Interpretation of Public Feedback to Transportation Policy: A Qualitative Perspective

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Abstract

Due to inadequate funding for road maintenance and expansion, many state governments are exploring the implementation of a vehicle-miles-traveled (VMT) policy. Such a policy requires adequate communication to the public that not only informs but also communicates the issues of concern to the constituents. As part of this communication, the Nevada Department of Transportation began by conducting workshops, while local newspapers allowed Internet-based response to the basic idea of this tax. Our article takes the qualitative data obtained from these multiple sources and analyzes it via a two-pronged qualitative methodology. First, we ascertain common profiles through iterative coding, and then we use concept maps to delve into the relationships between themes within these segments. Our findings indicate that by using qualitative segmentation followed by concept mapping of open-ended customer data, public policy officials can find genres or issues of interest to large segments and address those in communication endeavors.

Keywords

Transportation infrastructure, qualitative analysis, vehicle miles traveled, fuel taxation, communication framing

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Introduction

To public custodians and influential stakeholders and observers, the usage and fiscal realities of the highway system in the United States are staggering. Inadequate funding mechanisms for road maintenance, expansion, and innovation confront the US government and general public with a dynamic spending gap proportional to the slow deterioration in quality and capacity of the surface transportation infrastructure. As reported by the National Surface Transportation Infrastructure Financing Commission (NSTIF), the US road network grew by only 4.4 percent in 2009, despite doubling the number of car and truck miles driven on it (NSTIF 2009). This overutilization has accelerated road deterioration costs at a rate estimated to be three times what current funding mechanisms can support (NSTIF 2009). Additionally, this overutilization imposes costly externalities such as congestion delays, pollution, and accidents on the public. Estimated congestion costs alone ran $126, $113, and $115 billion in 2007, 2008, and 2009, respectively (Delucchi and McCubbin 2010).

There are various possible funding solutions aimed at keeping the national highway infrastructure up to date, and adequately matching user behavior do not lack clarity or urgency in the eyes of these custodians and stakeholders. Among such solutions is the replacement or augmentation of federal and/or state fuel usage fees, which serve as proxies for actual road usage, with a distance-based fee, specifically, vehicle-miles-traveled (VMT) user-charge system (NSTIF 2009). The logic for a VMT system stems from the fact that road deterioration increases with the number of vehicle miles accumulated by users and that distance-based vis-à-vis fuel-based user charges promise more precise and equitable allocation of actual highway consumption costs to users. The current fuel tax is levied per gallon, and hence is not sensitive to dynamic economic changes. Specifically, as the gas price changes, the tax amount stays the same. Moreover, as vehicles become more fuel efficient, the amount of tax collected gets reduced. In an extreme case, electric vehicles, which also use the same road facilities as regular ones, do not pay any fuel tax since they do not require any fuel. Hence, the government needs to introduce a mechanism that ties road usage to usage fees.

Despite the inefficiency of this problem and the promise of VMT user charges to public decisionmakers and influential stakeholders, among highway users (i.e., the general public) these realities are arguably less obvious. For most drivers, the slow, barely noticeable process of road deterioration generally holds little to no priority during any given vehicle trip. While

most drivers might acknowledge fuel tax dollars as funding sources for road provision and upkeep, it is just as likely that they do not regularly distinguish the actual cost of fuel purchases from the total amount of money spent at a pumping station. To most, money spent on vehicle fuel is viewed entirely as a private matter even though fuel user charges ensure that all vehicle operators participate in the public funding of highways. Debatably, fuel tax charges are so embedded in fuel expenditures and, to a great extent, ignored by most drivers. In fact, given fuel-purchasing behavior in general, most drivers would probably not notice changes in fuel tax levels, especially in these days of regularly rising fuel costs. However, substitution of fuel taxes by VMT-based or other highway funding solutions portends major disruptions to the status quo. Thus, it is not surprising that predicted signs of public acceptance of a VMT user-charge system point to resistance, calls for clarification, and questions about the need for it.

