Measuring Marketing: Using Content Analysis To Evaluate Relative Value In Valuation And Reasonable Royalty Analysis

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Introduction

In valuation and reasonable royalty analysis, economic experts often seek to measure the contribution of a technology to a particular product sold in the marketplace. In recent years, courts have instructed experts to apportion royalties and economic damages to the value contributed by a patented feature relative to non-patented features. While this instruction is straightforward in theory, experts are often left with the challenging task of reliably quantifying an apportionment for a specific feature within a complex product.

There are a variety of methods of apportionment that can be evaluated and employed for apportioning based on any individual situation. Recently, some of our experts have been utilizing empirical methodologies known as content analysis—i.e., detailed and quantitative analysis of documents and information—as one potential apportionment method for consideration. While not applicable in all circumstances, content analysis provides yet another methodology in an expert’s toolbox for apportioning in valuation and royalty analysis.

This article provides an overview of some of the theoretical, empirical, and academic foundations to content analysis. We suggest that measures of content analysis related to marketing content can, properly understood and applied, yield reliable and practical implementations of apportionment in valuation and royalty analysis.

Apportionment

Apportionment, as defined by the courts, involves separating the economic value of patented features and functionalities from un-patented features and functionalities. As the Federal Circuit stated in Ericsson v. D-Link Systems: “…where multi-component products are involved, the governing rule is that the ultimate combination of royalty base and royalty rate must reflect the value attributable to the infringing features of the product, and no more.”

Proper apportionment can be determined in a variety of ways, depending on what kind of value is added by a particular technology. Some technologies may provide a cost savings to the supplier, whereas other technologies may provide an increase in demand for an accused product. When a feature contributes to attracting customers, that increase in demand will often manifest in revenue earned through higher prices and/or greater quantity sold.

Common and often considered apportionment methods include the following (of course, methods may or may not be applicable depending on specific facts and circumstances):

- Salable components—Evaluations of separately sold product components.
- Product comparisons—Comparisons to salable products with different sets of attributes.
- Feature comparisons—Comparisons of feature value across different products.
- Equal division—Equal division among features, patents, or components.
- Relative weightings—Relative weighting according to devoted space or attention.
- Feature emphasis—Analysis of internal or external product evaluations.

1. See, for example:


4. See, for example:
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- Surveys—Evaluating consumer preferences via survey responses.
- Licensing—Inherent apportionment based on observed licensing.
- R&D Investment—Analysis of R&D investment in features, patents, or components.
- Cost savings—Analysis of cost savings attributable to claimed technology.

Despite the surface appeal of these approaches, experts often face the challenge of actually quantifying and implementing precise apportionment in ways that are supportable and defensible. Too often, experts receive criticism for quantifications that may be intuitive and reliable, even if there is some degree of uncertainty or imprecision with the selected approach. Consequently, evaluation of additional quantitative approaches—such as content analysis, described below—may be useful in the right context and circumstances.

**Content analysis**

Content analysis is a method of quantifying the subject matter of documents or information based on measuring the relative frequency of various aspects of its content, such as the frequency of a selected word or phrase relative to other words or phrases. Content analysis provides a methodology for taking information that is generally perceived as qualitative in nature, and quantifying it based on metrics of focus and attention.

Academic researchers have used content analysis to derive quantitative measures from a variety of sources, such as media coverage, financial analysis, and other written material. For example, Swales and Yoon (1992) used the frequency of written references to economic factors, growth, and strategic plans from annual president’s letters to stockholders to predict stock price performance. As another example, McKeone (1995) utilized column space and frequency of words to measure a company’s media coverage and create comparisons to its competitors. As another example, Gentzkow and Shapiro (2010) constructed indexes based on word usage to evaluate political slant and compare to other popular metrics of political leanings of media. Additional published literature can be found in the Appendix. Said another way, content analysis can be used to transform written or visual information into a precise quantification for consideration.

Consider an expert contemplating how to determine the relative value of one or more technologies within a complex product containing multiple features. That expert might implement content analysis to provide quantitative metrics of that relative value for evaluation, such as:

- **Frequency of occurrence in marketing materials**, advertising, or other materials, such as a share of words or relative frequency of occurrence in emphasizing particular features in advertising or other materials.
- **Frequency of occurrence across sources**, such as internal documents or online materials, in determining the relative occurrence of hits in search results.
- **Metrics of social media attention**, such as quantitative measures of interest via Google Trends, Twitter, and other social media metrics that provide quantitative assessment of human interest.
- **Relative time emphasis**, such as relative minutes of emphasis on one feature compared to minutes of emphasis on another feature in a marketing video or online tutorial.
- **Relative space emphasis**, such as the relative amount of space measured in area of a marketing brochure or consumer pamphlet.

