Attention in Business Press to the Diffusion of Attention Technologies, 1990-2017
CODEBOOK [V11; June 2017]

RONALD E. RICE
ZANE T. HOFFMAN

Department of Communication
University of California, Santa Barbara, CA 93106-4020
rrice@comm.ucsb.edu

8N. Trialability: Negative
9P. Complexity: Low
9N. Complexity: High
10A. Reinvention: Attribute
10T. Reinvention: Adoption Type

Purpose:
This study seeks to understand the evolution or social construction of innovation attributes of data storage, data tracking, and analytics technologies, as portrayed in trade publications from 1990.

Sample:
Business Source Complete was used to gather an appropriate sample size. For the search criteria, "Marketing" AND "data storage" OR "data analytics" OR "data tracking" were used. Upon inputting these search terms, the sample was further narrowed by selecting trade publications from 1990 to 2017. As data storage, data analytics, and data tracking technologies are a recent trend, the years 1990 through 2017 were selected. Trade publications were selected because these articles are specific to the industry and will provide a comprehensive view of how these specific technologies are discussed in the realm of marketing. Additionally, "full text" was selected to further narrow the sample. The overall search criteria yielded 835 articles. The unit of analysis will be the entire article, using the first mention of a specific technology in each of the three technology categories, with all instances of positive and negative attributes associated with that specific technology.

Introduction to Coding:
Read Article:
Read the entire article first, to get a sense of the topics, context, and relationships.

I. Coding for Manifest Information:
Then go back and enter/copy and paste the text for the manifest codes (described below).

II. Coding for Latent Content:
Coding for First Instance of a Specific Technology in One or More of the Three Categories (Tracking, Storage, or Analytics):
Each of these three technology categories has specific technologies that pertain to them. For example, data tracking technologies include technologies such as event-driven marketing, geofencing, geolocation, etc. Reliability will not be based on each specific technology coded; rather it will be based on coding for each of the three categories (tracking, storage, or analytics). Coders should still input every relevant technology into the classifications previously mentioned.

However, at this point the unit of coding is the sentence in which the "first mention only" of any of the three categories of technologies (tracking, storage, or analytics). Code attributes only in relation to the first mention of a specific technology within any category. So there may be multiple sentences referring to a specific technology in one of the three technology categories, but code for a positive and/or negative attribute only for the first instance of a specific technology, in the first-mentioned category.

This means you will have ONLY 0s or 1s in the attribute codes, and any attribute code will refer only to the first mention of a specific technology in the first-mentioned technology category.

This also means that once you identify the first category mentioned, go back to the FM columns, before the set of "1" columns, and code for the presence of the first-mentioned category in the FM set: FMT (tracking), FMS (storage), or FMA (analytics).

Coding for "Other" Specific Technology in Any of the Three Technology Categories:
If a specific technology, within a category, occurs in the article that is not explicitly mentioned as one of the possible specific types within its category, write the specific technology in the "Other" column for that category. Upon analysis, if codes are yielding 10% in the "Other" category, researchers will reassess to see if we need to create a new specific technology for that category.

Coding for Attributes:
Only the first-mentioned specific technology within the first mentioned of the three main technology categories of tracking, storage, or analytics will be coded for the first instance of any attribute (positive and/or negative) mentioned in association with that specific technology, throughout the article.

Thus there will be only a 0 or 1 in each positive or negative attribute; we are not now coding for multiple instances of an attribute.

In some cases two sentences will be inherently connected, so if the second refers to an attribute associated with a specific technology mentioned in the priori sentence, but does not itself explicitly mention the relevant specific technology, it will still be considered relevant. For example, "However, the report suggests there is room for agencies to provide help in the area of data analytics. Part of the problem comes from the fact that agencies say they are still struggling to understand data, scoring themselves an average of 5.88 out of 10." The second sentence is inherently connected to the previous sentence, which references data analytics. Therefore, in this instance, the second sentence references uncertainty pertaining to data analytics technologies and must be coded as such.

