Latent Semantic Analysis & Topic Modeling for Financial Documents

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1. **Problem Statement:**

In the finance industry, sell-side research is known to regurgitate company releases and be frequently repetitive by nature. Recent policy changes, including the EU’s MIFiD II, along with other industry trends are creating a headwind for the traditional sell-side equity research shop: whereas investors previously received research for free and compensated the provider through trading volume, banks are now being forced to put a price on their research product. More than ever, insightful research and differentiated opinions are key for the survival and profitability of a sell-side research department. However, there is no formal or analytical method to assess the value of a research product. Being forced to pay for a previously-free product, both the sell-side and buy-side are looking for a way to evaluate sell-side research value. Having such a tool to quickly and efficiently compare sell-side research products would be a powerful factor in weighing sell-side research consumption options and for evaluating the quality of a firm’s own product.

This problem statement has been narrowed from our previous problem statement to focus on one type of financial document, a third-party research report. This allows us to focus our approach rather than creating a tool that tries to server several purposes with the same approach.

1. **Approach:**

We leveraged topic modeling and Latent Semantic Analysis to find commonalities among several documents. Consider a group of 15 analysts covering the same company: subgroup A focuses on the company’s revenue growth, subgroup B focuses on the company’s pipeline, and subgroup C focuses on the company’s margin improvements. Due to the introduction of prices on research reports, a buy-side analyst consuming material from all 15 researchers is asked by his company to choose his four most trusted researchers.

The buy-side analyst has the option of re-reading all 15 reports, which would be time consuming and highly qualitative. Rather, he believes the most important component of the company that these 15 analysts cover is the margin improvement. Using the tool we are designing, he could easily identify subgroup C as the group of researchers whose views align most closely with his; by feeding the program reports from all 15 researchers, assuming the reports reflect the emphasis their authors place on the company’s story, the algorithm would successfully group together all research subscribing to subgroup C’s thesis. If repeated on a larger scale—say, with the same researchers but for different overlapping companies—this becomes an even more powerful tool for choosing his most-trusted four. This exact dilemma is currently being faced by analysts all over the world as buy-side firms determine spending methods for research reports.

Furthermore, this same methodology would identify researchers who consistently produce differentiated viewpoints, if the terms in their reports are particularly varied from those of their competitors. While this may be less useful to a buy-side analyst, it would be extremely useful for a sell-side shop to compare their own product to that of their competitors to ensure their opinions are unique.

Applications of linear algebra and statistical analysis were used to find commonalities and differences among the corpus of documents. First, to make parsing the documents easier, a text-stripper was used to remove all punctuation and unnecessary characters from a report, leaving behind only the words separated by spaces. From this stripped-down text, a Term x Document matrix is created, plotting, for each document, the counts of each of that document’s words against a master set of all the words contained in the corpus. This master set of all words in the corpus allows comparison between documents; it is as important to note which words *aren’t* included in a document as compared to other documents.

From the Term x Document matrix, our program does a Term Frequency-Inverse Document Frequency (TF-IDF) analysis. In TF-IDF, a Term x Document matrix is normalized for each document’s relative length (i.e. Term Frequency: words that make up a large percentage of a document with low count are weighted above words that have a high count but make up only a small percentage of the total words in the document) and the relative rarity of that word among all documents (Inverse Document Frequency; a word that only appears in one document is weighted heavier than the word “the,” for example, which will probably appear in every document of the corpus). In our scheme, each word in the Term x Document was weighted for Term Frequency by dividing the raw count of the word in each document by the total number of words in that document. Inverse Document Frequency was factored in by multiplying the weighted Term Frequency by the base-2 log of the ratio of total documents to the number of documents in which that word appears (we chose a base-2 log because our relatively-small corpus would see more differentiation than with a base-10 log, for example).

At this point, Singular Value Decomposition is applied to reduce the TF-IDF matrix, finding a value of k (representing the number of “topics” in Latent Semantic Analysis) in which all significant singular values are preserved (i.e. k isn’t too small as to reduce the matrix too far and eliminate useful data) but no undue work is done (i.e. k isn’t too large as to take too much time to compute). This is done by a function that calculates truncated SVDs on the TF-IDF, searching for differences in consecutive singular values such that one singular value is 5% or less of the value of its predecessor. If such a drop is found, this implies that the predecessor represents the rank needed to adequately preserve the TF-IDF, and the SVD is recalculated using that rank. The matrix is then reconstructed using the SVD output and the Frobenius Norm of the difference between the original TF-IDF matrix and the reconstructed one is checked to ensure the error is below .1%; if this is not the case, then the SVD is recalculated with rank increasing by one until the error is adequate or the maximum number of dimensions is reached.

When the final SVD has been found, it yields a Term x Topic matrix in which a positive-weighted term in a given topic column indicates that term is associated with that topic, and a similar Topic x Document matrix, which indicates in the same way which documents are associated with which topics. Because our corpus creates a singular value vector with a steady slope, the maximum rank is used (equal to the number of documents), thus many words are included within each topic, and many topics are included within each document. To decide which terms and documents to present for a given topic, the program chooses the top 5% of relevant terms and top 50% of relevant documents, ranked by the weight with which the term or document is associated with the topic at hand.

1. **Evaluation:**

To test the functionality of our program, we collected and analyzed by hand a series of sell-side reports on a small group of companies. These reports are, by nature, grouped into different categories. While they all cover a few companies in the Specialty Pharmaceuticals sector, some of those companies compete in the same indication space, and several companies are covered in multiple reports that we chose. Thus, we might expect some topics to include terms and reports relevant to those indications in which multiple companies repeat, and other topics to include companies that are similar in nature. For example, two companies covered in our corpus are Pacira Pharmaceuticals and Heron Therapeutics. These two companies both develop opioid-substitute products, thus they compete in the same space, and we would expect the two companies to appear together in the topics our program detects. On the other hand, TEVA and Endo are both generics manufacturers, thus while their portfolio is diversified and they may not compete as directly as the two aforementioned companies, we might expect them to appear together as well. An analysis of these examples, and others, can be found in the results section.

While it would confirm functionality if such a clear grouping occurred, should they not match, functionality is not necessarily poor. It is possible the program may group documents in ways we did not think to based purely off on term frequency.

While not implemented in this project, one could combine this with a tagger to make the software even more powerful. Returning to the previous example of tagging product names as “products,” rather than having our matrix be a term x document matrix, one could create a term/topic x document frequency matrix, having the “product” grouping replace the actual names of the products themselves. In effect, this could improve the functionality of the program by making the latent terms less opaque. Again, one could compare this to their own manual analysis to check validity. In implementing the tagger, it would be important that one paid attention to both false positives and false negatives. For example, while it is important the tagger can correctly identify products and tag them as such, it is equally important it does not identify non-products as products. Keep these incidence rates low will yield improved results.

