentiation.

Frame structure has managerial implications, too. To managers of newly public firms, there is value in understanding how frame structure facilitates entrepreneurial success in a highly equivocal environment. The topic modeling analysis has shown that the similarities between successful younger firms and successful mature firms are more than skin deep: successful IPOs are all alike in terms of the connections among interpretative frames of information and socio-cognitive contents; every unsuccessful IPO is unsuccessful in its own way. As Daft and Lengel (1986) put it: “Under conditions of high equivocality, the organization acquires data to answer subject questions and solve unknown problems (p. 557)”. This article provides earliest insights into an information domain’s role in obtaining a high-dimensional view of an IPO firm that allows it to see “where it fits within the environment and where it is going” (p. 569). The analysis suggests that information retrieved from closed domains like generalist news media may be merely the tip of an iceberg— a huge amount of media attention and evaluation is hidden in open-domain web spaces. Some information is unseen does not mean it does not exist. Therefore, before developing their media strategy, managers and entrepreneurs shall consider including a wide range of media sources that are captured by open domains like Google, Facebook, and Twitter in order to better understand the current state of the external environment. In addition, the shift in information retrieval has implications for the symbolic management of stockholders (Westphal & Zajac, 1998), as a far-reaching examination of the stock market’s reaction to symbolic action in corporate governance will enable it to be identified.



## **2. Literature Review: The Duality of Framing Perspective in Information Interpretation Research**

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### 2.1 Information as Interpretation

How does information influence newly public firms? A broadly theoretical answer suggested by the literature is that, as organizations, firms typically seek and process information to reduce uncertainty (Akerlof, 1970; Stiglitz, 2000). Additionally, since stock prices significantly reflect information in business news and securities analyses (eg., Davies & Canes, 1978; Beneish, 1991; Busse & Green, 2002), information has an impact on newly public firms' IPO performance.

In complementary, a stream of research has shifted its focus on the role of interpretation in legitimating and guiding market action (e.g., Westphal & Zajac, 1998; Zuckerman, 1999; Abolafia, 2010). Zuckerman's (1999) path-breaking study demonstrated that, to mitigate uncertainty, stakeholders had to work on the categorical imperative of securities analysts who had become product critics with power to draw market boundaries; evaluating stocks is thus "necessarily an interpretative exercise" (Zuckerman, 1999: 1431). Moreover, stakeholders' interpretation of information decided how they assess and use other information (Podolny, 2001; Fiss & Hirsch, 2005).

Interpretative ability varies across stakeholders, because their cognitive capabilities are limited (Simon, 1947). As Swedberg (2005a) pointed out: "cognitive limits on information processing along with the inherent unpredictability of the economic future make stock evaluations an interpretation project" (p. 293). Other factors of interpretative ability include cognitive biases

(e.g., DeBond and Thaler 1985), network positions (e.g., Prato and Stark 2007), and conflicts of interest (e.g., Hayward and Boeker 1998; Swedberg 2005b).

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## 2.2 The Role of Framing in Information Interpretation

Studies of IPO and media attention further point out that information could shape perceptions of newly public firms. Sustained media attention significantly affected how newly public firms' reputation was perceived (Rindova, Petkova, & Kotha, 2007) and the ways they affiliated with high status stakeholders (Higgins & Gulati, 2003). Several studies have shown how newly public firms' social approval assets function as interpretative frames of information (Pfarrer, Pollock, & Rindova, 2010; Smith, 2011; Hubbard, Pollock, Pfeffer, & Rindova, 2018).

The literature thus suggests that newly public firms need information, because it provides investors, stakeholders, and the public with perspectives. The answer says something about interpretative frames of information, about the frames' effects. It generally builds upon three related assumptions about the function of information. The most basic assumption is that information asymmetry (Akerlof, 1970) are end results of socio-cognitive processes that involve meaning-making, discourse creation, and reality construction (Kennedy, 2008; Zukin & DiMaggio, 1990).

The second assumption is that the production of information content is dynamic. Journalists' stock evaluations were influenced by their interpersonal relations with a firm's CEOs (Westphal & Deephouse, 2011) and their interactions with investors (Rao, Greve, & Davis, 2001). Public

firms' incentive plans became a symbolic mechanism of producing organizational information to govern shareholders' interest (Westphal & Zajac, 1998).