I. Manifest Content:
Copy and paste or type the following information for each article.

Publication:
PI: Article Identification: the exact unique article identification number. There should be 835 unique IDs, in strict sortable order (i.e., numbers from 001 to 835, etc.), uniquely and accurately related to each article and its file.
PT: Title of the Article
PV: Publication Venue: the title of the magazine, newspaper, trade publication, etc.
PD: Date Published: DD/MM/YY (NOTE: days first; include 0 for days 1-9 and months 1-9; i.e., 03/09/97; must use this format, meaning in most cases you can't copy and paste but have to type it in; the spreadsheet is set to use this format)
PL: Article Length: the word count

Relevant:
0 not relevant

1 relevant

Company:
CN: Company Name: the company discussed as having adopted, considering adopting, or promoting the technology
CRA: Company Role: **Adopting** it is company adopting or considering adopting the technology.
CRP: Company Role: **Promoting** it is a vendor/consulting company promoting the technology.
If not clear, leave blank.

II. Latent Content:
Cells are pre-filled with 0s. Code 1 if present; increase number for each instance referring to the first-mentioned specific technology in each of the three categories.

IIA. Classification of Technologies:
Code for the first mention of a specific technology within each technology category, but code for up to all three technology categories.

NOTE: When analyzing the current literature, social media are bound to be prevalent in the data driven marketing space. Social media are becoming increasingly important to marketing due to the extent to which companies are able to mine consumer data to provide businesses with audiences segmented by interests. For this coding scheme, use of social media terminology will provide contextual clues for the appearance of data storage and data tracking technologies. However, social media themselves are not considered data tracking, storage, or analytics technologies. Therefore, do not code for the social media platform specifically; rather, look for mention of the general category of data tracking, storage, or analytics technologies when social media platforms are mentioned.

First Mention (FM):
Once you have identified the first mentioned technology category (below), go back to the three FM categories, and enter a "1" under that first mentioned technology category.
FMT: tracking
FMS: storage
FMA: analytics

1. Data Tracking Technologies:
Tracking technologies are utilized by organizations to gather information about the consumers' online behavior. Any technology that serves to gather user profile data such as "how old you are, where you live, what you read, and what you are interested in" (Tactical Tech, 2016, p.1). Tracking technology can best be understood as technologies that gather information on the consumer and the consumer's online behavior.

List of Data Tracking Technologies:
1A. Cookies
1B. Customized coupons
1C. Event-driven marketing
1D. Geofencing
1E. Geolocation
1F. IP tracking

1G. Transactional purchasing data (Online transaction processing (OLTP): Clarification [provide reference]: "On line transaction processing (OLTP) involves gathering input information, processing the information and updating existing information to reflect the gathered and processed information. As of today, most organizations use a database management system to support OLTP. OLTP is carried in a client server system" (Revolvy, 2015, p. 1). We classify OLTP as a data tracking technology due to its need to be supported by a database management system. In order to classify it as a storage technology it would need to fully store data on its own.
1H. Other: if the first mention of a data tracking technology is something other than the above list, type in the name of that specific technology in the "other" cell.

2. Data Storage Technologies:
Data Storage technologies are any technology that stores customer data, sales data, behavioral data, and sentiment data. These technologies allow companies to utilize data in order to tailor their companies' efforts to meet customer preferences. There is a vast array of data storage technologies and thus this study seeks to classify each main subtype of data storage technologies. Coders will insert a "1" if a particular data storage technology is mentioned in the article or a "0" if they are not present. Code for possible multiple specific data storage technologies are present in the article.

List of Data Storage Technologies:
2A. Cloud Computing
2B. Database-general (see below)
2C. Database-relational (see below)
2D. Data center
2E. Data marts (isolated databases with scattered customer info/data)
2F. Data volumes
2G. Other: if the first mention of a data storage technology is something other than the above list, type in the name of that specific technology in the "other" cell.
Database-general vs. Database-relational:

The primary difference between a database management system and a relational database management system is that relational databases "store data in tabular form, while DBMS applications store data as files" (Richa, 2014, p. 1). A database management system may have tables of data, but there is no relationship between the tables, whereas relational databases have one or more relationships between the tables (Richa, 2014, p.1). Therefore, articles that explicitly mention "relational database" or "data in tabular form" then code it as "database-relational". If the article just mentions "database" in general, then code it as that.

