

## Appendix 1. The ProQuest Database and Dynamic Business Landscape

For business publications, we mainly use ProQuest ABI/INFORM Collection, one of the most comprehensive corpora that focuses on companies and business coverage around the world. In addition to newspapers and magazines, it also includes trade journals, reports, economic blogs, scholarly journals, etc., and most of the entries is related to full text. Detailed information about this corpus can be found at:

<https://proquest.libguides.com/abiinformcollection>

In this study, we only keep English newspapers and magazines published under the category of “Business and Economics” in the United States, and are listed below:

Table A1. Included Business Publications

TITLE	Pub Type	Publisher
Aggregates Manager (Online)	Magazines	Randall Reilly
American Banker	Newspapers	SourceMedia
American Banker (pre-1997 Fulltext)	Newspapers	SourceMedia
Army/Navy Store & Outdoor Merchandiser	Magazines	SouthComm Business Media LLC
Atlanta Tribune, The	Magazines	Atlanta Tribune: The Magazine
Automatic Merchandiser	Magazines	SouthComm Business Media LLC
Barron's (1921-1942)	Newspapers	Dow Jones & Company Inc
Better Investing	Magazines	National Association of Investment Clubs
Bloomberg Businessweek	Magazines	Bloomberg Finance LP
Bond Buyer, The	Newspapers	SourceMedia
Boston Business Journal, The	Magazines	American City Business Journals
Business and Economic Review	Magazines	Moore School of Business
Business Insider	Newspapers	Insider, Inc.
Business Intelligence Journal	Magazines	Data Warehousing Institute
Business Month	Magazines	Goldhirsh Group, Inc.
CC News	Newspapers	United Publications, Inc.
Channel Executive (Online)	Magazines	Jameson Publishing/Vert Markets
Charleston Regional Business Journal	Newspapers	BridgeTower Media Holding Company
Coast Business	Magazines	Ship Island Holding Company
Columbia Regional Business Report	Newspapers	BridgeTower Media Holding Company
Contract Management	Magazines	National Contract Management Association
Corporate Adviser (Online)	Magazines	Centaur Media USA Inc. (A member of Centaur Plc Group)
Cost Management	Magazines	Thomson Reuters (Tax & Accounting) Inc
CPI Detailed Report	Magazines	Superintendent of Documents, Labor Department
Crain's Chicago Business	Magazines	Crain Communications, Incorporated
Customer Relationship Management	Magazines	Information Today, Inc.
Daily Breeze	Newspapers	Los Angeles Newspaper Group
Daily Record	Newspapers	BridgeTower Media Holding Company
Deal.com, The	Magazines	The Deal LLC
Dealer Magazine	Magazines	Emerald Expositions LLC

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Diablo Business	Magazines	Diablo Business
Diversity Factor	Magazines	Diversity Factor
Diversity Suppliers & Business Magazine	Magazines	Hispanic Times
Dollars & Sense	Magazines	Economic Affairs Bureau
Economist, The	Magazines	The Economist Intelligence Unit N.A., Incorporated
Employment and Earnings (Online)	Magazines	Superintendent of Documents
Fair Employment Practices Guidelines	Magazines	Aspen Publishers, Inc.
Fast Company	Magazines	Mansueto Ventures LLC
Field Technologies (Online)	Magazines	Jameson Publishing/Vert Markets
Finance and Commerce	Newspapers	BridgeTower Media Holding Company
Financial Planning	Magazines	SourceMedia
Financial World	Magazines	Financial World Partners
Florida Trend	Magazines	Trend Magazine, Inc.
Forbes Life	Magazines	Forbes
Forbes ASAP	Magazines	Forbes
Fundweb	Magazines	Centaur Media USA Inc. (A member of Centaur Plc Group)
GSA Business Journal	Newspapers	BridgeTower Media Holding Company
Harvard Asia Pacific Review	Magazines	Harvard Asia Pacific Review
Harvard Business Review	Magazines	Harvard Business Review
Inc	Magazines	Mansueto Ventures LLC
Industrial Worker	Newspapers	Industrial Workers of the World
InfoAmericas	Newspapers	Global Network Content Services LLC, DBA Noticias Financieras LLC
Information Management	Magazines	IGI Global
Inland Empire Business Journal	Magazines	Daily Planet Publishing Inc.
IPS - Inter Press Service	Newspapers	Global Network Content Services LLC, DBA Noticias Financieras LLC
Journal of Commerce	Newspapers	IHS Maritime & Trade
License! Global	Magazines	MultiMedia Healthcare Inc.
Life Science Leader (Online)	Magazines	Jameson Publishing/Vert Markets
Louisville	Magazines	Louisville Magazine Inc.
Management Accounting (1986-1986)	Magazines	Institute of Management Accountants
Management Accounting (pre-1986)	Magazines	Institute of Management Accountants
Marketing Week (Online)	Magazines	Centaur Media USA Inc. (A member of Centaur Plc Group)
McKinsey Insights	Magazines	McKinsey & Company, Inc.
Mecklenburg Times, The	Newspapers	BridgeTower Media Holding Company
Monitor Global Outlook		
Minority Business Entrepreneur	Magazines	Full Stride Media
Modern Trader	Magazines	Alpha Pages
Money Marketing (Online)	Magazines	Centaur Media USA Inc. (A member of Centaur Plc Group)
MortgageStrategy (Online)	Magazines	Centaur Media USA Inc. (A member of Centaur Plc Group)
Multinational Monitor	Magazines	Multinational Monitor
Nation's Business	Magazines	Chamber of Commerce of the United States
Nation's Business (1986-1998)	Magazines	Chamber of Commerce of the United States