1. **Materials**
   1. **Data:** We acquired 33 sell-side reports on several different companies, including Endo Pharmaceuticals (Ticker: ENDP), Heron Therapeutics (Ticker: HRTX), Insys Pharma (Ticker: INSY), Kem Pharma (Ticker: KMPH), Lanett (Ticker: LCI), Mallinckrodt (Ticker: MNK), Pacira Pharma (Ticker: PCRX), Perrigo (Ticker: PRGO), Recro Pharma (Ticker: REPH), Synergy (Ticker: SGYP), Teva Pharmaceuticals (Ticker: TEVA), Trevena (Ticker: TRVN), UroGen (Ticker: URGN), Vanda Pharmaceuticals (Ticker: VNDA), and Zynerba (Ticker: ZYNE). It is important to note that these reports are written by the same author, thus while we may not be able to test the application of this program that compares different authors covering the same company, we can examine the program’s ability to detect trends and outlooks of a given author, as we know ourselves the intended takeaways behind the reports.
   2. **Code Libraries:** The Breeze Linear Algebra library was used for its matrix and vector representations and functions (DenseMatrix, DenseVector, SVD capabilities, etc.). Snippets of code from the extra credit assignment were used to help in the SVD process, namely the Truncated SVD function. Some Java I/O libraries were used to load the documents in a usable form and interact with the operating system, and the Scala math library was critical in log calculations and rounding.
   3. **Others:** None.
2. **Results:**

We are very pleased with the performance of our LSA program. Our relatively small corpus of 33 documents did not necessitate a matrix reduction, thus the program determines there are 33 “latent topics” within these documents. For each topic, the output of the program presents the top 5% of associated terms and top 50% of associated documents, ranked by relevance. The output of running our program with the corpus we created can be found in the appendix after the code documentation.

To begin, let’s analyze the examples given earlier. Recall that pharmaceutical companies Pacira and Heron (PCRX and HRTX respectively) compete in the same space, which is an opioid-substitute product for post-operative pain relief. We would therefore expect these two companies to appear in topics together, and indeed we observe that in the output. Of the two reports for PCRX and two for HRTX that are included in the corpus, all four are associated with Topic #8. Some of Topic #8’s terms are expected, such as “pcrx” and “hrtx,” the tickers of these two companies. But other terms provide further insight into what this topic may be: “anesthesia,” “bupivacaine,” “exparel,” and “htx” suggest this topic may be about the companies’ products (Pacira’s product, EXPAREL, and Heron’s product, HTX-11, are both bupivacaine-based treatments to administer anesthesia). We also see “nerve,” “block,” “broad,” “label,” “approval,” and “orthopedic.” While Pacira’s product is on the market and Heron’s is in late-stage trials (as of the publishing of these reports), both are seeking to broaden their labels by gaining an indication for the use of their product in nerve blocking, and both are targeting the orthopedic surgery market as well. Pacira is awaiting approval for the nerve block indication; Heron is awaiting approval for all indications.

Turning to the generics space, we see generics companies Endo, Teva, Lannett, and Perrigo all highly relevant in Topic #24. We see the tickers for these companies as highly relevant terms, as well as some of the products that are major revenue drivers and/or pipeline assets, including copaxone, fremanezumab, levothyroxine, and others. “Litigation” is listed as a highly relevant term, which makes sense as both Endo and Teva were recently involved in a court case over Lidoderm that was resolved earlier this year (generics companies frequently get into court battles over drug rights, which further supports Topic #24 being associated with the generics space).

Topic #2 was a surprising proof of functionality, as it only includes the two Kem Pharma documents as the highly relevant documents, and terms that are especially relevant to KMPH’s recent history. Similarly, Topic #4 contains three UroGen reports, and three of the five highly-relevant documents were published the day after a healthcare conference, validating relvant terms such as “presentation,” “meeting,” “touchedon” (“touched” and “on” for some reason combined), and “showed.”

While the above examples may seem to the untrained eye like cherry-picked phrases associated with the documents for a particular topic, they are indeed very specific terms reflecting the language a professional working in finance would use to describe these companies. Moreover, they are reflective of the author, and give insight into his or her thought process and writing patterns. Consider Topic #2, which only includes documents and phrases relevant to Kem Pharma. If this program were to receive a different corpus of reports published by a different author and identify a similar topic that focuses on Kem, one could compare the highly relevant terms between authors to gain a sense of what aspects of the company they are focusing on. Indeed, this tool could prove extremely useful in comparing different researchers, lending itself to the problem statement that explores the current over-saturation of sell-side equity research.

That being said, the program is far from perfect. Some topics make less sense, or are at least more difficult to identify. For instance, Topic #1 includes many terms that are fairly general and non-specific in describing a company—in other words, they could easily transcend industry and context—and has 17 highly relevant documents, which is half of our corpus of 33, indicating that *all* documents touch on this topic. While not necessarily wrong, such an output is not particularly insightful. Some other topics, while maybe consisting of fewer relevant documents, have a similar dynamic in that they are not easily identifiable based on their terms.

Admittedly, the corpus is flawed. A large part of gathering an appropriate corpus is pre-processing, and our python script to normalize the documents was somewhat elementary, nor the focus of our efforts. This manifests itself in several non-ideal ways. For example, some topics list “m” as a highly relevant term, which is a product of otherwise-successful pre-processing (for example, trying to eliminate a figure like ~$30m, which would be considered a unique term without providing particular insight, might successfully strip away everything but the “m”). However, these should not be mistaken with truly relevant terms that may not seem so, such as “gi” to abbreviate gastrointestinal. Other inconsistencies in grammar could also create unique terms that may be over-weighted. An ideal pre-processing script would eliminate these inconsistencies, and combined with what is already a powerful and functional program, produce even more significant results. Moreover, a broadened corpus could see even more interesting results, and perhaps the use of the program’s matrix-reducing abilities. While aspects of this project may be less-than-ideal, we are confident that the output is statistically and functionally significant, indicating correctness of our implementation.

With this in mind, we believe our program clearly addresses the problem statement. There is no way to quantitatively find the value in a third-party equity research report, which is problematic in an over-saturated field. Yet, there is opportunity in this, especially given the industry’s current state of disruption. We believe this tool provides the foundation for a platform that would allow a research consumer to easily and quickly search through a large amount of research reports for a very specific topic, or to compare different researchers in a systematic way that would be impossible to do manually. As the equity-research environment consolidates, such a tool would be invaluable for consumers to decide which researchers they value, and until that consolidation, it would prove valuable to sort through a plethora of vastly similar research to identify truly unique and insightful thinkers.

1. **Code Documentation**

**Execution Instructions:** Simply cd into the nlp\_final folder, then on the command line type >sbt followed by >run.

**Term\_x\_Document Class:** The class that implements our term x document creator. Takes an input array and has the following member functions.

**term\_x\_newdoc:** This function is run on the first document to be analyzed. It creates a map of terms and their frequencies, which it returns. Takes a document (string) as input.

**term\_x\_doc:** This function is run on all subsequent documents to be analyzed. It takes the output of the newdoc function and builds on it, term x document matrix of one column for the document at hand, which it returns. These are chained together such that each call to term\_x\_doc builds off of all terms previously seen in prior documents. This way, the last time term\_x\_doc is called, a master wordlist is created of all words in the corpus, which is useful for TF-IDF. This function takes a document (string) and the map produced by either the previous call to term\_x\_doc or by term\_x\_newdoc.

**analyze:** The “driver” for the basic term x document functionality of this class. Calls term\_x\_newdoc and term\_x\_doc as appropriate for all documents in the corpus given to be analyzed. Produces an array of Term x Document maps for all documents, given an input of an array of documents (the corpus).