Text-based programming languages like Python can be helpful in parsing and tabulating large quantities of text, yet more basic assessments can be performed using simple computation in Microsoft Excel. The key is to be thoughtful about any specific implementation and make an informed judgment on whether a calculation provides an economically reasonable assessment of relative value for the task at hand. Additional research may be fruitful in tying these quantitative metrics of

5. Note that the Federal Circuit has repeatedly emphasized that “estimating a ‘reasonable royalty’ is not an exact science. As such, the record may support a range of ‘reasonable’ royalties, rather than a single value. Likewise, there may be more than one reliable method for estimating a reasonable royalty.” Apple Inc., et al., v. Motorola, Inc., No. 2012-1548, 1549, 2014 U.S. App. LEXIS. 7757 (Fed. Cir. 2014).


value to known metrics of value, such as survey data. Content analysis has a rich academic history and foundation in the social sciences, including political science, journalism, social psychology, communications, and other fields. Its origins date back more than 50 years and aims to use scientific and systematic analysis of content in order to extract summary information and draw meaningful conclusions. Content analysis has been described as a “scientific, objective, systematic, quantitative, and generalizable description of communications content.”

**Evaluation of marketing emphasis**

In light of its rich academic support, utilizing content analysis of marketing emphasis to evaluate relative emphasis for apportionment in valuation and reasonable royalty merits consideration. That is, one application of content analysis in an apportionment context is its use in evaluating the relative emphasis placed on various product features or attributes when companies market their products to consumers. In this situation, content analysis can be used to quantify the relative emphasis on various features based on the magnitude of marketing attention devoted to them, measured by words, space, concepts, or otherwise.

Economic theory has long indicated that preferences can be learned from actual, observed behavior—i.e., that preferences are revealed through actions taken by firms and consumers in the marketplace. This theory of revealed preference is foundational to the field of economics. In the case of marketing, decisions by firms in a competitive environment to emphasize certain product features over others are informative on consumer preferences for those products. The foundational economic concept of profit maximization finds that profits are maximized where marginal revenue equals marginal cost. Because of limits to marketing resources and consumers’ attention, firms emphasize those features that are most impactful to demand in making profit-maximizing decisions. Said another way, firms maximize profits by marketing the features that are most relevant and impactful for purchase.

Published research on marketing practices confirms that, consistent with economic theory, marketing materials are designed to emphasize features that are important to consumers. Unsurprisingly, marketing materials that advertise multiple product benefits or features are designed to emphasize those that are most important and impactful on consumer demand and purchase decisions. For example, Mackenzie (1986) states: “one of the ways in which advertising influences the importance of an attribute is by focusing attention on it.” Similarly, Guido (2001) finds: “where an ad must seek out an audience member, the aim should be to maximize feature prominence (attention getting elements) of the information content advertisers want to convey to consumers, and to exclude the other advertising components.” Additional published literature can be found in the Appendix.

From a practical standpoint, measures of marketing emphasis can be evaluated based on the relative number of words, space, time, or other quantitative metrics devoted to a particular feature or functionality. As an example, suppose an expert seeks to measure the marketing emphasis of a patented technology for blind-spot detection in an automobile. An expert might consider using content analysis to quantitatively measure how often blind-spot detection is marketed in advertisements relative to other consumer add-on features like heated seats, anti-lock breaks, etc. If blind-spot detection is more frequently referenced or emphasized in advertisements relative to heated seats, then an expert may conclude, based on a content analysis, that the value to consumers of heated-seats is lower than the value of blind-spot detection. Of course, appropriate implementation would depend upon expert judgment and economics of the particular industry at issue.

In one recent example, Courts have allowed certain expert methodologies relating to relative emphasis or implementation in software. In *Finjan v. Blue Coat*, the district court accepted an expert’s content analysis of source code as a method for apportionment. To apportion revenue, the expert used “the percentage of each accused product’s source code attributable to the feature(s) accused of infringing one or more of Plaintiff’s patents-in-suit.” While this approach may not be applicable in all circumstances, its acceptances in this case provides some indication of

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broader potential acceptance of content analysis for measuring relative emphasis.