3. Data Analytics Technologies:
Data Analytics tools are primarily utilized to "organize, store, and mine all of the information scattered throughout their organization and provide customized intelligence to gain faster insight from the information" (Online-Behavior, 2012, p. 1). Due to data analytics technologies' capabilities to store information, there is an inclination to code it as data storage technology. However, *the primary function of data analytics is to organize the stored data and derive insight from it through metrics and analysis*. Data analytics allows companies to gain value and information from the data stored in the data storage technologies. Data storage technologies typically do not generate insight for business decisions, but simply store the data. This technology allows businesses to derive insights from their marketing efforts across platforms as

well as understand their competitors' offerings. Data Analytics technologies primarily focus on understanding trends and patterns by "analyzing and interpreting vast quantities of data; customer demographics, product purchase histories, internet experiences, and online transactions, turning information into insight and developing strategies to gain competitive advantages" (Online-Behavior, 2012, p. 1). Data analytics offer businesses a competitive advantage and therefore, have become highly discussed and adopted over the years.

List of Data Analytics Technologies:
3A. Behavioral
3B. Clickstream
3C. Predictive
3D. Stream
3E. Value based marketing
3F. Other: if the first mention of a data analytics technology is something other than the above list, type in the name of that specific technology in the "other" cell.

IIB. Attributes:
Code for presence of each attribute, positive and/or negative, for the first-mentioned of the three categories (as indicated in the FM codes above).

4. Compatibility: "the degree to which an innovation is perceived as consistent with existing values, past experiences, and needs of potential adopters" (Rogers, 1995, p. 224). Upon analysis of the current articles, an article could mention one or more of several different factors the technology will need to be compatible with in order to facilitate or promote adoption.

Compatibility Subtypes (culture, strategy, technology):
4A. Compatibility: Culture: Many articles have asserted that data driven marketing tools are changing the overall structure of organizations by creating the need for new roles. For example, CMOs need to either start learning the new technologies or organizations need to create a new position known as the CTMO (Chief Technology Marketing Officer). Additionally, emerging technology may create the need for employees to learn new skills in order to use the new technology. This may create a shift in the skills required by employers as well as new titles. Other aspects of culture include norms and influence. This may include, for example, mention of how this is a growing trend, that leading organizations are adopting it, that organizational and industry strategies are emphasizing aspects of the topic, etc.
If the article mentions lack of analytical skills (or skills in general), this is an instance of compatibility with culture. The organization's lack of analytical skills creates an incompatibility, because in order for the organization to properly use the technology, the culture needs to shift to one that institutes training with analytical tools or recruiting employees who already possess these skills.
4AP. Compatibility: Culture: **Positive**: A positive compatibility might be a mention of a smooth transition for developing new teams and roles based on the technology.
4AN. Compatibility: Culture: **Negative:** A negative relationship might be difficulty in shifting roles and teams to match with the adopted technology.
4B. Compatibility: Strategy: "A business strategy is a set of guiding principles that, when communicated and adopted in the organization, generates a desired pattern of decision making. A strategy is therefore about how people throughout the organization should make decisions and allocate resources in order accomplish key objectives" (Michael Watkins, 2007, p.1). In many

cases, an organization will need to be able to integrate the new data driven marketing technologies into their overall marketing department. The technology needs to be operational with current marketing budgets and allocation of resources in order for adoption to be achieved. Compatibility with strategy will be evident when articles mention factors such as "appropriate allocation of resources," "integrating digital media more effectively into their broad marketing plan," etc.

4BP. Compatibility: Strategy: Positive: A positive compatibility might be indicated through an ease of allocation of resources, or mention that the technology supports an organizational mission or market niche.

4BN. Compatibility: Strategy: Negative: A negative compatibility might be a misalignment of budgets and resources, or might not match the mission or market.

4C. Compatibility: Technology: Data driven technologies need to be compatible with organizations' current technology in order to ensure a smooth transition once the new technology has been adopted. Easy integration tends to aid in the transition to an emerging technology. This sub-type will be indicated through the discussion of integration and current technology utilized by the organization.

4CP. Compatibility: Technology: Positive: A positive compatibility might be indicated through easy integration, migration, or easy implementation due to existing systems.

4CN. Compatibility: Technology: Negative: A negative compatibility might be indicated through specialized coding, new systems, new hardware of software.

