Mobilizing Sustainability Research:
Exploring social media and conference presentations as channels for disseminating research on sustainable community plans

by

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Author's Declaration

I hereby declare that I am the sole author of this major research paper. This is a true copy of the major research paper, including any required final revisions, as accepted by my examiners.
I understand that my major research paper may be made electronically available to the public.

Abstract

Recognizing the need to effectively mobilize sustainability research, the purpose of this research study is to explore the dissemination of Dr. Clarke's research on sustainable community plans through the use of social media and conference presentations. With the increase use of social media sites, the study uses Twitter and LinkedIn as communication channels to disseminate research to targeted audiences. The targeted audiences include sustainability professionals, academics, as well municipal staff and councillors interested in or involved in work surrounding sustainable communities. Moreover, the study considers the impacts of content and language on dissemination as well the role of social media in effectively targeting participants with academic research. Using the strategies and processes of knowledge mobilization, the study disseminates six key messages on each social media site in three different versions, using public, academic, and visual language. The results of this study show that visual language, more specially the use of infographics, receive the highest engagement and response rates from social media users. Furthermore, this study confirms that message content also impacts the engagement and response rates of participants. Overall, this study illustrates that effective dissemination requires strategic communication planning and design in order to provide concise, practical, and informative knowledge. Using these findings as communication guidelines researchers can move forward in effectively mobilizing sustainability research and assist in bridging the gap between research and putting research into practice.

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1.0 Introduction

The concept of sustainability encompasses a complex and diverse discourse, research foci, and initiatives. Conceptualizations of, and approaches to, sustainability are diverse across academic and non-academic realms (Brown et al., 1987). Sustainable Community Plans (SCPs) are one example of how sustainability initiatives are enacted within communities on an international scale to address socio-ecological issues (Clarke, 2012). To engage partners in the implementation process of SCPs, to achieve successful plan outcomes, and to understand the approaches and opportunities of these plans, existing and future academic research must be effectively communicated to the appropriate audiences.

Without proper dissemination of this research, or of any key research on sustainability for that matter, information will not reach target audiences and in turn will not be effectively understood or utilized. Therefore, the dissemination of research plays a critical role in the realization of sustainability goals. Furthermore, the use of appropriate communication tools is necessary for mobilizing the knowledge generated from research in order to reach target audiences (Gagnon, 2011; Bennett & Jessani, 2011; Bernhardt et al., 2011; Lavis et al., 2003; Mairs et al., 2013). Therefore, the purpose of this study is to connect research on sustainability, specifically focusing on SCPs, with urban practitioners in order to effectively transfer knowledge.

The concepts of knowledge mobilization (KM) and knowledge translation (KT) are often used to describe the process of linking research and action (Bennett & Jessani, 2011). Moreover, they detail the transfer of communication between senders and receivers enabling research knowledge to be effectively put into practice (Bennett & Jessani, 2011). For the purposes of this study, knowledge mobilization and knowledge translation will be used interchangeably to describe the initial phases of disseminating and sharing knowledge with key players. Although

this study does not focus on the implementation and utilization of the disseminated research by the target audiences, it examines the importance of effective communication between both parties in order to reach a successful transfer of knowledge. Therefore, this study uses carefully selected mediums of communication to disseminate research to a selected sample of participants. The study also incorporates the role of language and content into the communication process of the sustainability research. By strategically presenting the academic research in three different forms of language (academic, public and visual language with the use of infographics) the study examines how these changes in the process of knowledge translation affect the response and engagement of targeted audiences. Moreover, six topics of content, under the larger research topic of sustainable community plans, are used in the study to examine its impact on the response and engagement of participants to the disseminated research.

Numerous approaches can be employed in order to mobilize knowledge; however, this research study focuses specifically on two strategies of knowledge mobilization: social media and conference presentations. Within the discussion of social media LinkedIn and Twitter are explored in detail. These applications, as well as conference presentations, are investigated in terms of their communication objectives and effectiveness. Exploring literature pertinent to the use of social media and conferences as knowledge mobilization strategies plays an important role in this study's assessment of the transfer of research on sustainable community plans to target audiences. This study builds on existing literature and contributes new ideas by addressing the following research questions:

1. How does the language of the information affect the diffusion of information as well as the engagement from participants?

2. How does the content of the information affect the diffusion of information as well as the engagement from participants?
3. How do people perceive Twitter and LinkedIn as channels for receiving academic research?

To address the research questions, data are collected using two mediums: social media and a qualitative survey, which includes both a hardcopy and online version. The social media component includes data collection via comments on both social networking sites as well as the collection of numbers for specific engagements on each site. In addition, an online survey was distributed through each social media platform and is used to further assess the participants' perceptions of each communication channel as a means for receiving the disseminated research. Using conference presentations as the second medium for disseminating research, a qualitative survey was distributed to the participants of four presentations at four unique conferences. This survey collected information regarding the role of content in dissemination practices. Therefore, it provided information related to the relationship between participant response and engagement and dissemination content. The data analysis for this study includes both qualitative and quantitative components. The qualitative component involves a content analysis of the data collected from the online and hard-copy survey questions and the textual responses on the social networking sites.

Based on the type of quantitative data collected (i.e. the number of shares, likes, favorites, comments, etc. on social networking sites) descriptive statistics are used to summarize the data and to identify what types of posts generated the most responses (Fisher & Marshall, 2009). In addition, a chi-square test was run to further analyze the patterns and frequencies of participant responses, including engagement and diffusion, as they relate to the content and language type of

the knowledge mobilization posts.

The data analyses provide insight into the efficacy of disseminating academic research to targeted audiences. This study demonstrates how social networking sites and conferences can be used as communication tools. More specifically, the findings of the study detail the benefits and limitations in using social media in the mobilizing of academic research as well the importance of content and language type in the dissemination process. With the increased popularity in social networking sites as marketing communication tools, this study comments on the effectiveness of LinkedIn and Twitter as communication channels for disseminating academic research. Furthermore, this study provides theoretical and practical contributions to existing literature and future studies. The results of this study shed light on the dissemination of knowledge via specific marketing communication tools. More specifically, researchers are provided with useful insights regarding the roles of social media, specifically Twitter and LinkedIn, as well content and language, in sharing research findings. The findings are useful for the purposes of disseminating knowledge effectively, and, consequently, bridging the gap between academic research and putting research into practice.

2.0 Literature Review

To address the research focus of this study it is essential to understand the type of research that is disseminated throughout the project. Therefore, it is necessary to review Dr. Clarke's research on collaborative strategic management. The investigation of this research has led to the development of six key messages that are were throughout this study in the dissemination posts. After a review of the literature on collaborative strategic management it is critical to review literature on knowledge mobilization and knowledge dissemination. Once these concepts are well understood it is necessary to explore the strategies and methods of knowledge transfer. Therefore, this section reviews literature on marketing strategies, including the role of social media, conference presentations, and word of mouth communication in order to provide insights on how researchers can strategize and plan for an effective transfer of knowledge.

The following sections provide an overview of the aforementioned themes investigated in recent literature. This review is a synthesis of the literature, aimed at exploring existing studies and research as well as acknowledging the gaps in the literature in order to justify the research goals of this study.

2.1 Collaborative Strategic Management

Literature relevant to collaborative strategic management represents critical information for the purposes of this research study. This section of the literature review explores topics within this domain of research leading to the development of the knowledge mobilization messages that have been disseminated throughout the study. Moreover, this section provides an overview of Dr. Amelia Clarke's existing research in order to provide readers with a better understanding of the type of knowledge that has been shared with targeted audiences and used in the assessment of the efficacy of mobilizing information through the use of different communication methods.

Within the research on collaborative strategic management, Clarke and Fuller (2010) describe the four phases that form the collaborative strategy process. The first phase refers to the forming of partnerships (Clarke & Fuller, 2010). The second phase involves developing the strategic plan that will be used to govern the partnership actions and provide a guiding framework (Clarke & Erfan, 2007). Phase three refers to the implementation of the plan. This relates to the collective partnership actions as well as the individual partner actions (Clarke & Erfan, 2007). The final phase describes the realized outcomes of the community plan (Clarke & Erfan, 2007). The following sections further explore the collaborative strategy process as well as the additional elements for the successful development and implementation of SCPs.

2.1.1 Cross-Sector Social Partnerships

From the review of literature on cross-sector social partnerships it is evident that these partnerships play a critical role in the development of sustainable community plans (Clarke, 2011; Clarke, 2014a). These partnerships provide collective decision-making and strategizing in order to incorporate the ideas of multiple stakeholders within a community (Clarke, 2011). From this type of approach, sustainable community plans (SCPs) can be developed. Consequently, partnerships represent an important feature in collaborative strategic management emphasizing the role of collective decision-making and strategizing (Clarke & Erfan, 2007). In addition to partnerships, participation—or stakeholder consultation—is important for successfully implementing SCPs (Clarke & Erfan, 2007). Using a participatory approach, the content of the plan as well as the majority of the decision-making surrounding the plan is restricted to the local governments jurisdiction (Clarke & Erfan, 2007). As detailed in the following sections, partnerships and collaboration are essential to the structure, development, and implementation of sustainable community plans (Clarke & Erfan, 2007).

2.2 Sustainable Community Plans

Clarke (2012) explains that a sustainable community plan (SCP) is "developed through public consultation, identifies a vision, includes environmental, social and economic goals and sets targets for the community" (p. 1). The development and implementation of sustainable community plans are necessary to address social, environmental and economic complexities and strategize towards the protection of the environment and the well being of civil society (Clarke, 2012). Moreover, the plans focus on ways to secure partnerships in order to scale up the approaches to achieving sustainability from local governments to community-wide actors (Clarke, 2011). To gain a thorough understanding of sustainable community plans it is important to explore literature relevant to sustainability topics, implementation structure, and outcomes. The three categories detail the structural features and components of successful SCPs.

2.2.1 Sustainability Topics

The topics addressed within sustainable community plans cover a diverse range of sustainability issues. Clarke (2011) explains that "topics in a typical collaborative regional sustainable development strategic plan can range from adequate shelter, natural resource use (including water, air, biodiversity, forests, energy, and land), infrastructure (including buildings, fleets, roads, bike paths, and water treatment), and waste management (including water, sanitation, drainage, and solid-waste), to healthy communities and green economy" (p. 153). These topics illustrate the ways in which SCPs are designed in order to address particular initiatives and issues of sustainability within communities.

2.2.2 Implementation Structure

To guarantee the effectiveness and success of an SCP it is necessary to ensure that the appropriate criteria are included within the implementation structure of the plan. Clarke (2011) explains that a successful implementation structure:

1. Engages key organizations from different sectors, and/or has a mechanism to identify them and add them.

2. Has collaborative form(s) (i.e. arrangements) to oversee the implementation and identify issue-based short-term actions, and also allows for networking between organizations.

3. Has individual organizations implementing within their own organizations.

4. Has a communication system that exists to further networking and to reach citizens.

5. Has a monitoring system that exists, including both state and action indicators, which also allows for adjustments to be made to the implementation actions, and renewal to be made to the collaborative strategic plan. (p. 165)

This list details the five criteria for evaluating a SCP implementation structure (Clarke, 2011). Related to the five structural criteria, there are five common "keys to success" essential to the implementation stages of sustainable community plans (Clarke, 2012). These include: oversight, partnership engagement, community-wide action, communications, and monitoring and measurement (Clarke, 2012). Three Canadian communities were used as case study examples to illustrate the adoption of the five keys to success within the implementation stages of an SCP (Clarke, 2012). These community examples include the Resort Municipality of Whistler, British Columbia, the City of Montréal, Quebec, and the City of Hamilton, Ontario (Clarke, 2012).

Using these case study examples in the examination of the five keys to success Clarke (2012) explains that oversight "should include a secretariat that coordinates the process, a decision-making body that oversees the process, and members of municipal council" (p.10). Partnership engagement ensures that the necessary partners and stakeholders are included within the discussion and implementation of SCPs (Clarke, 2012). To ensure community-wide action,

Clarke (2012) explains that "…partners need to take relevant action in their own organizations and report back on their progress" (p.14). The fourth focus is on communication, thus ensuring that progress is celebrated, partners are engaged and recognized, and that best practices are shared (Clarke, 2012). Lastly, monitoring and measurement "allows for adjustments to actions along the way, and for effective SCP renewal" (Clarke, 2012, p.18). The case examples illustrate the necessity for the integration of all five strategies for successful implementation of sustainable community plans.

2.2.3 Outcomes

The implementation of SCPs varies depending on the community, which leads to different types of outcomes. As researched by Clarke and Fuller (2010) these outcomes include plan outcomes, process outcomes, partner outcomes, action outcomes, and personal outcomes. Clarke and Fuller (2010) describe partner outcomes as the changes that result in an organization's behaviours or the structure of individual partners. Moreover, by examining SCPs, Clarke recognized the influence of collaborative structural features on plan outcomes (Clarke et al., 2014a). Therefore, Clarke et al. (2014a) seek to explore the relationships between the structural features of SCPs and the plan outcomes. To investigate these relationships, 37 Canadian communities were examined as case study examples. As explained by Clarke et al. (2014a) "empirically, the results of [the] study have demonstrated a number of significant correlations between key collaborative structures and plan outcomes through implementing [SCPs]" (p.16). Clarke et al. (2014a) provide a comprehensive list of correlations (i.e., community-wide actions with transportation, social infrastructure, food security, and climate change; Monitoring and reporting with energy and waste) and point out some of the plan outcomes that are not associated with structural features (i.e. land use, employment and housing). From the relevant research and findings on plan outcomes it is evident that not all collaborative

community sustainability plans are the same, that environmental topics are the most frequently included topics within SCPs, and that many of the structural features are strongly correlated to plan outcomes (Clarke et al., 2014a).

2.3 Key Messages to be Disseminated

This section of the literature review has highlighted key themes within the topic of collaborative strategic management. For the purposes of the research study, the topics of the key messages for dissemination include:

1. The collaborative strategy process
2. Topics in community sustainability plans
3. Collaborative strategic management outcome types
4. Key structural features for implementing a sustainable community plan
5. Partner outcomes from joining a community sustainability partnership
6. Participation versus partnership for community sustainability

These messages represent the main themes and topics pulled from the sustainability research. Each message represents specific content from the research on sustainable community plans. Moreover, these key messages were disseminated throughout the project to targeted audiences using three different versions of each (see Appendix A.). Each key message was presented in three different forms of language, including academic, public and visual language with the use of infographics. This manipulation of the message format was used to explore the role that language plays in the mobilization, diffusion, and response of academic research.

2.4 Content

In this study, content represents the type of information presented in each of the key messages and disseminated through each communication channel. This study assesses the impact of message content on the response and engagement rates of audiences. Therefore, each of the

key messages represent specific content related to sustainability plans enabling a comparison of response and engagement rates between all six messages. The results of this assessment provide insight into the types of message content most received by audiences at conferences and online.