While a content analysis may provide a quantitative measure of marketing emphasis, it is not always appropriate in all circumstances. For example, content analysis of marketing emphasis would not be appropriate for valuing a technology that is so fundamental or expected that it is not advertised. Taking the car example from above, core engine technology may not be advertised in the same way as consumer add-ons. Thus, care must be taken by the expert to conduct content analysis in a reasonable manner that is specific to the facts of a given case.

Conclusion

When valuing a particular technology or determining how two parties would negotiate over a license to a particular technology, experts often face the sometimes challenging task of apportioning for the value provided by claims of intellectual property. Utilizing content analysis, when properly applied, in certain circumstances as one potential methodology for quantitatively evaluating apportionment is worth consideration. This article discusses the rich academic and intellectual foundation for such an approach, and provides insights into practical implementation in reasonable royalty analyses.

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Appendix

Content analysis has been widely used and applied by researchers, analysts, and practitioners in a wide variety of fields. For example:

- **Swales and Yoon (1992)** use content analysis to predict stock price performance, explaining, “For each company, the study focused on the president’s letter to stockholders from the annual report for the period immediately prior to the group-selection year. Content analysis was used to classify and tally recurring themes identified by similar words or phrases. The themes included references to confidence, economic factors, growth, strategic plans, new products, anticipated losses, anticipated gains, long-term optimism and short-term optimism. We used the frequency of allusions to each theme and the percentage of the letters devoted to it to construct the data set.”

- **McKeone (1995)** discusses content analysis in the context of comparing a company’s media coverage to that of its competitors, stating, “First you need to find out how much coverage there was. Not just coverage of your company, but if you are operating in a competitive marketplace, how much your competitor received... Units of measurement fall into two groups—units such as column centimetres or column inches, and number of words... In many ways, simple word count, allowing a pro-rata figure for illustrations and headlines, is a much more useful measure.”

- **Laver and Garry (2000)** describe the Manifesto Research Group Project, in which “researchers set out to measure the relative emphasis placed on an issue by a party in a manifesto,” an analysis which “involved expert coders, fluent in the language concerned, reading each manifesto sentence by sentence and allocating each sentence to a category in the coding scheme.”

- **Laver, Benoit, and Garry (2003)** explain the identification and inference of policy positions from political texts, stating, “The texts analyzed can relate to collectivities such as governments or political parties or to individuals such as activists, commentators, candidates, judges, legislators, or cabinet ministers. The data generated from these texts can be used in empirical elaborations of any of the huge number of models that deal with the policies or motivations of political actors.” The paper treats texts “as collections of word data containing information about the position of the texts’ authors on predefined policy dimensions. Given a set of texts about which something is known, our technique extracts data from these in the form of word frequencies and uses this information to estimate the policy positions of texts about which nothing is known.”

- **Gentzkow and Shapiro (2010)** draw upon word usage to construct an index of political media language, stating, “there is a significant correlation between popular perceptions of a newspaper’s political leanings and its propensity to use words and phrases favored by different political parties in Congress. Our measure of media slant exploits this fact by endogenously identifying politically charged phrases.”

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es like ‘death tax’ and ‘estate tax,’ and computing their frequencies in daily newspapers throughout the United States.’”

- **A SAS White Paper (2010)** describes the benefit of text analysis for marketing, finding, “Text analytics are our only hope for monitoring, comprehending and participating in public discourse. While the variety of technologies may be perplexing, the uses for them are vital for calibrating the success of social media investments, and maintaining good relations and a competitive edge. From the advertiser’s perspective, success is measured in the reach required to generate awareness… Statistically derived intelligence from business-rules-driven text analytics tools is the latest advantage in the ongoing struggle for relevance, timeliness and a competitive edge.”

- **The Financial Post (2011)** indicated RBC’s count of words in the Federal Reserve’s Beige Book as informing its analysis of economic conditions, stating, “If you’re looking for some insight into the Beige Book—the Fed’s compilation of anecdotal information of current economic conditions—one way to achieve this is by looking at the language used in the report, much like minutes from FOMC meetings are scrutinized. RBC Capital Markets puts together a word count, tallying up the number of times ‘slow,’ ‘weak,’ or ‘subdued’ and their derivatives appear in the Fed’s Beige Book. The total jumped to 101 from 80 in the most recent report released Wednesday, which was based on conditions on or before May 27. Tom Porcelli, RBC’s chief U.S. economist, noted that this is the highest reading since the word count sat at 118 in October 2010.”