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Nation's Business (pre-1986)	Magazines	Chamber of Commerce of the United States
New Jersey Business	Magazines	New Jersey Business & Industry Association
Next Step Magazine	Magazines	Next Step
Nonprofit World	Magazines	Society for Nonprofit Organizations
Northwest Arkansas Business Journal	Magazines	Gray Matters, LLC
Oregon Business	Magazines	MEDIAmerica, Inc.
PM Network	Magazines	Project Management Institute
PPI Detailed Report (Online)	Magazines	Superintendent of Documents, Labor Department
Presidents & Prime Ministers	Magazines	EQES, Inc.
Regardie's	Magazines	Regardie's
Region, The	Magazines	Federal Reserve Bank of Minneapolis
Rental	Magazines	AC Business Media
Saint Paul Legal Ledger	Newspapers	BridgeTower Media Holding Company
Shopper Marketing	Magazines	EnsembleIQ
Smart Business Atlanta	Magazines	Smart Business Network
Smart Business Broward/Palm Beach	Magazines	Smart Business Network
Smart Business Chicago	Magazines	Smart Business Network
Smart Business Indianapolis	Magazines	Smart Business Network
Smart Business Philadelphia	Magazines	Smart Business Network
SMART Manufacturing	Magazines	SME
SmartMoney	Magazines	Dow Jones & Company, Inc. Financial Information Services
SmartMoney.com	Magazines	Dow Jones & Company, Inc. Financial Information Services
Software Executive (Online)	Magazines	Jameson Publishing/Vert Markets
St. Charles County Business Record	Newspapers	BridgeTower Media Holding Company
St. Louis Commerce Magazine	Magazines	St. Louis Region Commerce and Growth Association
Staffing Management	Magazines	Society for Human Resource Management
Stanford Social Innovation Review	Magazines	Stanford Social Innovation Review, Stanford University
Tax Features	Magazines	Tax Foundation Inc.
Transworld Business	Magazines	Source Interlink Companies
Vermont Business Magazine	Magazines	Boutin-McQuiston, Inc.
Wall Street Journal	Newspapers	Dow Jones & Company Inc
Wall Street Journal (Online)	Newspapers	Dow Jones & Company Inc
Wall Street Journal Americas, The	Newspapers	Dow Jones & Company Inc
Wall Street Journal Asia, The	Newspapers	Dow Jones & Company Inc
Wall Street Transcript	Newspapers	Wall Street Transcript
Western New York	Magazines	Greater Buffalo Chamber Services Corporation
World	Magazines	KPMG Peat Marwick

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Figure A1 shows the frequency of some words in the publications over time. The peak of company name mentioning often follows the happening of certain events without delay, which shows the timeliness and validity of the business news.