2.5 Language

For the purposes of this study, language represents the ways in which the content is presented to the audience. This refers to the accessibility of the information, impacting the understanding and engagement to the presented information (Shields and Evans, 2008). Shields and Evans (2008) reference Smith (2006) in order to identify 'academic jargon' as one of the key obstacles to academic-practitioner partnerships. They define academic jargon as "academic language and writing styles that are inaccessible to non-academics" and therefore support the need for easily understandable and communicable language (p.10). Moreover, academic language and jargon are discussed as potential barriers as it relates to the gap between academic research and putting research into practice (Gray et al., 2005; Steffens et al., 2014). Gray et al. (2005) assert that the complex and abstract nature of academic research can negatively impact the understanding of information, therefore reinforcing the need for proper translation and communication strategizing (Ankers & Brennan, 2002; Day & Montgomery, 1999; Ottesen & Grønhaug, 2004; Grønhaug, 2002; Ottesen & Grønhaug, 2002;-Gray et al., 2005).

Recognizing language as a potential barrier to effective communication, this study includes a variety of language types in order to assess the most effective ways to disseminate research. Due to the academic nature of the research presented in this study, it is important to consider the role of language in effective dissemination processes. The language types used in this study include: academic, representing the original text and language from the research; public, focusing on easily accessible, every-day language in order to communicate with a wider audience; and visual language which included the use infographics to allow for visual

representation of the research. Moreover, the use of infographics was included in order to provide audiences with clear and visual messages. For example, Newell and Dale (2015) refer to Korkmaz (2009) to explain that "[a]esthetic visuals with clear messages can be effective in attracting audiences and quickly conveying information" (p.17). Furthermore, the inclusion of the infographic allows for the visualization of research data that can easily be accessed and shared (Siricharoen, 2013).

2.6 Knowledge Mobilization

This section of the literature review explores methods and strategies for mobilizing knowledge. Strategies for knowledge mobilization are critical in order to effectively transfer the academic research to non-academics and professionals (Mairs et al., 2013).

2.6.1 Definitions

Knowledge mobilization (KM) is an important concept for the purposes of this research focus. It is a concept often used in the discussions of research and policy that describe the link between research and action (Bennett and Jessani, 2011). Moreover, KM refers to the ways in which key players such as researchers, stakeholders, organization leaders, community members, or any other type of research-user, can effectively put research knowledge into practice. Within the literature relevant to KM, a variety of terms are used to address similar concepts and practices. For example, some additional terms include: knowledge translation, knowledge transfer, knowledge dissemination, knowledge creation, and knowledge distillation (Bennett and Jessani, 2011; Dickinson, 2007; Gagnon, 2011; Graham et al., 2006; Lomas, 1993; Straus et al., 2011).

As explained by Shields and Evans (2008), the processes of KM are important due to the "increased interest in evidence-based policy development and decision making" (p.3). Therefore, as the research becomes more important for non-academic stakeholders, it is critical that it is

condensed and made relevant for the specific purposes of the policy-makers and that it is made user-friendly in order to create accessible and comprehensible information for the end-users. Gagnon (2011) references Lomas (1993) in order to explore three distinct types knowledge translation, which include "diffusion, dissemination, and implementation" (p.26). Lomas describes the first category of knowledge translation as the efforts of dissemination that are passive or unplanned, as well as mediated by peers (p.26). For example, diffusion may refer to publishing in peer-reviewed journals or presenting research findings to peers at conferences (Gagnon, 2011). Gagnon (2011) references Graham et al. (2006) to explain the second type of knowledge translation, *dissemination* of knowledge. As explained by Graham et al. (2006), this type of knowledge translation refers to the tailoring of research findings or messages in order to target specific audiences (Gagnon, 2011). The third category, *implementation*, ensures that the research findings and information are user-friendly and accessible in order to increase the audience's ability to adopt the information (Gagnon, 2011).

Straus et al. (2011) provide critical information regarding the specific terminology surrounding the concept of dissemination. Although the term dissemination is commonly used and emphasizes an important role for many researchers, it is not always sufficient. As asserted by Straus et al. (2011) "[k]nowledge creation, distillation, and dissemination are not sufficient on their own to ensure evidence-informed decision making" (p.7). Therefore, in particular research contexts it is necessary to use a term like knowledge translation as it ensures that information is shared but is also accessible and user-friendly in order for the knowledge-users to utilize the research or evidence in effective decision-making (Straus et al., 2011). As concluded by Straus et al. (2011) it is important to understand the purpose of the research in order to determine whether knowledge translation or knowledge dissemination is needed. Depending on the type of

research or evidence as well as the end goal for this research/evidence, it may not be necessary for the knowledge to be translated into action.

For the purposes of this literature it is critical to explore the processes and models of knowledge dissemination as well as translation/mobilization, as the research focus is to share research on sustainable communities in order for stakeholders to effectively understand and use this research in their practices and decision-making.

2.6.2 Theoretical Models

There are a number of significant principles, models, and frameworks relevant to the literature on mobilizing knowledge. For example, Straus et al. (2011) describe the knowledge-to-action cycle, a conceptual framework developed by Graham et al. (2006). This framework details the process of knowledge translation, demonstrating how knowledge and research can be applied and put into practice. More specifically, Straus et al. (2011) explain that the processes within the action cycle include:

> […] identification of the problem; identifying, reviewing, and selecting the knowledge to implement; adapting or customizing the knowledge to the local context; assessing the determinants of knowledge use; selecting, tailoring, implementing, and monitoring knowledge translation interventions and knowledge uptake; evaluating outcomes or impact of using the knowledge; and determining strategies for ensuring sustained knowledge use. (p.9)

For the purposes of this research study, it is important to consider the stages within the action cycle. Moreover, Bennett and Jessani (2011) outline three fundamental principles of knowledge translation: knowledge, dialogue, and capacity. Both the framework and principles of knowledge translation must be considered throughout the dissemination stages of this research project in order to ensure that the research knowledge is accessible, is familiar and easily communicable,

and that those participating in the process of knowledge translation recognize the skills needed to communicate or respond to information (Bennett and Jessani, 2011).

Furthermore, Bennett and Jessani (2011) cite Lavis et al.'s (2006) four models of knowledge translation: push, pull, exchange, and integrated. For the purposes of this study, it is appropriate to focus on the first model in order to explore the push or strategic transfer of research on sustainable communities to the intended audience (Bennett & Jessani, 2011; Lavis et al.'s, 2006). From the principles, models, and frameworks of knowledge translation we gather the importance of strategizing and planning for the sharing of information.

2.6.3 Strategies

From the review of literature it is evident that a breadth of approaches can be employed in order to mobilize knowledge. For example, several knowledge mobilization strategies include publications, presentations, workshops, websites, social media, focus groups, etc (Jacobson et al., 2007). The research study conducted by Jacobson et al. (2007) lists many of these strategies including "[…] regularly issued bulletins and newsletters, articles in newspapers, scholarly papers, presentations (to academic, practitioner, and lay audiences), project-sponsored symposia and conferences, [and] a Web site […]" (p. 100). This information provides a variety of options for researchers to develop knowledge mobilization strategies in order to better connect research and practice. Furthermore, the research on knowledge mobilization strategies indicates that in order create effective knowledge translation, strategies must be designed to inform audiences with user-friendly, comprehensible, concise, and informative knowledge (Mairs et al., 2013). Therefore, strategies must be carefully considered as well as specifically chosen to act as an effective communication tool.

This research study focuses more closely on two strategies of knowledge mobilization: social media and conference presentations. The following sub-section explores both of these

practices in more detail.

2.7 Social Media

If used effectively and efficiently, social media applications can promote discussion and dialogue, engage stakeholders, facilitate information transfer and understanding, and improve communication and collaboration in online environments (Berhardt et al., 2011; Briones et al., 2011; Ferguson et al., 2014; Lovejoy et al., 2012; O'Reily, 2005; Murphy and Salomone, 2013; Robelia et al., 2011). Furthermore, the review of literature details a comprehensive list of different social media tools and applications that have been explored and studied as communication tools. This list includes social media applications such as Twitter, Facebook, websites, weblogs, and wikis (Seo et al., 2009; Briones et al., 2011; Ferguson et al., 2014; Lovejoy et al., 2012; Waters & Jamal, 2011).

Within the discussion on social media and web 2.0 technologies, there is room to explore each dissemination application in greater depth. To determine the effectiveness of dissemination efforts it is critical that the applications are well understood and explored for their communication functions and opportunities. This study explores two popular social networking applications: LinkedIn and Twitter.

2.7.1 LinkedIn

LinkedIn is a professional social networking tool. LinkedIn allows users to post and share information in a professional and online environment (Hennig-Thurau et al., 2010). Castronovo and Huang (2012) refer to Hennig-Thurau et al. (2010) in order to describe several functions of the social networking application, including the ability to advertise a business on the site, to develop company profiles, and to develop two-way relationships with career professionals and firms. As a communication tool, LinkedIn, like many social networking sites, provides users with many opportunities to disseminate information to particular audiences.

2.7.2 Twitter

Many authors describe Twitter as a "micro-blogging" application, providing users with the opportunity to share information and real time message via posts limited to 140 characters (Castronovo and Huang, 2012; Lovejoy, et al., 2012). Lovejoy, et al. (2012) refer to Stelzner (2009) to explain the increased use of Twitter users on the Internet and the ability to use the application in order to reach a wide array of stakeholders thus "making it the most used social media application in official public relations, advertising, and marketing campaigns" (p. 313). Furthermore, Lovejoy, et al. (2012) assert that Twitter, like many social media sites, allow users to disseminate and exchange information in a timely manner. With condensed messages, Twitter forces users to limit the size of their posts in order to share user-friendly and easily understandable information (Lovejoy, et al., 2012).

Twitter represents a social networking tool very similar to blogging. Like blogging, Twitter allows users to easily communicate without geographical boundaries through both public and private messages (Waters & Jamal, 2011). In addition to the many messaging functions, the application also provides users with many opportunities to engage with stakeholders. For example, Lovejoy, et al. (2012) explain that "organizations [or other users] can communicate on Twitter through the use of the "@" symbol" (p. 314). This function connects users in a more direct manner, providing a simple and easy way of searching for other Twitter users. The retweet function is another example of communication tool on Twitter that allows one user to repost a tweet from another user while giving acknowledgement of the user by adding "RT@[username]" to the beginning of the message" (Lovejoy, et al., 2012, p. 314). Lastly, hashtags are a popular communication tool that categorizes messages by relevant topics on the social networking site. Therefore, Twitter is a social networking site that provides users with many communication tools. Twitter is a user-friendly application providing all types of users, including individuals,

organizations, and researchers, with many opportunities for effectively communicating and disseminating information to a wide and diverse audience.

2.7.3 Word of Mouth Communication (marketing)

With the increased use of the Internet, opportunities for word of mouth communication (WOM) have greatly increased. As explained by Huang (2010) WOM typically refers to communication shared through personal 'contagions' (p. 197). Huang (2010) refers to Dellarocas (2003) to exemplify different types of electronic word-of-mouth (e-WOM), including "online product-review forums, Internet discussion groups, instant messaging, chat rooms, mailing lists and weblogs" (p. 197). Huang (2010) explains that "numerous websites provide message boards and information threads for users to post information and exchange opinions" (p. 198). Therefore, e-WOM communication has become more popular in the decision making strategies of many consumers, allowing them to easily distribute and receive information and opinions (Liu, 2006; Huang, 2010). From the literature focused on e-WOM communication it is evident that there is a strong influence of word-of-mouth communication in online environments (Huang, 2010). Moreover, e-word-of-mouth communication can impact consumer consumption and consequently impact the sharing of information and knowledge in online settings (Godes, D. & Mayzlin, D., 2004; Huang, 2010).

2.7.4 Effectiveness

In the discussion of knowledge mobilization via social media applications there is a significantly smaller amount of literature focused on assessing the effectiveness of these communication efforts. The majority of the literature includes studies focused on how and why social media applications and tools are adopted by different users. More specifically, many of these studies analyze how social media is adopted for public relations purposes as well for stakeholder engagement and relationship building (Curtis et al., 2009; Briones et al., 2011;

Lovejoy et al., 2012).

However, one article has been identified that addresses a similar focus to this research project. Newell and Dale (2015) explore the use of online technologies in order to disseminate information on climate change. The authors analyze online tools and networks in order to determine how they can be used effectively to mobilize knowledge and create action specific to climate change adaptation and mitigation (Newell & Dale, 2015). To address this research focus, the article uses the *Meeting the Climate Change Challenge (MC3) Project,* which focuses on climate change innovations at the community level in British Columbia, Canada. Within the study, the researchers focused on the role of knowledge mobilization and the dissemination of research findings in order to "… bootstrap innovation diffusion, optimize local government and provincial partnerships, and share lessons from leading communities taking climate action with those less advanced" (Newell & Dale, 2015, p.3). To reach a wide-range of communities, the dissemination tools consisted mainly of Internet communications. As explained by Newell and Dale (2015), the dissemination process involved five channels: "an online case study library, online real-time e-Dialogues and LiveChats, social media, peer-to-peer learning exchanges, and traditional academic dissemination (conferences, workshops, peer-reviewed journal articles)" (p.3). To increase the effectiveness of the dissemination process, the online tools were used in conjunction with one another, therefore linking or referring participants to additional channels (Newell & Dale, 2015, p.3-4). The five channels allowed the researchers to evaluate how well each tool served as an effective means for sharing information on climate change. In the process of mobilizing knowledge it is critical to develop effective strategies or methods of dissemination.

The study's findings provide significant insight into the effectiveness of online technologies as communication tools. As explained by Newell and Dale (2015) there are four

major themes derived from the research findings. The themes were developed based on the analysis of using the five channels as communication tools. They include: *"*the effectiveness of building online presence and project awareness; differences between active and passive online audience engagement; the influences media type has on online content engagement; and the relationship (or lack thereof) between convenience and participation in online events" (Newell & Dale, 2015, p.15). The first theme, *online presence and project awareness,* focuses on the fact that popular websites attract more viewers. Newell and Dale (2015) relate this idea to the concept of 'brand building', as some sites are more popular than others and therefore have the potential to build a name for an online research space (p.16). The second theme, *online audience engagement,* suggests that typically participants preferred to observe and learn rather than to engage in two-way dialogue (Newell & Dale, 2015). The third theme, stresses the importance of the type of media in order to attract viewers to particular messages. These findings emphasize the role of visuals, such as images or videos, in attracting larger audiences (Newell & Dale, 2015). The last theme, *convenience and participation*, explains how more convenient communication technology increases the engagement and participation of an audience.