The third assumption pertains to media's agenda-setting function. Media operate not only as a communicative medium that passively transmit information properties (amounts, cascades, credibility, richness, etc.), but also as societal organizations that actively produce content of information to shape public perceptions (Gans, 1979; Carroll & McCombs, 2003). With this context, media attention decides what information becomes available for public attention at individual and industry levels (Ocasio, 1997; Hoffman & Ocasio, 2001)

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### 2.3 Frame Incongruence

Researchers of management and business have been long interested in applying the framing approach to studying organizational behavior in general (Cornelissen & Werner, 2014) and in the context of entrepreneurship in particular (Snihur, Thomas, & Garud, 2021). Yet prior research either has not theorized frame dynamics or has observed frames' singular effect. There are two exceptions, and they both relate to frame incongruence. The first is Weber and Mayer's (2014) "Transaction Cost Economics and the Cognitive Perspective: Investigating the Sources and Governance of Interpretive Uncertainty". In this theory paper, they conceptualized frame incongruence as a source of interpretive uncertainty that could undermine the positive effects of frames.

Weber and Mayer's (2014) framework on frame incongruence opens up management and business studies to opportunities of theorizing differentiation across frames. Hubbard, Pollock,

Pfarrer and Rindova's (2018) recent work provided empirical evidence and initiated the theorizing process. Their analysis demonstrated the differing and interactive effects of frame incongruence by showing how status and celebrity could function as interpretive frames of information to provide social approval assets with different socio-cognitive contents, and then influence newly public firms' alliance formations with stakeholders.

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## 2.4 Insights from Social Movement Literature

With these two exceptions, the relationality of frames unfolded. However, their approach displays the duality of interpretative frames and suggests that frame congruence and incongruence are mutually exclusive. Yet the congruence-incongruence dichotomy may not reflect empirical tensions within interpretative frames themselves.

Furthermore, although Hubbard et al. (2018) indicates a horizontal differentiation across interpretative frames of information, it is possible that the differentiation is hierarchical.

According to Eagly and Chaiken (1993), not all interpretative frames are equally applicable: the perceived applicability of a frame depended on individuals' interpretation of information.

Social movement studies corroborate this idea with empirical evidences from a variety of studies on master frames, including equal rights and opportunities, justice and injustice, oppositional and hegemonic, imperial, anti-imperial, market choice, and so on (Snow & Benford, 1992; Benford, 2013). Furthermore, master frames were particularly effective when the targeted audience of a social movement were diverse (Gerhards & Rucht, 1992; Noonan, 1995). The insights into

hierarchical differentiation across frames suggest the need to develop a new conceptual framework that considers both frame congruence and incongruence.

### **3. Research Method**

#### **3.1 Data and Sample**

This article is a part of a broader project that studies newly public firms' value creation and opportunity engagement during the COVID-19 pandemic. The project gathered data from two sources. First, it utilized the Stock Analysis website to identify all operating firms that issued an IPO in the United States between 2019 and 2021. The website's IPO section lists each newly public firm's basic information, including IPO date, symbol, name, price, return, statistics, and press releases. This article constructed its sample from 2021 IPOs. Following prior research (Bell, Filatotchev, & Aguilera 2018), it removed from its sample all special purpose acquisition companies (SPACs). The final sample size is 444.

The pre-IPO coverage data used to create the corpus were collected on Factiva for each of the firms for the 12 months before an IPO. The data collection process began with Factiva's Search Builder function. News sources were set to "All Sources but Not All Web News and Not All Blogs and Not All Pictures". In the "More Options" section, "search for free-text terms in" was set to "Headline and Lead Paragraph." Finally, it removed news items from non-U.S. markets, duplicates, republished news, recurring pricing and market data, obituaries, calendars, and so on from search results. The final data set consisted of 2950 news items.

