





**Using Crowdsourced Data
from Social Media to Enhance TMC Operations**

ITS Heartland Conference 2015



Acknowledgements 2
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- TMC Pooled Fund Study

Disclaimer

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- The views expressed in this presentation are solely those of the presenter and do not represent FHWA or USDOT.
- **Final Report — February 2015**
Publication Number: FHWA-JPO-14-165
- http://ntl.bts.gov/lib/54000/54800/54829/Crowdsourced_Data_Report_-_Final_508_Version.pdf
- **T3Webinars:** http://www.pcb.its.dot.gov/t3_webinars.aspx



Overview

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- What are the best opportunities for integrating crowdsourced data from social media into TMC TSM&O activities?
- How can agencies use SWOT Analysis to strategize projects for integrating crowdsourced data into their real-time operations?
- What measures of effectiveness can be used to provide a value proposition for assessing the return on investment?



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Crowdsourcing and Social Media

- Extracting Data from Social Media




- Third-Party Crowdsourced data





- Develop and Deploy Specialized Apps








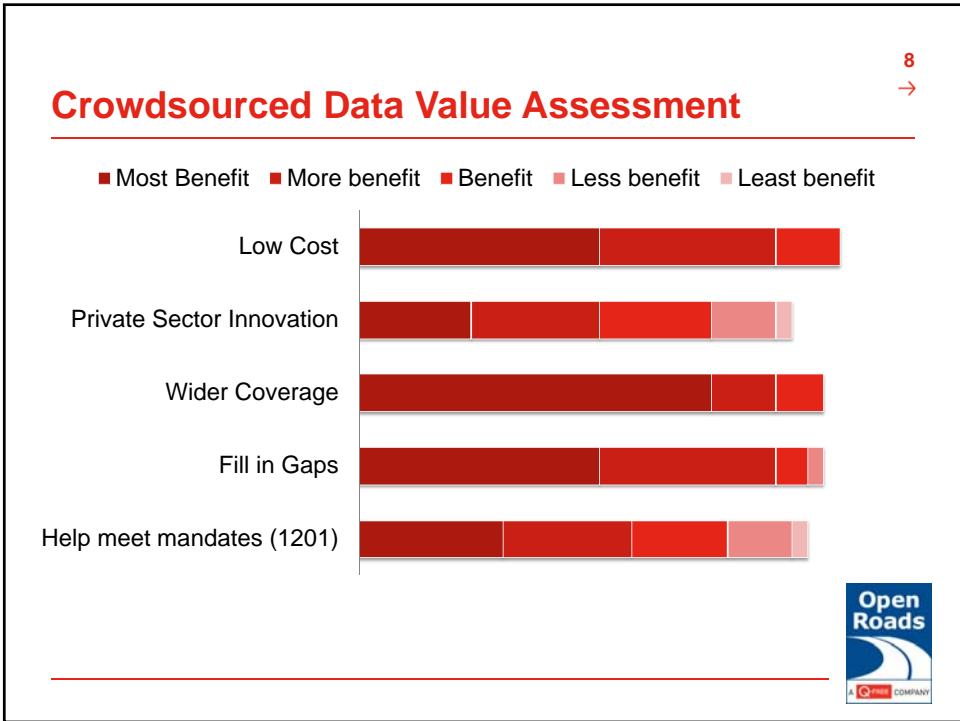
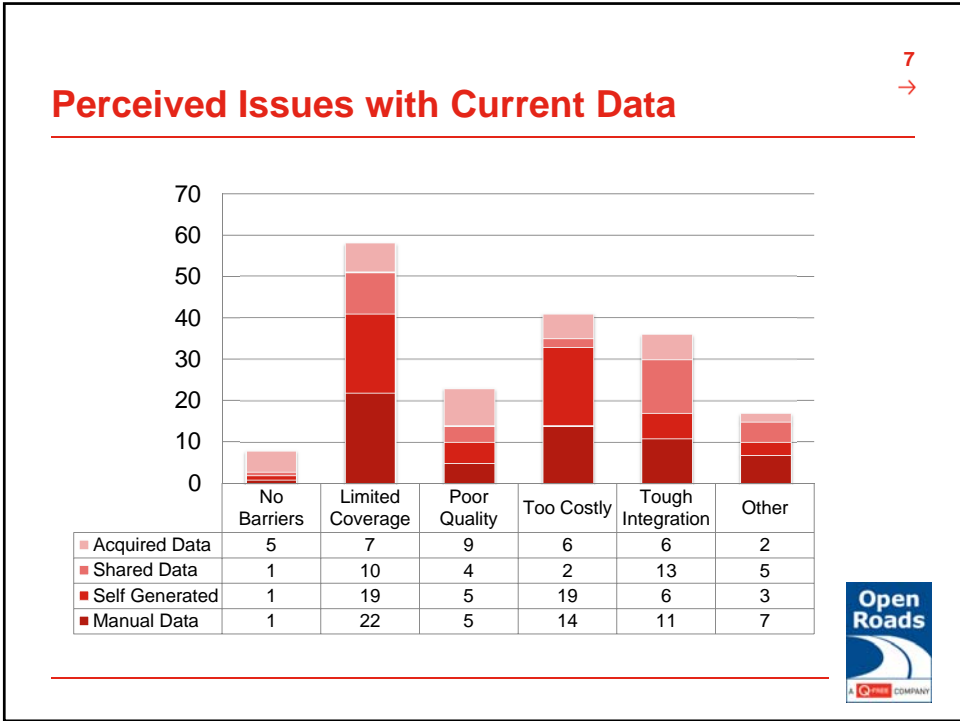
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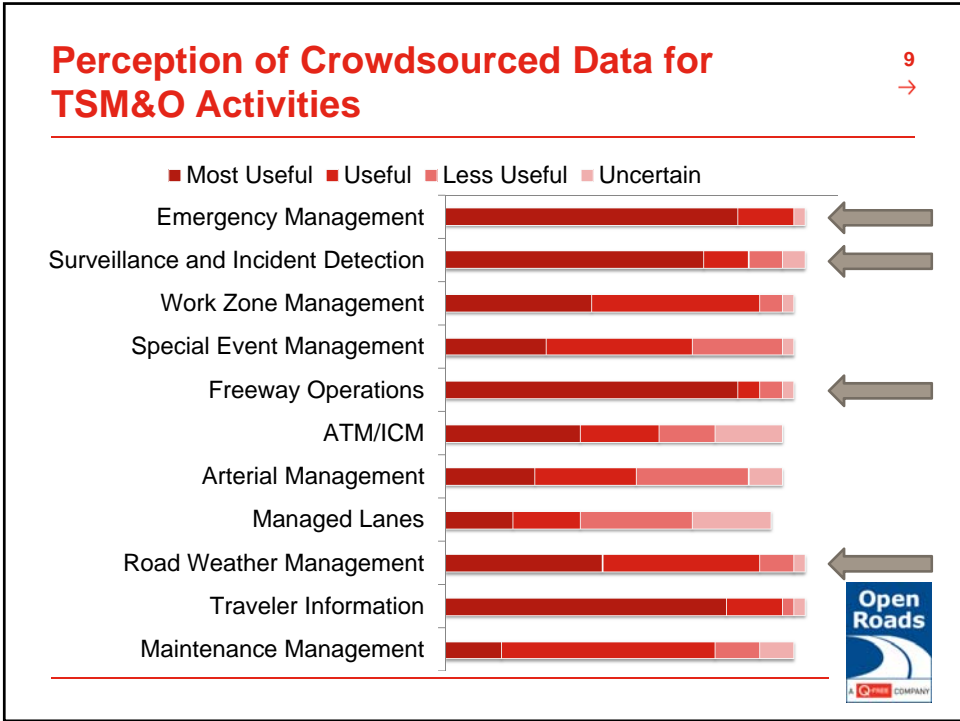
Criticality of TSM&O Activities at TMCs