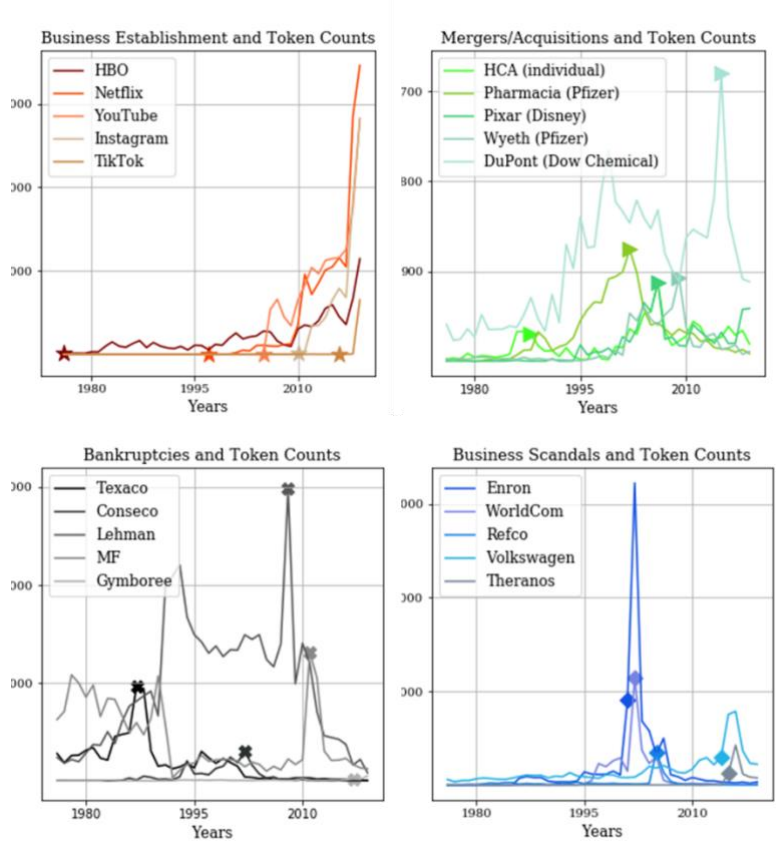


Figure A1. Token Counts of Company Names with Certain Events



Each of the color shows that the elements belong to a certain module, based on the discourse atom space division. Figure shows that the establishment of new ventures sometimes has an impact on the local business landscape: for example, the distance between trading module (including “exchange”, “trading”, “cash”, etc) and cryptocurrencies (including “cryptocurrencies”, “Litecoin”, “USD”, etc.) are “drawn” closer after PayBito is founded.

## Appendix 3. Robustness Check

### 3.1 Methods for Technical/Application Words Identification

In the main text, we use frequency difference filtering method for technical/application word division. This method helps us to identify the technical terms from USPTO corpus that are less frequently used in the public media. However, technical elements are not always equal to infrequent terms, and some technical words are so plain that they gradually become part of daily expressions (like “gene” or “software”). To validate our outcome based on this division, we replicate our data results with two other methods for technical words identification and two other methods for application words identification. In total, we have 3\*3 technical/application words set.

In addition to the original method based on word frequency difference, the two other methods for technical word identification are:

(1) Oxford dictionary method. The Oxford University Press has published a series of scientific dictionaries (for example, a dictionary of chemical engineering, the concise oxford dictionary of mathematics, etc.) and the entries are open for usage on the website: [oxfordreference.com](http://oxfordreference.com). In total, there are 61 scientific dictionaries, from which we have scraped all the terms. Any word from our business descriptions that are also in these oxford scientific dictionaries are identified as technical words.

(2) Additional information method. For all the word in our corpus, we put them into the search engine (Microsoft Bing) and get some relevant information. If there are a lot of technical relevant features in these texts, we identify the focal word as technical.

Similarly, we have also replaced the original method to identify application words with other two alternatives.

(1) Oxford dictionary method. The Oxford University Press has published a series of business dictionaries (for example, a dictionary of business and management, a dictionary of marketing, etc.) and the entries are open for usage on the website: [oxfordreference.com](http://oxfordreference.com). In total, there are 6 business dictionaries, from which we have scraped all the terms. Any word from our business descriptions that are also in these oxford business dictionaries are identified as application words as they show most important aspects of business models.

