

Cluster Consciousness and Branding in the Greater Sudbury Mining Innovation Cluster

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

Clusters have been a major area of interest for researchers and policymakers over the last 40 years. Clusters are defined as a “a geographic concentration of interconnected companies, specialized suppliers, service providers, and associated institutions in a particular field that are present in a nation or region” (Porter, 1998, p.78), while increased innovative capacities and economic growth are often cited as their contribution to regional economic development (Porter, 1990; Storper and Walker, 1989). There is a rich body of literature on clusters, including exploring the factors that lead to cluster development, how to create effective policies to support clusters, and understanding the social dynamics of innovation within clusters. However, the way clusters are branded and marketed is an underdeveloped area in the academic and policy literature. That being said, the work that has been done in this area has shown that clusters with effectively managed brands and identities are able to better realize the benefits of being in a cluster (i.e., increased collaboration, innovative capacity, etc.).

Given this gap in the literature, the purpose of this research is to explore the challenges and opportunities with creating a cluster identity and brand for the mining innovation cluster in Greater Sudbury, Ontario. Greater Sudbury, Ontario was selected as a case study because it is home to over 200 mining supply and service companies that, combined with regional research institutions and government agencies, make up the Greater Sudbury mining innovation cluster. This cluster is a primary economic contributor to the region and has been a leading employer in the Greater Sudbury area for decades. While this cluster is an important contributor to the regional economy, it has been cited (Robinson, 2004; Hall et. al, in progress ongoing) that the cluster is experiencing a lack of cluster consciousness. In other words, members of the cluster do not recognize themselves as being a part of a cluster.

In terms of methods, this research used document analysis and interviews with 13 key informants. This research followed a similar approach to Marauner and Zorn (2017) and used

the Triple Helix model to identify key informants in three core areas: postsecondary and research institutions, governmental bodies, and businesses and other related organizations (Etzkowitz, 2002). The results of the interviews showed some ambiguity from cluster members about the existence of a cluster brand. However, there was a general consensus among the interview participants that developing a cluster brand and identity is important to cluster members and they pointed to some key attributes that could be used to develop an effective cluster branding and identity strategy. These include Greater Sudbury's long history as a centre for mining as well as the region's expertise in underground, hard rock mining. Key informants also highlighted collaboration, representation, and place as challenges associated with the development of creating a cluster brand and identity. In addition, there were calls for more clearly defined cluster leadership to strengthen the gaps in the cluster brand and identity. Through the calls for stronger, more visible leadership from the key informants and the established importance of cluster governance in the examined literature, one of the major takeaways from this research is the need to establish clear, effective leadership for future cluster branding initiatives in the Greater Sudbury mining innovation cluster.

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Chapter 1

Introduction

1.1 Background and Research Gap

Clusters have captured the attention of researchers and policy makers over the last several decades. From high tech clusters like Silicon Valley to the ocean supercluster of Atlantic Canada, clusters are often seen as synonymous with regional economic development and innovation (Klepper, 2010; Deloreaux and Shearmur, 2018). Clusters are defined as “a geographic concentration of interconnected companies, specialized suppliers, service providers, and associated institutions in a particular field that are present in a nation or region” (Porter, 1998, p.78), while increased innovative capacities and economic growth are often cited as their contribution to regional economic development (Porter, 1990; Storper and Walker, 1989). Much of the attention on clusters by researchers and policymakers alike has focused on understanding the dynamics of cluster development (Porter, 1998; Baptista and Swann, 1998), creating effective cluster policy (Swann, 2006; TACTICS, 2012), understanding innovation and knowledge diffusion in clusters (Giulliani, 2007), and understanding the social dynamics of innovation more broadly (Wolfe and Gertler, 2004; Jaffe et al, 1993). However, there is a significant gap in the literature, particularly in Canada, on the marketing and branding of clusters.

The small body of literature that does exist on branding has shown that marketing initiatives are important for clusters (Staber and Sautter, 2017; Crombie, 2011). More specifically, research suggests that cluster branding and marketing has strengthened the innovative capacities and openness to collaboration of cluster members (Staber and Sautter, 2011; Tu, 2011). A strong cluster brand can also contribute to the social structure of the cluster by developing trust and social capital which work to create an innovative environment for cluster members (Crombie, 2011). Additionally, cluster branding initiatives can align the offerings of cluster members to provide external interests with a “bundle of benefits” that are complimentary to one another and work to satisfy the needs of sectoral stakeholders (Burmam et al 2012, p.29). However, there is little research on marketing clusters in Canada

and even less literature on marketing clusters linked to natural resource industries, like mining. Given this gap, this research will explore the challenges and opportunities with cluster branding and marketing using a case study of the Greater Sudbury mining innovation cluster.

Greater Sudbury, Ontario is home to a cluster of over 200 mining supply and services companies as well as mining-related research institutions and government agencies. This cluster has played a vital role in the local and regional economy for decades as a source of employment and innovation (Robinson, 2004; Hall and Donald, 2009; Hall, 2016). However, in his seminal work, Robinson (2004) identified the lack of a cluster consciousness as a key challenge facing the cluster. Cluster consciousness has been defined as “the acceptance of a sense of identity as being a member of a particular grouping” along with the acknowledgement that the peer-to-peer collaboration involved in a cluster will enable members to realize goals in collective ways (Emke et al., 2010, p. 8). More recent research has also identified challenges with developing a cluster consciousness as well as negative images associated with the mining industry as barriers for economic development and innovation (Hall and Donald, 2009; Hall et al, 2022). For example, mining has been referred to as “dirty, dangerous, and dying” (Hall and Donald, 2009 p.20) and is often associated with significant environmental and social impacts (Hall and Donald, 2009; Haddaway et. al, 2019; ARM, 2004; Sincovich et al., 2018). However, mineral resources will also play a critical role in the shift towards net-zero economies (Speech from the Throne, 2020). More specifically, Natural Resources Canada lists 31 critical minerals that Canada is well endowed with and can use to reposition itself as a leader in the shift towards net-zero economies and are “essential for renewable energy and clean technology applications” (NRCAN, 2021).

1.2 Research Questions

Given this gap in the literature, the purpose of this research is to explore the challenges and opportunities with creating a cluster identity and brand for the mining innovation cluster in

Greater Sudbury, Ontario. More specifically, this research will answer the following questions:

- 1) What are the benefits of having a cluster identity and brand?
- 2) What are the challenges associated with creating a cluster identity and brand?
- 3) Who should manage and promote a cluster identity and brand?
- 4) What tools could be used to develop a cluster identity and brand?

To answer these questions, this research used document analysis and interviews with key informants. This research followed a similar approach to Marauner and Zorn (2017) and used the Triple Helix model to identify key informants in three core areas: postsecondary and research institutions, governmental bodies, and businesses and other related organizations (Etzkowitz, 2002).

1.3 Research Contributions

This research is significant because it will help fill a gap in the broader literature on cluster marketing and branding and more specifically it will bring an application to the Canadian mining sector which has very rarely been the subject of research on innovation and economic development (Gruenhagen and Parker, 2020). Additionally, this project will work to aid policymakers by displaying the strengths and challenges for branding the Greater Sudbury mining innovation cluster and the mining sector more generally both nationally and internationally. Finally, this research will assist stakeholders in the mining innovation cluster by identifying possible ways to create a cluster consciousness which could promote innovation and economic development.

1.4 Thesis Outline

This thesis examines cluster branding, identity, and consciousness as it pertains to the Greater Sudbury mining innovation cluster. More broadly it will explore the challenges and

opportunities associated with the current state of the cluster's brand, identity, and consciousness. Chapter 2 discusses the existing literature on clusters, cluster branding, and mining innovation clusters more specifically. This chapter examines topics of cluster governance, development, identity, and the related debates in the cluster literature. Chapter 2 also connects the general cluster literature to the small body of academic and grey literature on mining innovation clusters specifically.

Chapter 3 reviews the methods used for this research including key informant interviews and document review. It also explains the sample selection process and rationale behind the chosen sample. Chapter 3 will also introduce the case study of the Greater Sudbury mining innovation cluster. The results and related discussion are presented in Chapter 4, involving thematic analysis from the key informant interviews as well as some connections between the responses and the theories and arguments presented in the literature review. Chapter 5 will conclude this thesis with a summary of the major research findings and a discussion of recommendations and areas for further research.

Chapter 2

Literature Review

As mentioned in the previous chapter, clusters and their related branding and marketing initiatives are the focal point of this research. However, a deeper understanding of clusters and why clusters are relevant is needed first. As a result, this chapter will examine the existing literature on clusters starting from a high-level overview of background literature on the importance of clusters. From there, this chapter will discuss the literature on how clusters are governed and branded with a particular emphasis on the importance of brand and identity to a cluster. After an assessment of the relevant challenges associated with cluster branding, this chapter will conclude with a section on the literature regarding mining innovation clusters specifically. There is a lacuna in the literature in this area, so the purpose of this section is to highlight the work that has been done and show the gaps this research is working to fill. Clusters are complex regional economic systems that rely on a multitude of conditions to succeed, this literature review will develop a framework for understanding these complexities and set the scene for how best to proceed in the coming chapters.