To compare variance in frame structure across newly public firms, the data set was divided into four subsets by firm age and IPO performance. Following prior research (Ibbotson & Ritter, 1995; Pollock & Gulati, 2007), this article used the level of underpricing as proxy of IPO performance. Underpricing refers to the amount of percentage change in stock price on the first day a stock trades on a public exchange (Ibbotson & Ritter, 1995). Information about underpricing is equivocal, because “it can simultaneously reflect lower uncertainty about a new firm’s market value and investor excitement about its future potential” (Hubbard, Pollock, Pfarrer, & Rindova, 2018: 1980; emphasis original). An IPO is broken if its percentage is zero or negative. This article used this information and coded a newly public firm 0 if it was a broken IPO; if a newly public firm did not have a broken IPO, it was coded 1.

Since firms age is a significant factor in IPO research (Beatty & Zajac, 1994), this article expected to see variance in frame structure across firms. Consistent with Ejara and Ghosh (2004), it accounted for the age of a newly public firm by taking the difference in years between its founding year and IPO year (i.e., 2021). Since quite a few 2021 IPOs were foreign ones, this article followed Bell, Filatotchev, and Aguilera (2014) to differentiate mature firms from younger ones. A newly public firm was coded 1 if it had founded for at least 20 years in 2021; firms were coded 0 if they had existed less than 20 years.

### 3.2 Method of Analysis

This article used topic modeling to explore the role of frame structure. Topic modeling, statistical models for identifying semantic themes within and across documents, enables researchers to “organize and summarize electronic archives at a scale that would be impossible by human annotation (Blei, 2012: 77-78). Since its invention by computer scientists in 2000s, topic modeling has been applied to sociology of culture (DiMaggio, Nag, & Blei, 2013) and management studies (Leiblein & Reuer, 2020; Hannigan et al., 2019).

A number of topic modeling methods have been developed, too, including Latent Dirichlet Allocation (LDA), Correlated Topic Model (CTM), Pachinko Allocation Model (PAM), Dynamic Topic Model (DTM), Self-Aggregating Topic Models (SATM), and so on (for a comparison of each method, see a recent review by Vayansky and Kumar, 2020). This article applied LDA, a method with pros for its strengths in analyzing general topic modeling tasks with simple data relationships and documents with average number of fifty words or above (Vayansky & Kumar, 2020). Therefore, the method is well-suited for this article, an exploratory study collecting general news items within short term period. This choice was supported by a decision tree device for topic modeling selection by Vayansky and Kumar (2020).

### 3.3 Technical Definitions of Terms

Interpretative frames: An interpretative frame was equivalent to a topic in algorithm outputs.

Topic refers to “a distribution over a fixed vocabulary” (Blei, 2012: 78). Consistent with Blei

(2012), this article named a topic with its most frequent term, which equated to the subject of an interpretative frame. In this article, the number of topical clusters was set to 26.

**Socio-cognitive content:** A cluster of socio-cognitive content was equivalent to a cluster of top ten most frequent terms in algorithm outputs.

**Frame congruence:** It occurred when a secondary frame's subject appeared on socio-cognitive content clusters of primary frames. A secondary frame with a subject of "shares" was typified as a congruence type of frame alignment, because the term of "shares" appeared on the "million" primary frame's socio-cognitive content.

**Frame incongruence:** It occurred when a secondary frame's subject did not appear on socio-cognitive content clusters of primary frames. A secondary frame with a subject of "produce" was an instance of incongruence type of frame alignment, because the term of "produce" did not on primary frames' socio-cognitive content clusters. Frame incongruence:

**Alignment ratio:** It is a novel metric invented to capture the shape of a frame structure. The ratio compares congruent alignment to interpretative frames of information. The formula to calculate the ratio is dividing the number of congruence alignment by the number of interpretive frames, i.e., the number of topical clusters.



## 4. Findings: How Frame Structure Influences IPO Performance

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### 4.1 Hierarchical Differentiation

A topic modeling analysis of the 2021 IPO corpus revealed a frame structure that was formed and enabled by primary frames, the foundations of interpretative frames upon which information about financial markets and individual firms rest; secondary frames, the interpretative frames that aligned them with primary frames through congruence or incongruence; and socio-cognitive content clusters, groups of frequent terms that fleshed out primary and second frames.