The MC3 study provides useful information regarding the role of Internet communication strategies to effectively disseminate research. Although the focus of this study was on the dissemination of climate change research, the strategies and findings can be related to a wide-range of projects focused on knowledge mobilization. Based on the discussion and conclusions of the study, there are some fundamental observations that should be applied to other projects related to sharing knowledge and research. As asserted by Newell and Dale (2015): "in order to effectively communicate and disseminate research findings and share knowledge, researchers should establish a dynamic web presence, consider how the public prefers to engage in learning

about research or science, how practitioners (in particular) use the media, and be mindful of the sort of media that attracts particular public audience segments" (p.19). The incorporation of these ideas into the practice of knowledge mobilization increases the effectiveness of disseminating information and putting research into practice.

This article by Newell and Dale (2015) demonstrates one useful research example in exploring the effectiveness of dissemination. Although many of the functionalities and purposes of social media are thoroughly reviewed, there is evidently a lack of research concentrated on the effectiveness of using each tool to reach communication goals, or more specifically to transfer academic research. Therefore, this study aims to incorporate and build upon existing research surrounding social media and knowledge mobilization.

2.8 Conference Presentations

Conference presentations are a traditional and common means of disseminating information to target audiences, particularly in the world of academia. Relevant literature confirms the widespread use of conferences to communicate information and transferring knowledge, including academic research, to specific audiences and/or the general public (Coad & Devitt, 2006; Dimitrios, et al., 2014; Henn & Bathelt, 2015; Saha et al., 2005). With in-person communication and visual aids, conferences provide presenters with numerous opportunities to disseminate information. For example, oral presentations at conferences provide speakers with the opportunity to engage and to create discussion with the audience (Coad & Devitt, 2006). This method of communication is more direct and personal yet there are several restrictions and challenges to consider, such as geographical limitations, audience capacity, short-term engagement, and time constraints (Coad & Devitt, 2006; Dimitrios, et al., 2014; Henn & Bathelt, 2015; Saha et al., 2005). Therefore, this study includes conference presentations as well as social media as communication channels in order to target larger audiences with the disseminated

research.

2.8.1 Effectiveness

As a popular method, recognized for its contribution to the promotion of research and knowledge, it is important that the effectiveness of conference presentations is further researched (Dimitrios, et al., 2014). Consequently, it is necessary to explore conference presentations for their communication tools and uses and for their effectiveness in mobilizing knowledge.

2.9 Gaps in Literature

This review has detailed a substantial list of knowledge mobilization strategies and methods. Moreover, it has explored literature relevant to the use of social media, including LinkedIn and Twitter, and conference presentations as communication tools. The literature details how each strategy and application can be used however there is further research needed in assessing how each one actually acts as an effective communication tool.

2.10 Research Questions

From the existing literature and the gaps identified within the relevant themes of this review, it is appropriate to address the following research questions to further explore the effectiveness of mobilization knowledge via specific communication methods:

1. How does the language of the information affect the diffusion of information as well as the engagement from participants?
2. How does the content of the information affect the diffusion of information as well as the engagement from participants?
3. How do people perceive Twitter and LinkedIn as channels for receiving academic research?

3.0 Methodology

The following chapter addresses the research method sand procedures used in this study.

3.1 Ethics

Due to the participatory involvement in this research project an ethics application has been completed. In order to engage the necessary target audiences a hardcopy and online survey were developed for the data collection and analysis components of the project. Therefore, this study has been reviewed and has received ethics clearance through the University of Waterloo Research Ethics Committee (Appendix B.).

3.2 Sample

The sampling methods used in this study were purposive sampling and snowball sampling. As explained by Padgett (2012) the first method, purposive sampling, refers to the "… deliberate process of selecting respondents based on their ability to provide the needed information" (p.73). Consequently, this method of sampling was used in order to gather a selective group of participants that represent the target audience of the research project. This portion of the study's sample includes participants involved in the discussion of sustainable communities. To obtain this sample, the participants were recruited at four practitioner-oriented conferences, all of which were selected due to their relevance to the topic of sustainable communities. The first conference is the Federation of Canadian municipalities' (FCM) Sustainable Communities Conference, which was held in London, Ontario on February 10th, 2015. The second conference, the ICLEI World Congress 2015, was held in Seoul, Republic of Korea in April 2015. The third conference is the International Symposium on Corporate Responsibility and Sustainable Development held at Ryerson University in Toronto Ontario on June 7th, 2015. The fourth conference is the First Working Meeting of the EU-Canada Urban Policy Cooperation, which was held in Toronto Ontario on July 6th, 2015. The conference participants include sustainability professionals as well as those who are attending in their professional capacity as municipal staff or councilors. The selection of these particular

conferences was done in order to ensure that the target audience of this study was obtained. In terms of the sample size, 28 participants attended the training session and completed the survey at the FCM conference. A total of 7 participants completed the survey at the ICLEI World Congress. Finally, 7 participants completed the survey at the International Symposium on Corporate Responsibility and Sustainable Development and a total of 28 participants completed the survey at the First Working Meeting of the EU-Canada Urban Policy Cooperation. Regarding sample sizes for the online surveys, there were 7 participants on Twitter and 22 participants on LinkedIn.

Snowball sampling is typically used in order to recruit participants through the referrals or connections of one member of a particular group (Padgett, 2012). This sampling method was used in this study in order to secure participants on Twitter and LinkedIn. This process involved the engagement of particular online participants and their efforts to share research knowledge and engage additional participants through their personal, and/or professional online networks (Baltar & Brunet, 2012). More specifically, this sample includes the number of people engaging via our social media outlets (Twitter & LinkedIn). This audience includes sustainability professionals, academics, as well municipal staff and councillors interested in or involved in work surrounding sustainable communities. In terms of the sample size for the social media component, there were approximately 243 (calculation of the total engagements for all key messages) participant engagements on Twitter, and approximately 126 (calculation of the total comment and like count of all key messages) participant engagements on LinkedIn. A detailed overview of the participant numbers, including the specific engagements on social networking applications, are further presented and analyzed in the findings section of this report.

3.3 Data collection

For the purposes of this study data is collected using two mediums, social media and

conference presentations (see Appendix C. for a visual representation of the study procedures).

3.3.1 Social media

The social media component of this study includes data collected via two social networking sites, Twitter and LinkedIn. Using social media as a medium for data collection allows for the dissemination of information to a greater number of receivers (Mairs et al., 2013). To create effective knowledge translation via social networking sites, the dissemination strategies focuses on informing audiences with user-friendly, comprehensible, concise, and informative knowledge (Mairs et al., 2013). Using both LinkedIn and Twitter, and the many applications within each online network, the study focuses on disseminating tailored information in order to engage and obtain responses from the targeted audiences.

To collect data via LinkedIn and Twitter, a series of key messages were posted to each communication channel throughout the study. As outlined in the literature review, the six key messages represent a synthesis of a particular topic or research finding within the research on sustainable community plans. To assess the participant engagement and response to the disseminated academic research, each of the messages were strategically presented with specific content (research finding related to sustainable community plans) and in a particular form of language. The three forms of language were academic, public, and visual language, which were presented in the form of an infographic. Furthermore, an online survey was used to collect additional information from participants concerning their perceptions of each communication channel as a means for receiving academic research. This survey was presented to participants through both Twitter (see Figure 1. in Appendix D.) and LinkedIn (see Figure 2. in Appendix D.) on July 2nd, 2015 through to August 4th, 2015. The qualitative survey questions that pertain to this research project are part of a larger project and survey. Thus, only question 28 from the Twitter survey, and question 33 from the LinkedIn survey are included in the following data

analysis. Moreover, this survey question relates specifically to the infographic of key message 2 (see Figure 2. in Appendix A.).

The scheduling of the key message dissemination consisted of a post on Tuesdays, Wednesdays, and Thursdays around noon each day. The dissemination of key messages on Twitter and LinkedIn ran from June 2015 to October 2015: key message 1 was disseminated the week of 23rd; key message 2 was disseminated the week of June 30th and July 6th; key message 3 was disseminated the week of July 14th; key message 4 was disseminated the week of July 21st; key message 5 was disseminated the week of August 4th; and key message 6 was disseminated the week of September 29th. The time of day was chosen in order to reach the highest amount of social media traffic on each site (Meidlinger, 2015). The public post was typically disseminated on the Tuesday of each week, the academic post on the Wednesday of each week, and finally the infographic on the Thursday of each week. In addition to the comments received for each of the six key message postings, the number of social media engagements was also recorded for both LinkedIn and Twitter. For Twitter, the study looks at the number of impressions, total engagements, link clicks, retweets, favorites, detail expands, media engagements, profile clicks, email shares, and hashtag clicks. In terms of LinkedIn, the study collects the number of view counts, like counts, and comment counts for each of the key messages.

3.3.2 Conference presentations

The second medium, conference presentations, represents the more traditional method of research dissemination. Due to the relevant focus of each conference, these were appropriate events to attract the target audience of this study, which included predominantly sustainability professionals.

To collect data at each conference a qualitative survey was distributed to the participants (see Figure 3. in Appendix D.). The survey collects information about the participants'

receptivity to the content of each conference presentation. Like the online surveys, the qualitative survey questions from the hardcopy survey are part of a larger project and survey. Thus, only questions 19-22 are included in the following data analysis.

Regarding the conferences, the presentation length and audience differ between all four. The presentation at the FCM's Sustainable Communities Conference is the longest of the four, providing conference attendees with an 8-hour training day focused on implementing sustainable community plans. The attendees at this conference represented a national audience and largely included practitioners. A twenty-minute presentation was presented to international and academic audiences at both the ICLEI World Congress 2015 conference as well as the International Symposium on Corporate Responsibility and Sustainable Development. Lastly, a thirty-minute presentation was delivered at the First Working Meeting of the EU-Canada Urban Policy Cooperation to an audience of community representatives and practitioners from Canada and Europe. The 8-hour presentation at the FCM conference enabled the dissemination of a much more in-depth overview of the research, while the other three presentations focused on disseminating a project overview as well as international research findings. Although the four conference presentations were not identical, the overall messages on sustainable community plans remain consistent throughout therefore supporting the analysis of the content and participant receptivity to content.

3.4 Data Analysis

For this research study, both qualitative and quantitative data analyses were conducted.

3.4.1 Qualitative

The qualitative data analyzed consists of the responses from the survey questions, both online and hardcopy, and the textual responses on the social networking sites. A content analysis was used to analyze the qualitative data. The purpose of the content analysis is to make valid

inferences from the data, in order to provide knowledge, new insights and a representation of facts based on the effectiveness of dissemination and knowledge mobilization (Krippendorff, 2013). Conducting a content analysis of the data enables the "subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns" (Hsieh & Shannon, 2005, p. 1278). With the process of a qualitative content analysis, the study utilizes deductive coding. The purpose of deductive coding is to analyze the qualitative data using pre-developed coding schemes in order to answer the study's research questions. Both coding schemes were generated from relevant literature and the study's research questions. This analytical process describes the methodological approach of directed content analysis, an approach that involves the use of "analytic codes and categories derived from existing theories and explanations relevant to the research focus" (Berg & Lune, 2012, p. 352). The goal of a directed approach to content analysis, as presented by Hsieh and Shannon (2005) is to validate or conceptually extend a theoretical framework or theory. This approach supports the development of each coding scheme. The first coding scheme (see Figure 1. in Appendix E.) was used to analyze the textual responses on LinkedIn as well as the qualitative responses from the hardcopy survey. This coding scheme was used to answer research question number two, providing data on the participants' receptivity to the content of each dissemination process. The second coding scheme (see Figure 2. in Appendix E.) was used to analyze the qualitative responses from the online survey in order to answer research question number three.

To begin the analysis of the qualitative data, the hardcopy survey responses were transcribed and organized by individual conference. In addition to the qualitative survey responses, the comments from the social media platforms were organized for data analysis. The qualitative data were separated into six categories in order to track the origin of the data. The six

categories include the four conferences as well as Twitter and LinkedIn. Moreover, separating the data into six categories enabled the differentiation between codes generated from the different target audiences. Once categorized, the first coding scheme was created in order to proceed with a deductive coding process. Using this coding scheme, a content analysis was conducted to analyze the qualitative data in order to answer the study's research questions. The responses to the qualitative survey were coded for key words related to the effectiveness and usefulness of social media as communication channels for academic research. To analyze the qualitative survey responses the second coding scheme was used followed by a content analysis of the data. The survey responses were coded for key words related to the content of all six key messages. Once coded and analyzed, all the qualitative data were reduced and organized into tables, which are presented in the next chapter of this study.

3.4.2 Quantitative

Descriptive statistics were used to analyze the quantitative data collected throughout the study. This analytical approach is a useful strategy for describing the data sample, which includes observational details such as number frequency (Cowell & Carter, 2012). More specifically, it allows for the summation of data collected from LinkedIn and Twitter as well as the identification of the types of posts that generated the most responses (Fisher & Marshall, 2009). In other words, this enabled the determination of the frequency of online engagements on each site in order to identify the amount of traffic and the response rates. Consequently, this method of analysis describes how the data relates to the effectiveness of dissemination and knowledge mobilization.

In addition to descriptive statistics, a chi-square test was run in order to analyze the patterns and frequencies in participant responses. This test was used to examine whether or not there are significant differences within four sets of data: the diffusion rates per content type, the

diffusion rates per language type, the engagement rates per content type, and finally the engagement rates per language type.

3.5 Quality and Rigour

Quality and Rigour, or trustworthiness, refers to the degree to which the interpretations and conclusions of a study are based on the data, are logical and can be trusted (Padgett, 2012). More specifically, trustworthiness is composed of four components including credibility, transferability, auditability, and confirmability, all of which must be accounted for throughout the study (Padgett, 2012). The credibility of a study refers to whether or not the interpretations of the data are accurate (Padgett, 2012). Transferability signifies the generalizability of the study (Padgett, 2012). In other words, transferability considers how the results of the study can be applied to other studies. Auditability ensures that the procedures of the study are documented and traceable (Padgett, 2012). The fourth component, confirmability, ensures that the findings and results are linked to the data and have not been made-up or imagined by the researcher (Padgett, 2012). Due to the levels of subjectivity in qualitative content analysis, issues of trustworthiness can easily arise (Elo, S., & Kyngäs, 2008). Strategies that researchers can employ to mitigate threats to trustworthiness include prolonged engagement, triangulation, peer debriefing and support, member checking, negative case analysis, and leaving a decision trail for auditing purposes (Padgett, 2012).

To ensure the quality and rigour of this study, a number of the aforementioned strategies have been applied throughout the analytical phases of the project. An audit trail was maintained throughout the stages of data analysis. This involved the development of a written document that includes ongoing research memos concerning the ideas and insights drawn from the data and findings. Moreover, a decision trail was kept in order to ensure that future researchers and readers can understand how conclusions were drawn from the data. These steps provide detailed

information surrounding the processes of data analysis including the stages of coding and statistical analysis in order to justify and confirm the theoretical and practical contributions that are gained from the findings of this research study.