2.1 Cluster Background and Importance

As alluded to earlier, the most widely accepted definition of a cluster was created by Michael Porter (1998, p.78), who suggests that clusters “are geographic concentrations of interconnected companies, specialized suppliers, service providers, and associated institutions in a particular field that are present in a nation or region”. Clusters are defined by their geographic scope which Porter (2000) outlines as the distance across which information, transactions, incentives, and other organizational interactions occur. One of the more famous examples of a cluster is the technology cluster commonly referred to as Silicon Valley in California. The high concentration of firms in linked industries based in Silicon Valley is a distinctive feature that signifies the presence of a cluster. Porter (2000) also suggests that clusters use their location as their competitive advantage, which is reinforced by

such elements as information and technological spillovers (both formal and informal) as well as other complementarities that serve to benefit firms involved on all sides of the relationship. An important consideration for Porter's definition of a cluster also encompasses the cross-industry dynamics inherent to a cluster. For example, raw material supply firms, marketing firms, and research institutions may all be part of one cluster. This inclusion of "linked industries" as well as his explanation of sociological factors within clusters (the previously mentioned information spillovers) are what differentiates Porter's definition from the existing literature on the agglomerations of firms and are imperative to analyze when proceeding in cluster research.

Scholars like Porter, Baptista and Swann argue that clusters are important because clustered firms show a higher innovative capacity (Porter, 1990; Baptista and Swann, 1998). New technology patents and an increased ability to accommodate more complex customers are cited as important effects of having an increased innovative capacity in a cluster (Porter et al, 2008). Porter's (2000) work also provides a strong analysis of the dynamics inherent to industrial clusters and how member organizations of these clusters interact with one another to reinforce their respective competitive advantages to an external audience. These interactions, as posited by Jaffe (1993), combined and catalyzed by geographical proximity, are conducive to impactful knowledge "spillovers" that expedite the diffusion of innovations within a cluster. These spillovers can help fill knowledge gaps for clustered organizations and, when successful, encourage further collaboration for innovation (Jaffe, 1993). Some arguments have been made to highlight inefficiencies of this point by suggesting that, although these spillovers do occur, knowledge and information is selectively diffused and does not diffuse symmetrically across a cluster (Giulliani, 2006). There are also risks associated with these spillovers in some clusters. For example, concerns of the spillover of sensitive information and the development of overdependencies are cited as primary risks for cluster members (Visser and de Langen, 2006). Further, there is a possibility that firms may see being competitive and being collaborative as being mutually exclusive traits for their organization (Visser and de Langen, 2006). The hesitancy to collaborate that firms may hold

on account of these risks is likely to lower regional innovation and limit “collective learning” in the cluster (Giulliani, 2006, p.1). These risks can be mitigated by effective cluster governance which is discussed later in this chapter.

Visser and de Langen (2006, p.178) point out that there are both “static and dynamic advantages” associated with clusters. The static advantages, built off of Nadvi and Schmitz’s framework (1999, p.1505), are those advantages that are inherent to the clustering of firms, which include specialized labour supply, faster diffusion of new information, and better access to specialized suppliers and services. They further describe the dynamic advantages as those advantages that “arise when actors undertake joint actions and collective investments with a view to breaking into export markets” (p.178). This separation of both inherent advantages and advantages that require deliberate action suggests there must be a coordinated, collaborative effort to realize dynamic advantages. These joint actions, according to both Nadvi and Schmitz (1999) as well as Visser and de Langen (2006), point to the importance of collaboration in a cluster, but highlight the necessity to effectively facilitate such interfirm cooperation. When clustered organizations are acting collaboratively, according to Nadvi and Schmitz (1999) they are recognized as being better performing - both as individuals and as a collective. As mentioned, collective actions do require deliberate coordination, often by a cluster governing body. The literature on cluster governance and its importance to the greater body of cluster literature will be discussed at further length in Section 2.2.

In addition to innovation and collaboration as key factors of the importance of clusters, a wide range of literature points to clusters as being a foundational base for regions to strengthen the competitiveness of their economies (Storper and Walker, 1989). A number of researchers including Asheim (1996), suggest that local concentrations of firms push some regions and industries from focussing on weak competition (i.e., prices and wages) to strong competition (i.e., developing technologies and new capabilities). Asheim (1996) further suggests that when members of a regional economy position themselves on the basis of strong competition, they are likely to strengthen their position in respective markets. A

parallel can be drawn from Asheim's (1996) work on regional competition to cluster theory because clusters focussing on strong competition will, in theory, develop differentiation and drive regional innovation. These benefits associated with clusters, both static and dynamic, are important to understand why clusters are important, however, they do not explain much in the way of cluster development.

As noted in Chapter One, much of the research on clusters has focused on understanding how clusters develop (Porter, 2000; Baptista and Swann, 1998; Storper and Walker, 1989; Andersson, 2012). For example, Andersson's (2012) work has explored the life cycle of clusters including the following four stages: Embryonic, Established, Mature, and Declining. Andersson (2012), describes embryonic clusters as being at the beginning stages of the life cycle, whereas declining clusters have already experienced their growth plateau and are returning to a state of decline or potential failure. Established clusters, then, are clusters that have outgrown the embryonic stage but still have room to continue to grow. Finally, Andersson (2012) argues, mature clusters are in a state of stability and may be reaching a plateau wherein growth will come with a higher level of difficulty. He further argues that, although these are distinct definitions for developmental stages, clusters may not necessarily follow a discrete, linear growth process and their growth may involve false starts, setbacks, or major growth leaps. That being said, it is important to distinguish these stages because clusters will require different types of interventions or governance depending on their stage in the life cycle.

Donahue et al (2018) provide a framework for identifying common traits in prominent clusters. More specifically, in their study of North American clusters, they highlight five key traits: (1) Focusing on establishing a robust ecosystem, not quick job gains; (2) Industry-driven, university-fueled, government-funded; (3) Placing a collective big bet on a unique opportunity; (4) Championed by passionate dedicated leaders; and (5) Anchored by a physical centre (Donahue et al, 2018, p. 6). These traits are important to understand because they can be used as a framework for defining clusters and potentially highlighting what a cluster may be lacking.

Cluster theory has also often been used as a policy tool due to its emphasis on innovation, international competitiveness, and productivity. Porter's definition and its respective implications have been adopted in both industry and government policy (Motoyama, 2008). Motoyama (2008) argues, however, the application of cluster policy has typically focussed on increasing the global competitiveness of a cluster and less so on cluster development. They suggest this application is the result of Porter's definition of clusters being less focused on the historical processes that were necessary for the development of the cluster. When cluster theory is applied to policy, it is often with the goal of developing a cluster from scratch or trying to create a cluster to exist where it may not be entirely feasible (Motoyama, 2008). As per Motoyama (2008) the historical and developmental process of cluster development should not be separated from the current state and possible success of a cluster. In other words, some clusters may appear to have all the features of a successful cluster but may not have the history in the region that builds a story and strengthens relationships which work to differentiate a cluster. For Motoyama (2008), it is important that policy makers work to implement policies complimentary to common historical events in the development of successful clusters.

Several scholars have further critiqued cluster theory for its ambiguity, for example, Martin and Sunley (2003) critique Porter's lack of rigidity in defining clusters. They suggest that having no clear definition is what makes it such an enticing theory to absorb, but it leaves much to be desired in terms of its ability to stand as a comprehensive, exhaustive definition. Their critiques stretch from Porter's definition to his evaluation of cluster success, wherein, Porter equates regional competitiveness to productivity. Martin and Sunley (2003) suggest that, although competitiveness and productivity are both important measurements, the dynamic network of a cluster requires more than simply increased productivity to be competitive. They also suggest that the universal approach to defining all clusters by a single set of characteristics may not lead to the most effective assessment of the dynamics of a cluster. In addition to the critiques from Martin and Sunley (2003), Kitson et al (2004) put forward the notion that regional innovation policies must address the issues of

collaboration and social dynamics of organizations in a particular region as opposed to the individual competitiveness of organizations in the region. As it has been established, clusters can play an important role in regional development. So, the focus now turns to how these clusters can develop and maintain their importance to their industries and local economies and why it is important to do so.

2.2 Cluster Governance

A key factor in the effectiveness and growth of a cluster revolves around how it is governed (Donahue et al, 2018). Clusters are not equal and they are governed in a variety of ways. They also often employ policies that may work for one specific cluster but not for others. The literature on cluster governance is primarily focused on showing how cluster governance is structured and what tools these governance structures may use to spur growth and collaboration within the cluster. Visser and de Langen (2006) discuss two reasons for the importance of cluster governance: (1) the level of transaction costs and (2) the scope of non-market coordination. More specifically, for Visser and de Langen (2006) a well governed cluster will offer its members reduced transaction costs along with increased collaboration and coordination throughout the cluster's value chain. Referring back to the risks mentioned above relating to intellectual property or sensitive information spillovers and relationships of overdependence, it is within the scope of the cluster governance structure to work to mitigate these risks by encouraging and facilitating collaboration without overexposing members and ensuring a mutual respect for privacy on some matters (Donahue et al, 2018; Visser and de Langen, 2006).