(2) Open method. Compared with the conservative criterion of oxford dictionary method, the open method aims to maintain most information in the corpus. After we identify the technical words in each business description, we throw away the stop words, and all left words are classified as application.

The alternative methods allow us to test the robustness of our results. After completing all the word division work, we replicate our analysis for figure 5 and 6. The results are shown in figure A5-A10.

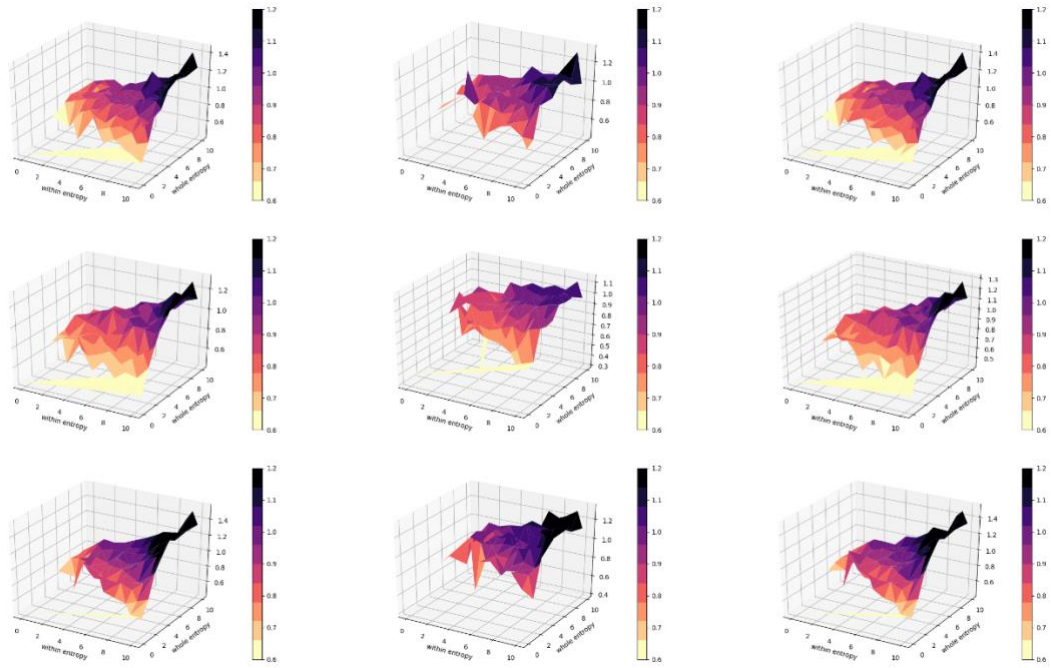


Figure A5. Relationship between Entropy Measurements and Funding Numbers<sup>1</sup>