4.0 Findings

The research findings of this study are organized per research question and presented in the following sections. The sections include language, which looks at message format, content, which focuses on the topic of each key message, and communication channels, which focuses on the platform used to disseminate the messages.

4.1 Language

This section answers research question number one: How does the language of the information affect the diffusion of information as well as the engagement from participants?

4.1.1 Diffusion of information

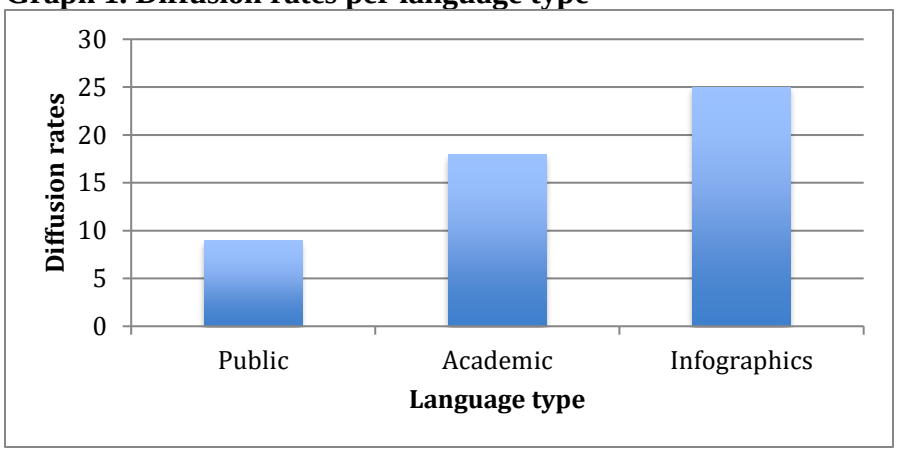
To assess the diffusion of information by Twitter participants as it relates to the language type used for the key message posts, the number of retweets on Twitter is analyzed. This data allows for the comparison of diffusion rates based on the three language types. Consequently, this analysis allows for the comparison of public language, academic language, and visual language (infographics) of each key message. The data collected for this analysis are presented in Table 1. This table includes the number of retweets for each language type used for each key message post. A comparison of the impact of language type on rates of information diffusion by participants is shown in Graph 1. Graph 1 shows the diffusion rates, looking specifically at a comparison of the number of retweets per language type on Twitter.

Table 1. Diffusion per language type on Twitter

Key Message	Language	Retweets
1	Public	0
	Academic	5
	Infographic	3
2	Public	0
	Academic	5
	Infographic	2
3	Public	3
	Academic	3
	Infographic	4
4	Public	3
	Academic	2
	Infographic	7
5	Public	1
	Academic	2
	Infographic	4
6	Public	2
	Academic	1
	Infographic	5

As shown in Graph 1, the results of this analysis indicate that the infographic posts were the most frequently diffused by participants. The academic posts received the second highest diffusion rate, followed by the public posts.

Graph 1. Diffusion rates per language type



4.1.2 Chi-square test results

A chi-square test of goodness-of-fit was performed to assess whether the different types of language used for the messages produced equal diffusion rates. The results of this test are presented in Figure 1. The language types were not equally diffused, X^2 (2, N=52)=7.42, p<.05.

The results indicate a significant difference between each of the language types. Therefore, this shows that the infographic is diffused the most by participants, followed by the academic post, and then the public post on Twitter.

Figure 1. Chi-square test – Diffusion per language type

KM_Language_Diffusion

	Observed N	Expected N	Residual
Public	9	17.3	-8.3
Academic	18	17.3	.7
Infographic	25	17.3	7.7
Total	52		

Test Statistics

	KM_Language_Diffusion
Chi-Square	7.423[a]
df	2
Asymp. Sig.	.024

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 17.3.

4.1.3 Engagement of participants (Twitter & LinkedIn)

The engagement of participants was tracked on both Twitter and LinkedIn by collecting quantitative data that reflects participant interactions with the three language types. In terms of engagement on Twitter, the number of retweets, likes, favorites, detail expands, media engagements, profile clicks, email shares, and hashtag clicks were collected. Moreover, the number of impressions were collected in order to compare the participants' engagement with the posts to the participants' viewing of the posts. This comparison enables the differentiation between engagement and viewing. Table 2 shows the number of impressions and total engagement rates for each language type used for each key message. To determine the engagement rates on LinkedIn the number of likes, comments and cross platform shares were collected. This data is shown is Table 3. To compare the engagement rates with view rates on LinkedIn, Table 3 includes data relevant to the number of views of each language type.

Table 2. Engagement with language types on Twitter

Key Message	Language	Total Engagement*	Impressions
1	Public	2	281
	Academic	29	931
	Infographic	10	519
2	Public	4	473
	Academic	11	898
	Infographic	52	1701
3	Public	6	491
	Academic	7	500
	Infographic	18	605
4	Public	12	634
	Academic	6	399
	Infographic	37	2279
5	Public	5	479
	Academic	5	324
	Infographic	9	742
6	Public	5	379
	Academic	2	195
	Infographic	23	818

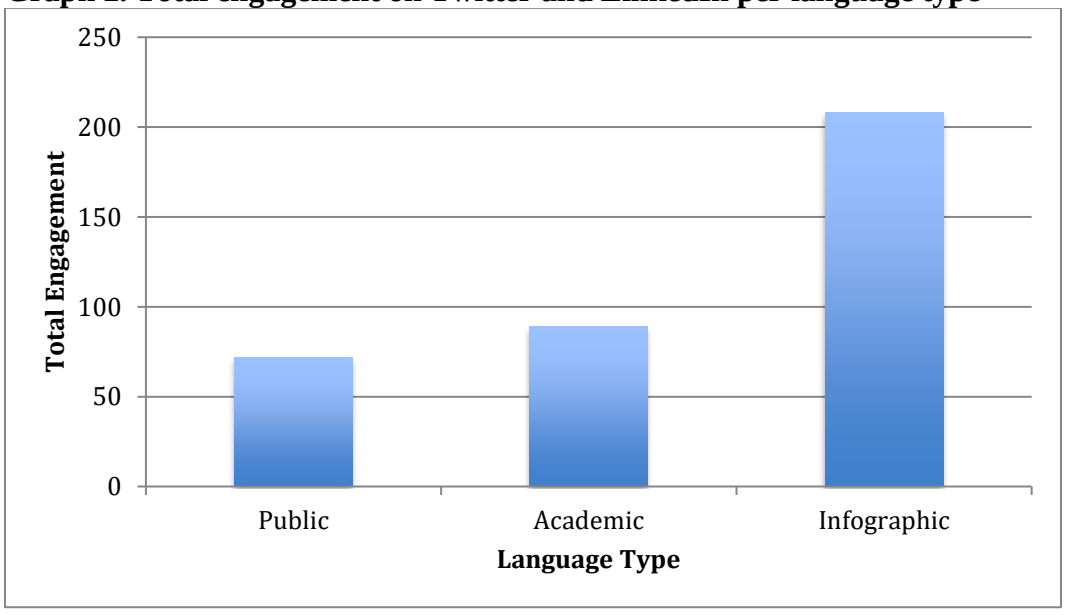
(*Total engagement**:** the number of retweets, likes, favorites, detail expands, media engagements, profile clicks, email shares, and hashtag clicks)

Table 3. Engagement with language types on LinkedIn

Key Message	Language	Total Engagement	View Count
1	Public	8	98
	Academic	0	4
	Infographic	10	80
2	Public	8	71
	Academic	5	64
	Infographic	20	470
3	Public	3	51
	Academic	3	33
	Infographic	4	65
4	Public	9	47
	Academic	2	39
	Infographic	6	43
5	Public	4	33
	Academic	3	47
	Infographic	12	70
6	Public	6	13
	Academic	16	78
	Infographic	7	20

Graph 2 shows the results for the total engagement rate of participants with regards to the language type on Twitter and LinkedIn. The results indicate a relatively high engagement rate with visual language. In other words, the participants engaged the most with the infographics used to present the key messages.

Graph 2. Total engagement on Twitter and LinkedIn per language type



4.1.4 Chi-square test results

A chi-square test of goodness-of-fit was performed to assess whether the engagement of participants with the key messages was equal for the three language types. The results of this test are presented in Figure 2. The results indicate a very significant difference among the language types, X^2 (2, N=369)=89.29, p<.001. Therefore, this shows that participants engaged the most with the posts disseminated via infographic, followed by the use of academic language, and then the public language.

Figure 2. Chi-square test – Engagement with language type

KM_Language_Engagement

	Observed N	Expected N	Residual
Public	72	123.0	-51.0
Academic	89	123.0	-34.0
Infographic	208	123.0	85.0
Total	369		

Test Statistics

	KM_Language_Engagement
Chi-Square	89.285[a]
df	2
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 123.0.

4.2 Content

This section answers research question number two: How does the content of the information affect the diffusion of information as well as the engagement from participants?

4.2.1 Diffusion of information

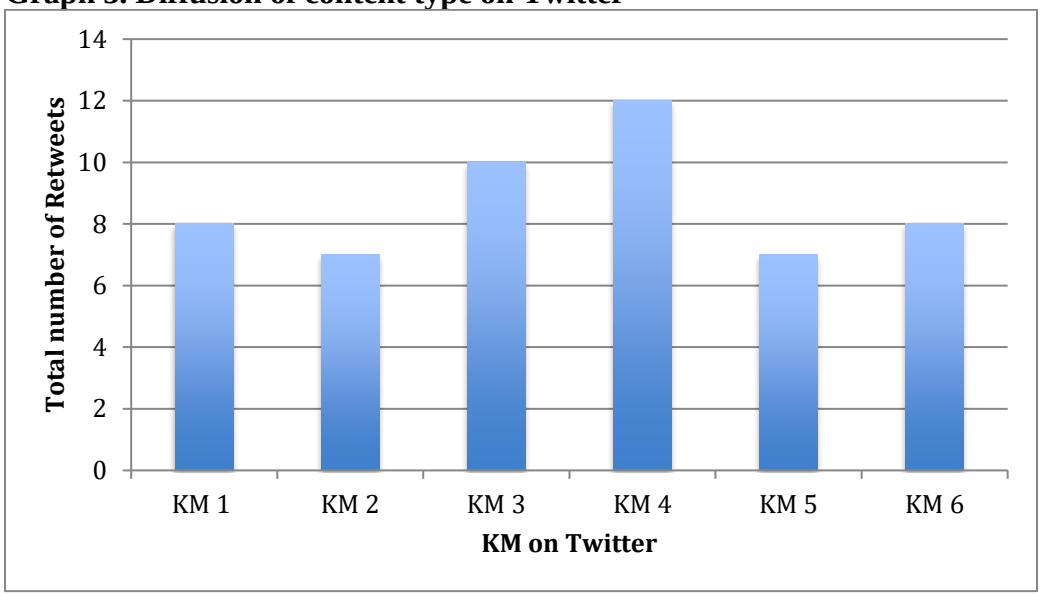
The diffusion of information is also assessed in order to track the participants' interest in the content of each key message. The same data was collected for this assessment as those used to track the diffusion of information per language type. This includes the number of retweets on Twitter. This data is shown in Table 4.

Table 4. Diffusion per content type on Twitter

Key Message	Retweets
Key message 1: The collaborative strategy process	8
Key message 2: Topics in community sustainability plans	7
Key message 3: Collaborative strategic management outcome types	10
Key message 4: Key structural features for implementing a sustainable community plan	12
Key message 5: Partner outcomes from joining a community sustainability partnership	7
Key message 6: Participation versus partnership for community sustainability	8

As shown in Graph 3, key messages 3 and 4 received the highest diffusion rate. The results of this data do not indicate a significant pattern in regards to the diffusion of particular content by participants. The majority of the key messages including key messages 1, 2, 5, & 6, received a relatively similar number of retweets.

Graph 3. Diffusion of content type on Twitter



4.2.2 Chi-square results

A chi-square test of goodness-of-fit was performed to assess whether the content presented in each key message produced equal diffusion rates. The results of this test are presented in Figure 3. The results show that there was no significant difference between key messages, X^2 (5, N=52)=2.23, *ns*.

Figure 3. Chi-square test – Diffusion per content

KM_Message_Diffusion

	Observed N	Expected N	Residual
KM1	8	8.7	-.7
KM2	7	8.7	-1.7
KM3	10	8.7	1.3
KM4	12	8.7	3.3
KM5	7	8.7	-1.7
KM6	8	8.7	-.7
Total	52		

Test Statistics

	KM_Message_Diffusion
Chi-Square	2.231[a]
df	5
Asymp. Sig.	.816

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 8.7.

4.2.3 Engagement of participants

In addition to the engagement of participants with language type, the engagement with the content of each key message was also examined. This engagement encompasses both qualitative and quantitative data in order to assess how content plays a role in the engagement rates of participants.

The quantitative analysis of participant engagement with key message content includes data gathered via Twitter and LinkedIn. The results of this analysis, specific to Twitter, are shown in Table 5. The engagement rates on LinkedIn are presented in Table 6. Once again, the number of impressions and views were collected on each social media application for the purposes of comparing the engagement rates with the rate of participant views of each post.

Table 5. Engagement with content type on Twitter

Key Message	Total Engagement*	Impressions
Key message 1: The collaborative strategy process	41	1731
Key message 2: Topics in community sustainability plans	67	3072
Key message 3: Collaborative strategic management outcome types	31	1596
Key message 4: Key structural features for implementing a sustainable community plan	55	3312
Key message 5: Partner outcomes from joining a community sustainability partnership	19	1545
Key message 6: Participation versus partnership for community sustainability	30	1392

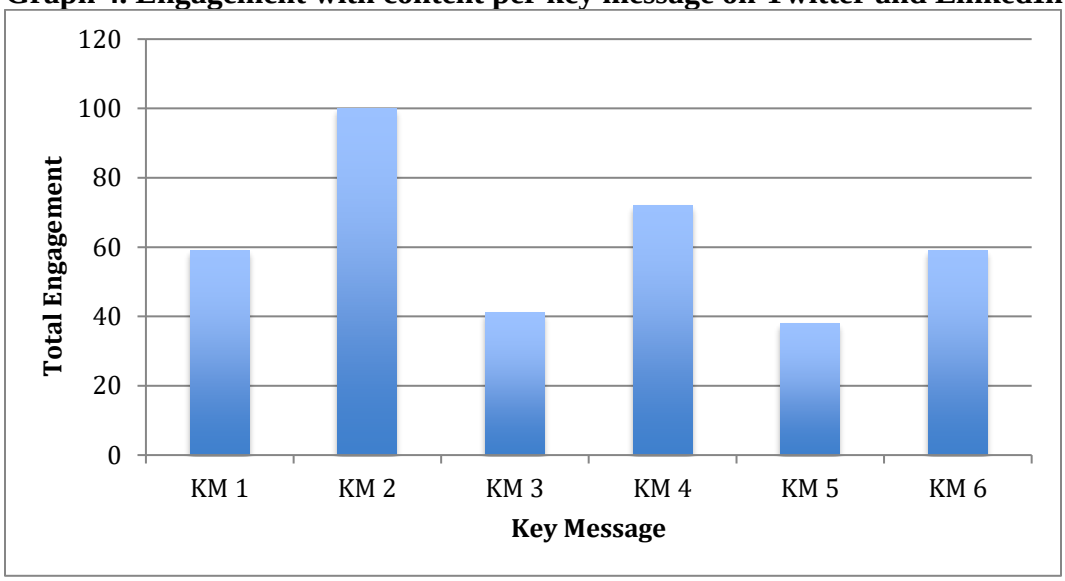
(*Total engagement**:** the number of retweets, likes, favorites, detail expands, media engagements, profile clicks, email shares, and hashtag clicks)

Table 6. Engagement with content type on LinkedIn

Key message	Total Engagement	View Count
Key message 1: The collaborative strategy process	18	182
Key message 2: Topics in community sustainability plans	33	605
Key message 3: Collaborative strategic management outcome types	10	149
Key message 4: Key structural features for implementing a sustainable community plan	17	129
Key message 5: Partner outcomes from joining a community sustainability partnership	19	150
Key message 6: Participation versus partnership for community sustainability	29	111

Graph 4 displays the results of the data collected for the engagement with message content on both Twitter and LinkedIn. The results show that participants' engaged the most with key messages 2 and 4, and the least with key messages 3 and 5. The remaining two key messages received the same level of engagement from participants, which includes 59 total engagements each.