- **Young and Soroka (2012)** use word count to analyze political sentiment, finding, “Political discourse cannot be reduced to mere factual information—the tone of a text may be as influential as its substantive content. Indeed, numerous studies have focused on the tone or sentiment of news content, political speeches, and advertisements. Moreover, a substantial and growing body of research suggests that affect is a central component of individual decision making and political judgment generally, as well as the processing of media information in particular. The reliable and valid analysis of sentiment is, in short, a critical component of a burgeoning field of research in political communication, and political science more broadly… Our instrument uses a dictionary-based approach consisting of a simple word count of the frequency of keywords in a text from a predefined dictionary.”

- **Taddy (2013)** discusses “the relationship between text data—product reviews, political speech, financial news, or a personal blog post—and variables that are believed to influence its composition—product quality ratings, political affiliation, stock price, or mood polarity. Such language-motivating observable variables, generically termed sentiment in the context of this article, are often the main object of interest for text mining applications. When, as is typical, large amounts of text are available but only a small subset of documents are annotated with known sentiment, this relationship yields the powerful potential for text to act as a stand-in for related quantities of primary interest.”

- **Taddy (2013)** describes his analysis of Twitter posts to determine political sentiment, stating, “We are motivated by the problem of design and analysis of a particular text mining experiment: the scoring of Twitter posts (‘tweets’) for positive, negative, or neutral sentiment directed towards particular U.S. politicians…. Text data are viewed throughout simply as counts, for each document, of phrase occurrences. These phrases can be words (e.g., tax) or word combinations (e.g., pay tax or too much tax).”

- **BlackRock Investment Institute (2013)** maps the frequency of word use in portfolio manager blog posts to both characterize 2013 and plan for 2014, stating, “Clearly, ‘growth’ (or absence thereof) has been foremost on our minds, followed by ‘risk’ and ‘rates,’” with a graphic explained as follows: “The bubbles show the top-50 most frequently used investment terms in blog post responses by BlackRock portfolio managers to the firm’s ‘question of the week.’ Bubbles are proportionally sized by word count to represent the frequency of usage.”

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• The University of Chicago Computation Institute (2014) describes the analysis of text as data, crediting text analysis with determining the authors of the Federalist Papers and proposing methods to increase Yelp’s value to users, stating, “Many of these text analyses are based simply on counting words, or what Taddy called ‘The Bag of Words’ – parsing raw text into individual words, phrases, or even emoticons and hashtags, then treating them as an independently distributed sample where statistics can be applied... Spam filters, search engines, and Siri all use software based on these methods, now known as natural language processing.”

• Merrick (2015) expresses the wide and varied uses of content analysis, stating, “Aided by powerful computers and new statistical methods, [researchers] are dissecting newspaper articles, financial analyst reports, economic indicators, and Yelp reviews... Businesses may be able to learn about a product defect before anyone calls customer service. Economists could pinpoint the start of a financial crisis and determine which policy remedies are most effective. Political junkies can use text to understand why the phrase ‘mashed potato’ boded ill for Newt Gingrich’s presidential aspirations—and learn from that, too. Investors can also benefit from analyzing text... Other researchers are using large-scale text analysis to parse bodies of language ranging from financial statements and company documents to eBay product descriptions to the Google Books corpus... At heart, text analysis is still a practice of counting words—or ‘tokens,’ in statisticians’ parlance—and using those counts to make predictions about the speaker or author.”

Published research on marketing practices confirms that, consistent with economic theory, marketing materials are designed to emphasize features that are important to consumers. For example:

• Mackenzie (1986): “These findings suggest that one of the ways in which advertising influences the importance of an attribute is by focusing attention on it.”

• Guido (2001): “[Marketing communication] operates to maximize consumer awareness and must incorporate elements that will direct search (call attention) to the product or to specific aspects of it. To succeed, it must transfer attention to an unsought message (information or motivating stimulus). Therefore, where an ad must seek out an audience member, the aim should be to maximize feature prominence (attention getting elements) of the information content advertisers want to convey to consumers, and to exclude the other advertising components.”

• Shimp (2010): “It is critical that the package designer acknowledge that the package ‘advertisement’ at the point of purchase occurs in an incredibly cluttered environment for a very short duration. Acknowledging this fact makes it much easier to devote package space to the most important brand benefit.”

• Hawkins, Mothersbaugh (2010): “Once a manager has isolated the combination of motives influencing the target market, the next task is to design the marketing strategy around the appropriate set of motives. This involves everything from product design to marketing communications... One consideration is the extent to which more than one motive is important. If multiple motives are important, the product and ads must provide and communicate them, respectively.”

• Burrow (2009): “Promotion emphasizes the qualities of the product or service that consumers believe are most important... Promotion reminds consumers of the reasons they prefer the product.”