The extant literature offers numerous, useful studies that explore public acceptance of highway funding alternatives; often their context centers on comparative evaluation of perceptions toward a wide range of funding solutions. Dill and Weinstein (2007), for instance, analyze survey results from California resident support for 12 highway revenue options, including a mileage-based fee for in-state travel. Similarly, Gupta, Kalmanje, and Kockelman (2010) assess perceived public support among Texas citizens of more than a dozen funding mechanisms. To date, a few studies have raised public acceptability issues concerning a VMT system of user charges, most notably the 2009 NSTIF study that predicts a variety of concerns, including the probability that such a system could lead to negative reception by the general public. However, few to no studies corroborate these concerns with the public's voice.

With this in mind, we undertake a study aimed at giving voice to, analyzing, and explaining public perceptions about a VMT user-charge system. From a practical standpoint, we offer a mechanism by which policy authorities such as the Nevada Department of Transportation officials (NDOT) can further understand public constituency concerns. Even more significantly, we highlight the importance of allowing for interactive opportunities between the public and the policymakers. Such communication mechanisms provide two key benefits. First, they provide firms with public feedback that can later be analyzed and, second, they create an environment whereby concerns can be voiced and information can be shared between the public and the officials. The benefit of understanding these concerns prior to policy implementation is underscored by the basic tenet

of democratic theory, "the belief that citizens should be able to influence policies that govern their lives" (Hobolt and Klemmemsen 2005). In sum, we show that not all concerns are deemed equal, meaning that within the public constituency different audience segments can be identified and further understood. Exploring these different segments and their specific concerns can help NDOT identify and target education and communication campaigns toward them.

In the next section, we discuss the implications of public opinion research methods on policy and provide our argument that a qualitative approach provides a meaningful foundation to explore public opinion toward policy. In addition, extending the textual analysis using primary audience segmentation techniques is useful for understanding an audience with respect to policy formulation. We then explain the methodology and tools used to mine public thinking about this controversial subject. From this, a discussion of results from the textual analysis ensues. We close with overall conclusions and managerial implications.

Literature Review

The relationship between public opinion and policy is complex and not absolute in causality; indeed, prior research suggests that the relationship is interactive or reciprocal at best (Wlezien 2004). Most empirical research suggests that public opinion does impact policy and implies that opinions matter (Burstein 1998, 2003). Conventional approaches to gauging the influence of public opinion on policy is primarily centered upon surveying the public for opinions on policies. Certain policies may elicit stronger responses from the public due to their perceived importance, whereas others may not, which can lead to biased samples (Burstein 2010).

Influential research by Page and Shapiro (1983) examines the congruence between public opinion and policy in the United States between 1935 and 1979. In this study, data collected by hundreds of surveys on policy preferences identifies 357 issues that had significant opinion change during that time period. Their findings suggest that opinion did influence policy in a majority of the cases. However, the main limitation of the study is that the authors did not publish their measures of opinion or policy (Burstein 2010). In general, most research in this area addresses macrolevel public opinion as opposed to delving further into understanding that the general population of public opinion, noting that they may be quite diverse in their preferences (Burstein 2010). Therefore, research should continue to identify better methods to attain and address public opinion regarding policy,

such as using textual analysis to identify clusters or segments of public sentiment in response to a policy. Recently, research by Bicquelet and Weale (2011) suggests that a plethora of textual data collected from open-ended survey questions may be of benefit in policy analysis, especially during the initial stages of exploration.

Segmentation, a process used to divide the entire market into smaller clusters, profiles, typologies, or groups, is a core element of marketing strategy (Kotler and Armstrong 2004) and a precursor to targeted communication strategies. Indeed, the appropriate framing of a message requires a clear understanding of the target audience or segment for that message and the concerns or issues that may need to be addressed. For example, in the context of the VMT, Krishen, Raschke, and Mejza (2010) use an experimental setting to deductively illustrate how various message framings are more (or less) effective for prevention-oriented (those who focus on avoiding loss) versus promotion-oriented (those who focus on achieving gain) individuals. Both scholars and practitioners have developed multiple techniques for segmenting markets. For our particular context, we focus on a potential transportation policy in which we analyze citizen responses regarding the potential policy. Two types of segmentation that researchers have utilized are quantitative and qualitative techniques.