**outMatrix:** Given the master wordlist and an array of Term x Document maps for all documents, outMatrix produces a DenseMatrix of the common Term x Document matrix across all words and documents (using the Breeze matrix types makes TF-IDF and SVD much easier).

**tf-idf:** Given the DenseMatrix-form Term x Document, tf-idf normalizes the Term x Document for term frequency and inverse document frequency as previously discussed. Output is a same-dimension DenseMatrix.

**fastTruncatedSVD:** Borrowed from the extra credit assignment, this is a short and powerful algorithm to calculate the singular value decomposition of rank k for a matrix. Given a DenseMatrix (the tf-idf output) and integer k (desired rank), it returns a triplet of the three matrices required to reconstruct the tf-idf.

**SVD\_wrapper:** This lengthy function has a simple task: determine the right rank to use for SVD. Given the tf-idf matrix and a value k that indicates the number of documents in the corpus (also the maximum rank of the SVD), this hones in on the optimal rank by trading jumping through potential ranks in iterations of five to try and observe a steep decline in singular values, thereafter finding the ideal rank based on a trade-off with error in reconstructing the matrix given by a Frobenius Norm. This returns a tuple of the left and right matrices produced by the final decomposition, representing a term x topic matrix and topic x document matrix respectively.

**analyze\_SVD:** Responsible for the output of the program. Takes in the outputs of SVD\_wrapper (term x topic matrix and topic x document matrix) and prints out, for each topic, the top 5% of relevant terms and top 50% of relevant documents in an easily-digestible format.

**Term\_x\_Document Object:** Handles the execution of our code on our corpus. Reads in the documents in the resources folder with the assistance of the **getListOfFiles** function, then calls the methods of the term\_x\_document class to execute the program.

1. **Appendix**

Program output used in the results section is as follows:

Topic #1 includes terms (most significant 5%):

[kp, kmph, olinvo, seek, pediatric, meloxicam, partnerships, mitogel, continues, management

reiterated, coercialization, reph, allow

for, prices, adolescent

aged, continue

to, mickle, broader, coitted, pbms

to, populations, apadaz

management, to

executing, kmph

also, unique, generics', mentioned, travis, presentation, iv, th, annual, healthcare

conference, applicability, during, presented, adhd, study, partner, focusing, pk, hetlioz, lat, exparel, apadaz, submission, ceo, drive, just, teva, platform, patients, sgyp, efficacy, utuc, volume, believes, prgo, strategy, being, lci, timing, leverage, announced, zyn, within, cr, ', nda, product, line, grade, mid, vesigel, block, non, pivotal, tradipitant, vnda, ebitda, data, urgn, cdmo, trvn, operating, results, day, safety, highlighted, pain, officer, healthcare, post, focused, than, date, advisory, coittee, asset, peak, trulance, dermatitis, where, m, developed, chief, meeting, sales, interim, launch, conference, htx, nerve, approved, opioid, levothyroxine, company, potential, today, growth, expect, other, physicians, population, could, profile, surgical, late, belief, annual

healthcare, drug, low, expects, noted, products, remains, also, management, more, opioids, adjusted, ie, shares, meeting

likely, lead

product, bourdow, potential

average, “early, developed

for, users, dosing, carrie, recallolinvo, the

pipeline, catalysts

that, adopter”

hospitals, more

rapid, news, disease, income, medical, earnings, business, upcoming]

Topic #1 appears in documents (most significant 50%):

[Kem\_322ALT.txt, TRVN\_322ALT.txt, Recro\_323ALT.txt, Kem\_42ALT.txt, UroGen\_322ALT.txt, Synergy\_322ALT.txt, Kem\_225ALT.txt, Vanda\_322ALT.txt, Recro\_228ALT.txt, PCRX\_215ALT.txt, LCI\_322ALT.txt, TRVN\_312ALT.txt, PRGO\_227ALT.txt, Vanda\_326ALT.txt, UroGen\_43ALT.txt, UroGen\_415ALT.txt, UroGen\_315ALT.txt]

===========================================================

Topic #2 includes terms (most significant 5%):

[kp, pediatric, kmph, seek, partnerships, allow

for, prices, adolescent

aged, continue

to, mickle, broader, coitted, pbms

to, populations]

Topic #2 appears in documents (most significant 50%):

[Kem\_322ALT.txt, Kem\_42ALT.txt]

===========================================================

Topic #3 includes terms (most significant 5%):

[mitogel, utuc, cr, grade, vesigel, urgn, interim, population, olympus, meeting, full, tract, medical, prgo, complete, upper, kidney, nmibc, touched

on, its

discussion, approved

for, undisclosed

medical, shortly, showed, to

treat, provide

a, th

annual, believes

a, compassionate

use, schoenberg, initiate

its, the

standard, mark, md, candidate, intent, invasive, adjusted, low, care, american, rate, study, income, urothelial, clinically, urological

association, bladder

cancer, muscle, ind, far, carcinoma, data

from, unmet, patients, hetlioz, recall, track, ongoing, removal, response, un, generally, patent, file, zyn, ', today, aes, line, teva, would, undergone, alternative, top, good, morning, first, requires, n=, earnings, discussed, report, intends, news, release, high, development, so, including, kp, drug, rtgel, results, impact

on, review, low

and, and

conference, for

prgo, items, finish, causes

significant, final, specific, schedule, said

preliminary, reconciliations, think

the, pretty

much, repurchase, setup, long

it, review

procedures, had, month, vnda, m&a, officer, non, durability, look, disease, expiry]

Topic #3 appears in documents (most significant 50%):

[UroGen\_322ALT.txt, UroGen\_43ALT.txt, UroGen\_415ALT.txt, PRGO\_227ALT.txt, UroGen\_315ALT.txt, Vanda\_326ALT.txt, ZYNE\_13ALT.txt, ZYNE\_313ALT.txt, Vanda\_322ALT.txt, Vanda\_215ALT.txt, PRGO\_32ALT.txt, Vanda\_35ALT.txt]

===========================================================

Topic #4 includes terms (most significant 5%):

[mitogel, olinvo, utuc, cr, vesigel, grade, urgn, population, interim, reph, meloxicam, where, meeting, olympus, tract, full, medical, chief, officer, presentation, touched

on, its

discussion, approved

for, undisclosed

medical, shortly, showed, to

treat, provide

a, th

annual, believes

a, compassionate

use, schoenberg, initiate

its, the

standard, mark, md, candidate, kidney, upper]

Topic #4 appears in documents (most significant 50%):

[UroGen\_322ALT.txt, TRVN\_322ALT.txt, UroGen\_43ALT.txt, Recro\_323ALT.txt, UroGen\_415ALT.txt]

===========================================================

Topic #5 includes terms (most significant 5%):

[olinvo, being, trvn, meeting

likely, lead

product, bourdow, potential

average, “early, developed

for, users, dosing, carrie, recallolinvo, the

pipeline, catalysts

that, adopter”

hospitals, more

rapid, belief, annual

healthcare, coittee, advisory, oliceridine, for

trv, action, ofirmev, developed, major, november, migraine, exparel, management

reiterated, acute, onset, opioids, severe, moderate, officer, such, chief, operating, focus, products, improved, stage, asset, conference, during, lci, differentiated, coming, per, pdufa, upcoming, ie, continues, next, levothyroxine, cost, range, focused, were, pain, noted, treatment, late, safety, topic, due, th]