Donahue et al (2018) provide a strong framework that acts as a summation of existing literature as well as practical observations of clusters to better understand cluster governance structures and the related tools they employ. They identify three forms of governance found in successful cluster initiatives which are: a cluster hub, shared leadership, and a holding company. More specifically, the cluster hub involves having one organization, such as an industry association as the central manager for cluster initiatives, whereas shared leadership refers to a collection of organizations sharing the responsibilities of leadership and, finally,

the holding company structure involves having one company responsible for multiple cluster initiatives (Donahue et al, 2018). However, it is important to note that the governance structure is highly contextual and the type of governance employed must be suitable for the current stage (see earlier discussion) of the cluster (Donahue et al, 2018).

For Castillo-Villar (2021), the governing and leadership roles in a cluster should serve the purpose of facilitating collaboration with a focus on bridging or connecting cluster members through a co-created cluster identity. While cluster identity will be discussed further in the next section, it is important to note its role in the realm of cluster governance. Castillo-Villar (2021) also argues for a leadership structure rooted in collaboration and a non-hierarchical style. They suggest that, although there may be a central manager of a cluster, it is more effective to act as a cooperative collaborator when it comes to engaging with cluster members. In other words, a strong cluster governance structure has goals of co-creating opportunities and an identity for the cluster through highly participatory engagement (Castillo-Villar, 2021).

With this focus on collaboration and member participation in mind, it is helpful to look at the different tools cluster managers might use to foster collaboration, build an identity, and strengthen the cluster image. More specifically, Donahue et al. (2018) describe five types of cluster interventions or tools that could be employed by a cluster governing body or bodies to spark further cluster development. These include: Information and Networks; Talent Development; Research and Commercialization; Infrastructure and Placemaking; and Capital Access (for a summary see Table 1). Of particular importance for this research is the emphasis on information and networks and placemaking. More specifically, facilitating the flow of information to fill knowledge gaps both with cluster firms and potential cluster targets that may have gaps in their perception of the cluster brand or identity (Donahue et al, 2018). Furthermore, the geographic concentration of organizations requires specific infrastructure to ensure its success (Donahue et al, 2018). The development of such cluster infrastructure and reinforcing elements of place through the establishment of R&D facilities, collaborative platforms, or any physical venues necessary

for cluster collaboration or sense of place will be recurring potential interventions in this research (Donahue et al, 2018).

Table 1 – Cluster Governance Tools

Type of Intervention	Governance Strategies
Information and Networks	<ul style="list-style-type: none"> • Facilitate knowledge flows to fill internal and external knowledge gaps • Provide communication channels for increased collaboration. • Establish continuous internal flows of information and accessible information for cluster targets
Talent Development	<ul style="list-style-type: none"> • Work to understand skill shortages and employer needs within the cluster. • Increase collaboration with academic institutions and vocational training facilities
Research and Commercialization	<ul style="list-style-type: none"> • Connect firms to fill knowledge gaps and facilitate partnerships with R&D centres and academic research • Close the gap between SME innovation and commercialization by providing a platform for greater market reach
Infrastructure and Placemaking	<ul style="list-style-type: none"> • Provide research and development facilities • Create platforms for collaboration and communication • Create other cluster-tailored spaces to establish or strengthen a sense of place
Capital Access	<ul style="list-style-type: none"> • Broker influxes of capital to the cluster through connecting member organizations to available funding. • Effectively communicate the cluster’s value to potential investors and other capital holders.

Source: Adapted from Donahue et al, 2018, p. 4-5

These interventions have a clear focus on collaboration, image, and identity. Governance activities focused on these three pillars that involve strong engagement from

cluster members are more likely to be successful per the prevailing arguments in the literature discussed above (Donahue et al, 2018; Castillo-Villar, 2021). These tools and interventions extend to all facets of cluster operations, but have a particular relevance to cluster branding and identity. Specifically, as mentioned above, placemaking, cluster infrastructure, and collaboration are all closely tied to the strength and development of a cluster brand and identity. To better understand how these tools relate, and how they can ultimately be applied in practice, I turn now to a discussion of the existing literature on cluster branding and identity.

2.3 Cluster Branding and Identity

The branding and identity of clusters plays an important role in their respective success. The five traits in successful cluster initiatives mentioned above all revolve around, or relate to the brand and identity of the cluster itself. There has to be buy-in from cluster members, support organizations, and other related entities for a cluster to have any of these traits and the way these traits are communicated and pitched to stakeholders both inside and outside the cluster is critical to the further development and success of the cluster. Some cluster theory literature (Crombie, 2011; Tu, 2011; Staber and Sautter, 2011) points to cluster identity as a part of the formation process, which implies the existence of a cluster necessitates the establishment of a cluster identity. For example, Mauroner and Zorn (2017, p. 90) highlight “the establishment of a strong cluster brand as a prerequisite for the success of a cluster initiative”.

Mauroner and Zorn (2017) also identify three main components to cluster identity: cluster initiatives, cluster management, and cluster branding. Cluster initiatives can be defined as a cluster development focused collective or project with efforts coming from private firms, governmental bodies, and research institutions (Mauroner and Zorn, 2017). While cluster management is the coordination of cluster related operations such as “marketing of the cluster, supply chain development ... attraction of foreign direct investment, management training and joint R&D projects” (Mauroner and Zorn, 2017, p.

291). Cluster branding is a focal area of cluster management that works to “[identify] the identity of a particular cluster brand” and to use this identity to display the defining characteristics of a cluster brand in order to “build brand awareness, visibility, credibility, and loyalty” (Mauroner and Zorn, 2017, p. 291). There are multiple definitions and applications of cluster branding, however, Mauroner and Zorn’s definition provides a foundational understanding of the complex processes associated with cluster branding.

Although often cited as a critical part of cluster theory and success, cluster branding and identity has had minimal prominence in the field until the last decade. Staber and Sautter (2011, p. 1350) define the fundamental notion of cluster identity as “the shared understanding of the basic industrial, technological, social, and institutional features of a cluster” and point out that cluster identity involves answering two questions: 1) Who are we?; and 2) How do others see us? Building off the brand focussed work of Burmann et al. (2012), Mauroner and Zorn (2017) see the notion of cluster branding as a two-faceted phenomenon that encompasses cluster identity and cluster image. Cluster identity is the self-perception of the cluster brand whereas the cluster image is the external image of the cluster brand (Mauroner and Zorn, 2017, Figure 2).

Mauroner and Zorn’s (2017) theory of cluster branding can be broken down and assessed as a feedback loop derived from the relationships between cluster members and cluster target groups. The cluster identity develops from within, among member organizations of the cluster which forms a “bundle of benefits” that is then perceived by the external target groups whose response, in turn, forms the cluster image (Burmann et al 2012, p.29; Mauroner and Zorn, 2017). The cluster brand as a concept can be understood as a promise to the target groups (Andersson, 2012). This suggests that the cluster’s brand is made up, in part, by its promised offerings in products, services, and the broader goals of the cluster. Andersson (2012) explains how the identity, image, and positioning add to the cluster brand on top of the promises made. This approach highlights a key element of clusters, as it suggests a cluster brand should be understood as a social process between cluster members, associated institutions, and external target audiences (Andersson, 2012).

2.3.1 The Importance of Cluster Branding

According to TACTICs (2012), it is imperative for clusters to have a unified identity in order to build an effective cluster strategy. Clusters that have a shared vision and identity are often associated with effective cluster management, flows of knowledge, and collaboration among cluster members – each of which are crucial in the success of a cluster (TACTICs, 2012). The importance of cluster identity and branding initiatives is further underscored through the nurturing of cluster innovation and growth (Tu, 2011). Tu (2011) argues that cluster branding and marketing initiatives help connect smaller cluster members to critical resources and connections and can be used to push these organizations past possible barriers to growth and can further develop a cluster’s innovative capacities.

As discussed earlier in this chapter, some benefits of a strong cluster include increased innovative capacities and more robust regional development. It is important to understand, however, the role that cluster branding has in fostering these drivers of success within clusters. Tu (2011) provides some further insights into the specific benefits derived from cluster branding including increased cooperation between enterprises, which is an important feature of a cluster. For example, cluster marketing initiatives can allow for a transparent flow of product information between member organizations on such things as product pricing, newly developed products, or new R&D initiatives. The sharing of this type of knowledge between member firms leads to a “product division”, where companies may redirect their focus if they know another member organization is working on similar products (Tu, 2011, p. 40). This awareness of member firms’ operations provides increased product diversity and, in turn, heightened cluster attractiveness (Tu, 2011).