Quantitative segmentation mainly focuses on using psychographic information of consumer activities and behaviors whereas qualitative segmentation techniques use psychological measures such as personality traits or attitudes (Quinn 2009). For example, one quantitative technique commonly used to identify segments is cluster analysis of customer attribute weights. This method requires researchers to identify key attributes of a particular product type, gather consumer weights for those attributes, and then perform conjoint analysis of the data. For example, recent research by Kimiloglu, Nasir, and Nasir (2010) identifies four clusters of consumers in the cellphone market by analyzing attribute weights for their sample. In addition to forming taxonomies of types of individuals, segmentation research also sets forth patterns of consumption around which clusters of consumers strategize.

Although most researchers agree on the importance and usefulness of segmentation, widespread debate continues on the best mechanism to achieve such segmentation. Some argue that segments are often defined such as to overstate the conformity within the segment and that instead, we should define consumer archetypes, or "individuals who express the richness and diversity of a given target segment" (Morris and Schmolze 2006,

p. 289). Indeed, at its best, any segmentation model is an approximation of reality (Wedel and Kamakura 2000).

Bond and Morris (2003) discuss latent class segmentation, or a process by which a population is divided into different groups of consumers through cluster analysis. They pinpoint the pitfalls of this quantitative technique; in particular, when the data are finally analyzed and the clusters are charted in two dimensions, there are often no significant differences in the demographic and psychographic makeup of the clusters. As a solution to this problem, Bond and Morris suggest qualitative segmentation to augment the quantitative methods, and hone in on need-based segmentation as opposed to simple people-based segmentation. In other words, these scholars suggest that quantitative research may be able to derive *what* people consume, but qualitative can augment this information with *why* they consume it.

Danneels (1996) explains the chain of reasoning behind applying a qualitative approach to in-depth interview data. The steps he suggests are the following: (1) transcription of in-depth interview data; (2) identification of *memos* (Berg 1989), or brief theoretical notes that occur to the researcher during the process of gathering the data; (3) sorting and combining the memos into broader theory-based statements; (4) conceptual clustering of quotes from all cases; and finally (5) introduction of theoretical propositions. The need to make segmentation strategic in nature, that is, targeted toward a specific overarching goal, often makes qualitative tiered approaches more appropriate (Sausen, Tomczak, and Herrmann 2005).

The coding of verbal data into logical categories tends to be the first step in any qualitative segmentation approach. Donath (2004) discusses various techniques for qualitatively analyzing email archives, including (1) semantic analysis of the topic and text of an email, (2) affective analysis to detect the personality of the sender and receiver of an email, and (3) social analysis, which attempts to gather the structure of the relationship between the sender and receiver based on the tone of the message. One application of these techniques done by Wakkee (2006) includes descriptive statistical content analysis of actual email header information and qualitative analysis of the email content to uncover intended meanings. Using this combination of qualitative profiling techniques, Wakkee (2006) is able to graphically represent her findings in a timeline graph.

Mindset or cognitive segmentation clusters respondents based on their patterns of utility for a product or idea, and involves modeling individual feelings toward a concept (Gabay et al. 2010). This approach

uses clustering of qualitative concepts to form segments as opposed to data-mining techniques and decision rules. The general basis for using attitudes and perceptions is grounded in personal construct theory (Kelly 1955), which proposes that individuals develop cognitions that maximize their anticipation or predictability of future events in their environment. As mentioned previously, qualitative segmentation can allow for a deeper understanding of constituents by delving further into their often unsolicited open-ended thoughts and ideas. Similar to messages pertaining to the importance of public transit (Smith, Razzouk, and Richardson 1990), successful deployment of VMT and other important transportation messages will require systematic communication that goes beyond surface-level targeting, and instead requires NDOT to focus messages to target public opinion segments of the population. Such insights can allow for a deeper understanding of not only what they believe but also why they believe it. Thus, a qualitative segmentation method can be used to gain understanding and insights of a constituent's attitude toward a potential public policy, and thereby provide the government with a means to strategize appropriate communications with constituents prior to policy implementation in hopes of gaining greater policy acceptance in the future. In the next section, we describe the methodology used and discuss our findings.

Methodology

Individuals are stakeholders in policy building and often are engaged in the policy dialogue. Considered the *attentive public*, these individuals have an interest in the policy, but may not have the time or resources for regular engagement. Thus, public participation provides a meaningful way in which government can engage in a policy dialogue to share information and knowledge regarding a policy as well as listen to the specific concerns and comments of their citizen stakeholders.