Graph 4. Engagement with content per key message on Twitter and LinkedIn



4.2.5 Chi-square test results

A chi-square test of goodness-of-fit was performed to assess whether the engagement of participants with the key messages on both Twitter and LinkedIn was equal. The results of this test are presented in Figure 4. The results indicate a significant difference between the content of each key message, X^2 (5, N=370)=43.06, p<.001.

Figure 4. Chi-square test – Engagement with content

KM_Message_Engagement

	Observed N	Expected N	Residual
KM1	59	61.7	-2.7
KM2	101	61.7	39.3
KM3	41	61.7	-20.7
KM4	72	61.7	10.3
KM5	38	61.7	-23.7
KM6	59	61.7	-2.7
Total	370		

Test Statistics

	KM_Message_ Engagement
Chi-Square	43.059[a]
df	5
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 61.7.

The qualitative analysis of participant engagement with key message content includes data gathered from the qualitative responses of surveys distributed at the four conferences. The data from each of the conferences was coded in order to conduct a qualitative content analysis. The topics of the key messages are used to code the hard copy survey data and to further refine the categorization of codes. The results of the content analysis are shown in Table 8 and indicate two main categories derived from coding. These categories include: key structural features for implementing a SCP; and participation versus partnership for community sustainability. Each of these categories is developed from the topics of each key message and represents the content receiving the highest engagement rate from participants at all four of the conferences. The findings of this analysis include: 13 comments for key message 1; 1 comment for key message 2; 2 comments for key message 3; 59 comments key message 4; 7 comments for key message 5; and 24 comments for key message 6. Therefore, key messages 4 and 6 received significantly high number of comments compared to key messages 1, 2, 3 and 5.

Table 7. Coded data from hard-copy survey questions

Key Message	Comments	Total # of comments
Key message 1: The collaborative strategy process	- Collaboration and monitoring - We have to involve all the society (public, private, non-profit, university, etc.) - The importance of the partners involvement for the success of the plan, beyond their opinion as passive stakeholders. - Involving several partners in agreements - Importance of having buy in at all levels of municipality - Utilize partnerships and collaboration - Importance of collaborative decision making processes - Building partnerships for the future not just short term - Plans can sit on a shelf without a clear implementation structure - The importance of giving the ICSP implementation - Implementing ICSP's - Implementation - Importance of local government implementation process models	13
Key message 2: Topics in community sustainability plans	- Differences across urban, rural, remote partnerships are important.	1
Key message 3: Collaborative strategic management outcome types	- Different models of partnerships - Differences across urban, rural, remote partnerships are important.	2
Key message 4: Key structural features for implementing a sustainable community plan	- Monitoring - Reconfirmed partnership, monitoring and communication as priorities for our work - Monitoring/measurement is critical to success - Collaboration and monitoring - Monitoring as a narrative - Monitoring as story telling - Monitoring is useful - Partnerships are key success factors - Measurement is a means of storytelling - 'Monitoring is exciting' - Monitoring and reporting on results is critical - The importance of monitoring ad reporting on wins/losses. - 5 keys to success - Monitoring should act as a narrative - Monitoring should be a narrative - Monitoring	59

	- Monitoring is valued and important within all community types. - Monitoring is exciting and very important - Monitoring is awesome! - Monitoring to 'prove' the good actions - Keys to success - Importance of monitoring/eval - Buy in from partners important - Partners implementing plan is key to success - Partners engagement is a key issue for the success of the S.P. - It is important to monitor these processes to review and compare examples. - Monitoring - Reminders to follow-up on the monitoring and reporting from our plan. - Engagement of partners - Involving several partners in agreements - Keys to success - 5 keys to success - Structure and study design matter - Different models of partnerships - Different governance structures and approaches - Importance of working with community partners - Importance of collaborative decision making processes - Importance of the state and globe institutions - Importance of partners - Importance of networking for partners - In general partners are interested to change and they see it's importance - Importance of partners networking - Partners are important - Partnerships can take many different forms, but are an invaluable way of implementing plans - Different implementation's that can/should be used - Measurements vary - Importance of networking for long term implementation - Importance of local government implementation process models - Implementation structure - How best to engage and retain partners in implementation	
Key message 5: Partner outcomes from joining a community sustainability partnership	- Buy in from partners important - Importance of long-term relationships - Importance of networking for partners - In general partners are interested to change and they see it's importance - Partners - Partners have varying expectations - Importance of networking for long term implementation - How best to engage and retain partners in implementation	7
Key message 6: Participation versus	- Reconfirmed partnership, monitoring and communication as priorities for our work - Collaboration and monitoring	24

partnership for community sustainability	- Partnerships are key success factors - Importance of collaborating with partners - Partnerships are important in the overall sustainability of all communities. - Partnership is crucial - Partnerships are critical for community-wide implementation - We have to involve all the society (public, private, non-profit, university, etc.) - The importance of the partners involvement for the success of the plan, beyond their opinion as passive stakeholders. - Involving several partners in agreements - Role of local governments - Different governance structures and approaches - Many partnership model can work - Strong partnerships come through objective based institutions - Partnerships are important - Utilize partnerships and collaboration - Partnerships - Partnership - The importance of partnerships - Importance of partners - Importance of partnerships - Building partnerships for the future not just short term - Partners are important - Partnerships can take many different forms, but are an invaluable way of implementing plans	

4.3 Communication Channels

This section answers research question number three: How do people perceive Twitter and LinkedIn as channels for receiving academic research? To determine people's perceptions of both Twitter and LinkedIn as communication channels for receiving academic research, a qualitative content analysis was conducted. Table 8 shows the data derived from the coding of the qualitative online survey questions. As shown in Table 8 the survey questions were coded into four categories, including: useful and effective, inappropriate/ineffective, suggestion(s), and issues with post. These categories are suitable for answering the research question, as they are indicators to the participants' perception of each communication channel for receiving research. Overall, the results of the content analysis indicate that the majority of participants think that LinkedIn and Twitter are inappropriate and/or ineffective communication channels for receiving

and in turn disseminating academic research. Furthermore, the results show a number of issues related to the post itself, therefore impacting the reception of information and perception of LinkedIn and Twitter as channels for receiving research.

Table 8. Coded data from online survey questions

Categories	Codes
Useful and effective	- Gaining access to broad range of sustainability and climate change information was the key reasons that I joined Twitter - I think Twitter is a very valuable resource for disseminating info on sustainable community plans - Overall, I'm very supportive of using Twitter - I think that posting research information on LinkedIn will definitely provide you with a very wide & diverse audience. - Until I became aware of your present efforts, I never thought of LinkedIn as a good means of reaching a desired audience in this way, but rather a means to link people with specific training / interests... your efforts bring a greater level of detail to posts.
Inappropriate/ ineffective	- Twitter is the single conduit for disseminating information. - Twitter is more of a dialogue platform - It is more effective to engage the public rather than to learn about trending activities. - Overall, I thought the tweet really didn't share much at all. - Only learned a little bit about what cities' priorities are - Anyway, I find that LinkedIn is one good source of information, but I'm more likely to use it as a source of expertise and knowledge from specific individuals (or for cooperation with those individuals) rather than a source of information in the articles themselves. - I find LinkedIn a problematic website to use at work. I could be doing research for my work, or I could be looking for another job. It looks a bit sketchy so I'm not entirely comfortable using it. - I don't usually find the information I want on Linkedin but that is because many of my peers do not use it. - Most of my experience on LinkedIN has been following and participating on several discussion groups. I dropped out because it seemed unproductive.
Issues with post	- The tweet didn't show anything about how to implement a sustainable community plan, - Most of these questions had to do with the implementation of sustainable community plans, whereas the infographic only briefly explained what topics are included in several cities' plans, with no mention to how they were implemented. - I learned next to nothing about the implementation of sustainable community plans, - The infographic is the extent of the information provided in the tweet. - Only issue I encountered is that the information presented in the article given only refers to the content of community sustainability plans, and not to their implementation. - I think the post could have been a bit more detailed.

	- I do not think the post was about the implementation of sustainable community plans. It was about the content of sustainable community plans. I did not see anything about implementation. - I found the post frustrating as it didn't provide the actual question answered by the communities. As a result, I couldn't really interpret the data. - Poster was confusing - Because the infographic itself wasn't really about implementing sustainable community plans, I felt the questions in the survey weren't necessarily framed correctly. - I feel the information presented was very general about what topics municipalities include in the their plans -- there was no information at all about how these topics are prioritized in their plans or they implement the goals/targets set out related to them. - It was not at first clear that I needed to click a link to view the full article. "For more details, click here" is misleading in a bad way, it made me think that they would be details as to how the graphic was generated - in reality, it was a much richer article with much more useful information. - The infograph was not well designed. - The infographic claimed to show what Canadians think, and what communities are thinking and doing, but it did not identify who constituted "Canadians" or "communities". - This is less about LinkedIn than designing effective visualizations to post on LinkedIn. - The post seemed very short so there doesn't appear to be too much information in it - Was I meant to comment on the LinkedIn infograph or the website it linked to? - I did not spend much time on the website, it started out sounding too academic, - More detailed information that could have been disseminated through this infographic

5.0 Discussion and Conclusion

This section discusses the findings of the study as they relate to existing literature and the study's research questions. Additionally, the limitations of the research study are addressed as well as the potential directions for future research.

5.1 Practical Implications

The results of this study support existing literature that suggest social media channels are best utilized to engage and interact with online users and audiences. Therefore, in addition to creating one way dialogue with disseminated research, encouraging two-way dialogue and conversation will further increase the diffusion and engagement rates on the social networking sites. Moreover, the study illustrates the effectiveness of visualizing data and information to share knowledge with targeted audiences. Existing literature as well as the findings of this study support the use of infographics in successfully attracting audiences by quickly conveying information that is easily accessible and shareable (Korkmaz, 2009; Siricharoen, 2013).

5.2 Language

Bridging the gap between academic research and putting research into practice is hindered by a number of factors, all of which impact the effectiveness of reaching necessary stakeholders with accessible and usable knowledge. Based on existing literature, this study has recognized language, more specifically academic jargon, as one such factor in creating a potential barrier to linking academic research and action (Gray et al., 2005; Steffens et al., 2014). The results of this study support this idea, showing a significant difference between each of the language types used to disseminate research to participants.

Visual language, disseminated through infographics, received the highest engagement and diffusion rates by online social media users. These results show that participants were more likely to share the infographics with other social media users. Moreover, participants engaged the

most with the academic research, whether it was through commenting or liking the posts, when they were disseminated to them in the form of an infographic.

Providing participants with visual representations of the research, which included the use of graphs, charts, and graphics, allowed for easily mobilized knowledge between sender and receiver. The minimalism of the infographics ensured that the academic research was comprehensible to a large audience. Moreover, using Bennett and Jessani's (2011) principles of knowledge translation, the infographics ensured that the disseminated research was accessible, familiar and easily communicable to the participants. Although the visual language showed the highest engagement and diffusion rates, the rates for the academic posts are higher than those of public post. This discrepancy indicates that participants are not consistently responding to communications presented in more accessible language. Consequently, this could be due to the audience type. The targeted audience for this research study is practitioners and non-academics, however this could not be easily controlled in social media environments thus impacting the type of participants and language preferences.

Overall, the findings of this section of the research study indicate that academic research must be thoughtfully presented to receive higher participant response rates. This study has confirmed the role of visual language as one example for mobilizing research in a user-friendly process. Using both Twitter and LinkedIn, the dissemination of academic research can be most effectively shared with users through the use of visual and straightforward information.

5.3 Content

Mobilizing specific types of information can have an impact on participant response rates. As outlined in the literature review, this study compiled a total of six key messages for the dissemination stages. These key messages are derived form Dr. Clarke's research on sustainable

community plans. Each of the messages focuses on a particular research focus or finding of Dr. Clarke's work on sustainability plans.

The results related to the impact of content type show very different findings in terms of the diffusion of information and the engagement of participants. The findings for this section of the study indicate that message content did not impact the rates in which participants diffused information on each social media site. Therefore, the different key messages did not influence the degree to which participants shared information via Retweeting the posts on Twitter. With that being said, it is important to note that calculating the diffusion rates on social media was limited to the number of Retweets on Twitter, therefore impacting the amount of data collected and used in the analysis.

The results based on the engagement rates of participants towards specific content show a significant difference between key messages. Regarding social media, the results indicate that participants engaged the most with key message 2 and key message 4. In other words, participants showed higher rates of engagement with information that related to topics included in SCPs as well as to the structural features for implementing the plans. Both types of content are derived from Dr. Clarke's larger research project and represent knowledge highly related to practitioner based management and processes. For example, key message 2, which received the higher engagement rates from participants, provides readers with specific details concerning the topics most important to the development and implementation of community sustainability plans. Moreover, this content is derived from a survey delivered to 37 Canadian cities, thus providing readers with critical knowledge based on national research. Furthermore, participants can use this information in order to develop and strengthen their own community sustainability plans. In regards to the content from key message 4, it is appropriate this also received a high rate of

engagement from participants as it provided readers with the necessary criteria to implement and evaluate a sustainable community plan's structure. Moreover, this information details the most effective ways to structure the collaboration between partners and stakeholders, which is increasingly important for practitioners and organizations as they focus on addressing complex social and ecological problems.