Topic #5 appears in documents (most significant 50%):

[TRVN\_322ALT.txt, TRVN\_312ALT.txt, LCI\_322ALT.txt, Vanda\_322ALT.txt, PCRX\_31ALT.txt, PCRX\_215ALT.txt, LCI\_27ALT.txt, Synergy\_322ALT.txt]

===========================================================

Topic #6 includes terms (most significant 5%):

[teva, ', hetlioz, vnda, entry, tradipitant, patents, paragraph, prevail, dermatitis, would, extension, five, event, generic, late, anda, disease, atopic, out, patent, largely, sgyp, filing, likelihood, many

of, lawsuit, ip, contesting, road

for, today

though, scenarios, orphan, methods, infringed, or

, share

on, '

', filed

by, runs, invalid

unenforceable, dcf, settle, assuming

teva, from

our, least, is

not, granted, assumed, largely

unexpected, dec

, ivs

vnda, automatically

enact, exclusivity

ode, eligible, matter, alleges, respond, vnda

were, composition, filed, ensuing, received, paragraph

iv, able, gastroparesis, month, days, litigation, jan, initiation, exclusivity, all, copaxone, base, fanapt, hpi, broadening, design

of, itch, management

expects, worst, nk, specifically, antagonist, parallel

only, factored, with

atopic, kelly, hetlioz

management, validated, endpoint

of, properties, jim, validate

tradipitant, severity, tradipitant

recall, access

for, conference

management, and

its, nrs, modifying, but

noted, pruritus, jet, settlement, initiative, early, buyers]

Topic #6 appears in documents (most significant 50%):

[Vanda\_326ALT.txt, Vanda\_322ALT.txt, TEVA\_28ALT.txt, Synergy\_322ALT.txt, Vanda\_215ALT.txt, Vanda\_35ALT.txt, Vanda\_18ALT.txt, SGYP\_31ALT.txt, LCI\_322ALT.txt, SGYP\_14ALT.txt]

===========================================================

Topic #7 includes terms (most significant 5%):

[', teva, olinvo, kp, hetlioz, entry, patents, paragraph, prevail, late, management

reiterated, kmph, iv, five, extension, would, vnda, trvn, event, patent, seek, advisory, coittee, exparel, pediatric, generic, anda, meeting

likely, lead

product, bourdow, potential

average, “early, developed

for, users, dosing, carrie, recallolinvo, the

pipeline, catalysts

that, adopter”

hospitals, more

rapid, likelihood, many

of, lawsuit, ip, contesting, road

for, today

though, scenarios, orphan, methods, infringed, or

, share

on, '

', filed

by, runs, invalid

unenforceable, dcf, settle, assuming

teva, from

our, least, is

not, granted, assumed, largely

unexpected, dec

, ivs

vnda, automatically

enact, exclusivity

ode, eligible, matter, alleges, respond, vnda

were, composition, filed, ensuing, received, paragraph

iv, news, filing, out, weakness, meloxicam, migraine, then, oliceridine]

Topic #7 appears in documents (most significant 50%):

[Vanda\_326ALT.txt, TRVN\_322ALT.txt, Kem\_322ALT.txt, TRVN\_312ALT.txt, TEVA\_28ALT.txt, PCRX\_215ALT.txt, PRGO\_227ALT.txt, Kem\_42ALT.txt, Kem\_225ALT.txt, UroGen\_322ALT.txt]

===========================================================

Topic #8 includes terms (most significant 5%):

[block, exparel, nerve, broad, pcrx, hrtx, program

htx, despite, produce, regional, readout

we, valuation

becomes, follows, voted, hrtx’s, from

their, label

while, anesthesia, calls, la, reasonable, strip, think

pcrx, we've, remain

perform, when

potential, typically

the, exparel

for, management

sets, tomorrow

in, afternoon, models, nerve

block, consensus

sales, recoend, deservedly, lead, bupivacaine, htx, competing, in

nerve, ultimately, always, discussions, competitor, rated, pressure, getting, under, april, narrow, shares, their, tomorrow, reports, run, either, constructive, adcom, seek, negative, come, later, response, approval, get, approved, label, advisory, coittee, peak, attractive, post, h, had, orthopedic, down, sales, more, pdufa, forecast, weakness, studies, order, efforts, not, investors, expected, growth

competitor]

Topic #8 appears in documents (most significant 50%):

[PCRX\_215ALT.txt, PCRX\_31ALT.txt, HRTX\_319ALT.txt, HRTX\_31ALT.txt, ZYNE\_313ALT.txt, ZYNE\_13ALT.txt, INSY\_311ALT.txt, SGYP\_14ALT.txt]

===========================================================

Topic #9 includes terms (most significant 5%):

[sgyp, olinvo, trulance, access, us

partnerships, among, january

approval, bringing, prioritization, evaluate;, constipation

coercialization, centered, promotes, company

currently, additional

capital, crg

debt, continuing, foundation, ex, wants

to, strategic

and, gi, its

, management

and, optimizing, dtc

advertising, metrics, adoption

improving, breakeven;, facility, explore, drive, continues, troy, hamilton, ', co, strong, uptake, sales

force, via, priorities, ibs, healthcare

conference, indication, income, certain, ensure, trvn, opportunities, existing, include, being, all, investments, cost, accelerate, prgo, require, help, largely, highlighted, initiative, discussion, hetlioz, coittee, advisory, earnings, meeting

likely, lead

product, bourdow, potential

average, “early, developed

for, users, dosing, carrie, recallolinvo, the

pipeline, catalysts

that, adopter”

hospitals, more

rapid, iv, order, news, exparel, reach, teva, c, financial, oliceridine, for

trv, action, ofirmev, annual, through]

Topic #9 appears in documents (most significant 50%):

[Synergy\_322ALT.txt, TRVN\_322ALT.txt, PRGO\_227ALT.txt, Vanda\_326ALT.txt, TRVN\_312ALT.txt, SGYP\_31ALT.txt, SGYP\_14ALT.txt, ZYNE\_313ALT.txt, PCRX\_31ALT.txt, Recro\_228ALT.txt]

===========================================================

Topic #10 includes terms (most significant 5%):

[dermatitis, tradipitant, disease, atopic, broadening, design

of, itch, management

expects, worst, nk, specifically, antagonist, parallel

only, factored, with

atopic, kelly, hetlioz

management, validated, endpoint

of, properties, jim, validate

tradipitant, severity, tradipitant

recall, access

for, conference

management, and

its, nrs, modifying, but

noted, run, applicability, trials, hpi, whether

or, pruritus, gastroparesis, intends, psychiatrists, developed, sighted, work, discuss, associated, endpoint]

Topic #10 appears in documents (most significant 50%):

[Vanda\_322ALT.txt, Vanda\_215ALT.txt, Vanda\_35ALT.txt, Vanda\_18ALT.txt, PRGO\_227ALT.txt, PCRX\_215ALT.txt]

===========================================================

Topic #11 includes terms (most significant 5%):