These benefits highlight the importance of treating cluster dynamics as a social process. Crombie (2011, p.1) suggests that cluster branding will ultimately provide a social structure within the cluster and its respective region that is conducive to cultivating “entrepreneurial activity, innovation, and growth”. The social structure to which Crombie (2011) is referring involves a sense of collective trust, collaboration, and social capital that

all work to encourage and foster innovative action. Although these social phenomena are difficult to quantify, if the sentiment of trust and collaboration resonate with cluster members, as Crombie (2011) suggests, they may have a stronger base upon which they can develop a cluster brand. Mauroner and Zorn (2017: 301), echo the sentiment of Crombie (2011) as they highlight the cluster brand as an “expression of social and economic relationships between cluster members” which can lead to increased visibility and influence with regional decision makers.

Staber and Sautter (2011) point to cluster branding’s effect on the absorptive capacities of member firm as a key benefit to building a strong identity for the cluster. They further argue that the associated communication and knowledge spillover effects of a strong cluster brand are key drivers of innovation and may enable firms to continue to expand their ability to effectively retain the shared knowledge (Staber and Sautter, 2011). This increased sharing of information and heightened communication internally may be a factor in effectively communicating the value of the cluster to external interests (Staber and Sautter, 2011). As discussed in the next section, cluster branding is not without its challenges and there are some gaps and debates in the literature that require attention to better understand the prevailing perspectives on cluster branding.

2.3.2 Challenges with Cluster Branding

One major challenge to note related to cluster branding is the effect of varying capacities of member firms on the cluster brand. As argued by Staber and Sautter (2011), member firms within a cluster are not equal in their ability to both absorb and distribute knowledge. It must be understood that the differing capacities of cluster members are part of the differentiating characteristics of the cluster. Therefore, it is important to build a brand that is compatible with the strengths of all its members – meaning the central cluster brand should lend itself well to the varying capabilities of all of its firms as opposed to one that is focussed primarily on the larger members.

Another important challenge in the cluster branding literature is the translation from theory to policy. As Koszarek (2013) argues, there is plenty of literature that highlights the importance of cluster branding, but the literature falls short in effectively assessing and offering solutions to the challenges and needs on the front lines of the cluster. This gap has also led to a low awareness of the benefits of cluster branding as well as a lack of focus on effective strategies in cluster branding initiatives (Koszarek, 2013). Additionally, Andersson (2012) points out that clusters have historically attempted to conform to the global community and have largely ignored the untradeable assets their respective regions have to offer. Through an assessment of cluster naming strategies, Andersson (2012) points out that clusters that try to appear as part of a global community are diluting their existing differentiation. Cluster branding theories (Andersson, 2012; TACTICS, 2012; Mauroner and Zorn, 2017) suggest brand differentiation rooted in the untradeable assets of a region and its place brand are more effective in developing a cluster brand than reaching for a globalized brand. A more detailed overview of the importance of place branding in cluster branding will be discussed later in this section.

There are several additional challenges in the cluster branding literature, including: 1) who should manage and promote cluster branding initiatives? and, 2) what tools should be used to develop a cluster brand and identity? To address the first question, the literature identifies regional policy makers, member firms, and research institutions as the key players. For example, in a report by TACTICS (2012), they suggest that regional policy makers should be the ones in charge of managing cluster branding initiatives. On the contrary, Staber and Sautter (2011) suggest that the role of policy makers is to respond to the identity established by member organizations to create a favourable political environment in which the cluster's identity can be adopted and promoted effectively.

This approach taken by Staber and Sautter (2011) is the prevailing perspective in the literature as it builds upon the inherent qualities of a cluster brand discussed earlier in this chapter. For example, the idea of the cluster brand as an expression of the existing relationships lends itself well to decision making and management theory that puts the

responsibility of cluster brand management on all contributing members as opposed to one singular entity – this relates to the earlier discussion on the importance of a non-hierarchical, participatory governance style (Castillo-Villar, 2021). Koszarek (2013) further discusses the importance of including a range of stakeholders and cluster representatives in addition to regional bodies of government in the decision-making process. Mauroner and Zorn (2017) also support this diversified approach as they suggest turning to a non-profit management organization made of up cluster managers and stakeholders to take on the bulk of the work in developing and promoting cluster brands.

Turning to the second question, there are a wide array of suggested tools for developing a cluster identity and brand. One tool highlighted by TACTICS (2013) includes mapping the cluster’s members to gain an understanding of an aggregate identity and to clearly define the cluster in order to provide the cluster with an effective brand. The goal of this mapping would be that the cluster could use this combined identity to identify points of strength and weakness and coordinate strategies to better align with its members. Mauroner and Zorn (2017) describe an internal process of identity building through workshops, lectures, and open discussions to engage cluster members and stakeholders with creating an internal cluster identity. They suggest these internal events can better align the strategies of member firms which, in tandem with an identity mapping initiative, would provide a high level of insight and work to further establish the cluster identity.

Looking at Koszarek’s (2013) work again, it is suggested that clusters should use tools such as social media to engage with their target groups and better understand their perceived brand image. They also highlight the importance of cluster engagement with research institutions to examine and uncover the potential points of differentiation and existing weaknesses related to the cluster brand. The final tool is one that draws on the use of place branding in cluster branding initiatives (Tactics, 2012; Andersson, 2012; Mauroner and Zorn, 2017). As previously mentioned, using a cluster’s particular region as a means of identity building and as a differentiation strategy is regarded as an effective strategy. Therefore, adopting place branding tactics that are aligned with the branding and promotional

strategies of regional brands can translate into an effective component of a cluster brand and perceived image. Implementation of place branding strategies in cluster branding serves to satisfy a large portion of the challenges in the existing literature and the notion also compliments the developmental theories regarding cluster branding and identity.

One of the most important connections between place branding and cluster branding, as pointed out by Andersson (2012), is that both should be understood as being concerned with the marketing and development of the cluster/place. Andersson (2012, p. 2) uses this link to place-branding to establish that cluster branding typically has more to do with “behaviour, action, and development” than just standard marketing activities. As mentioned above, the literature also suggests there are place branding tactics that can be translated directly for the benefit of cluster branding. Using the “historical and cultural character” of a place to establish differentiation and create a community consciousness is a tool that can be applied to cluster branding from the practice of place branding (Andersson, 2012, p. 35). Much like a place brand, a cluster brand transcends boundaries of the public and private sectors and requires a flow of communication and cooperation between these boundaries to be developed effectively (Andersson, 2012). These theoretical links between place and cluster branding provide a framework within which brands and clusters can be developed using existing practices from both fields of branding. To fully develop this linkage and to better understand the ways cluster brands are developed and presented in practice, the next section provides a few examples in practice.

2.4 Cluster Branding in Practice

Cluster branding has been a field of burgeoning interest over the better part of the last decade as academics and practitioners alike have attempted to understand the dynamics and best practices associated with establishing a cluster brand (Koszarek, 2013; Andersson, 2012; Mauroner and Zorn, 2017). Over the last decade, researchers have turned to insights from place branding literature for application in developing cluster brands (Andersson, 2012).

This section will look at a few examples of cluster branding in practice to show how cluster brands have been developed and presented, as well as how they have been closely connected to best practices in the literature on place branding.

2.4.1 Brand Architecture

The literature already discussed in this Chapter is based on studies of clusters and their respective brands in practice. For Andersson (2012), the clusters in Scandinavia are of particular interest. In his work, he initially introduces the concept of brand architecture. Brand architecture is the organization of various brands in a particular region and involves a focus on how the brands are positioned and how they interact with each other (Andersson, 2012). The figure below provides a visual for the general structure of brands and the relative number of brands in each brand category.

Figure 1 – Brand Architecture



Source: Andersson, 2012, p. 51

Andersson (2012) highlights four types of brand architecture strategies: the house of brands, the branded house, the endorsed brand, and the sub-brand strategy. Of particular importance to this research are the branded house and sub-brand strategies. The sub-brand strategy typically involves an umbrella brand related to a government support platform that stimulates and supports clusters at a sub-brand level. The sub-brands do not necessarily have to be in linked industries, however, they will all be linked through their engagement and interaction with the supporting umbrella brand. The example Andersson uses involves a Norwegian government led initiative, however, a more applicable example to this research would be the Canadian Superclusters initiative that was briefly discussed in the introduction. The Canadian Superclusters sub-brand strategy uses the Supercluster funding initiative as well as the Canadian national brand as the umbrella brands with each funded cluster as the sub-brands. The sub-brands include the British Columbia-based Digital Technology Supercluster, the Maritime-based Ocean Supercluster, the Prairies-based Protein Industries

Supercluster, the Ontario-based Advanced Manufacturing Supercluster, and the Quebec-based Scale AI Supercluster (ISEDCanada, 2021). The only major link between the sub-brands is their Canadian location and their Supercluster initiative funding. A brand architecture strategy like this one is effective in enabling the sub-brands to access established brands at the regional and national levels while also promoting sector level brands through the national brand's reach (Andersson, 2012). Again, it can be shown through this example the importance and heavy use of place brands in the establishment and development of cluster brands.