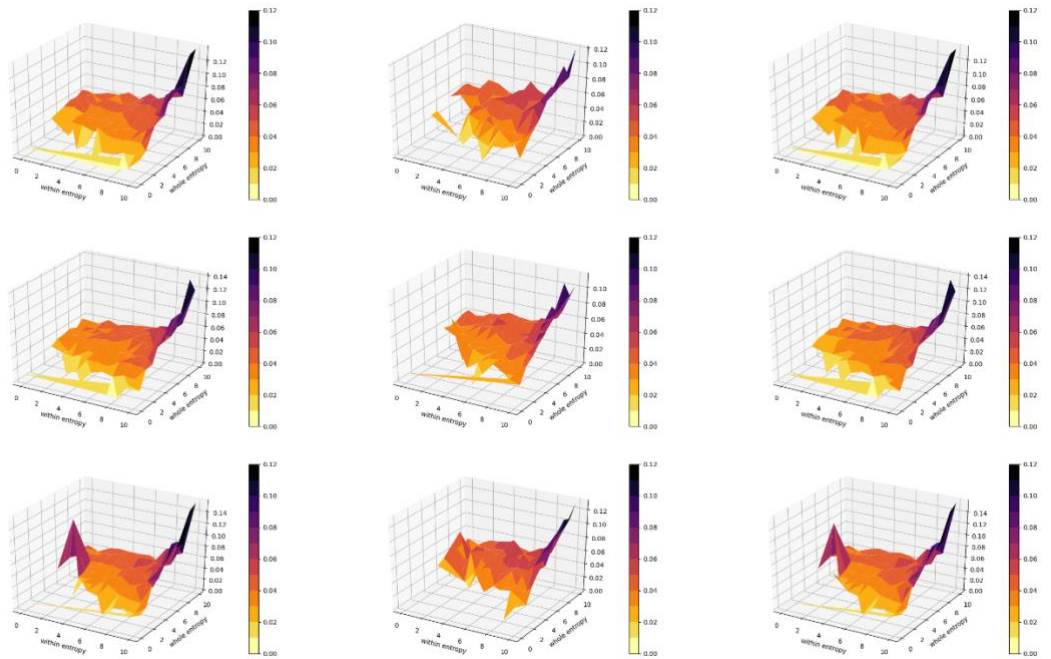


Figure A6. Relationship between Entropy Measurements and IPO/High Price

<sup>1</sup>For figure A5-A7, x-axis: within entropy; y-axis: whole entropy;  
 For figure A8-A10, x-axis: inner closeness; y-axis: outer distance.

Three Columns from Left to Right are Three Methods for Application Word Identification:  
 original method, oxford dictionary method, open method;

Three Rows from Top to Bottom are Three Methods for Technical Word Identification:  
 original method, oxford dictionary method, additional information method.