[mitogel, ', block, prgo, nerve, teva, hetlioz, broad, exparel, utuc, earnings, income, cr, seek, sgyp, vesigel, grade, urgn, weakness, annual, th, during, entry, population, presentation, run, complete, healthcare

conference, dermatitis, response, vnda, patents, paragraph, prevail, disease, drive, lci, interim, order, morning, narrow, healthcare, applicability, tradipitant, trulance, olinvo, opportunity

for, would, program

htx, despite, produce, regional, readout

we, valuation

becomes, follows, voted, hrtx’s, from

their]

Topic #11 appears in documents (most significant 50%):

[PCRX\_215ALT.txt, UroGen\_322ALT.txt, Vanda\_326ALT.txt, Synergy\_322ALT.txt, PRGO\_227ALT.txt, Vanda\_322ALT.txt, Kem\_322ALT.txt, LCI\_322ALT.txt]

===========================================================

Topic #12 includes terms (most significant 5%):

[income, earnings, ', news, today, opportunity

for, zyn, impact

on, review, low

and, and

conference, for

prgo, items, finish, causes

significant, final, specific, schedule, said

preliminary, reconciliations, think

the, pretty

much, repurchase, setup, long

it, review

procedures, release, morning, topic, weakness, forecasts, related, uncertainty, outcome, look, turnaround, preview, good]

Topic #12 appears in documents (most significant 50%):

[PRGO\_227ALT.txt, LCI\_322ALT.txt, Vanda\_326ALT.txt, ZYNE\_13ALT.txt, Synergy\_322ALT.txt, PCRX\_215ALT.txt, Kem\_322ALT.txt]

===========================================================

Topic #13 includes terms (most significant 5%):

[kmph, apadaz, htx, kp, partnership, monetize, est, peak, hrtx, regulatory

approval, abuse, hal, apap, probability, pain, ;, achieving, end, pro, coercial, success, post, assume, candidates, kp

, adjusted, m, iv, un, dilutive, partners, nov, by

e

sustol, reaches, cycle, success;

assume, life, m

by, pos,

kp, methylphenidate

prodrug, result, prodrug, oral, creating, intranasal, opioid, raise, hycd, scenario

clinical, ligand, operative, equity, approval, e, catalysts, ability, cinv, sales, fund, jet, fanapt, overhang, value, teens, product

and, hinges, partnership

, studies

kmph, with

a, royalty

kp, substances, bupivacaine, positive, generics, methylphenidate, cash, by, capital, m;, lag, partnering, give, sufficient, believe, through, financing, therapy, relative, case

cinvanti, currently

do, scenario

htx, e

hrtx, aloxi, line, non, superiority, model, top, efforts, hetlioz, like, factor, partner, failure, g, data, forecasted, current, economics, risk, results, deal, receives]

Topic #13 appears in documents (most significant 50%):

[Kem\_225ALT.txt, Kem\_42ALT.txt, HRTX\_31ALT.txt, HRTX\_319ALT.txt, Vanda\_35ALT.txt, TRVN\_312ALT.txt, Vanda\_215ALT.txt, PCRX\_31ALT.txt, Vanda\_18ALT.txt, SGYP\_14ALT.txt]

===========================================================

Topic #14 includes terms (most significant 5%):

[kmph, apadaz, kp, ', block, monetize, partnership, abuse, regulatory

approval, apap, broad, hal, teva, expansion, pro, nerve, drug, achieving, pharma, partner, kp

, success, margin, candidates, late, hycd, scenario

clinical, ligand, intends, run, discussions, partners, fund,

kp, methylphenidate

prodrug, result, prodrug, oral, creating, intranasal, prgo, disease, zyn, cagr, product

and, hinges, partnership

, studies

kmph, with

a, royalty

kp, substances, announcement]

Topic #14 appears in documents (most significant 50%):

[Kem\_225ALT.txt, Kem\_42ALT.txt, PCRX\_215ALT.txt, Vanda\_326ALT.txt, Vanda\_322ALT.txt, PRGO\_32ALT.txt, UroGen\_322ALT.txt]

===========================================================

Topic #15 includes terms (most significant 5%):

[hetlioz, vnda, jet, lag, expansion, fanapt, ', margin, moves, pos,

fanapt, cagr, sms, adj, peak, design, prgo, non, smith, magenis, stable, share, sleep, placebo, gastroparesis, ruling, scenario

hetlioz, entry, zyn, +, sales, ad, bps, topic, deployment, between

,

range,

chci, value, syndrome, patents, paragraph, prevail, worth, tradipitant, would, spend, same

moa, mnlo, serlopitant, circadian, night, hours, disorder, creation, operating, jan, m&a, specifics,

rx, m, extension, benefit, reiterate, kmph, meloxicam, days, outperform, guide, preliminary, brackets, pushed, results, stat, pharma, iv, filing, upside, patent, late, achieve, get, even, investors, topical, vanda, acceleration, assets

for, sms

assume, upside

vnda, growing

base, overturned]

Topic #15 appears in documents (most significant 50%):

[Vanda\_35ALT.txt, Vanda\_215ALT.txt, PRGO\_32ALT.txt, Vanda\_18ALT.txt, Vanda\_326ALT.txt, LCI\_322ALT.txt, ZYNE\_13ALT.txt, PCRX\_215ALT.txt, Synergy\_322ALT.txt, Kem\_42ALT.txt]

===========================================================

Topic #16 includes terms (most significant 5%):

[hetlioz, fanapt, jet, lag, vnda, endp, moves, insy, growth,

fanapt, sms, volume, consensus, share, gastroparesis, midpoint, tradipitant, generics, erosion, smith, magenis, pos, subsys, spray, debt, cbd, design, ruling, scenario

hetlioz, get, sleep, placebo, spend, m, non, ad, chronic, estimate, copaxone, came, cost, guide, preliminary, brackets, pushed, exceeds, adj, cautious, acthar, +, ebitda, see, consensus', sgyp, cellulite, achieves, stabilization, end, fails, same

moa, mnlo, serlopitant, block, business, achieve, guidance, meloxicam, mnk, payer, broad, look, until, price, circadian, night, hours, disorder, re, levo, does, average, declines, little, yield, wait, olinvo, required, term, approved, syndrome, lower]

Topic #16 appears in documents (most significant 50%):

[Vanda\_35ALT.txt, Vanda\_215ALT.txt, Vanda\_18ALT.txt, INSY\_311ALT.txt, ENDP\_227ALT.txt, MNK\_227ALT.txt, TEVA\_28ALT.txt, SGYP\_31ALT.txt]

===========================================================

Topic #17 includes terms (most significant 5%):

[medical, where, touched

on, its

discussion, approved

for, undisclosed

medical, shortly, showed, to

treat, provide

a, th

annual, believes

a, compassionate

use, schoenberg, initiate

its, the

standard, mark, md, candidate, vesigel, data

from, urological

association, bladder

cancer, muscle, ind, officer, meeting, clinically, track, chief, generally, removal, ongoing, healthcare, surgical, unmet, alternative, file, carcinoma, requires, urothelial, discussed, conference, nmibc, presentation, htx, during, upcoming, hetlioz, after, report, non, presented, focused, urgn, intends, drug, potentially, exparel, grade, endp, vnda, high, meaningful, fanapt, management, development, may, hrtx, kmph, insy, apadaz, phase, also, consensus, guidi

to, reviewed, representatives, generating, centers

ascs, briefly, setting, conference

during,

differentiation, barriers, discussed

its,

pdufa, outlined, launch

iv, near

term, henwood, touched, initially

target]