#### 4.11 Primary Frames

Horizontal differentiation unfolded over primary frames. Primary frames fell into three types, including million, company, and genre. The “million” type consisted of interpretative frames where the term “million” appeared most frequently on their socio-cognitive content clusters. The type was the most dominant among the three and contained 39% of media attention. In a similar vein, an interpretative frame was classified as the “company” type when its most frequent content was a newly public firm’s name. 22% of media attention fell into this type, and they included the following newly public firms (in alphabetical order): agiliti, apeiron, arhaus, biofrontera, duckhorn, enfusion, evotec, frontier, genworth, gitlab, krispy, kyndryl, latham, leonard green, oatly, ortho clinical, robinhood, sangoma, stevanato, and vitro diagnostics [list their official names]. Only 15% of media attention fell into the “genre” type. It contained

interpretative frames where news sources and financial service companies were the most frequent terms.

Echoing the finding of a recent study (Hubbard, Pollock, Pfarrer, & Rindova, 2018), the analysis found variance in socio-cognitive content across the three primary frames. The “million” type provided its interpretative frames with content that was generally related to entrepreneurial finance and stock investment (“banks,” “billion,” “capital,” “exchange,” “funding,” “market,” “nasdaq stock,” “offering,” “price range,” “prospectus,” “public,” “securities,” “shares,” “stocks,” “spacs,” “raise,” “range,” “revenue,” “transaction,” “underwriting,” “ventures” and so on).

Although there was some content overlap between the “million” and “company” types of primary frames, the latter provided interpretive frames of information several exclusively frequent terms in entrepreneurial finance and stock investment, including “equity,” “holding,” “listing,” “private,” “rating,” “revenues,” “smallcap,” “statement,” “trading,” “waiver,” “warrants,” “initial,” “first,” “managers,” “customers”. Nevertheless, the majority of content pertained to industry categories (“airline,” “biotechnology,” “financial,” “insurance,” “investment management,” “manufacturing,” “medical,” “semiconductor,” and “technologies”); products/services (“bionomics,” “chain,” “clinical,” “diagnostics,” “doughnut,” “equipment,” “fitness,” “insurance,” “investment management,” “laboratory,” “mortgage,” “plantbased,” “pools,” “residential,” “software services”). A small set of the frequent terms gave geographical information about IPOs (“frankfurt,” “german,” “moscow,” and “united states”).

The “genre” type provided interpretative frames with content that were very different from those of the “million” and “company” types. Its frequent terms mainly associated to names of media source or terminology in journalism (“announces,” “coverage,” “credit,” “editing,” “follow jones,” “information,” “investor service,” “newswires,” “opinion,” “ratings,” “renters,” “source”).

#### 4.12 Secondary Frames

Less than 25% of media attention applied secondary frames; they had more various types than primary frames, including “securities,” “statements,” “shares,” “lock period,” and “common”. In addition, there was typically considerable overlap between secondary and primary frames in terms of socio-cognitive content. Most important, as a whole, all the secondary frames aligned them with primary frames through congruence.

At a glance, one might conclude that primary frames play a more important than secondary ones in influencing IPO performance. But, in actuality, the opposite is true. Given that all secondary frames here are congruently aligned with primary frames, one could speculate that frame structure is only observable below the surface of data. The speculation was raised based on the proposition that the shape of a frame structure depends on both frame congruence and incongruence, as mentioned in the introduction. In other words, the function of secondary frames can only be shown when variance in frame alignment is considered.

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## 4.2 Variance across Firms

The fact that not all firms that went IPO in 2021 were newly founded raised a question: How was the frame structure of IPO information about younger firms different from that of mature firms? And how did the variance in frame structure influence IPO performance? Thus, this article recognized that media coverage of newly public firms can conceptually exhibit four types of frame structure: (1) younger firms with IPO success (Y+S); (2) younger firms with IPO failure (Y+F); (3) mature firms with IPO success (M+S); and (4) mature firms with IPO failure (M+F). Figure 1 illustrates the four types of frame structure.