## Acquisition Numbers

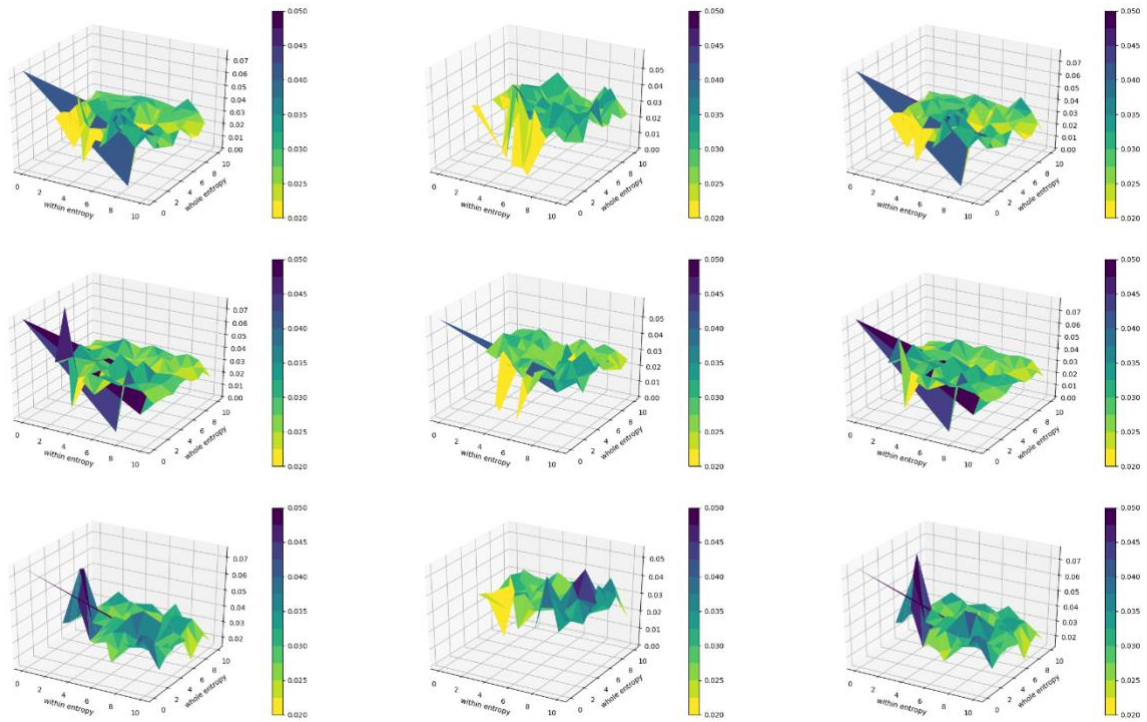


Figure A7. Relationship between Entropy Measurements and Closing Numbers

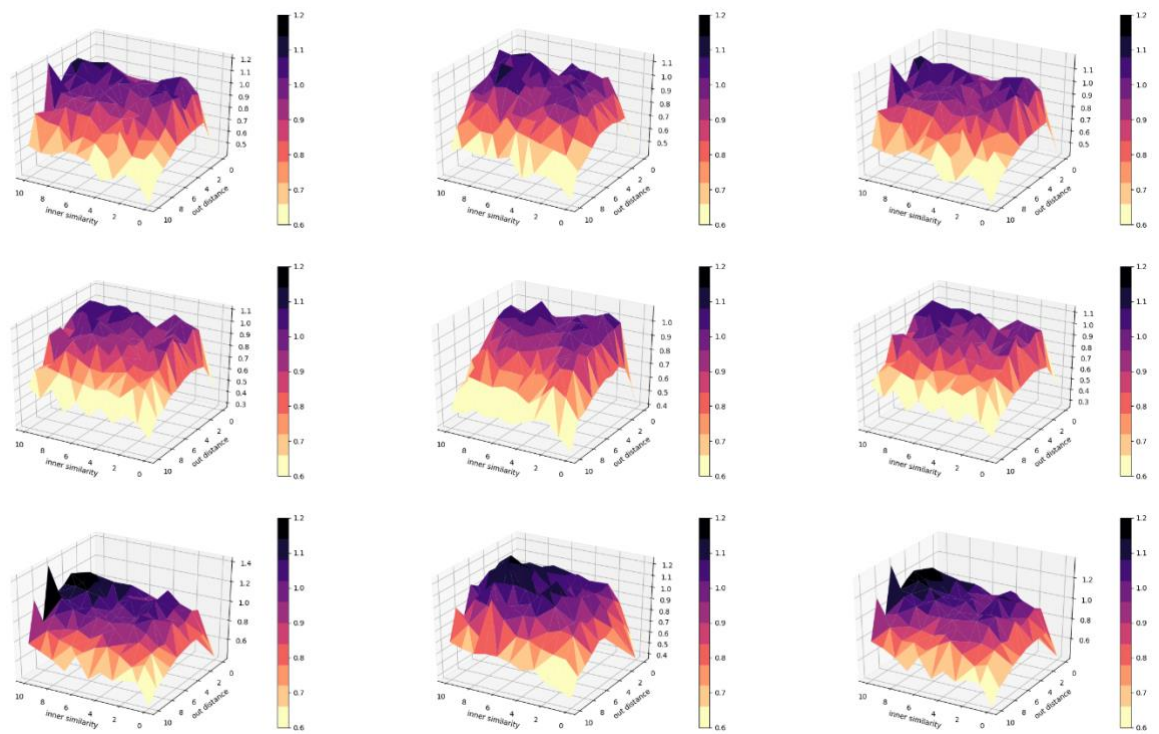


Figure A8. Relationship between Distance Measurements and Funding Numbers

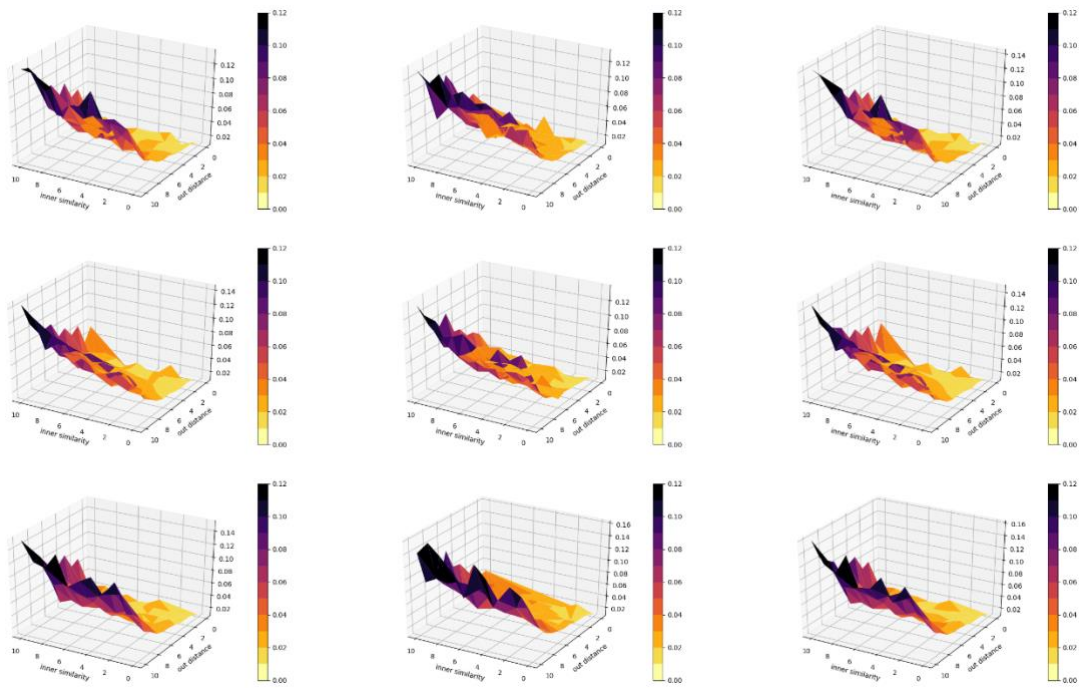


Figure A9. Relationship between Distance Measurements and IPO/High Price Acquisition Numbers

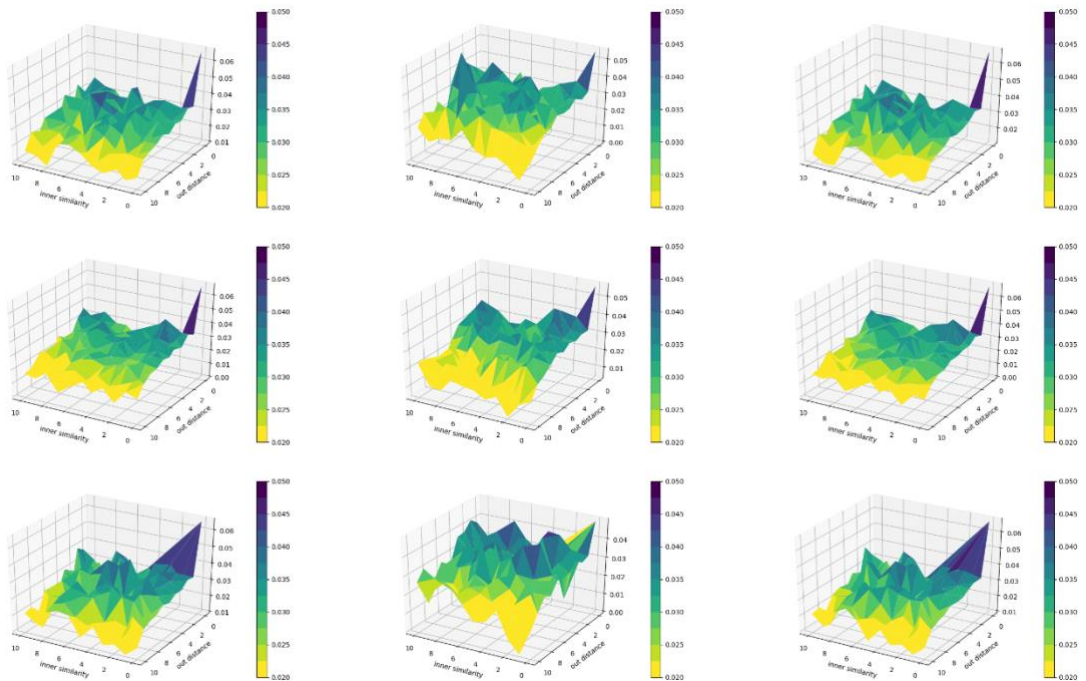


Figure A10. Relationship between Distance Measurements and Closing Numbers

From figure A5-A10, we can see that with change of word division methods, the general pattern of our results does not change much.

### 3.2 Methods for Space Division

In our original analysis, we use discourse atom to divide the space into 100 sections as modular structure to support innovative strategies. Here, we change the space division technique from discourse atom (100) to kmeans (200). The general pattern does not change.

### 3.3 Methods for Module Involvement

Each firm can get engaged in several modules, yet they are included in some modules “by accident” as only one or two words fall into that module. To take this possibility into consideration, we try to delete these “accident” modules when calculating the entropy and distance measurements for each firm and replicate our analysis. The general pattern does not change.