This research analyzes textual data taken from the information exchange between the Nevada Department of Transportation and the attentive public regarding a potential Vehicle Miles Traveled (VMT) fee study. The textual data were gathered from 293 different individuals and obtained from transcriptions of public comments from citizens attending public meetings sponsored by NDOT in both northern and southern Nevada, emails and comments sent to NDOT based on their VMT study Internet communications, as well as comment postings from the two major newspapers in the state (CITY 1 Gazette Journal and the CITY 2 Sun) on an article describing the study and providing information on the public meetings.

The descriptive data totaled approximately 135 pages of text and comments, ranging from one line to two pages.

Procedures and Analysis

We analyzed our qualitative data from two different perspectives or units of analysis, which we will label in our results as (1) media mode analysis, and (2) qualitative coding analysis. For the media mode analysis, we aim to determine the impact of media mode, that is, whether constituents communicated via one of three different sources. For the coding analysis, we interrogate the data via a two-pronged qualitative approach.

The media mode analysis, as outlined in table 1, consists of data from (1) public meetings, (2) emails and comments based on the NDOT VMT study Internet communications, and (3) newspaper article comments received via a website. Table 1 provides details on the media mode and number of comments received.

The qualitative coding analysis approach is two-pronged. First we categorized the responses into four different profiles or audience segments. Our qualitative approach to the NDOT public feedback began with the conceptual categorization of the findings, which must be derived in order to classify the data (Spiggle 1994). Following the process conducted in previous qualitative research, three trained researchers served as content analysis coders (Reynolds and Arnold 2000) and studied the data extensively in order to find emergent user typologies. Each coder independently analyzed and categorized the input of users to follow key themes. Following this process, the authors met and agreed on the key categories or user response segments of input.

Then we analyzed the textual data based upon these profiles to determine if conceptual differences regarding the policy, if any, exist between these audience segments. Understanding the conceptual differences between audience segments can help provide insights as to how to more effectively target communications of the VMT study to these various audience segments. Quite simply, the typical response to public policy is

Table 1/Sample Size Based on Media Mode

Media Mode	Cross-reference to Figure 1	Number of Responses
Public meeting comments	Folder1_meeting	14
NDOT VMT study Internet communications comments and emails	Folder1_email	182
Newspaper article comments	Folder1_web	97

either positive or negative support of the specific principle. In our study, we further delineate the group of responders by identifying four possible profiles: (1) those who positively responded and would like to participate in the VMT pilot program (*Positive Response*); (2) those who responded with questions seeking more information (*Information Requesters*); (3) those who responded with other solutions offered for consideration (*Solutions Oriented*); and (4) those who responded negatively with no alternative solutions provided (*Negative Response*). Table 2 lists the number of comments in each profile. To ensure reliability of coding, two researchers separately coded the responses and categorized them into one of the four profiles. Any differences in coding were resolved by a third researcher.

Since the positive response profile expressed support with an interest in participating in NDOT's test program, these responses were not further analyzed. Of interest was determining if the remaining three segments provided differing concepts relating to the policy, and if so, what specifically would NDOT need to communicate in the future to educate the public as the policy dialogue and study continues.

We used Leximancer (www.leximancer.com) to conduct our semantic analysis since it is a text data-mining tool using machine learning technique to discover concepts and themes among a body of text. The software enables a visualization of the discovered themes and how they interrelate via concept maps (Smith 2007). Marketing and advertising, as well as accounting and informatics, have used concept maps to analyze textual data (e.g., Campbell et al. 2011; Crofts and Bisman 2010; Rooney 2005). The benefit of using a text analyzer is that the algorithm automatically and efficiently learns which words predict which concepts, allowing large volumes of data to be analyzed. Thus, for exploratory purposes, such software is appropriate and does not rely solely on humans to code the text and to retrieve concepts, nor does it require an a priori coding scheme that can bias researchers in their exploration as they may have constrained themselves in labeling key concepts and find it difficult to see beyond their coding grid (Atkinson 1992). Based upon our analysis of the response data collected, the

Table 2 /Number of Responses per Segment

Profile Type	Number of Comments
Positive Response	17
Information Requesters	66
Solutions Oriented	104
Negative Response	106

concepts automatically derived from the textual analysis algorithm suggest that the three different audience segments appear to emphasize different concepts that are deemed important to each group. Interpretation of the concept map also provides information related to the interrelationship of the concepts with the three segments.