■ High ■ Medium ■ Low

| Activity | High | Medium | Low |
|-------------------------------------|------|--------|-----|
| Emergency Management | 85% | 10% | 5% |
| Surveillance and Incident Detection | 75% | 15% | 10% |
| Work Zone Management | 55% | 30% | 15% |
| Special Event Management | 45% | 35% | 20% |
| Freeway Operations/Management | 70% | 20% | 10% |
| ATM/ICM | 50% | 30% | 20% |
| Arterial Management | 40% | 35% | 25% |
| Managed Lanes | 30% | 30% | 40% |
| Road Weather Management | 65% | 25% | 10% |
| Traveler Information | 70% | 20% | 10% |
| Maintenance Management | 60% | 25% | 15% |



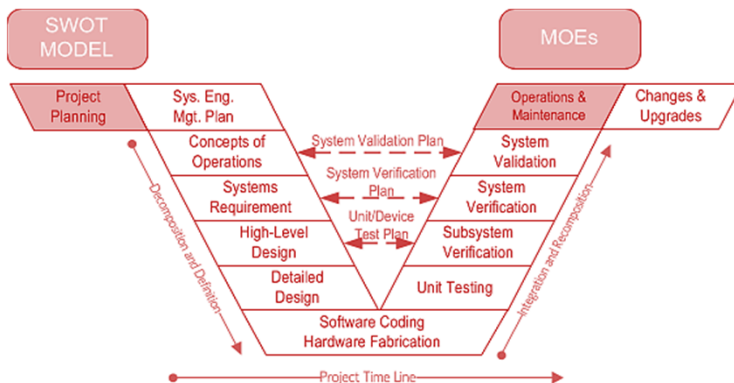




- ### State of the Practice 10 →
- Crowdsourcing and Social Media tools have a strong market penetration
 - Increased use by state transportation agencies
 - Disseminate traveler information via Twitter and Facebook
 - Engaging citizens through social media (Iowa DOT)
 - Integrating third party data (Waze, Inrix)
 - Developing specialized apps (Utah’s Road Condition App)
 - Mining Social Media for TSMO-related information (DDOT)
- Open Roads**
A QinetiQ COMPANY

Value Proposition

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SWOT Model Framework

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| Implementation Considerations Strengths & Weaknesses | | |
|--|---|--|
| Operational <ul style="list-style-type: none"> • Staffing • Experience • Business Process • Culture • Training • Performance Measures | Institutional <ul style="list-style-type: none"> • Social Media Policies • Social Media Staffing • Agency Culture | Technical <ul style="list-style-type: none"> • Data Integration • Social Media Experience • Mobile App Development • TMC Infrastructure |
| Opportunities <ul style="list-style-type: none"> • Achieving TSM&O Objectives • Overcome Data Deficiencies • Improve Institutional Cooperation • Social Media Monitoring Tools • Humanizing DOT • Gamification and Incentivizing Citizens | | Threats <ul style="list-style-type: none"> • Data Quality • Data Validity and Credibility • Data Privacy • Data Ownership • Distracted Driving • Emerging Innovations |



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Example SWOT Analysis - UDOT


| STRENGTHS | WEAKNESSES |
|--|--|
| Progressive Agency Project Champion Strong technical foundation Strong training focus at UDOT | Limited experience working with Citizens Designing mobile apps Processing data from citizens |
| OPPORTUNITIES | THREATS |
| Improve Road Condition Reporting Motivated Citizen Base Mobile technologies | Data Accuracy Internal Networking "Hands Free" laws |