5. Uncertainty (includes risk**):** Greenhalgh has described risk as a factor influencing adopter decisions. If the innovation carries much uncertainty of the outcome, which the individual or organization might perceive as risky, it is less likely to be adopted. "Because an innovation's risks and benefits are not evenly distributed in an organization, the more the balance between risks and benefits reflects the organization's power base, the more likely the innovation is to be assimilated" (Greenhalgh, 2004, p. 596). For example, the technology seemed too expensive and not fully developed when initially created, so the return on investment (ROI) is uncertain, so the investment is risky. However, according to Alfieri "with the cost of processing, storage and tools having gone down so much, if you're not using data to make your decisions, or at least to inform your decisions, you're probably not doing your job" (Alfieri, 2015, p. 3). This demonstrates a reduction in uncertainty as the technological advancement has reduced the financial uncertainty regarding return on investment for organizations. With operational costs being reduced, it indicates a higher rate of financial return. Due to the development of the technology over the past several decades, the price of data driven technology has decreased, primarily due to the increase in technological capability, reduction in storage and processing, and increased market. Therefore, much of the risk pertaining to cost and outcome for mature technologies dissipates over time. Additionally, there was concern over the capabilities of such technologies and skepticism about the effectiveness of tracking data. However, this has also dissipated due to trade show demonstrations and evidence of higher marketing ROI's. There is a growing concern over the legality of tracking consumers' online behavior and if it violates current privacy laws. Currently, these methods are legal, but there is growing discussion over the extent to which consumer data can be obtained. This can lead to growing concerns for organizations, as their source of revenue could be dramatically changed if stricter policies are enforced. For the purposes of this study, risk will be classified as uncertainty regarding adopting the technology, including financial, policy/legal, technological.

5. Uncertainty Subtypes (financial, policy, technological):

5A. Uncertainty: Financial: Any reference to financial uncertainty (including ROI, or return on investment); includes, for example "difficult" to estimate ROI, financial costs, budgeting concerns, etc.) that may be placed on adopting the new data driven marketing technologies.
5AL. Uncertainty: Financial: Low: This will be indicated by a decrease in risk regarding finances.
5AH. Uncertainty: Financial: High: This will be indicated by an increase in risk regarding finances.
5B. Uncertainty: Policy/legal: Any reference to the potential legal ramifications or sanctions pertaining to data mining and analytics. The articles may note concerns about intrusion of consumer privacy and the uncertainty regarding emerging privacy laws.
5BL. Uncertainty: Policy/legal: Low: This will be indicated by a decrease in legal uncertainty.
5BH. Uncertainty: Policy/legal: High: This will be indicated by an increase in legal uncertainty.
5C. U**ncertainty: Technological:** Any reference to uncertainty relating to their technologies capabilities or integration with current systems.
5CL. U**ncertainty: Technological: Low:** This will be indicated by less uncertainty or risk regarding technological factors.
5CH. U**ncertainty: Technological: High:** This will be indicated by more uncertainty or risk regarding technological factors.

6. Relative Advantage: "relative advantage is the degree to which an innovation is perceived as being better than the idea it supersedes" (Everett Rogers, 1995, p. 212). Relative advantage is subjective, or socially constructed as any economic, financial, or performance based benefit facilitating competitive advantage for the organization. As news stories or trade articles will rarely specifically use the term relative advantage, this attribute will be indexed by such words as improving (positive) or reducing (negative) "value creation," "customer acquisition," "optimization," "competitive image." Additionally, the articles may reference the technologies aiding in developing customer relationships; this is also an example of relative advantage. Although terms such as "analytics" and "tracking" do offer the company a relative advantage as they aid in the allocation of resources, in this coding scheme these will be classified under data tracking or analytics technologies. Additionally, terms such as "return on investment" will be classified under financial uncertainty due to potential adopters being uncertain about the financial yields of the technology.

6P. Relative Advantage: Positive: Reference to a positive aspect of relative advantage such as optimization of revenue or significant return on investment.
6N. Relative Advantage: Negative: Reference to a negative aspect of relative advantage such as poor returns or lower margins.

[NOT CODED: Observability (often included with Communicability): "the degree to which the results of an innovation are visible to others" "the observability of an innovation, as perceived by members of a social system, is positively related to its rate of adoption" (Rogers, 1995, p. 244). Data tracking, storage, and analytics have little visibility to the populace, as they are typically internal, offsite for companies, or processed through third parties. Due to the lack of observability with these specific technologies, the study will focus on communicability and not code for observability.]