Results

We present our results in multiple forms, but begin with concept maps. In these maps, concepts that are closest to the unit of analysis labeled in the figure indicate the degree of strength or correlation toward the unit. Likewise, the concepts are also linked to other concepts, showing the strength of association between concepts themselves. Thus, the closer (further) the concept is to the unit of analysis label, the stronger (weaker) the correlation is between those concepts.

Media Mode Analysis

To determine if the themes derived from the data are dependent upon the mode of media used by the public we conduct an initial analysis of the data categorized by the form of media from which the public responded to the policy. For this level, response data were collected through three different communication channels, as outlined in table 1 (above). Automatic qualitative analysis of this data produced the concept maps given in Figure 1.

As depicted in Figure 1, it is important to note that the communication modes of email to NDOT and public meeting response data are closely linked. This finding provides an interesting insight for governing entities
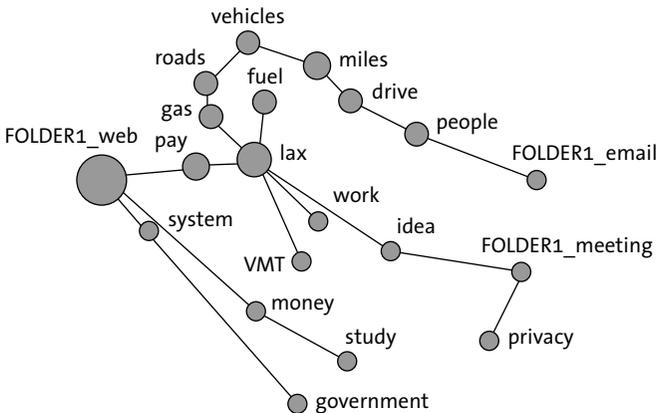

Figure 1 Conceptual Distances between Concepts Based on Media Mode

and the role of e-government. For example, public meetings can be costly to conduct, and citizens may find the meeting times and locations inconvenient in relation to their schedules. However, e-government applications can allow citizens to voice their opinions towards policy at times that are convenient for them. Further, as can be discerned from Figure 1, the results suggest that the issue of *privacy* is highly emphasized by those who attended the public meetings and communicated to NDOT via email. In contrast, the comments that were posted on the Web in response to the newspaper articles suggest a set of diverse conversations relating to the VMT policy. The issue of privacy is discussed; however, it is not emphasized as heavily as those who voiced their opinions at the public meeting and via email responses.

Qualitative Coding Analysis

Following the two-pronged qualitative procedure, we find that the three audience segments have significantly different concerns toward the VMT policy. Figures 2 and 3 depict the concept mappings based on the segments as our unit of analysis.

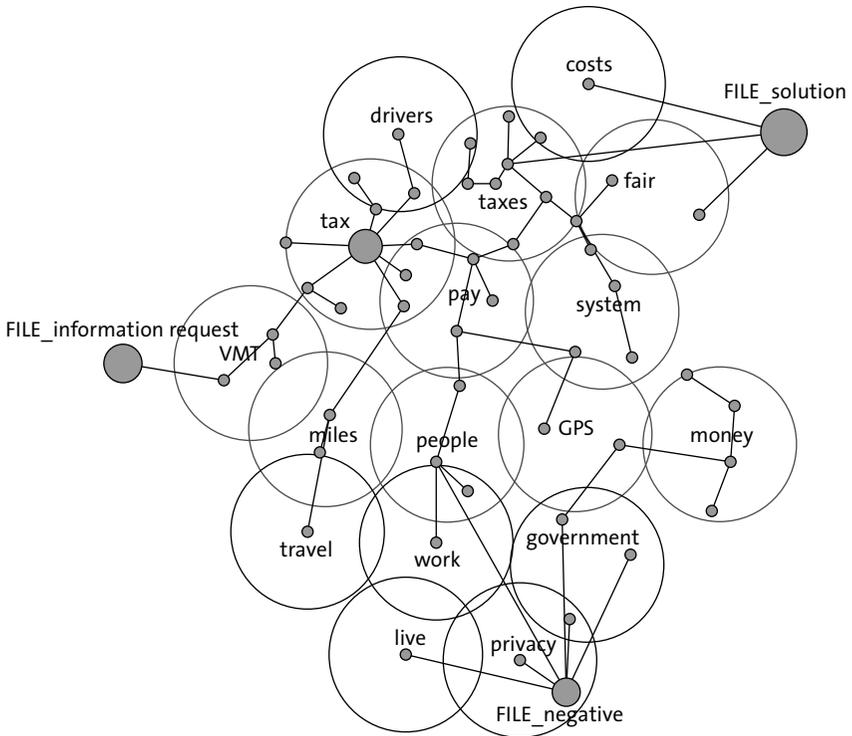**Figure 2** Conceptual Distances between Concepts for Feedback Segments