Topic #17 appears in documents (most significant 50%):

[UroGen\_322ALT.txt, Recro\_323ALT.txt, Vanda\_18ALT.txt, ENDP\_227ALT.txt, INSY\_311ALT.txt, HRTX\_319ALT.txt, ZYNE\_13ALT.txt, HRTX\_31ALT.txt, Vanda\_215ALT.txt]

===========================================================

Topic #18 includes terms (most significant 5%):

[insy, cbd, subsys, spray, settlement, y, doj, stabilization, declines, ', risking, stabilize, epinephrine, buprenorphine, scenario

subsys, volumes, naloxone, forecast

syndros, getting, capital, require, experience, meloxicam, signs, prospects, until, balanced, perform, any, iv, sgyp, maintain, five, generates, de, options, don't, prefer, more, consensus, digits, modestly, material

improvement, begin, payments, the

product, programs

catalysts

, estimates

insy, reward

given, doj

investigation, slow, pdufa

q, spray

july, real, we

update, cannabidiol, pharmacokinetic, syndros', approved

doj, think

physicians, tirf, in

base, high

pipeline, our

previous, nor, and

epinephrine, managed

care, improves, points

subsys, market

syndros]

Topic #18 appears in documents (most significant 50%):

[INSY\_311ALT.txt, SGYP\_31ALT.txt, SGYP\_14ALT.txt, Recro\_228ALT.txt, Vanda\_326ALT.txt, Vanda\_322ALT.txt, TRVN\_312ALT.txt]

===========================================================

Topic #19 includes terms (most significant 5%):

[exparel, insy, orthopedic, cbd, subsys, spray, efforts, guidi

to, reviewed, representatives, generating, centers

ascs, briefly, setting, conference

during,

differentiation, barriers, discussed

its,

pdufa, outlined, launch

iv, near

term, henwood, touched, initially

target, two

positive, ambulatory, gerri, a

total, growth

competitor, draft, jnj, promotional, ebitda, endp, then, its

revenue, procedures, pcrx, other, growth, coercialization, settlement,

exparel, earlier, soft, only

leads, introduced, exparel’s, date, generics, programs, hetlioz, set, y, stabilization, hospital, apadaz, offer, section, stay, favorite, initially, outpatient, expand, ideas, doj, prior, undergone, fail, await, far, th, declines, annual, assets, incremental, consensus, six, approximately, clarity, presentation, n=, secure, adoption, had]

Topic #19 appears in documents (most significant 50%):

[PCRX\_31ALT.txt, Recro\_323ALT.txt, INSY\_311ALT.txt, UroGen\_43ALT.txt, ENDP\_227ALT.txt, Kem\_225ALT.txt, Vanda\_18ALT.txt, TRVN\_322ALT.txt, Vanda\_35ALT.txt]

===========================================================

Topic #20 includes terms (most significant 5%):

[exparel, meloxicam, orthopedic, iv, efforts, growth

competitor, draft, jnj, promotional, cdmo, procedures, emerging, therapy

reph, pipeline

m, grows, settings, pcrx,

exparel, earlier, soft, only

leads, introduced, exparel’s, reduce, priced, generates, endp, digits, part, prior, section, fail, business, scenario

iv, reducing, reph’s, generics, continues, single, utilization, approval

downside, adequately, focused, incremental, stay, offer, revenue, share, color, assets, out, approvable, margins, secure, operative, by

, kols, updates, acthar, overall, growth, prevention, per, co]

Topic #20 appears in documents (most significant 50%):

[PCRX\_31ALT.txt, Recro\_228ALT.txt, MNK\_227ALT.txt, ENDP\_227ALT.txt, UroGen\_322ALT.txt, Synergy\_322ALT.txt, Vanda\_18ALT.txt]

===========================================================

Topic #21 includes terms (most significant 5%):

[insy, cbd, subsys, spray, teva, meloxicam, htx, copaxone, y, growth, settlement, doj, us

partnerships, explore, among, january

approval, bringing, prioritization, evaluate;, constipation

coercialization, centered, promotes, company

currently, additional

capital, crg

debt, continuing, foundation, ex, wants

to, strategic

and, gi, its

, management

and, optimizing, dtc

advertising, metrics, adoption

improving, breakeven;, facility, iv, stabilization, mg, sales

force, uptake, via, apadaz, declines, jet, ensure, bupivacaine, g, fremanezumab, priorities, drive, strong, hetlioz, lag, healthcare

conference, before, pressure, through, post, fanapt, broad, us, continued, getting, certain, asset, erosion, pos, stabilize, epinephrine, buprenorphine, scenario

subsys, volumes, naloxone, forecast

syndros, financial, physicians, generates, investments, opportunities, business, un, digits, b, olinvo, fails, both, signs, prospects, moves, adjusted, no, endp]

Topic #21 appears in documents (most significant 50%):

[INSY\_311ALT.txt, TEVA\_28ALT.txt, Synergy\_322ALT.txt, Recro\_228ALT.txt, HRTX\_31ALT.txt, PCRX\_215ALT.txt, Vanda\_35ALT.txt, HRTX\_319ALT.txt, Vanda\_215ALT.txt]

===========================================================

Topic #22 includes terms (most significant 5%):

[teva, copaxone, exparel, insy, average, cbd, subsys, spray, mg, fremanezumab, levo, erosion, gross, continued, less, orthopedic, street, lci, mnta, levered, authorized, industry, sandoz, programs, refinancing, approvals, efforts, y, doj, growth

competitor, draft, jnj, promotional, consensus, margins, until, jet, highly, procedures, letter, optimistic, meloxicam, timely, pressure, lag, fq, volume, accounts, along, getting, launches, return, stabilize, epinephrine, buprenorphine, scenario

subsys, volumes, naloxone, forecast

syndros, offer, tax, future, clarity, potential, enough, approval,

exparel, earlier, soft, only

leads, introduced, exparel’s, particularly, pcrx, q

we, june, competitor

june, drivers

fremanezumab, pressures, migraine

fremanezumab, revised

e, delay, stake

, austedo, sales

accretive, cutting, didn't, presents, scenario

, entering, epipen

]

Topic #22 appears in documents (most significant 50%):

[TEVA\_28ALT.txt, INSY\_311ALT.txt, PCRX\_31ALT.txt, LCI\_27ALT.txt, Vanda\_35ALT.txt, Vanda\_215ALT.txt, Recro\_228ALT.txt, SGYP\_14ALT.txt, UroGen\_322ALT.txt]

===========================================================

Topic #23 includes terms (most significant 5%):