As mentioned, the second brand architecture strategy that relates well to this research is the branded house strategy. Andersson (2012) defines the branded house strategy as being characterized by a primary umbrella brand that acts as a unifying identity for linked sub-clusters to build their brands and identities around. The example used by Andersson (2012) involves the Finnish Cleantech Cluster which is the primary umbrella brand unifying the brands of four separate regions in Finland – all of which are home to a Cleantech sub-cluster. The four regions – Kupio, Lahti, Oulu, and Uusima – build their brands around the existing identity and brand promise of the umbrella Finnish Cleantech Cluster brand. The focal areas of each region, while similar in their missions, are differentiated enough from one another to have an established sub-brand. These sub-brands are not like the previous strategy's sub-brands as they are rooted in similar fields, and in the case of the Finnish Cleantech Cluster, they are all built around the umbrella brand promise of “Environmental Technology: Finland's Next Success Story” (Andersson, 2012, p. 61). The umbrella brand provides this promise for the sub-brands to build around and also acts as a liaison for connecting the regions to contacts in international markets.

Understanding the structure and dynamics of how brands interact at the different levels shown above in Figure 1 is essential for this research as it shows that brands do not exist in a vacuum. Brands, whether they be regional or cluster, interact with related brands both above and below them in their relative brand architecture strategy. These brand relationships can have a great effect on the identity and perception of the brands and are

important to keep in mind (Andersson, 2012). Now that examples of brand architecture and the relative positioning of cluster and place brands has been discussed, examples of branding practices at the cluster level will be discussed.

2.4.2 The Cluster Level Brand

As discussed earlier, the cluster brand functions as much as a marketing tool as it does a development tool. When looking at examples of cluster branding in practice, it is effective to look at a brand image example as well as an internal analysis of the brand as a means to develop brand, identity, and the cluster more broadly. Mauroner and Zorn (2017) examined the brands and identity of two clusters in the Thuringia region of Germany. Their work focused less on the outward facing brand and more on the functional purpose of the brand itself. Through interviews with cluster members, Mauroner and Zorn (2017, p.302) found three categories for the function of the cluster brand: Visibility and Attention; Exchange and Cooperation; and Idea and Promise. Under the visibility and attention category, they highlighted raising the brand awareness to external stakeholders, regional policy makers, and new talent as being important functions of the brand. The responses under the exchange and cooperation category revolved around using the brand to increase communication and knowledge flows as well as further developing strong relationships both inside and outside of the cluster (Mauroner and Zorn, 2017). Finally, the idea and promise category highlighted a recognition of importance for the brand promise to potential targets as well as the brand as being a “vision of the future” cluster organizations can work toward (Marauner and Zorn, 2017, p. 302). Marauner and Zorn (2017) identify a number of tools used to develop the brand and identity of the clusters in their study, including facilitating regular cluster member meetings, cooperative marketing and public relations, and the initiation of internal projects and programs.

Turning now to an example of an outward facing cluster brand, Arizona’s Optics Valley cluster provides an interesting example. The Optics Valley cluster, based in Tuscon,

Arizona, is home to over 300 optics focused organizations that produce and research optic technologies like telescopes, mirrors, and lasers (TACTICS, 2013). Optics Valley's naming strategy is one that is used widely across the globe in all types of clusters (Andersson, 2012; TACTICS, 2013). While the city of Tucson is situated in a valley, using the word "Valley" for the name in a cluster context immediately brings two ideas to mind. The first being the obvious reference to one of the world's most recognizable cluster brands: Silicon Valley. While the second idea suggests that there is some geographic centre where this cluster contains a critical mass of organizations. The use of geographic terms like valley, region, city, province, or hub in the cluster name is a common strategy that signals a concentration of firms and closely relates the name of the cluster to its respective region (Andersson, 2012; TACTICS, 2013).

In 2001, the Optics Valley cluster received a grant to fund a marketing campaign targeted at residents and visitors with the goal of raising brand awareness to locals and visitors to the region (TACTICS, 2013). Through the use of local media, business publications, high visibility advertisements (posters, billboards, etc.), and an established partnership with local job banks, the cluster pushed its brand out to major local platforms (TACTICS, 2013). The brand they broadcasted focused on highlighting the low living costs for both people and businesses, the existing relationships with important regional stakeholders, and showcasing popular local entrepreneurs and their international networks (TACTICS, 2013). The focal areas of the marketing campaign touched on a few important tools in the cluster brand toolkit through telling the stories of cluster members, highlighting ambassador networks, and the standard public relations and publicity outreach (TACTICS, 2013; Andersson, 2012). Using these tools can work to attract new talent, prospective cluster businesses, and raise the brand attractiveness to the cluster's targets (Andersson, 2012). Given that this example was implemented in 2001, there was no social media usage in their marketing campaign. It is important to note that in contemporary examples, social media is a primary component of similar cluster branding campaigns (Andersson, 2012). Where Optics Valley may have been channeling funds towards posters and billboards, a contemporary

cluster branding campaign would likely use those funds to pay for sponsored advertisements, boosted job postings, and other social media related tools to bring their cluster branding up to date (Andersson, 2012).

2.5 Mining Innovation Clusters

Much of the academic research exploring the social dynamics of mining innovation and mining clusters in Canada has focused on the mining supply and services sector in Greater Sudbury. For example, Robinson's (2004; 2006) pioneering work explored the roots of the cluster and explored its challenges and opportunities. One of the major challenges cited in his work was a lack of "cluster consciousness." He describes the phenomena of cluster consciousness as being a cluster applied derivative of Marx's class consciousness theory that distinguishes a class "in-itself" from a class "for itself" (Robinson, 2004, p.5). This analogy lends itself well to the cluster distinction as a cluster *in-itself* would be one consisting of members that have a shared involvement with the means of production – in this case, the organizations are all concerned with providing and advancing services and technology in the mining services and supply sector. Whereas a cluster *for-itself* would organize itself accordingly for the pursuit of its own interests – therefore, the organizations must go beyond their commonalities, both geographic and sector contribution, to realize their respective goals through collective action. For Robinson (2004), this theory of consciousness is used as a policy tool as well as an organizational tool to foster an environment conducive to collective action. However, he argued during the early 2000s that the Greater Sudbury mining innovation cluster had not yet reached a state of sufficient cluster consciousness.

A more recent snapshot of the Greater Sudbury cluster highlighting its social dynamics provides insight into a disconnect between individual cluster members and a concrete cluster brand and identity (Hall et al, 2022). Hall et al (2022) highlight that cluster consciousness in the Greater Sudbury mining innovation cluster is still developing, much like the indications of Robinson's findings 15 years prior. Both the more recent work and the foundational pieces (Hall et al, 2022; Robinson 2004, 2006) suggest a lack of senior

government resources dedicated to the cluster as a possible contributor to this lack of cluster consciousness.

Beyond this work, there is little academic research on cluster branding and marketing for the mining industry. However, there are some practical examples from mining clusters in Finland and Australia. These examples appear to be split into two camps and are either focused on the brand image externally or the brand identity internally. In Australia and Finland, there are representative websites that are linked to member organizations and contain descriptive information of the brand, identity, and operations of mining-related clusters (METS, 2021; Finnish Mining, 2021). Having a central domain shows the clusters have undergone concerted efforts to organize and align the brand in an effort to synthesize the cluster identity and image. The Australian website is supported through the Australian Government's Department of Industry, Science, and Resources whereas Finland's is through a non-profit industry association (METS, 2021; Finnish Mining 2021). The Finnish website shows a very clear mission of the cluster brand as the navigation of the website is set up in such a way that it tells the story of the cluster, why it is important, and how it is making an impact (Finnish Mining, 2021). This effort to tell a story is echoed in existing literature on cluster branding as Andersson (2012) highlights storytelling as an important soft factor clusters can adopt to effectively market themselves externally.

In terms of internal examples, The METS cluster hosted a government supported Marketing and Sales masterclass for member organizations to develop their marketing in a way that is aligned with the goals of the METS cluster (METS Ignited, 2021). An event like this works to foster collaboration by bringing together member organizations as well as developing an aligned marketing strategy throughout the cluster. In Finland's case, there are similar events that work to bring member organizations with the purpose of aligning values and strategies (Finnish Mining, 2021). Furthermore, the Finnish cluster hosts an event that works to showcase Sustainable tech and operations in the sector as a means to connect its member organizations to a broader audience (Oulu Mining Summit, 2021).