A qualitative analysis was also conducted to assess the participants' engagement with particular content at all four conferences. The results of this analysis show that key message 4, which includes content related to the key structural features for implementing a SCP, received the highest response rates from conference attendees. These results were derived from the qualitative survey responses and represent the content that received the highest attention from each of the conference presentations. In comparison to the results for engagement with content on social media, participants showed more of an interest in content regarding the five keys to success for SCPs rather than the topics included within the plans. Consequently, this difference in results can be linked to the audience types on social media and attending the conference presentation. Due to the purposive sampling method, the participants at each of the conferences represent the exact target audience of this study and include participants who are generally familiar with SCPs and therefore the topics of the plans. Therefore, these participants would be more likely to comment on the content most applicable to their efforts in understanding and implementing SCPs, such as the key structural features.

The content of key message 2 and key message 4 show that participants engaged the most with the research topics that were more tailored to successful development, implementation, and evaluation of SCPs. Moreover, these content topics exemplify concrete and user-friendly information that can be used in the work and planning of the study's participants. Consequently,

the results of this section are in line with Graham et al.'s (2006) definition of knowledge translation, which refers to the tailoring of research findings or messages in order to target specific audiences (Gagnon, 2011). Recognizing the targeted audience of this study as sustainability practitioners and professional participants it is important that participants were able to engage and relate to the content most applicable to their work and interests.

5.4 Communication Channels

As shown in the literature review a limited amount of research has focused on the effectiveness of social media sites as communication channels for academic research. Recognizing this gap in the literature, the third section of this study focused on understanding the social media users' perceptions of these sites as channels for receiving and disseminating academic research. The results of this section of the study did not provide sufficient insight on using social media sites to communicate with target audiences. The results of the analysis of the online survey questions showed that the majority of participants had an issue with the post itself, therefore impacting their perspectives on using social media to disseminate research. These responses included issues with the design of the infographic as well as the actual content provided in the infographic. Based on the types of issues that arose with the post, an accurate response to the research question cannot be provided. Due to the number of issues users had with the post itself, the study cannot accurately comment on the effectiveness of social media as communication channels for receiving and disseminating research. This research question should be further explored in future research. For example, there is opportunity to strategically analyze how best to use social media for the purposes of disseminating academic research and to determine how users respond to research when disseminated to them via social media sites.

5.5 Limitations

It is critical to note several limitations of the study, which hinder the integrity of the

research with regards to the generalizability of the findings. These limitations relate primarily to the use of the social media applications within the study. As determined by this study, the world of social media presents a number of variables that can impact the data collection, analysis and results of a research study. Therefore, the following section acknowledges these types of limitations.

5.5.1 Online presence

LinkedIn and Twitter were both used in this research study in order to collect the necessary data. This data was collected based on the response rates from participants on each of the social networking sites. With that being said, these participants represent the existing followers or connections of Dr. Clarke. Therefore, the data is strongly impacted by the amount of followers or connections on each site at the time of the data collection. It is also important to note that the number of Dr. Clarke's connections on LinkedIn and followers on Twitter increased as this study progressed. In order to reach more participants, external tweeting and connections were made which increased both sets of numbers. This limitation is most relevant to the second research question, which assess the impact of message content on diffusion and engagement rates. Overall, the increased number of followers and connections from the beginning of the data collection process of the study, June 2015, and the end of the data collection process, October 2015, must be considered when examining the results of this research study.

5.5.2 Controlling for extraneous variables

Accurately analyzing the interactions on social media is a complicated task, which can be impacted by a number of extraneous variables. As outlined in the methods section of this report, the study collected quantitative data from both LinkedIn and Twitter. Consequently, it is difficult to control variables that might have impacted the study's results, in terms of participant engagement or the diffusion of information by participants, and thus causation cannot be

claimed. For example, there is no way to control for potential confounds, such as political occurrences, world events, conferences, or personal interests, that may have impacted why a participant chose to like a particular key message or to share a different key message. Therefore, it is difficult to make concrete conclusions about the relationships between the variables of this study, only that a correlation does indeed exist.

5.6 Future Research

This research study has examined and applied the strategies and processes of knowledge mobilization in order to disseminate research to target audiences. As previously outlined in the practical implications of this study, recommendations for future research include the engagement of participants on social media sites through two-way dialogue and discussions. Consequently, future research should incorporate more discussions and conversations with participants regarding the disseminated information in order to ensure the effectiveness of sharing knowledge. Moreover, to build on this study, future research can examine the implementation of the knowledge disseminated throughout this project. This would involve an analysis focused on whether or not the participants used the research on sustainable community plans in their own practices. This research would further support the final stages of the knowledge mobilization process, looking at the implementation and utilization of the disseminated research by the target audiences. Furthermore, future research would be beneficial to effectively bridge the gap between sustainability research and putting research into practice through the implementation of SCPs.

5.7 Conclusion

This research study explored the dissemination of Dr. Clarke's research on sustainable community plans through the use of social media and conference presentations. Moreover, the study sought to acknowledge the gaps in existing literature with research questions focused on

the impact of content and language on dissemination as well the role of social media in effectively targeting participants with academic research. The effective use of infographics for the dissemination of academic research shows the importance of mobilizing user-friendly and concise information. Moreover, this study confirms the significance of tailoring information with appropriate content to ensure its relevance for targeted audiences.

Understanding best practices for communicating via social media is critical to effective dissemination in the online world. This study sheds light on the effectiveness of LinkedIn and Twitter as communication channels for disseminating academic research by providing social media users with a clear understanding of what types of messages and in which forms will receive the biggest impact. Recognizing the impact of visual language and message content this study exemplifies processes for successfully mobilizing knowledge between sender and receiver. With strategic communication planning and design, which encompasses concise, practical, and informative knowledge, researchers can effectively disseminate research to targeted audiences using both conference presentations and social media sites.

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Appendix A: Key Messages

Figure 1. Key Message 1

Infographic:

Public Message

Climate change, environmental degradation, social inequity … there are no quick-fix solutions. These complex problems require the involvement of different sectors. Cross-sector partnerships bring together different actors in order to enable dynamic solutions to social and environmental problems. The collaborative strategic management process involves:

1. Defining the problem and build partner relationships
2. Creating a strategic plan
3. Taking action both as individuals and a collective
4. Realizing the outcomes of these efforts

Revisions at different stages in the process allow for continual improvement.

Clarke, A. & Fuller, M. (2010). Collaborative Strategic Management: Strategy formulation and implementation by multi-organizational cross-sector social partnerships. *Journal of Business Ethics*, 94(Supplement 1): 85-101.

Academic Message

Multi-organizational cross-sector social partnerships are becoming an increasingly common means of addressing complex social and ecological problems that are too extensive to be solved by any one organization. Below details a conceptual model of the collaborative strategic management process:

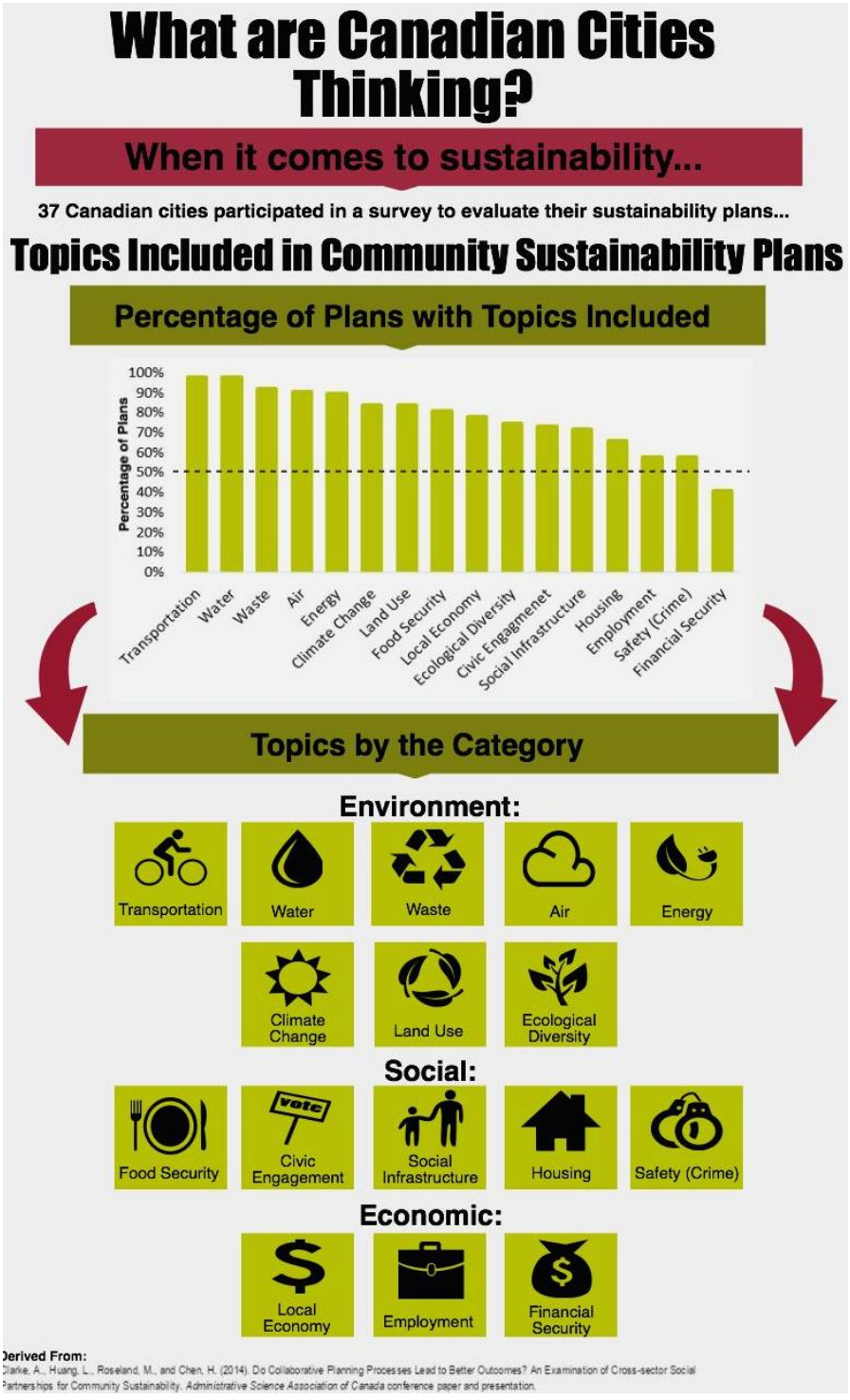
1. **The first stage of the collaborative strategic management process is assessing the environmental, social, and economic contexts of the issue and forming the partnership.**
2. **The second stage of the process is the formulation of the collaborative strategic plan. It is in this phase where partners work together to find a common vision and negotiate a collaborative strategic plan.**
3. **The third stage of the process involves the implementation of the collaborative strategic plan, through both deliberate and emergent approaches. Some aspects of the implementation will be collectively enacted by the partnership, and some aspects of the implementation will be individually enacted by the partners within their own organizations.**
4. **The final stage is the realized collaborative strategy implementation outcomes, which are the results of the actions taken by both the partnership and by the individual partner organizations.**

Each phase of the development process can be influenced by external factors such as changes in the domain. A series of feedback loops persist allowing for corrective action, overlapping activities, cyclical decision-making and new partners to engage.

Clarke, A. & Fuller, M. (2010). Collaborative Strategic Management: Strategy formulation and implementation by multi-organizational cross-sector social partnerships. *Journal of Business Ethics*, 94(Supplement 1): 85-101.

Figure 2. Key Message 2

Infographic:



Public Message

Through a survey of 37 Canadian municipalities, we found that 16 topics are typically included within community sustainability plans. There is an evident trend in the inclusion of certain topics over others; most common being environment related, followed by social, followed by economic. See below for the results of the percentage of plans that have each topic:

1. **Environmentally related: Transportation (97.5%), Water (97.4%), Waste (91.6%), Air (90.3%), Energy (89.5%), Land Use (89.2%), Climate Change (83.8%), and Ecological Diversity (74.3%)**
2. **Socially Related: Food Security (80.6%), Civic Engagement (73%), Social Infrastructure (71.4%), Housing (65.8%), and Safety (Crime) (57.8%)**
3. **Economically Related: Local Economy (78%), Employment (57.6%), and Financial Security (40.7%)**

Derived from: Clarke, A., Huang, L., Roseland, M., and Chen, H. (2014). Do Collaborative Planning Processes Lead to Better Outcomes? An Examination of Cross-sector Social Partnerships for Community Sustainability. *Administrative Science Association of Canada* conference paper and presentation.

Academic Message

Through a survey of 37 Canadian municipalities, 16 topics were identified within their community sustainability plans. The topics and percentage of plans with this topic are listed here:

1. **Environmentally related: Transportation (97.5%), Water (97.4%), Waste (91.6%), Air (90.3%), Energy (89.5%), Land Use (89.2%), Climate Change (83.8%), and Ecological Diversity (74.3%)**
2. **Socially Related: Food Security (80.6%), Civic Engagement (73%), Social Infrastructure (71.4%), Housing (65.8%), and Safety (Crime) (57.8%)**
3. **Economically Related: Local Economy (78%), Employment (57.6%), and Financial Security (40.7%)**

Derived from: Clarke, A., Huang, L., Roseland, M., and Chen, H. (2014). Do Collaborative Planning Processes Lead to Better Outcomes? An Examination of Cross-sector Social Partnerships for Community Sustainability. *Administrative Science Association of Canada* conference paper and presentation.

Figure 3. Key Message 3

Infographic:

Public Message

Engaging in a collaborative community sustainability partnership has numerous benefits that can be experienced by individual organizations while also contributing to overall community wellbeing. Six incentives to join a community sustainability plan have been identified below:

1. Get to know other partners and learn about sustainability
2. Become better known in the community and beyond
3. Help increase community cohesiveness and pride
4. Increase legitimacy of sustainability initiatives, products, and services
5. Contribute to community sustainability progress while achieving your own organizational sustainability goals
6. Realize cost savings from sustainability projects

Derived from:
Clarke, A. & MacDonald, A. (2012). Partner Engagement for Community Sustainability: Supporting Sustainable Development Initiatives by Reducing Friction in the Local Economy. State of Knowledge Report. Ottawa: Sustainable Prosperity.