[acthar, mnk, inomax, payer, sells, amitiza, stannsoporfin, teva, issues, expansion, growth, brand, successfully, niemann, scmp, m&a

generics, pick, divest, vts, type, digit, visibility, topic, when, hard, copaxone, headline, r&d, prior, pediatric, b, become, target, generics

business, branded, timely, buying, cagr, generics, pdufa, constipation, mg, sell, even, flat, deal, clinical, manner, few, h

inomax, anip, reference

to, mnk

trades, proceeds, disc, generics

business

base, years

downside, constipation

spring, program

april, suited

to, collection, mnk

has, margin

expansion, forecasts

no, corticotropins, decision

upside, provided

ahead, company

including, becomes, unable, year

for, assumption

acthar, recent

pipeline, includes

contribution, therakos, overleveraged, absent, growth

generics, s&p, forecast

inomax, flow

through, scenario

more,

however]

Topic #23 appears in documents (most significant 50%):

[MNK\_227ALT.txt, LCI\_322ALT.txt, TEVA\_28ALT.txt, PRGO\_32ALT.txt, UroGen\_315ALT.txt, ZYNE\_313ALT.txt, UroGen\_415ALT.txt]

===========================================================

Topic #24 includes terms (most significant 5%):

[endp, teva, copaxone, sgyp, expansion, topic, cellulite, exparel, operating, mg, trulance, meloxicam, fremanezumab, prgo, tranches, jet, brands, even, share, cagr, balance, headwind, lag, crg, scenario

plecanatide, fourth, qualify, third, e, dilutive, continued, enthusiastic, launched, pdufa

date, switch, makes, a

grandfathered, want, tim, marketing

and, management

category, local, crew, trajectory, meanwhile, yet, marty, feels, relatively

durable, though

it, it

currently, galvan, entrants

could, player, reminded, generic

levothyroxine, written, presence

currently, views, anesthetic, e

ebitda, pose, ebitda

contribution, extensively, nti, partnered

products, to

enter, index, legacy, lidoderm, files, vasostrict, xiaflex, scenario

base, trading, pruning, dupuytren, litigation, portfolio, mnta, levered, authorized, industry, promotion, expense, market, chronic, stabilization, trades, during, stable, street]

Topic #24 appears in documents (most significant 50%):

[ENDP\_227ALT.txt, TEVA\_28ALT.txt, LCI\_322ALT.txt, SGYP\_14ALT.txt, SGYP\_31ALT.txt, PCRX\_31ALT.txt, PRGO\_32ALT.txt, Vanda\_35ALT.txt, Recro\_228ALT.txt]

===========================================================

Topic #25 includes terms (most significant 5%):

[officer, meloxicam, today, being, htx, rare, chief, disorders, effective, meeting

likely, lead

product, bourdow, potential

average, “early, developed

for, users, dosing, carrie, recallolinvo, the

pipeline, catalysts

that, adopter”

hospitals, more

rapid, shift, acthar, increasing, conference, november, belief, annual

healthcare, plans, strategy, were, opioids, developed, major, apadaz, management

reiterated, focused, day, such, fxs, operating, its

data, rare

neurological, thc

patch, syndrome—zyn, am, counicating, patients

with, efficient, epileptic, category

of, psychiatric, on

and, which

could, h

based, rating

epilepsy, recruiting, evaluating, target

attractive, failed, not

provided

other, formally, dee

—zyne, speculative, est

to, squires, announcement

the, is

expected, median

baseline, h;, hold, path

forward, rates;, discontinuing, markets, zyne

named, seizure, enthusiasm, chance, modify

the, expertise, the

hiring, liza, in

neurological, dr, total

number, brain, continued

push, hire, study;, her, cmo, doesn't, and

cost, big

impact, view

chief, likely

reduces, call]

Topic #25 appears in documents (most significant 50%):

[ZYNE\_13ALT.txt, TRVN\_322ALT.txt, MNK\_227ALT.txt, Recro\_228ALT.txt, UroGen\_43ALT.txt, HRTX\_319ALT.txt, HRTX\_31ALT.txt, Kem\_225ALT.txt, Vanda\_18ALT.txt, TEVA\_28ALT.txt]

===========================================================

Topic #26 includes terms (most significant 5%):

[zyn, attributed, zyne, epilepsy, fragile, meloxicam, dose, being, clinical, also, htx, mg, differentiated, meeting

likely, lead

product, bourdow, potential

average, “early, developed

for, users, dosing, carrie, recallolinvo, the

pipeline, catalysts

that, adopter”

hospitals, more

rapid, program, later, do, stage, major, x, continues, understand

zyn, await

further, epilepsy

no, program

catalysts

, test, operations, learned, formulation, course, scenario

inclusion, its

fxs, developing, clinical

milestones, option

for, pipeline

through, burn

of, frame

epilepsy, m

remaining, in

fragile, assumption

zyn, agency, page, other

neuropsychiatric, determine, qd, cannibidiol, and

epileptic, dee

no, valuation

downside, phase

, trial

design, syndrome

no, forward, with

refractory, following, specific

indications, these

as, points

fxs, human

study, gained, maximum, clinical

development, was

actually, to

mid, syndrome

need, same, disorders

base, helps, called, candidate

may, epileptic

encephalopathies, the

shares, learnings

from, company

focused, potential

as, a

higher, pharmaceutical,

zyne, valuation

inclusion]

Topic #26 appears in documents (most significant 50%):

[ZYNE\_313ALT.txt, TRVN\_322ALT.txt, LCI\_27ALT.txt, Recro\_228ALT.txt, HRTX\_31ALT.txt, MNK\_227ALT.txt, UroGen\_322ALT.txt, INSY\_311ALT.txt, PCRX\_215ALT.txt, HRTX\_319ALT.txt]

===========================================================

Topic #27 includes terms (most significant 5%):

[adjusted, un, patent, rtgel, vesigel, grade, expiry, vesimune, mitogel, durability, platform, expires, botugel, bladder, urinary, achieve, extended, urgn, before, fails, delivered, treat, asset, achieves, assumption, its

patent, risk, urgn’s, successful, receives, hard, interim, nmibc, beyond, runway, k, indications, peak, their, raising, oncology, efficacy, points, mitogel’s, mathematically, pt, represent, somewhat, overactive, causes, interfering, proprietary, uro, various, interstitial, mitomycin, therefore, paradigm, natural, coercialized, delivery, types, being, shift, open, low, ability, meloxicam, without, per]

Topic #27 appears in documents (most significant 50%):

[UroGen\_315ALT.txt, UroGen\_415ALT.txt, TRVN\_322ALT.txt, ENDP\_227ALT.txt, Recro\_228ALT.txt, PCRX\_31ALT.txt, LCI\_27ALT.txt]

===========================================================

Topic #28 includes terms (most significant 5%):

[jet, lag, moves,

fanapt, pos, sleep, placebo, sms, design, share, adj, ruling, scenario

hetlioz, pruritus, circadian, night, hours, disorder, peak, +, dermatitis, hpi, specifics, stat, fails, levo, chronic, same

moa, mnlo, serlopitant, yield, cost, lci, payer, exceeds, syndrome, patients, strategy, next, ad, value, would, worth, apadaz, acthar, vanda, acceleration, assets

for, sms

assume, upside

vnda, growing

base, overturned, schizophrenia

along, overlooking, pruritus

catalysts

q,

positive, +

, optionality, may

be, gastroparesis

h, share

upside

positive, downside

phase, in

chronic, tradipitant

h, monetizes, downside

tradipitant, in

downside

fanapt, derisked

clinical, franchise

base,

phase, indication

company, upside

tradipitant, vnda

to, in

gastroparesis

assume, pharmaceuticals, assumption

hetlioz, and

management, believe

today, hikma, appeal

h,

assume, syndrome

upside, by, along, achieve, up, business, modest

growth, only, like, reflects, set]