Figure 3 Feedback Segment-based Response Concept Map

The *Information Requesters* segment entails understanding how the VMT policy may be operationalized or assessed once it is placed into law. For example, in this segment, constituents might be interested in ascertaining information regarding how vehicle registration fees or VMT would be collected if a person is driving across state boundaries. This indicates that NDOT will need to provide additional information as to how this policy would be governed and implemented if it becomes law. For the *Solutions Oriented* segment, figures 2 and 3 show that the concepts of better solutions or those deemed as fair solutions and the cost of implementing the VMT appear to be of most importance to this segment. Hence, it is with this segment of policy responders that NDOT will want to communicate its reasons as to why a VMT policy is the best solution when compared to other possible solutions to the fuel-tax funding gap dilemma. However, the *Negative Response* segment appears to be more concerned with privacy than with costs associated with implementing VMT. This is further shown

by examining the correlation between certain links and the three different response segments (see table 3). What is important here from the results of the concept maps is that within the public response toward this potential policy, two major themes are becoming apparent, *privacy* and *cost* to implement. However, as shown in table 3, privacy issues are less important to the *Solutions Oriented* segment than the *Negative Response* segment. Thus, NDOT will need to tailor its responsiveness in communicating with these segments differently.

Although our research objective is exploratory by nature, the concept maps still provide valuable insights regarding differences and similarities between the three different response segment groups. With the use of these maps, further investigation of the detailed responses can help create meaningful communication messages regarding the VMT study to each audience segment. For government institutions, the best method of communicating all of the key issues for a particular future public policy to its constituents is not always clear. In the case of VMT, approximately a year prior to the public outreach meetings, NDOT conducted workshops in both CITY 1 and CITY 2. The intent of the workshops was to invite specific members from various communities such as environmental groups, privacy groups, taxpayer organizations, public and elected officials, and the trucking industry to help identify potential issues relating to the VMT policy. The majority of the issues identified specifically pertained to administration of the VMT policy, privacy, and technology issues. Our exploratory research results from public responses indeed provide validation that these issues are important. However, what is most interesting is that NDOT has yet to fully communicate its argument as to why this policy is the best solution for STATE from a cost-benefit perspective. The issue of costs to administer the VMT program

Table 3/Concept Correlations

Correlation between Concepts	Information Request (N = 66)	Negative (N = 106)	Solutions (N = 104)	Fisher's r-to-z Transformation	*p* Value (2-tailed)
Privacy	.41	.83		−4.70	*.00*
	.41		.17	1.64	.10
		.83	.17	−7.26	*.00*
Costs	.38	.41		−0.22	.83
	.38		.63	−2.13	*.03*
		.41	.63	−2.18	*.03*

Note: The Fisher r-to-z transformation calculation provides the significance of the difference between the two correlation coefficients. The calculator is at http://faculty.vassar.edu/lowry/rdiff.html.

did not arise from the workshop. One possible reason is that the workshop attendance was relatively low, with only 18 individuals attending in CITY 1 and 24 in CITY 2.The relatively small group of attendees perhaps restricted the ability to identify a wider range of potential issues that the VMT policy needs to address for the next phase of the study. In addition, our study emphasizes the importance of government-to-constituent communication and provides NDOT with additional information from citizens on how to better address the nuances of the policy.