Academic Message:

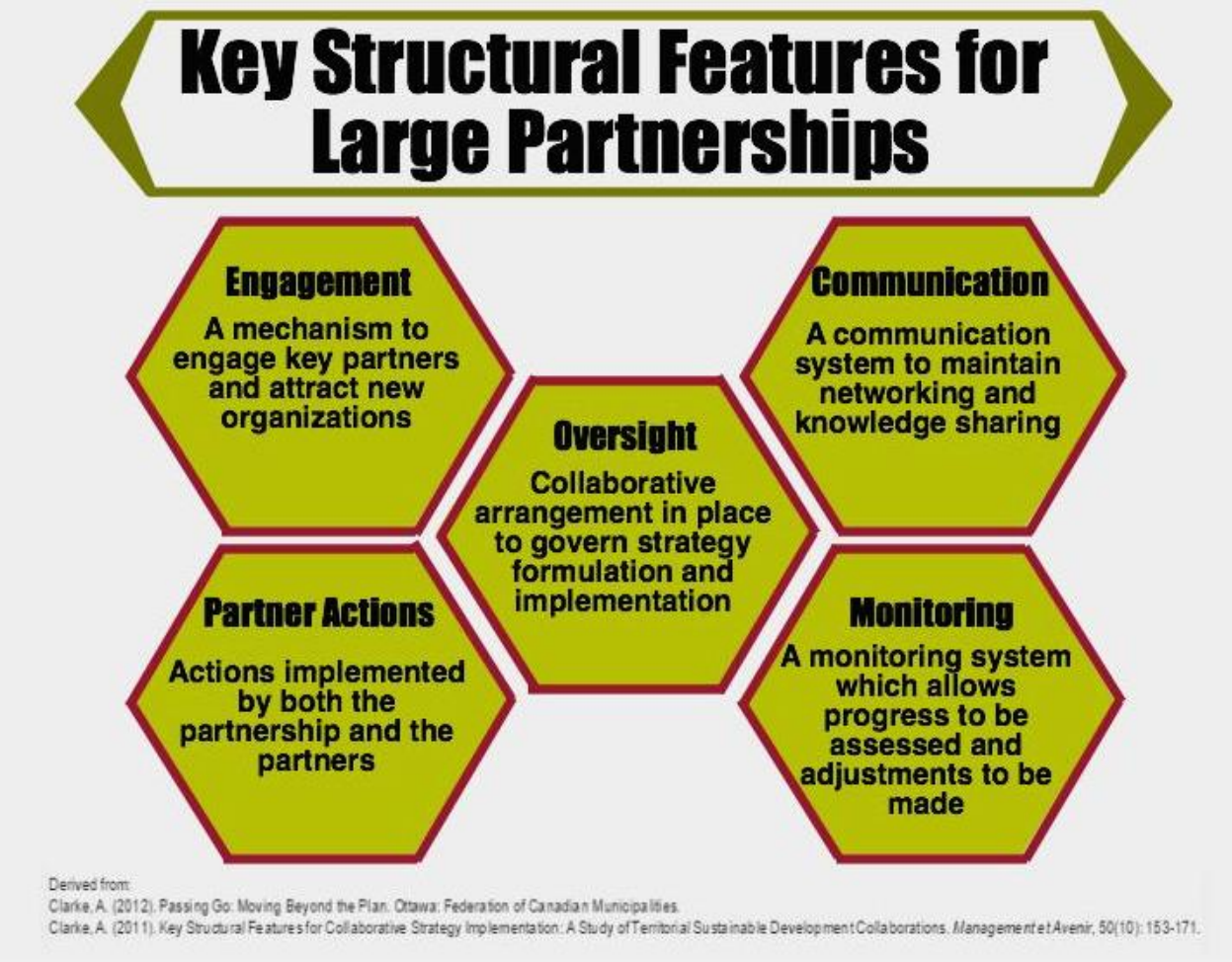
Businesses can find it challenging to engage in sustainable development strategies due to lack of understanding or resources. However, there are several incentives that encourage partner organization involvement in a collaborative community sustainability partnership, allowing for increased information flow and resource sharing.

1. Improved networking and knowledge sharing
2. Improved reputation
3. Increased positive relationships with the community
4. Increased legitimacy for sustainability initiatives, products and services, and regarding corporate citizenship
5. Progress towards organizational and community sustainability goals
6. Cost savings from sustainability initiatives contributing to financial performance

Derived from:
Clarke, A. & MacDonald, A. (2012). Partner Engagement for Community Sustainability: Supporting Sustainable Development Initiatives by Reducing Friction in the Local Economy. State of Knowledge Report. Ottawa: Sustainable Prosperity.

Figure 4. Key Message 4

Infographic:



Public Message

Sustainability is a complex issue to tackle, and progress requires many players. But what is the best way to structure this collaboration? Below are five keys to a successful implementation structure:

1. A collaborative entity that oversees implementation by facilitating connections and identifying short and long term actions
2. A communication system that maintains networking between partners and informs citizens
3. A monitoring system, including indicators, which reviews progress and allows for adjustments to be made to the implementation
4. Mechanisms that engage key partners and attract new ones
5. Individual partners that take action within their own organizations

Derived from:
Clarke, A. (2011). Key Structural Features for Collaborative Strategy Implementation: A Study of Territorial Sustainable Development Collaborations. *Management et Avenir*, 50(10): 153-171. DOI: 10.3917/mav.050.0153

Academic Message

Implementing a Community Sustainability Plan is a complex process involving many partners/stakeholders and presents opportunity for both failure and success. To evaluate a Community Sustainability Plan's implementation structure the following criteria, which includes five key features, can be used:

1. Has collaborative arrangements to oversee the implementation and identify issue-based short-term actions, and also allows for networking between organizations;
2. Has a communication system that exists to further networking and to reach citizens;
3. Has a monitoring system that exists, including both state and action indicators, which also allows for adjustments to be made to the implementation;
4. Engages key organizations from different sectors, and/or has a mechanism to identify them and add them; and
5. Has individual organizations implementing within their own organizations

Derived from:
Clarke, A. (2011). Key Structural Features for Collaborative Strategy Implementation: A Study of Territorial Sustainable Development Collaborations. Management et Avenir, 50(10): 153-171. DOI: 10.3917/mav.050.0153

Figure 5. Key Message 5

Infographic:

Public Message:

Various outcomes are realized through partnerships and collective action. The outcomes range from the individual level to the community level; six have been identified:

1. Plan-outcomes: related to the original issues that the partnership formed to address.
2. Process-outcomes: changes in the formation and implementation process of the partnership.
3. Partner-outcomes: related to changes by individual partners.
4. Outside stakeholder-outcomes: changes in the relationships between the partnership (and/or the individual partners) and non-participating stakeholders.
5. Person-outcomes: related to learning and changes of an individual.
6. Context-outcomes: unexpected outcomes related to contexts beyond the focal issue(s) of the collaborative strategy.

Derived from:
Clarke, A., & Fuller, M. (2010) Collaborative Strategic Management: Strategy Formulation and Implementation by Multi-Organizational Cross-Sector Social Partnerships. Journal of Business Ethics, 94(Supplement 1): 85-101.

Academic Message:

The final stage of a collaborative strategic management process is the realized implementation outcomes, which are the results of the actions taken by both the partnership, and by the individual partner organizations. Six types of outcomes have been identified:

1. Plan-centric: outcomes related to the issue(s) around which the collaboration has formed, and which are documents in the collaborative strategic plan.
2. Process-centric: outcomes that lead to adaptations and changes to the collaboration formation, formulation, and implementation processes.
3. Partner-centric: outcomes related to learning and changes in the organizational behaviour or structure of individual partners.
4. Outside stakeholder-centric: outcomes involving changes in the inter-organizational relationships between the partnership (including its individual partner organizations) and non-participating stakeholders.
5. Person-centric: those outcomes whose scope is limited to that of an individual.
6. Context-centric: unexpected outcomes related to the political, economic, social, technical, ecological, and/or legal environments; beyond the context of those involving the focal issue(s) of the collaboration.

Derived from:
Clarke, A., & Fuller, M. (2010) Collaborative Strategic Management: Strategy Formulation and Implementation by Multi-Organizational Cross-Sector Social Partnerships. Journal of Business Ethics, 94(Supplement 1): 85-101.

Figure 6. Key Message 6

Infographic:

Public Message:

Participation/Stakeholder Consultation Approach:

- Ideal for a municipal sustainability plan
- The local government makes the decisions re: the sustainability plan
- The local government integrates input from community organizations
- Topics within the sustainability plan are restricted to the local government's jurisdiction
- The local government implements the sustainability plan

Partnership/Collaboration Approach:

- Ideal for a community sustainability plan
- Decision-making is shared through inter-organizational collaboration
- Cross-sector entity (or entities) oversees the process
- Topics within the sustainability plan are community-wide; not restricted to the local government's jurisdiction
- The organizational partners help implement the sustainability plan

Derived from:
Clarke, A. & Erfan, A. (2007). Regional Sustainability Strategies: A Comparison of Eight Canadian Approaches. *Plan Canada, 47(*3): 15-18.

Academic Message:

Participation/Stakeholder Consultation Approach:

- Ideal for a corporate/organizational sustainability strategy
- The firm/government/organization (e.g. the focal organization) receives input from stakeholders
- Decision-making is conducted by the focal organization
- The sustainability plan's content is restricted to the mandate of the focal organization
- The focal organization implements the sustainability plan

Partnership/Collaboration Approach:

- Ideal for a collaborative sustainability strategy
- A cross-sector partnership oversees the process
- Decision-making is shared through inter-organizational collaboration
- The sustainability plan involves a shared vision and collective goals that are bound by the social problem
- The implementation phase involves multiple organizational stakeholders

Derived from:
Clarke, A. & Erfan, A. (2007). Regional Sustainability Strategies: A Comparison of Eight Canadian Approaches. *Plan Canada, 47*(3): 15-18.

Appendix B: Ethics Approval

UNIVERSITY OF WATERLOO

OFFICE OF RESEARCH ETHICS

Notification of Ethics Clearance of Application to Conduct Research with Human Participants

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Principal/Co-Investigator: Amelia Clarke	**Department:** Environment and Business
Principal/Co-Investigator: Lei Huang	**Department:** SUNY - Fredonia
Student Investigator: Natalie Heldsinger	**Department:** Environment & Resource Studies
Student Investigator: Wen Tian	**Department:** Local Economic Development

ORE File #: 20495

Project Title: Accessing the effectiveness of disseminating research on sustainable community plans to non-academic audiences using social media, websites and survey questions.

This certificate provides confirmation the above project has been reviewed in accordance with the University of Waterloo's Guidelines for Research with Human Participants and the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans. This project has received ethics clearance through a University of Waterloo Research Ethics Committee.

***Note 1**: This ethics clearance is valid for one year from the date shown on the certificate and is renewable annually. Renewal is through completion and ethics clearance of the Annual Progress Report for Continuing Research (ORE Form 105).*

***Note 2**: This project must be conducted according to the application description and revised materials for which ethics clearance has been granted. All subsequent modifications to the project also must receive prior ethics clearance (i.e., Request for Ethics Clearance of a Modification, ORE Form 104) through a University of Waterloo Research Ethics Committee and must not begin until notification has been received by the investigators.*

***Note 3**: Researchers must submit a Progress Report on Continuing Human Research Projects (ORE Form 105) annually for all ongoing research projects or on the completion of the project. The Office of Research Ethics sends the ORE Form 105 for a project to the Principal Investigator or Faculty Supervisor for completion. If ethics clearance of an ongoing project is not renewed and consequently expires, the Office of Research Ethics may be obliged to notify Research Finance for their action in accordance with university and funding agency regulations.*

***Note 4**: Any unanticipated event involving a participant that adversely affected the participant(s) must be reported immediately (i.e., within 1 business day of becoming aware of the event) to the ORE using ORE Form 106. Any unanticipated or unintentional changes which may impact the research protocol must be reported within seven days of the deviation to the ORE using ORE form 107.*

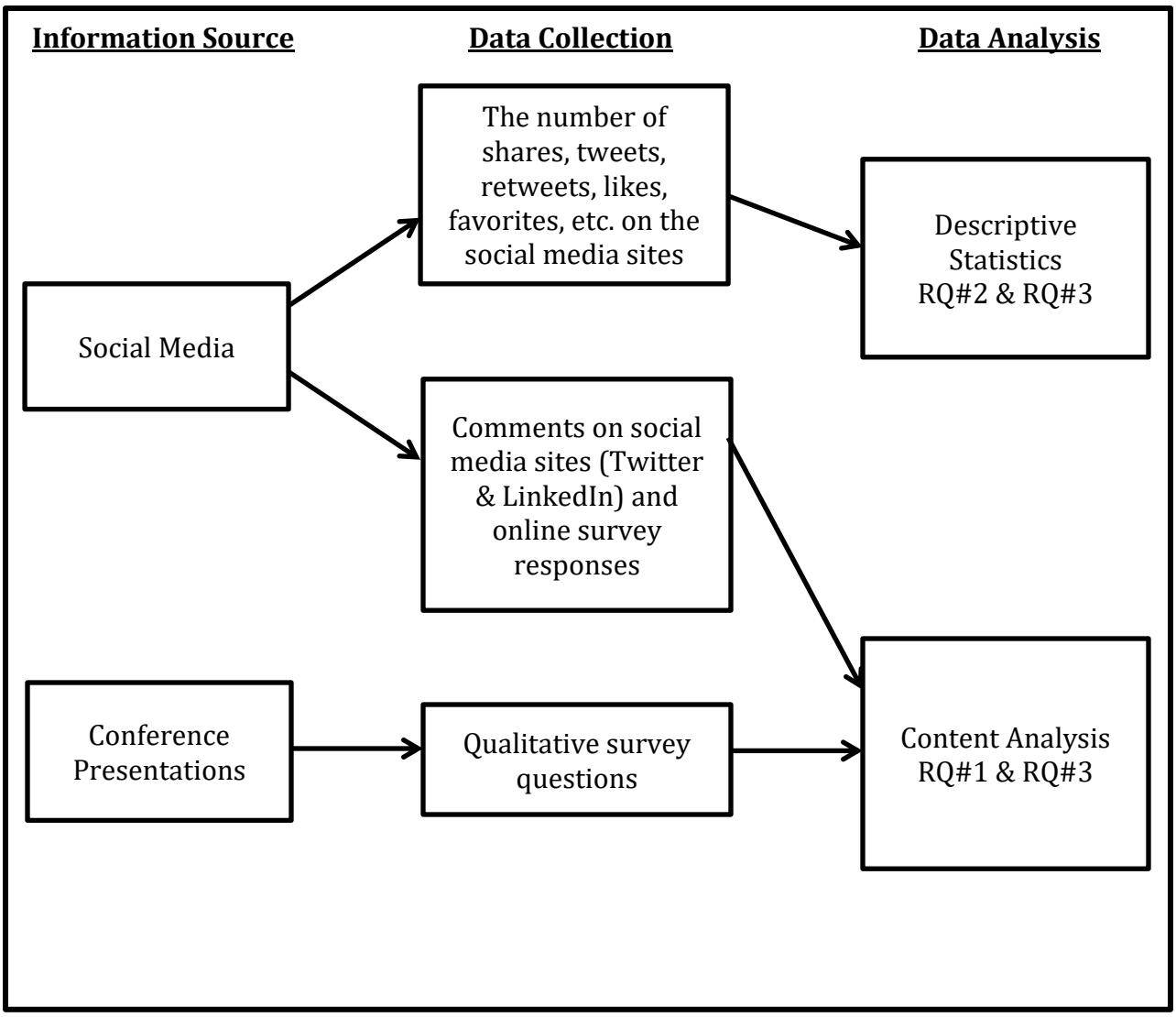
Maureen Nummelin, PhD
Chief Ethics Officer