Topic #28 appears in documents (most significant 50%):

[Vanda\_35ALT.txt, Vanda\_215ALT.txt, LCI\_27ALT.txt, MNK\_227ALT.txt, Kem\_225ALT.txt, ENDP\_227ALT.txt, INSY\_311ALT.txt, UroGen\_322ALT.txt, SGYP\_14ALT.txt, PRGO\_227ALT.txt]

===========================================================

Topic #29 includes terms (most significant 5%):

[apadaz, apap, partner, hycd, scenario

clinical, ligand, abuse, pro, upside, approximately, sufficient, be

worth, seeking, maybe, runway

well, scripts

in, activated, validates, drug

post, cns

therapies, investor

concern, struck, be

expensive, kp

upside, crl, positioned, hand, a

pbm, activities, secure

automatic, nasal, term

management, only

way, pivotal

study, overblown, activated

therapy, from

kmph, next

, kp

methylphenidate, as

management, generics

and, apadaz

deal, our

model, m

catalysts

mid, traditional, months

market, m

which, fact, pharmacies

balance, it

seems, coming

months, for

some, assumption

kp, seeks, structure, benzhydrocodone, points

apadaz, appreciate, differentiation

vs, management

is, shifting, edits, partner

with, kp

current, hydrocodone, dependence, intra, since

management, was

in, authorizations, prodrug

platform, royalties, deterrent, is

enough, call

with, partner;, share

what]

Topic #29 appears in documents (most significant 50%):

[Kem\_225ALT.txt, SGYP\_14ALT.txt, TRVN\_312ALT.txt, Vanda\_18ALT.txt, Kem\_322ALT.txt, MNK\_227ALT.txt, Recro\_228ALT.txt, HRTX\_31ALT.txt]

===========================================================

Topic #30 includes terms (most significant 5%):

[amendment, canada, trulance, sgyp, deal, crg, expense, m, until, cumulative, reduction

excl, needle, acquired

, the

inflection, secures, formulary, agreement, points

trulance, consensus

m, isn't

going, reach

breakeven, math

business, min, shifted, m

operating, sales

forecasts, efficiencies, but

takes, upfront,

meaning, requirement, guidance

crg, sgyp

has, though

does, though

did, partnerships

upside, newly, with

roughly, amended, operating

expense, the

additional, deferred

revenue, flexibility

for, available, reach

profitability, recent

trulance, dilution

balance, sometime

in, cph,

trulance, trulance

royalty, sales

and, best

while, expenses, agreement

reduces, table, fee, capital, came, consensus, branded,

sgyp, three,

revenue, forecasts, along

with, meets, inflection, the

next, wait, slightly, really]

Topic #30 appears in documents (most significant 50%):

[SGYP\_31ALT.txt, Kem\_225ALT.txt, HRTX\_31ALT.txt, TRVN\_312ALT.txt, LCI\_27ALT.txt, Vanda\_35ALT.txt, Recro\_228ALT.txt, ZYNE\_13ALT.txt]

===========================================================

Topic #31 includes terms (most significant 5%):

[jet, sleep, placebo, lag, circadian, night, hours, disorder, stat, specifics, spend, positively, k, benefit, along, this

provides, conditions, this

indication

what, challenge, needed, the

total, on

both, plan

before, vnda

chose, treating, and

it, this

indication, initial, previous

jet, penetration, study

evaluating, months

we, every, class

us, airports, snda

submission, a

bit, clinical

catalysts, travel

, questions, each, its

coercial, share

next, minutes

p, minutes, alertness, simulated, change, events

we, additional

sales, confounding, sig

jet, scales, improving

tst, tradipitant

in, actually, accelerating, vas, travelers, detail, rhythm

disorders, still

some, all

near, viability, targeted, a

treatment, kass, light, risk

coercial, is

likely, psychiatry

initiative, attitudes, term

as, destinations, tst, deprivation, pt

key, secondary, time, sig, study

design, creation, catalysts, including, class]

Topic #31 appears in documents (most significant 50%):

[Vanda\_35ALT.txt, UroGen\_315ALT.txt, Vanda\_18ALT.txt, HRTX\_31ALT.txt, Vanda\_322ALT.txt, LCI\_27ALT.txt, INSY\_311ALT.txt, UroGen\_43ALT.txt, UroGen\_322ALT.txt]

===========================================================

Topic #32 includes terms (most significant 5%):

[therapy, assumption, its

patent, rtgel, k, medical, itt, intent, invasive, population, core, expected, scenario

urgn, formulated, in

uro, additional

development, dwell, research, utuc

, estimate

urgn, study

mitogel, opportunities

balance, a

phase, utuc

h, be

presented, viewed,

turbt, opportunistic, assumption

urgn,

urgn, trial

upside, large

molecules, trial,

mitogel, term

catalyst, utuc

urgn, urgn’s

early, business

update, of

fluids, term

clinical, fold, respective

indications, conducted, before

patent, data

q, management

recent, scenario

mitogel, recurrence, cost

of, arm, of

upwards, expiry

in, data

demonstrating, received

positively, utuc

vesigel, fail

in, for

improved, creation

avenue, botox, plenty, interim

results, molecules, the

olympus, olympus

are, areas

within, investors

vesigel, previously

we, forma, patients

considered, offering]

Topic #32 appears in documents (most significant 50%):

[UroGen\_315ALT.txt, Vanda\_215ALT.txt, UroGen\_43ALT.txt, UroGen\_322ALT.txt, HRTX\_31ALT.txt, MNK\_227ALT.txt, Kem\_322ALT.txt]

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Topic #33 includes terms (most significant 5%):

[s, ultimately, ev, leading, consistent, exparel, pbo, demonstrated, launch

the, p&t, review

opioid, ae, auc, in

launch, benign, proportion, opioidfree

patients, size, efficacy

coercial, risked

, supporting

the, injections, less

technique, takeout, to

both, minimization, prepare,

coercial, validate, takeout

at, sit

well, range

our, pricing

until,

also, row, advantage, it

does, exploring, indicate, numerous, multiples, a

takeout, administrators, today

results, compelling

product, augmentation, acquired, injection, teva

h, reinforce

htx, and

generic, itself, pain

catalysts

late, them, to

pcrx;, vs

generic, strategies

administration, tka

, acquirers

■, fetch, dependent, today

positive, fast, statistically, and

believe, prevailing, coittees, instillation

administration, administer

local, noted

this, bupivacaine

while, differentiated

product, positively

as, expedited, in

addition, track

designation, op, hrtx, generic, results, whether, both, points

phase, force]

Topic #33 appears in documents (most significant 50%):

[HRTX\_319ALT.txt, Vanda\_35ALT.txt, SGYP\_31ALT.txt, Vanda\_18ALT.txt, ZYNE\_313ALT.txt, UroGen\_315ALT.txt, PRGO\_32ALT.txt, TEVA\_28ALT.txt, UroGen\_322ALT.txt]