Conclusions and Recommendations

Capturing consumer response to or beliefs about a particular message is an important part of the communication cycle with a consumer. Such responses are now more readily available due to multiple communication channels, including those that allow verbal responses (videos or recorded messages) or written responses (regular mails, emails, blogs, or opinions written on websites). Given the plethora of ways that the public can now offer feedback to a message, policymakers are even more challenged to acquire this information, parse it, and somehow gather meaningful insights from it. Our research sets forth an approach to this problem, that is, how to gather useful insights from qualitative consumer feedback. More specifically, we take multiple forms of unsolicited verbal accounts from the public regarding a potentially new vehicle mile taxation policy, qualitatively analyze them to form feedback segments, and propose communication mechanisms for targeting each of them.

In our study, we conduct a fine-grained, textual analysis of citizen responses given at three types of public forums on the concept of a VMT fee piloted by the NDOT. Our data is comprised of commentary voiced and transcribed in face-to-face settings or written and passed through electronic media. When analyzing public commentary about a potential disruption to road user charges, semantics loom as a large issue owing to subjects' inexpert knowledge of the topic and varied personal lexicons. To help clarify semantic content behind this commentary, we use an algorithmic content analysis program. This semantic analysis program is then used to produce a concept map pointing to a possible taxonomy of stances toward a statewide VMT that might be used to plan outreach and educational efforts, should implementation of such a system come to fruition.

As we discussed in our review of quantitative and qualitative segmentation techniques, the importance of clustering individuals into similar groups mainly arises from the need to convey the most relevant and timely

information to each group. Our qualitative analysis shows that whereas the three main segments we identify have overlapping thoughts regarding VMT, their primary concerns are unique. Such information would be very difficult to obtain from a deductive research effort, since we would not be extracting it from open unsolicited comments and would have to have a predisposed set of beliefs regarding the issues.

Our findings highlight four key considerations. First, unsolicited response or information is now available for any and all transportation initiatives, and such input should be analyzed in a manner similar to what we presented in this paper. Second, as an initial step in analyzing qualitative response, we suggest inductive identification of user categories, profiles, or segments, through memos. Third, once these segments are identified, our research shows that broader themes can emerge through the use of concept mapping that can then be used as a guide for communication initiatives. Finally, creative techniques can and should be deployed to convey targeted messages regarding transportation policies so as to understand consumer concerns and cater to their precise transportation needs.

Our inductive qualitative-analysis technique confirms this general finding in that we show that segments can be identified from unsolicited public response to represent independent user categories. For an initiative like VMT, the need for carefully communicated and executed public policy messages is critical, and such messages need to extend beyond simple mass market efforts.

Recent qualitative research stresses the need for broadening beyond demographic or psychographic segments and attempting to target tribes or consumption communities. The linking of these communities to their similar segment most often runs deeper than demographic segmentation might reveal. Instead these groups are linked by their common involvement in and around a central idea. One way to target VMT communications would involve deploying an e-government initiative, or a "government-wide innovation effort to reorganize task processes and change work practices through the use of information technology" (Choi and Yoon 2009, p. 246). In studying the Utah government website, Chau, Fang, and Sheng (2007) find that search terms on such sites tend to be seasonal, but some terms, remain constant, such as "tax," which peaks around April 15 but is still searched throughout the year. The movement of governmental agencies toward increasing use of information technology is a natural evolution, albeit a slow one. Marchionini, Samet, and Brandt (2003) argue that the three main purposes for e-government would be: (1) information access, (2) transaction with governmental agencies, and (3) participation in government

decisionmaking. In fact, research indicates that as governments transition to increased Internet use, they become less bureaucratic and more citizen-centric (Ho 2002). Taking it a step further, studies also show that increased use of searching on e-government sites by outside firms leads to strategic benefits such as intelligence generation (Thompson, Rust, and Rhoda 2005). Overall, deployment of e-government efforts leads to positive outcomes and can allow government agencies to take advantage of traditional customer-retention strategies such as data-driven targeted communications to deliver messages such as those related to VMT.

Note
The first two authors contributed equally in the preparation of this manuscript.

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