2/9/2015
Date

OR
Julie Joza, MPH
Senior Manager, Research Ethics

Appendix C: Study Procedures

Figure 1. Study Procedures



Appendix D: Surveys

Figure 1. Online survey – Twitter

Survey questions

1. What is your current role?

☐ Councilor ☐ Municipal staff ☐ Consultant ☐ Student ☐ Other (Please specify) _____

Please respond to the following eleven questions (Q2-Q12) using this scale:

Not at all	Slightly	Somewhat	Neutral	Moderately	Very much	Extremely
1	2	3	4	5	6	7

General feedback on the Twitter:							
	1	2	3	4	5	6	7
2. The overall message of the tweet was important for me	☐	☐	☐	☐	☐	☐	☐
3. The information delivered in the tweet is memorable	☐	☐	☐	☐	☐	☐	☐
4. This tweet provided relevant information	☐	☐	☐	☐	☐	☐	☐
5. This tweet was a valuable source of information about implementing sustainable community plans	☐	☐	☐	☐	☐	☐	☐
6. How motivated were you to read this tweet	☐	☐	☐	☐	☐	☐	☐
7. I learnt something from this tweet that I did not know before about implementing sustainable community plans	☐	☐	☐	☐	☐	☐	☐
8. This tweet reminded me of some important information about implementing sustainable community plans	☐	☐	☐	☐	☐	☐	☐
9. This tweet influenced my opinion about implementing sustainable community plans	☐	☐	☐	☐	☐	☐	☐
10. I would recommend this tweet to others	☐	☐	☐	☐	☐	☐	☐
11. These tweets are an effective way to find information about implementing sustainable community plans	☐	☐	☐	☐	☐	☐	☐
12. The information from this tweet will affect my behaviours on implementing sustainable community plans	☐	☐	☐	☐	☐	☐	☐

Please respond to the following eight questions (Q13-Q20) using this scale:

Strongly disagree	Somewhat disagree	Disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3	4	5	6	7

Instructions: based on the reasons you browse or participate in the sustainability online community, please indicate your level of agreement or disagreement with the following sentence:							
	1	2	3	4	5	6	7
13. I am comfortable with obtaining information about implementing community sustainability plans from Twitter	☐	☐	☐	☐	☐	☐	☐

Instructions: In your opinion, to what extend do the following statements about the content and design of the website apply to you?

	1	2	3	4	5	6	7
14. The information offered from Twitter is useful	☐	☐	☐	☐	☐	☐	☐
15. The information offered from Twitter is understandable	☐	☐	☐	☐	☐	☐	☐
16. The information offered from Twitter is sufficient	☐	☐	☐	☐	☐	☐	☐

Instructions: based on your opinions of Twitter online community, please indicate your level of agreement or disagreement with the following sentences							
	1	2	3	4	5	6	7
17. Twitter provides efficient updates on hot threads	☐	☐	☐	☐	☐	☐	☐
18. Twitter provides convenient information search	☐	☐	☐	☐	☐	☐	☐
19. Twitter archives useful threads containing rich and concise information	☐	☐	☐	☐	☐	☐	☐
20. Twitter invigilates the postings well to main quality	☐	☐	☐	☐	☐	☐	☐

Please respond to the following four questions (Q21-Q24) using this scale:

Not at all	Slightly	Somewhat	Neutral	Moderately	Very much	Extremely
1	2	3	4	5	6	7

To what extent are you involved in the message?							
	1	2	3	4	5	6	7
21. How likely are you to spread the content from this tweet to someone else	☐	☐	☐	☐	☐	☐	☐
22. Did you think deeply about the information contained in Twitter?	☐	☐	☐	☐	☐	☐	☐
23. How much effort did you put into reading the message from Twitter?	☐	☐	☐	☐	☐	☐	☐
24. How personally involved did you feel with the presented topics?	☐	☐	☐	☐	☐	☐	☐

Please respond to the following three questions (Q25-Q27) using this scale:

Strongly disagree	Somewhat disagree	Disagree	Neither agree nor disagree	Agree	Somewhat agree	Strongly agree
1	2	3	4	5	6	7

Instructions: based on the reasons you browse or participate in the Twitter online community, please indicate your level of agreement or disagreement with the following sentences:							
	1	2	3	4	5	6	7
25. To obtain relevant information about sustainable community plans	☐	☐	☐	☐	☐	☐	☐
26. To learn more about sustainable plan implementation	☐	☐	☐	☐	☐	☐	☐
27. To seek advice on sustainable community plans	☐	☐	☐	☐	☐	☐	☐

28. Do you have any other comments?

Figure 2. Online survey – LinkedIn

Survey questions

1. What is your current role?
☐ Councilor ☐ Municipal staff ☐ Consultant ☐ Other (Please specify) _____

Please respond to the following three questions (Q2-Q4) using this scale:

Not at all interesting	Slightly interesting	Somewhat interesting	Neutral	Moderately interesting	Very interesting	Extremely interesting
1	2	3	4	5	6	7

What topics did you find interesting?	1	2	3	4	5	6	7
2. Overview of sustainable community plans	☐	☐	☐	☐	☐	☐	☐
3. Implementing sustainable community plans within local governments	☐	☐	☐	☐	☐	☐	☐
4. Partnership/collaboration structures and key features	☐	☐	☐	☐	☐	☐	☐

Please respond to the following fifteen questions (Q5-Q19) using this scale:

Not at all	Slightly	Somewhat	Neutral	Moderately	Very much	Extremely
1	2	3	4	5	6	7

General feedback on the session:	1	2	3	4	5	6	7
5. The overall message of the LinkedIn discussion was important for me	☐	☐	☐	☐	☐	☐	☐
6. The information delivered in the LinkedIn discussion is memorable	☐	☐	☐	☐	☐	☐	☐
7. This LinkedIn discussion provided relevant information	☐	☐	☐	☐	☐	☐	☐
8. This LinkedIn discussion was a valuable source of information about implementing sustainable community plans	☐	☐	☐	☐	☐	☐	☐
9. How motivated were you to visit this LinkedIn discussion	☐	☐	☐	☐	☐	☐	☐
10. I learnt something from this LinkedIn discussion that I did not know before about implementing sustainable community plans	☐	☐	☐	☐	☐	☐	☐
11. This LinkedIn discussion reminded me of some important information about implementing sustainable community plans	☐	☐	☐	☐	☐	☐	☐
12. This LinkedIn discussion influenced my opinion about implementing sustainable community plans	☐	☐	☐	☐	☐	☐	☐
13. I would recommend this LinkedIn discussion to others	☐	☐	☐	☐	☐	☐	☐
14. These LinkedIn discussions are an effective way to find information about implementing sustainable community plans	☐	☐	☐	☐	☐	☐	☐
15. How likely are you to spread the content from this LinkedIn discussion to someone else	☐	☐	☐	☐	☐	☐	☐
16. The information from this LinkedIn discussion will affect my behaviours on implementing sustainable community plans	☐	☐	☐	☐	☐	☐	☐

To what extent are you involved in the message?							
	1	2	3	4	5	6	7
17. Did you think deeply about the information contained in LinkedIn?	☐	☐	☐	☐	☐	☐	☐
18. How much effort did you put into reading the message from LinkedIn?	☐	☐	☐	☐	☐	☐	☐
19. How personally involved did you feel with the presented topics?	☐	☐	☐	☐	☐	☐	☐

Please respond to the following thirteen questions (Q20-Q32) using this scale:

Strongly disagree	Somewhat disagree	Disagree	Neither agree nor disagree	Agree	Somewhat agree	Strongly agree
1	2	3	4	5	6	7

Instructions: based on the reasons you browse or participate in the sustainability online community, please indicate your level of agreement or disagreement with the following sentences:							
	1	2	3	4	5	6	7
20. I am comfortable with obtaining information about implementing community sustainability plans from LinkedIn	☐	☐	☐	☐	☐	☐	☐
21. My opinions are respected by members of the community	☐	☐	☐	☐	☐	☐	☐
22. I am a valuable member of the community	☐	☐	☐	☐	☐	☐	☐

Instructions: based on your opinions of LinkedIn online community, please indicate your level of agreement or disagreement with the following sentences							
	1	2	3	4	5	6	7
23. LinkedIn provides efficient updates on hot threads	☐	☐	☐	☐	☐	☐	☐
24. LinkedIn provides convenient information search	☐	☐	☐	☐	☐	☐	☐
25. LinkedIn archives useful threads containing rich and concise information	☐	☐	☐	☐	☐	☐	☐
26. LinkedIn invigilates the postings well to main quality	☐	☐	☐	☐	☐	☐	☐

In your opinion, to what extend do the following statements about the content and design of the website apply to you?							
	1	2	3	4	5	6	7
27. The information offered from LinkedIn is useful	☐	☐	☐	☐	☐	☐	☐
28. The information offered from LinkedIn is understandable	☐	☐	☐	☐	☐	☐	☐
29. The information offered from LinkedIn is sufficient	☐	☐	☐	☐	☐	☐	☐

Instructions: based on the reasons you browse or participate in the LinkedIn online community, please indicate your level of agreement or disagreement with the following sentences:							
	1	2	3	4	5	6	7
30. To obtain relevant information about sustainable community plans	☐	☐	☐	☐	☐	☐	☐

31. To learn more about sustainable plan implementation	☐	☐	☐	☐	☐	☐	☐
32. To seek advice on sustainable community plans	☐	☐	☐	☐	☐	☐	☐

33. Do you have any other comments?

Thank you for participating in this survey! We really appreciate it!

Figure 3. Hard-copy survey (Developed by Wen Tian & Natalie Heldsinger)

1. What is your current role in implementation?
☐ Councilor
☐ Municipal staff
☐ Consultant
☐ Other (Please specify)_____

Not at all interesting	Slightly interesting	Somewhat interesting	Neutral	Moderately important	Very interesting	Extremely interesting
1	2	3	4	5	6	7

What topics did you find interesting?	1	2	3	4	5	6	7
2. Overview of sustainable community plans	☐	☐	☐	☐	☐	☐	☐
Corporate implementation:							
3. Implementing sustainable community plans within local governments	☐	☐	☐	☐	☐	☐	☐
4. Market-based instruments	☐	☐	☐	☐	☐	☐	☐
Partnerships for (community-wide) implementation:							
5. Partnership/collaboration structures and key features	☐	☐	☐	☐	☐	☐	☐
6. Stakeholder engagement	☐	☐	☐	☐	☐	☐	☐

Not at all	Slightly	Somewhat	Neutral	Moderately	Very much so	Extremely so
1	2	3	4	5	6	7

General feedback on the session:	1	2	3	4	5	6	7
7. The overall message of the session was important for me	☐	☐	☐	☐	☐	☐	☐
8. The information delivered in the session is memorable	☐	☐	☐	☐	☐	☐	☐
9. This session provided relevant information	☐	☐	☐	☐	☐	☐	☐
10. This session was a valuable source of information about implementing community sustainability plans	☐	☐	☐	☐	☐	☐	☐
11. How motivated were you to complete this session	☐	☐	☐	☐	☐	☐	☐
12. I learnt something from this training session that I did not know before about implementing sustainable community plans	☐	☐	☐	☐	☐	☐	☐
13. This session reminded me of some important information about implementing sustainable community plans	☐	☐	☐	☐	☐	☐	☐
14. This session influenced my opinion about implementing sustainable community plans	☐	☐	☐	☐	☐	☐	☐
15. I would recommend this session to others	☐	☐	☐	☐	☐	☐	☐
16. These trainings are an effective way to find information about implementing community sustainability plans	☐	☐	☐	☐	☐	☐	☐

17. How likely are you to show the content from this session to someone else	☐	☐	☐	☐	☐	☐	☐
18. The information from this session will affect the implementation of my work on community sustainability plans	☐	☐	☐	☐	☐	☐	☐

19. What are three key messages you retained from this session?

20. What information from the session do you think you will use?

21. Is there anything in particular that you will share with colleagues / stakeholders?

22. Do you have any other comments?

Thank you for participating in this survey! We really appreciate it!

Appendix E: Coding Schemes

Figure 1. Coding Scheme for Research Question #2

Key Messages	**Indicators**
Key Message 1 - The collaborative strategy process	- Multi-organizational cross-sector social partnerships - Four phases: 1. Partnership forms 2. Strategic plan 3. Collective partnership actions & individual partner actions (implementation) 4. Realized outcomes
Key Message 2 - Topics includes in community sustainability plans	- Topics included in sustainability plans 1. Topic of Environment: transportation, water, waste, air, energy, climate change, land use, ecological diversity 2. Topic of society: food security, civic engagement, social infrastructure, housing, safety (crime) 3. Topic of Economy: local economy, employment, financial security
Key Message 3 - Collaborative strategic management outcomes	- Partner outcomes - Plan outcomes - Process outcomes - Outside Stakeholder outcomes - Person outcomes - Context outcomes
Key Message 4 - Key structural features for implementing a sustainable community plan	- 5 keys to success: 1. Oversight 2. Communication system 3. Monitoring system 4. Engagement of partners 5. Partner actions
Key Message 5 -Partner outcomes from joining a community sustainability partnership	- Benefits of community sustainability partnerships - Improved networking - Improved reputation - Increase in community cohesiveness - Legitimacy of sustainability initiatives, products, and services - Progress of sustainability goals - Financial savings
Key Message 6 - Participation	- Consultation approach

versus partnership for community sustainability	- Collaboration approach - Partnership - Participation - Stakeholder engagement - Role of local governments - Decision-making processes - Commitment to implementation

Figure 2. Coding Scheme for Research Questions #3

Categories	**Indicators**
Useful and effective channel for receiving research	- Detailed comments (related to the benefits of the channels as a means for disseminating research) - Inclusion of supporting research/knowledge related to dissemination through social media - Analyzing benefits of channel - Comments on receiving particular information - Positive comments on particular information
Inappropriate/ineffective channel for receiving research	- Detailed comments (related to the limitations or ineffectiveness of the channels as a means for disseminating research) - Critiquing/speculating communication channel - Providing alternative suggestions or opinions for disseminating research more effectively - Critiquing/speculating particular information or indicating lack of understanding of information through communication channel
Suggestions for using Twitter/LinkedIn as a channel for disseminating research	- Provide alternate use for Twitter/LinkedIn as communication channels - Provide comments on improving communication through Twitter/LinkedIn
Other	- Issues with post itself - Comments or concerns with inforgraphic and content of infographic