The governance structure of the Australian cluster is critical to its success and stands as an important, practical example of how a cluster is governed. The cluster is said to be “industry-led, government-funded”, which, in their case, involves an organization called METS Ignited that is an Australian industry growth centre funded by Australia’s Department of Industry, Science, and Resources (METS Ignited, 2021). METS Ignited is a national cluster support organization that manages, promotes, and engages with multiple sub-clusters across the country – each one of these sub-clusters has a different area of expertise under the mining equipment, technology, and services umbrella (METS Ignited, 2021). This organization leads innovation acceleration, commercialization, and education activities as well as scouts out industrial problems that require further innovation from the sub-clusters (METS Ignited, 2021). As the lead cluster support organization, METS Ignited has five primary goals listed as the core of their mandate which include developing a “shared vision, strengthening collaboration, addressing gaps in the METS-Mining ecosystem, raising profiles, and promoting clusters” (METS Ignited, 2021). It is clear that these five goals hold cluster branding and identity to a high level of importance (shared vision, raising profiles, promoting clusters) and METS Ignited has ensured the inclusion of innovation and collaboration into their mandate. The emphasis METS Ignited puts on these areas of importance to cluster literature, positions them as one of the more important examples for cluster governance especially in the mining innovation world.

2.6 Conclusions

This chapter has discussed clusters, their importance, governance, and critiques as well as cluster branding, identity, and consciousness. Strengthening the components of cluster branding and identity dynamics is crucial to the success of a cluster, and will be discussed further in the results of this study. Through this exploration of the existing literature on clusters and the related focal areas, it can be seen that there is a particularly large gap in the literature around cluster branding and identity in mining innovation clusters. This research will work to fill this gap through a more thorough examination of cluster branding and

identity in the Greater Sudbury mining innovation cluster. I turn now to a discussion of the methods used for the collection and analysis of data for this project along with an examination

Chapter 3

Methodology

Now that the project has been introduced and the relevant literature has been discussed, this chapter will outline the methods used for this research. A suitable research design was chosen with the research questions in mind:

- 1) What are the benefits of having a cluster identity and brand?
- 2) What are the challenges associated with creating a cluster identity and brand?
- 3) Who should manage and promote a cluster identity and brand?
- 4) What tools could be used to develop a cluster identity and brand?

This chapter will first touch on the rationale behind the qualitative approach for this research along with an introduction to the research tools used which will then be followed by a discussion on the sample selection process. The methods for this project include semi-structured key informant interviews, document analysis, and a case study. After the methods have been outlined, this chapter will conclude with an examination of the data collection and analysis procedures.

3.1 Research Approach

The purpose of this project is to research the challenges and opportunities with creating a cluster identity and brand for the mining innovation cluster in Greater Sudbury, Ontario. To effectively explore these challenges and opportunities this project used a qualitative approach. A qualitative approach was pertinent to this project as qualitative methods work to address the complex dynamics of the research problem to provide a project with the flexibility necessary to dissect the issues at hand (Creswell and Creswell, 2018). The data for this project was collected through key informant interviews, document analysis, and a case study. An inductive thematic analysis was conducted after the data collection process to explore the most pertinent challenges and opportunities in the creation and development of a cluster identity and brand in Greater Sudbury. The use of an inductive thematic analysis, or a

“bottom up” approach, ensured the themes of the results were more closely linked to the respondents’ points of view and the data collected as opposed to any hypotheses held prior to conducting the research (Braun and Clarke, 2006). It is worth noting that this project received ethics clearance from a University of Waterloo Research Ethics Board (REB #43695) on October 7th, 2021.

3.2 Semi-structured Interviews

Semi-structured interviews were used to have conversational flexibility in the interview process. Semi-structured interviews involve a set of questions but allow for a conversational flow along with probing follow-up questions to explore the areas of interest (SAGE, 2020). The semi-structured nature allowed for proper context to be discussed by each participant throughout the interviews and proved effective in uncovering potential recommendations for the cluster. The flexibility of semi-structured interviews enabled the questions to be shifted to dig deeper into some areas of cluster branding and consciousness in which some individuals and their organizations may have particularly unique insights.

The interviews aimed to answer questions related to the creation, development, and possible future of the cluster identity and brand of the Greater Sudbury mining innovation cluster. These questions also worked to gain a stronger understanding of the state of Greater Sudbury’s cluster consciousness through assessing whether participants – who were identified as members of the cluster – felt there was a concrete identity and brand for the cluster. The questions, however, did not involve asking participants about their company or organization size, ownership, and other related information. The use of a semi-structured interview enabled the conversations to dive deeper into contextual factors relating to some participant responses. The interview guide is provided in [Appendix A](#).

All of the interviews were conducted virtually through Zoom. Each participant was categorized into one of the three levels of the Triple Helix model and are referred to in the data analysis as either Academic Key Informant, Government Key Informant, or Industry Key Informant. The interviews took between 20 and 90 minutes and were conducted between

October, 2021 and April, 2022. 13 interviews were conducted in total: 1 with an Academic Key Informant, 3 with Government Key Informants, and 9 with Industry Key Informants (which included individuals from industry organizations and mining supply and services companies). There were a few cases where participants had a thorough understanding or experience with another one of the categorizations which added a better representation of each group, although it may not be well represented in the distribution of the sample. The interviews were recorded and were transcribed after completion to provide a transcript for further analysis.

The selection of key informants for this project was based on the Triple Helix model used by Mauroner and Zorn (2017) in their case studies on cluster marketing and branding in two of Germany's established clusters. The Triple Helix model highlights three important levels of organizations in a cluster. They are, as posited by Etzkowitz (2002), universities and research institutions; governmental bodies; and businesses and other related organizations. By selecting key informants from each level of the cluster, this research provides a more holistic account of the dynamics of the cluster.

Purposive sampling was used to obtain participants for the research. Purposive sampling involves identifying participants that are "most likely to yield appropriate and useful information" (Kelly, 2010 p.317). Individuals with first-hand experience in the Greater Sudbury mining innovation cluster were highlighted as important potential participants. Identifying individuals that may have unique and extensive insight on the cluster was crucial for extracting important information while staying true to the scope of the research. Once these individuals were identified, invitations, along with information regarding the project, were sent to individuals involved at each level of the cluster's Triple Helix. Most participants were invited to participate through publicly available contact information, however, when such information was not available an invitation to participate was sent to a general organization contact information. On a few occasions in the interview process, snowball sampling was employed wherein participants were asked, or voluntarily,

recommended other individuals that might be interested in participating in this research (Vogt, 2005).

3.3 Data Analysis

The data was analyzed manually through thematic analysis. After the interviews were transcribed, the analysis began by reading over each transcript multiple times to become familiar with the participant responses and underlying themes. A concept map was drawn out by hand to highlight recurring themes from each major interview question which were then used as codes to be identified throughout the transcripts. The themes that were selected each had a level of relevance to issues discussed in the literature review while some were also intended to relate to potential practical recommendations for the cluster. Once these themes were deduced, they were assigned to relevant quotations from the transcripts and were counted and analyzed to better understand their relative importance in the interview responses. As mentioned the concept map was initially drawn by hand, however, Figure 2 shows an example of the process of listing themes and associating quotes from key informants.

Figure 2 – Coding Process Example



3.4 Case Study – The Mining Innovation Cluster in Greater Sudbury

Case studies are important because they provide a holistic assessment of the target of the research which works to explain the complex social dynamics of the case, when approached qualitatively (Yin, 2014). This project uses a case study of the Greater Sudbury mining innovation cluster because mining has played an integral role in the development of the Greater Sudbury region. More specifically, it has been a mainstay in their local economy for the better part of a century and it has a recognized cluster (Robinson, 2004). The cluster has its roots in the 1970’s when mining companies INCO and Falconbridge began downsizing which led to massive job losses – upwards of 10 000 jobs – which ultimately contributed to the development of the mining innovation cluster (Buse, 1996). This downsizing was a result of a downturn in the nickel market which led to calls in Greater Sudbury for economic diversification away from strictly mining (Buse, 1996). Many of the individuals who lost their jobs started working on contract for the mines they once worked in and some would ultimately end up creating their own mining supply and service firms (Buse, 1996). These

firms along with the academic institutions and support organizations in the region would later be recognized as a cluster (Robinson, 2004; Doyletech, 2010).

The cluster is now an important innovation hub in Canada in a sector that has seen a recent increase of interest due to the importance of Canada's minerals in the transition to net zero economies (Hall et al, 2022; Government of Canada, 2021). As mentioned in Chapter 2, Hall et al (2022) found that the Greater Sudbury mining innovation cluster needed to strengthen its cluster consciousness at the time of their study. As the literature has shown in Chapter 2, there are key benefits associated with having a strong cluster consciousness, brand, and identity which may catalyze and facilitate regional innovation (Mauroner and Zorn, 2017; Andersson, 2012). In the next chapter it will be shown that there are a number of organizations working to promote and grow mining innovation in the region. The recent attention, proven benefits to cluster consciousness, and regional interest in innovation all make the Greater Sudbury mining innovation cluster a strong case study for the purpose of this project.

3.5 Summary

This chapter has outlined the methods used in this project. Through the use of qualitative methods including semi-structured key informant interviews and a case study, this project works to address the complex social dynamics of branding the Greater Sudbury mining innovation cluster. The qualitative, semi-structured approach allow for fluid conversations in the interview process which, as we will discuss in the next chapter, provided highly relevant context to the branding and marketing issues currently faced by the Greater Sudbury mining innovation cluster. Having this context and the first-hand perspectives allow for an in-depth discussion of the interview results as a means to answering the research questions revolving around the dynamics of the Greater Sudbury mining innovation cluster brand and identity.