### 4.21 Media Attention

Resonated with findings of previous studies (Pollock & Rindova, 2003; Rao, Greve, & Davis, 2001; Rindova, Petkova, & Kotha, 2007), the analysis found a positive correlation between media attention and IPO success. As Figure 2 illustrates, both younger and mature firms that succeeded at their debut gained more media attention than their unsuccessful counterparts. Collectively, 50.23% of media attention were given to successful younger firms, whereas less than 29% were to their unsuccessful counterparts. Successful mature firms gained more media attention than their unsuccessful counterparts, too.

On average, mature firms with IPO success garnered most attention. The average number of news items per each successful mature firm is 8.09, much higher than that of their unsuccessful

counterparts. The numbers for successful younger firms and unsuccessful younger firms are 7.81 and 4.99, respectively.

#### 4.22 Frame Distribution

Figure 3 shows that frame distribution was at variance with actual practice outcomes of newly public firms. The uneven distribution of primary and secondary frames across firms provided empirical support for the correlation between frame structure and IPO performance.

In general, primary frames were more salient in the IPO information. A large percentage (between 85% and 58%) of interpretive frames in each type of frame structure were dominated by primary frame. Among the three types of primary frames, successful firms typically mainly had more “million” and “genre” types of frames than their unsuccessful counterparts, regardless of firm age. This pattern was not seen on the “company” type; there was a marked increase in the “company” type among mature firms, regardless of IPO performance.

However, primary frames tell little about frame structure, because, it is secondary frames’ alignment that plays a decisive role. The result showing secondary frame patterns provided empirical evidence. Quantitatively, secondary frames and IPO performance were negatively associated. To successful younger firms, only 15% of media attention applied secondary frames; the number climbed up to 42% when their unsuccessful counterparts were considered. Similarly,

compared to their unsuccessful counterparts, successful mature firms had fewer secondary frames.

#### 4.23 Frame Alignment

The nature of secondary frames matters for frame structure, too. Figure 4 presents characteristics of secondary frames by firm age and IPO performance. It shows that secondary frames vary widely in terms of topics, ways of alignment with primary frames, and the relation of part to whole.

Frame topics: Firms with IPO success had fewer secondary frame topics, regardless of their age. Successful mature firms had least topics (seven topics), followed by successful younger firms (ten topics), unsuccessful mature firms (eleven topics), and unsuccessful younger firms (twelve topics). Moreover, successful mature firm had least exclusive topic (three topics) whereas this unsuccessful counterparts had seven exclusive topics. The number of exclusive topics for successful younger firms and their counterparts was six and eight, respectively. Lastly, topical overlap was common among newly public firms, regardless of IPO performance. Overlapping topics included “final pricing,” “firms,” “lockup,” “offering,” “price managed,” “securities,” “shares,” and “sources”. The overlap indicates that a secondary frame could be non-directional and facilitate both IPO success and failure.

Frame incongruence: Moreover, incongruent alignment only becomes visible on the variance within frame structure, which provides support for the conceptual model of this article. The

significance of frame incongruence was in particular noticeable when unsuccessful firms were compared. Overall, firms with IPO success had weaker incongruent alignment than their unsuccessful counterparts. The number of incongruent alignment for successful younger firms and unsuccessful ones are five and nine, respectively. Mature firms bore a remarkable similarity to their younger counterparts.

Alignment ratio: To efficiently compare the different associations between frame structure and IPO performance, alignment ratio was calculated for the cells of Y+S, Y+F, M+S, and M+F. The result shows a positive correlation between alignment ratio and IPO performance. Since the higher the ratio is, the flatter the structure, it was concluded that frame structure and IPO performance was negatively related.

## **5. Conclusion and Discussion**

There are limitations to the analysis of information framing. Although this article's research design has advantages for studying the effects of information framing on entrepreneurial outcomes, it is difficult to assess whether this article's findings could generalize to other empirical contexts. However, it did show that the structure of information framing that this article theorized about public perceptions of entrepreneurial action is generalizable to other studies with similar interests in interpretation, such as research on social approval assets as interpretive frames.

Also, this study focused on the association between information framing effects and entrepreneurial action perception. Little is known about the workings of information framing as one of organizations' information-related capabilities and explore how it relates to information gathering and processing as well as individuals' information exposure capabilities.