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TSM&O Activities and Crowdsourcing


| Activity | Criticality | Social Media | Third-Party Data | Specialized Apps |
|--------------------------|-------------|--------------|------------------|------------------|
| Incident Management | Very High | Moderate | Very High | High |
| Traveler Information | Very High | Moderate | High | High |
| Work Zone Management | High | Moderate | High | Low |
| Special Event Management | High | Moderate | Medium | Low |
| Freeway Operations | High | Low | High | Low |
| Arterial Management | High | Moderate | High | Low |
| Road Weather Management | High | Moderate | Low | High |
| Managed Lanes | Low | Low | Low | Low |
| Maintenance Mgmt. | Low | Moderate | Low | Moderate |



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Measures of Effectiveness


- Impacts on TMC Operations
 - How can Crowdsourced Data contribute to the TMC operations
 - Do TMCs have the ability to measure the impacts
- Areas of Interest
 - TMC Resources
 - Agency Reputation
 - Ability to Meet TSM&O Objectives
 - Data Effectiveness



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Agency Resources and Reputation

| Objective | MOE | Data Needs |
|--|--|--|
| Perform TMC operations in a cost-effective manner. | <ul style="list-style-type: none"> • Monetary costs associated with social media activities, including staffing, software, etc. | <ul style="list-style-type: none"> • Capital and operating program costs |
| Increase level of engagement with traveling public by using social media | <ul style="list-style-type: none"> • Measure the reach of social media outlets. Changes in reach are direct indication of information value -- users are seeking the information • Measure use of agency supported hashtags, which indicates value of information focus and structure. • Increased user confidence in real-time information obtained from agency with social media strategies | <ul style="list-style-type: none"> • Number of followers • Number of times agency posts are shared • Number of unique user sharing agency posts with others |



Improve TSM&O Before and After Assessment

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| TSM&O | Objective | MOE | Data Needs |
|---------------------|---|---|---|
| Incident Detection | Detect incidents as quickly as possible. | <ul style="list-style-type: none"> Incident detection time. Social media outlets may allow agencies to detect incidents more quickly. Incident detection time on corridors where traditional detection/monitoring devices are not available | <ul style="list-style-type: none"> Number of incidents detected first via social media compared with other traditional means Differential in detection time via social media vs other means Need to track incident detection source for all incidents. |
| Incident Management | Improve safety for responders and other travelers | <ul style="list-style-type: none"> Identify how using crowdsourced data can improve the TMCs situational awareness | <ul style="list-style-type: none"> Surveys Qualitative reviews of archived social media data and records of actions taken |
| | Verify reported incidents | <ul style="list-style-type: none"> The ability for an agency to verify reported incidents is important for credibility. | <ul style="list-style-type: none"> Time to verify incidents detected via social media vs. those detected by other means Need to track verification times for all incidents |



Data Effectiveness

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| Objective | MOE | Data Needs |
|---|---|--|
| Increase quality of data available to TMC Staff | <ul style="list-style-type: none"> Evaluate quality of crowdsourced data compared with other data sources, and ability of crowdsourced data to improve the quality of performance reporting Social media data can provide additional details about an incident that assist with the response. | <ul style="list-style-type: none"> Details about incidents collected from social media vs other means. Need to track source of incident attributes to determine contribution of social media to the overall picture of the incident. |
| Data Reliability | <ul style="list-style-type: none"> The reliability of social media reports. The accuracy of information incidents obtained from social media. | <ul style="list-style-type: none"> Number of false positive incident reports. Percentage of new information about incidents that is correct vs. incorrect. |
| Reduce Data Latency | <ul style="list-style-type: none"> Reduce the time between when an event occurs in the transportation network and when the TMC operational staff is aware of the event | <ul style="list-style-type: none"> Before and after analyses Comparing detection time across data sources |



Summary and Conclusions

- Agencies seeking for newer, and less costly data sources to improve TSM&O Activities
- Crowdsourced data looks appealing but agencies need to understand the direct and indirect costs
- SWOT analysis is a useful tool to help agencies assess their capabilities and readiness to plan and execute crowdsourced data projects
- Agencies operating TMCs should embrace projects that are best suited to their strengths and provide the best opportunities for success.
- New MOEs are needed to provide a value assessment and generate return on investment



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