Chapter 4

Results

This Chapter includes an examination and discussion of the responses from the key informant interviews to explore the challenges and opportunities with creating a cluster identity and brand for the mining innovation cluster in Greater Sudbury, Ontario. This Chapter closely follows the research questions in its organization of sections with each section discussing the themes that emerged in the interviews. This chapter contains six sections exploring the results of the key informant interviews as well as a further examination of the Greater Sudbury case study. After an analysis and discussion of the case study, supported by the interviews, the major themes will be discussed. The discussion of major themes deduced from this study include an examination of the existing Greater Sudbury mining innovation cluster brand and identity as well as three categories of challenges for the cluster – the challenges of place, collaboration, and leadership and representation. This is followed by a discussion of potential pathways for managing the cluster brand as well as possible tools that could be implemented in the cluster for practical use. A final summary of the results will conclude this Chapter and synthesize the findings of this study.

4.1 The Greater Sudbury Mining Innovation Cluster

In his seminal work, Robinson (2004, p.2) argues that there is an “empirically significant” concentration of businesses focused on mining supply and service in the region (see also Doyletech, 2010). However, stakeholders in the Greater Sudbury region did not always recognize this concentration of businesses as a cluster. As Robinson (2004) notes, around 2002, a working paper was commissioned by the City of Greater Sudbury to identify the top five regional industries that were strong candidates to be recognized as a cluster and there was no mention of mining or mining supply and service in the final five candidate industries. It remained overlooked as a cluster until Robinson’s 2004 paper on the Greater Sudbury

mining supply and service cluster which stands as a central piece in recognizing the development of the cluster.

To discuss the existence of the cluster to members of the economic development office and city council, Robinson brought together the three branches of the Triple Helix described in Chapters 2 and 3 as being essential to a cluster – industry organizations, research institutions, and government. This collaboration to recognize the cluster spawned the first organized event that introduced Greater Sudbury’s mining supply and services sector as a cluster to regional stakeholders and representatives of each branch of the Triple Helix. This event, called the Roundtable Promoting Greater Sudbury’s Mining Service and Supply cluster, was held in late 2002 and stood as the formal introduction of the cluster to regional stakeholders in industry, government, and research (Robinson, 2004). It was around this time that the first cluster-oriented organization was founded by Dick DeStefano – the Sudbury Area Mining Supply and Services Association (SAMSSA; Sudbury Mining Solutions, 2019). Robinson (2004) reflects on SAMSSA’s early success in connecting local firms to exporting opportunities as an important synergy between cluster theory and effective practical application. He concludes his seminal paper with a discussion of this era as being the early beginnings of a cluster consciousness in the region.

Since the time of Robinson’s publication in 2004, the cluster has seen growth in its network, economic contribution, and employment as the cluster has roughly 300-member firms, conducts around \$4 billion in annual exports, and employs more than 12,000 people (InvestSudbury, nd). There are also a number of government, research, and industry organizations that have emerged. For example, SAMSSA, which has since been renamed MineConnect, has worked to expand its network across Northern Ontario and now has over 120 corporate members in their network. With a recent project to open up a satellite office in Elko, Nevada, MineConnect has also expanded the market reach of local member organizations (MineConnect, 2021). MineConnect lists six core benefits to membership on their website: lead generation, connecting to key mining personnel, MineConnect events, connecting to the media, trade missions, and being part of their website’s member directory

(MineConnect, 2021). More specifically, MineConnect helps to expand market opportunities for member organizations and works to connect local members to international targets. MineConnect's role in the cluster is unique in the sense that they are the primary industry association in the region and their international reach aims to market and globalize the products and services of Northern Ontario mining supply and service companies.

In addition to MineConnect, there are a few other major players that work specifically in innovation and the commercialization of new mining technologies – specifically the Northern Centre for Advanced Technology (NORCAT) and the Centre for Excellence in Mining Innovation (CEMI). Founded in 1995, NORCAT was created to provide a platform to support and stimulate entrepreneurship, tech innovation, and skilled labour in the Greater Sudbury area (NORCAT, nd). NORCAT is also a provincial Regional Innovation Centre (RIC) for Greater Sudbury (Government of Ontario, 2021). They have been a primary support organization for regional innovation since their inception with programs focused on training, innovation, pre-market testing, education, research and development, and advising (NORCAT, nd). One of NORCAT's defining features is their underground test mine where companies can test new technologies before bringing them to market or making further adjustments to existing products. They have been a strong proponent of collaboration and innovation in Greater Sudbury as they work to house a number of start-ups, mid-sized companies, and research organizations at their facilities (NORCAT, nd).

The Centre for Excellence in Mining Innovation or CEMI, similarly, focusses their efforts on filling innovation and commercialization gaps in mining technology as they work to “lead and coordinate innovations that can be integrated into mining operations” (CEMI, nd). CEMI previously managed an initiative called the Ultra Deep Mining Network that worked to fund research and innovation projects that aimed to provide solutions to ultra-deep mining with a focus on rock stress reduction, energy reduction, and human health (CEMI, nd.). CEMI currently leads an initiative called the Mining Innovation Commercialization Accelerator (MICA) that is a national initiative, funded by the Government of Canada's Strategic Innovation Fund, that works to “modernize mining” through supporting the

commercialization of innovative technologies across Canada (MICA, nd). With the goal of bridging the gap between innovation and commercialization, CEMI also runs initiatives focused on scouting for innovative technology, identifying industrial challenges, and matching innovative solutions to emerging industrial challenges (CEMI, nd). The initiatives supported and led by CEMI involve firms, academic and research organizations, as well as industry associations.

In terms of government support, the City of Greater Sudbury's economic development strategy, entitled *From the Ground Up*, includes the mining supply and services cluster as an integral part to the region's growth strategy from 2015 to 2025 (InvestSudbury, 2015). Of the nine goals listed in this economic development plan, four targets are heavily based on the region's mining supply and services cluster. Table 2 displays a few of the core action points relating to the mining supply and services cluster. Along with these action points, *From the Ground Up* mentions mining and mining supply as being the region's foundation for further developing a robust economic ecosystem (InvestSudbury, 2015).

Furthermore, in cooperation with Ontario North's Economic Development Corporation (ONEDC) the City of Greater Sudbury offers the Export Marketing Assistance Program. This program helps "export ready" firms, not-for-profits, and associations expand their market reach by covering export marketing costs including, but not limited to: exhibition costs, outgoing trade mission costs, product testing, market research and intelligence (InvestSudbury, nd.). The Export Marketing Assistance Program is funded by the Federal Economic Development Agency for Northern Ontario (FedNor) and the Northern Ontario Heritage Fund Corporation (NOHFC). Furthermore, this program is championed by business development officers with the City of Greater Sudbury, along with the other major economic centres of Northern Ontario including Timmins, North Bay, Sault Ste. Marie, and Thunder Bay.

Table 2 – From the Ground Up Action Points

Goal	Related Actions
A Robust Entrepreneurship Ecosystem	<ul style="list-style-type: none"> • Develop more physical and virtual innovation incubation spaces • Maintain and expand database of provincial and federal funding support programs to encourage entrepreneurship and innovation
A Highly Skilled and Creative Work Force	<ul style="list-style-type: none"> • Model talent attraction and retention initiatives • Explore global best practices in trades-based education and apprenticeship programs ... to facilitate the movement of tradespeople into key technical fields in mining supply and services
The Global Leader in Mining Supply and Services Industry	<ul style="list-style-type: none"> • Aggressively market Sudbury and support private sector efforts by positioning Sudbury as the centre for hard rock technology and the mining supply and services hub for the global mining sector • Promote opportunities in automation, productivity improvement, and robotics in the mining supply and services sector with existing research and innovation activities • Work with industry sector representatives to identify and address anticipated local skill shortages in mining and mining supply and services industries
One of the Most Integrated Education and Innovation Ecosystems in Ontario	<ul style="list-style-type: none"> • Expand research capabilities and intensity in ... mining innovation and exploration • Develop and attract programs and services that fill research, innovation, and commercialization gaps in the region

(Source: InvestSudbury, 2015, p. 20-54)

In addition, FedNor is the Government of Canada’s vehicle to support and fund projects in Northern Ontario that focus on “job creation and economic growth” in the region (FedNor, 2019). Their active programs work to support and fund both businesses and non-profits in Northern Ontario. FedNor also funds a Northern Ontario Mining Showcase pavilion at the Prospectors and Developers Association of Canada (PDAC) Convention that

hosts over 70 Northern Ontario organizations in the mining sector (FedNor, 2017). The support from a federal body like FedNor provides the region with funding that can work to further stimulate growth and innovation in the region. The provincial government is also active in the Greater Sudbury mining innovation cluster, specifically with the Ministry of Mines and the Ministry of Northern Development. The Ministry of Mines oversees the extraction and development of Ontario's mineral resources, while the Ministry of Northern Development includes the Northern Ontario Heritage Fund Corporation or NOHFC which offers funding and development programs for organizations in the region, with a specific platform aimed at the development and extraction of critical minerals (MNDM, 2022).