In addition to firm-level analyses, researchers can study how entrepreneurial opportunities as an interpretative frame works at micro and meso levels. Possible research questions include how the cognitive biases of individual entrepreneurs and teams influence their heuristics (Alvarez and Barney, 2020) as well as how entrepreneurial emotion is experienced by stakeholders (Huy & Zott, 2019). Another possible topic is how a frame structure of information is embedded within entrepreneurial ecosystems.

This article's research design emphasizes the formation of a frame structure within a time interval, and its sample consists of only one year in the uncertainty-ridden context of COVID-19. Studies using different time frames or different contexts of uncertainty may tell a remarkably different story. Future research shall continue to explore variances in information framing in different market shock times.

Is COVID-19 uncertainty a type of Knightian uncertainty under which decision makers did not know the possible outcome of a decision and its chance and also did not know what the best decision was (Knight, 1921)? Future research shall continue to explore whether Knightian uncertainty increases or decreases the effects of information framing.



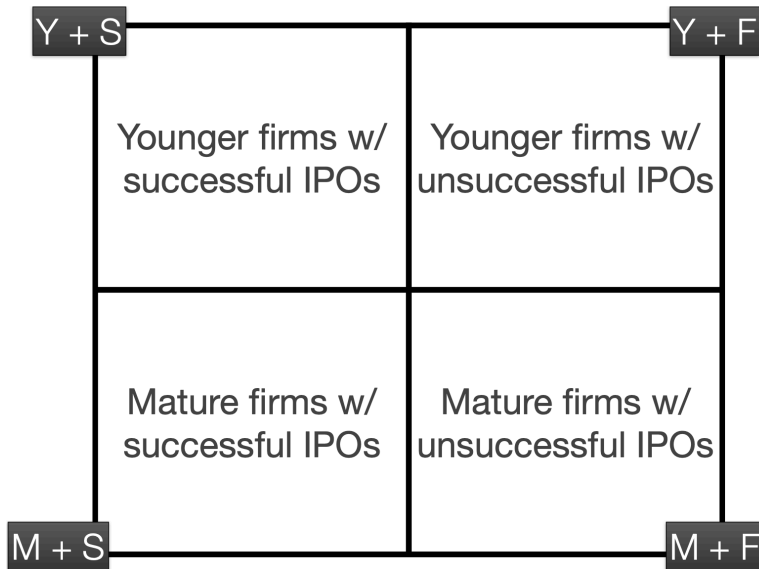
Additionally, future research could endeavor to conduct a comparative and historical analysis to determine the nature of an association between information framing and market wide events. Although this article is able to snap a picture of a frame structure from information about newly public firms during the COVID-19 crisis, it puts market wide events' impact on hold with the crisis signs in the temporal background. Therefore, although the article is illustrative that there is a non-stationary process of perceiving and acting on opportunities among newly public firms in the financial market during the COVID-19 crisis time, the question of how market wide events play a role here remains an open question. Additional exploration of information framing in another crisis time, such as 2008 financial crisis, is needed. Future research could also explore perceptions of risk in the context of uncertainty since conditions of uncertainty are generally equivalent to conditions of risk (Stigler, 1985).

A third potential limitation arises from data. It's cross-sectional nature prevented this study from analyzing changes in information over time. In addition, the data sources are limited. Although this article extracted interpretative frames from financial news, there are other media sources that could supply information about newly public firms. This article chose news from generalist media because their socio-cognitive content was useful for studying the public perception of entrepreneurial action. Other types of textual data from specialist media, such as financial analyses , were not as public to our context. Comparing information framing between generalist media and specialist media is beyond the scope of this study, but it deserves future research's attention.