7. Communicability: This attribute focuses on one's ability to communicate about the prospective technology, or be exposed to others' communicating about it. There is a growing trend of communication about these data driven technologies, as more businesses are selling these technologies grow and improve their technology. So examples would include the upward trend in marketing and communication about data driven marketing technologies, with conferences, blog posts, webinars, trade shows, etc. all centered on the need for these technologies to improve the companies' marketing efforts. Additionally, many industry leaders discuss how this is the emerging trend for technology and who else has adopted the technology. Therefore, this also indicates an element of communicability as it increases the social and competitive pressure for adoption.

Additionally, mentions of how an organization heard about a general or specific aspect from other organizations, trade associations, conferences, mentions in the press, webinars, training opportunities, sales team visits, and vendor conference presentations would be coded as communicability. Another example is how an organization plans to communicate to the public about their product or service. This may include mentions of their publicity or marketing campaigns, about particular ads, promotions, websites, blogs, etc.

7P. Communicability: Positive:** Reference of success in communication about the technology, whether from the company or to the company.
7N. Communicability: Negative: Reference of difficulties in communicating about the technology, insufficient information, difficulty in gathering an audience, lack of viewership for advertisements.

8. Trialability: "the degree to which an innovation may be experimented with on a limited basis" (Rogers, 1995, p. 243). A trial run has the ability to dissipate uncertainty regarding the innovation, and can be used as a mean to reaching full adoption status. In terms of data storage, tracking, and analytics technologies, a trial can help reduce uncertainty regarding compatibility, relative advantage, and reinvention. The current trend in the data driven marketing industry is to offer free demos which would allow potential adopters to experience first-hand how the technology will work within their infrastructure. Examples of trialability include demonstrations and beta applications organizations can test, and trials of components or modules before deciding on full adoption.

8P. Trialability: Positive:** Reference of success in beta tests and demonstrations, and ability to try out various components.
8N. Trialability: Negative: Referencing difficulties during demonstrations or beta tests, or mentioning "turnkey" systems, or need for full transition or large-scale implementation.

9. Complexity: "the degree to which an innovation is perceived as relatively difficult to understand and use. The complexity of an innovation as perceived by members of a social system, is negatively related to its rate of adoption" (Rogers, 1995, p. 242). Complexity may be indexed by mention of a high learning curve, presenting a challenge in implementation. Additionally, complexity may be indexed by an indication of how much previous knowledge a user needs in order to utilize the technology.

9L. Complexity: **Low**: Ease of use or simplicity, easy to understand reports and processes. References to ease of use of the technology should be coded as positive (that is, low) complexity.

For example, "Amdocs' big data analytics portfolio in 2014, which was designed to make data clean, accessible and actionable for service providers of third parties." The quotation illustrates how the introduction of data analytics technology is simplifying the process of analyzing data.
9H. Complexity: **High:** A high learning curve, or need for consultants to help implement.

10. Reinvention: Reinvention is an attribute of an innovation that allows "potential adopters to adapt, refine, or otherwise modify the innovation to suit their own needs" (Greenhalgh, 2004, p. 596). Reinvention is adaptation of the innovation after adoption. This attribute is increasingly important when evaluating organizations' adoption of digital technologies for data-driven marketing. From initial research, it is evident that organizations have a variety of different needs based on their industry, and thus will need technology that can be adapted to fit their organizational infrastructure. Rogers defines reinvention as "the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation" (Rogers, 1995, p. 541). However, this study's primary purpose is to analyze reinvention as an attribute of the innovation. Due to the variance in definitions, coders will account for both definitions.

Reinvention Subtypes (attribute, adoption type):
10A. Reinvention: Attribute: "A technology may be marketed or advertised as easily adjustable, customizable, reconfigurable, tailored in order to fit the organizations' needs. To the extent to which a potential adopter perceived this as a worthwhile quality of the innovation, it will serve as an attribute affecting adoption" (Rice, 2017).

10T. Reinvention: Adoption Type: "reinvention or adaptation of the innovation that occurs after the initial adoption, such as the redesign or changing of data driven marketing technologies by the organization to meet their needs and wants, or developing new ways to use or integrate the initial adopted technology" (Rice, 2017). For example, articles may discuss how an organization discovered new uses for the technology they adopted, or implemented the innovation in ways that were not originally advertised or intended.