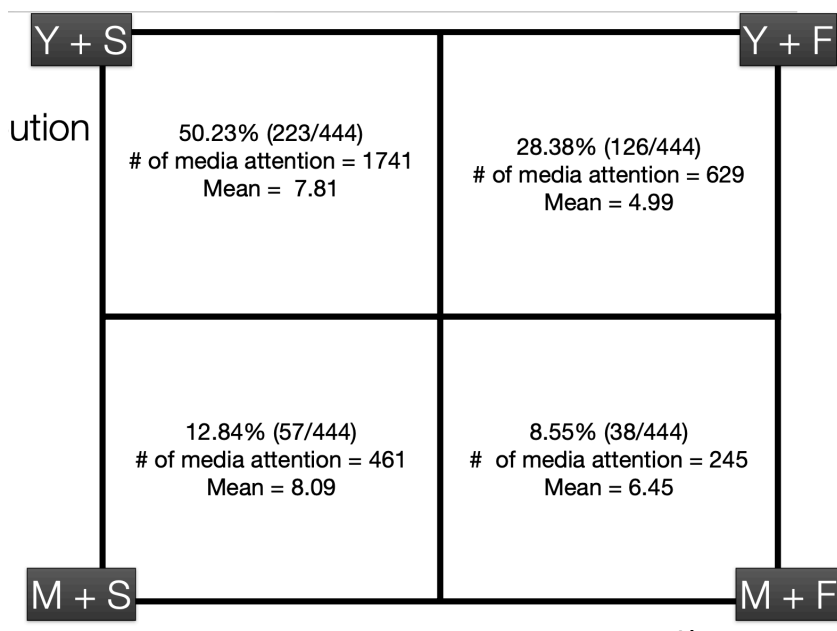
Lastly, this article used textual data to illustrate socio-cognitive processes of information framing, and could not directly assess how a frame structure at a macro level affected firm-level perceptions and actions. Future research using traditional content analysis or experimental methods can complement topic modeling analysis.

## 6. Figures

**Figure 1. Four Types of Frame Structure**

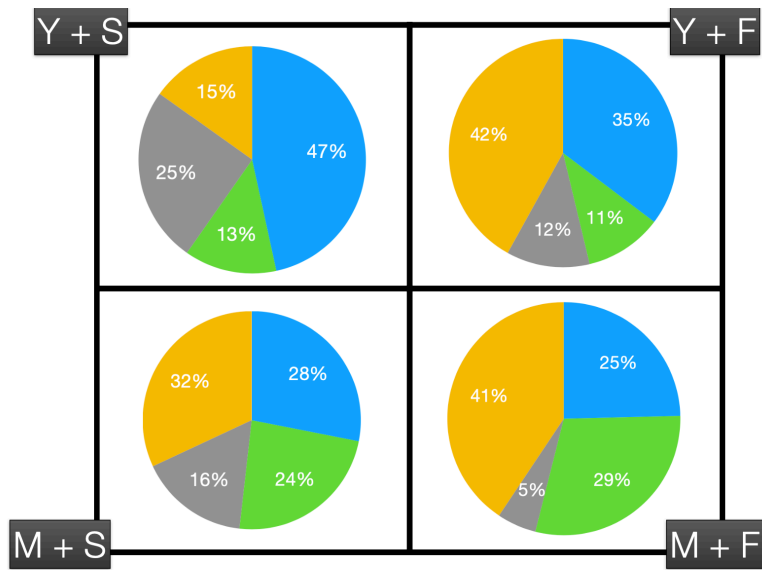


**Figure 2. Distribution of Media Attention by Firm Age and IPO Performance (n = 2950)**



**Figure 3. Distribution of Primary and Secondary Frames by Firm Age and IPO**

**Performance**



**Figure 4. Types and Topics of Secondary Frames by Firm Age and Entrepreneurship**

**Action (\* denotes congruence)**

		<b>Entrepreneurship Action Outcome</b>	
<b>Firm Age</b>		<b>IPO Success</b>	<b>IPO Failure</b>
	<b>Young Firms</b>	Million Shares Common* Nasdaq* Offering* Shares* Securities* Agreed Lockup period Secure Underwriter Ventures	Capital Market* Offering* Priced* Lockup period Molecular Mortgage Priced managed Securities Statements Stronghold Trading debut User Testing
	<b>Mature Firms</b>	Offering* Company* Securities class common mister priced managed final pricing	Shares* Securities Produce common stock House Final pricing Rating Distributor Virtual regulatory filing priced managed