The mining innovation cluster also includes a significant amount of mining related research and training at Laurentian University and Cambrian College (see Hall 2017). For example, MIRARCO – the Mining Innovation, Rehabilitation, and Applied Research Corporation, has been conducting research on innovative technologies and processes for over 20 years in the Greater Sudbury region (MIRARCO, nd). Laurentian University is also home to the Goodman School of Mines that offers a comprehensive list of graduate and undergraduate mining related programs, conducts an array of mining related research, as well as provides workshops, certification programs, and field experience to prepare the “future leaders of the industry” (Goodman School of Mines, nd). Meanwhile, Cambrian College is host to the Centre for Smart Mining that works to “facilitate new technology adoption” in the mining sector with a particular focus on companies that may have difficulties implementing new technology (Cambrian, nd.). MIRARCO and the Centre for Smart Mining engage in collaborative mining research and list each other as primary partners in their research activities. Finally, the cluster also includes College Boreal, a French college that offers mining focused engineering programs, professional certifications, and conducts mining-based applied research in the region (CollegeBoreal, nd.). These innovation facilitators, government agencies, and academic institutions makeup a strong network through which the Greater Sudbury mining innovation cluster can provide practical solutions to mining companies both in the Greater Sudbury region and globally.

4.2 The Greater Sudbury Mining Innovation Cluster Brand and Identity

This project set out to explore the challenges and opportunities with creating a cluster identity and brand for the mining innovation cluster in Greater Sudbury, Ontario. More specifically, this research is focused on answering the following questions:

- 1) What are the benefits of having a cluster identity and brand?
- 2) What are the challenges associated with creating a cluster identity and brand?
- 3) Who should manage and promote a cluster identity and brand?
- 4) What tools could be used to develop a cluster identity and brand?

This section will discuss the interview responses for questions based around the existing cluster brand in Greater Sudbury, the realized or potential benefits, and the internal perspectives on how the cluster should be branded moving forward.

4.2.1 The Cluster Consciousness Problem

A common response when respondents were asked whether the cluster has a clear brand was “yes, and no” (Government Key Informant #2), in fact, over half of the respondents had some level of caveat to their “yes” responses. One participant said “well it’s [in the] early stages” (Industry Key Informant #3), with another adding “that’s a very tricky question” (Industry Key Informant #5) when questioned about the existence of a cluster brand. Industry Key Informant #5 further added that the cluster “has a clear identity” but hesitated in suggesting the same clarity existed for the brand. The consistency of this ambiguity confirms earlier work that the cluster is experiencing a disconnect between the cluster members and the cluster brand and identity. In other words, the lack of cluster consciousness highlighted first by Robinson (2004) and again by Hall et al (2022) remains an issue for the cluster.

As discussed in Chapter 2 having an internal connection to a cluster brand and identity plays an important role in fostering cluster growth. This connection to a shared identity, or cluster consciousness, has been referred to as a vehicle through which increased collaboration and innovation can take place. Gaining a better understanding of the dynamics

of the Greater Sudbury cluster brand and identity can therefore provide insight into possible remedies for this gap in cluster consciousness. To gain this understanding, we must first discuss the current state of the cluster brand itself.

4.2.2 The Branding Problem

There was a general consensus among the interview participants that developing a cluster brand and identity is important to cluster members. For example, one participant responded “it’s undeniable that it’s important” (Industry Key Informant #5) as another added “I’m convinced that it is extremely important” (Industry Key Informant #9). Despite the recognition of this importance by cluster members, it has been discussed that there is no concrete cluster brand. There are, however, some shared attributes held by the cluster and its members that are cited as being what Greater Sudbury is known for in the mining world or, in other words, that make up the cluster identity. These attributes were referred to throughout the interviews as being central parts of the general perception of the mining industry in Greater Sudbury despite the fact there has been no concrete branding effort to create this perception.

For example, participants mentioned Greater Sudbury’s global reputation in hard rock mining as being a catalyst for getting business done. One respondent mentioned “the mining community knows Sudbury as the hard rock mining capital of the world” (Industry Key Informant #1). Another participant added “this cluster provides an expertise in absolutely everything ... required for hard rock mining” (Industry Key Informant #7). The consistency of this theme is important to discuss as the region’s expertise in hard rock and base metal mining, were mentioned or alluded to in every single interview and evidently, it is a very clear part of the perceived brand from within the cluster. What’s more important to extract from this theme is that hard rock mining was a consistent response when participants were asked to name a few key attributes associated with the cluster. When asked about the attributes of the Greater Sudbury mining innovation cluster one participant responded with:

“Well, first of all you have to say underground hard rock, base metal mining” (Industry Key Informant #4). The same participant added “anything to do with the underground, base metal mining industry and the expertise and support systems around that is what the region is known for”. Another participant added that the cluster has potential for “global scale in leading expertise especially in underground hard rock mining” (Industry Key Informant #6). The repeated appearance of hard rock and base metal mining expertise has shown that there are elements of an existing shared identity that has given the cluster a level of credibility in the market regardless of the absence of an intentional branding strategy.

Another theme in the responses when asked about the existing brand in Greater Sudbury was a reference to the region’s long history of mining. As discussed in the previous chapter, mining has been a central piece of the Greater Sudbury economy for the better part of a century. This longstanding history is not lost on stakeholders and was mentioned by the majority of respondents as being a key attribute of the Greater Sudbury brand. One participant said “I think Sudbury as a whole has a bit of a brand based on its history” (Industry Key Informant #5). They further commented the importance of the history when attracting new clients: “there’s, you know, 80 to 100 years of mining history behind [a] pitch and it does carry a lot of weight” (Industry Key Informant #5). Another participant echoed the importance of the history of mining through saying “there’s a long history of experience and success is another key, Sudbury has been mining for 100 years or so and we’ve just got it down pat” (Industry Key Informant #7). When reflecting back on the discussion of the literature in Chapter 2, having these two central attributes mentioned repeatedly throughout the interviews suggests that, again, there are features of a shared identity in Greater Sudbury that is recognized from within and spreads across multiple branches of the cluster’s Triple Helix.

A less frequent, but critical theme that emerged in the discussion of the current state of the cluster’s brand is the role cluster brand development can play in building a robust ecosystem that can withstand the depletion of local/regional natural resources. Mines can’t last forever. In fact, one participant mentioned that the average mine lifespan is about 5-10

years (Industry Key Informant #8). Greater Sudbury's mines, however, are "extraordinary ... 100-year ore bodies" (Industry Key Informant #8) which has enabled the region to develop the expertise repeatedly mentioned as a defining feature of the Greater Sudbury mining innovation cluster. Naturally, a mining heavy economy like Greater Sudbury's has faced issues of diversification in the past (Robinson, 2004; Buse, 1996). However, the long-standing deposits position Greater Sudbury as a historical centre for expertise and as these regional mines start to deplete, that expertise can continue to flourish in the mining supply, service, and innovation world. While you cannot separate a mine from its geography, you can extend the mining community's supply and service market reach far beyond the regional boundary. As one interview participant states "Sudbury may not have mines in 30 years" (Industry Key Informant #6), and another participant added "the mines of the future are not going to be in our own backyard" (Industry Key Informant #4), so establishing a global reach for the Greater Sudbury mining innovation cluster is important for the development of a robust cluster ecosystem that can withstand a decline in ore bodies.

Shared attributes and references to a common identity are not enough to suggest the existence of a strong brand, however. As was discussed in the literature review, a cluster brand can benefit strongly from effective governance and intervention. Roughly two thirds of respondents mentioned, the cluster does not have a concrete branding strategy. While there was discussion of attempts to strengthen the cluster's brand, most respondents that highlighted the absence of a concrete plan suggested that these attempts were fairly sporadic. One example that came up multiple times was the recent Superclusters bid put together by stakeholders in the mining service and supply cluster. Originally led by CEMI and the Canadian Mining Innovation Council (CMIC), the joint letter of intent mentioned the Clean, Low-Energy, Efficient, and Remediated (CLEER) Supercluster would include five clusters situated in British Columbia, Alberta, Ontario, Saskatchewan, and Quebec along with eight anchored resource companies along with post-secondary institutions and industry associations (CEMI, 2017). This bid was in response to a federally backed call for proposals

for clusters to be named to a list of five “Superclusters” that would end up receiving significant federal investment (ISEDCanada, nd; see also Chapter 2).

As mentioned, CEMI and CMIC put together the CLEER bid for the Supercluster initiative, and as per one respondent, “made it to the top seven, but did not make the final five” (Government Key Informant #1). The process of this bid, however, was mentioned throughout these interviews as being an example of a concrete marketing and branding initiative for the cluster. One respondent perceived that they missed out on the funding because the cluster was to be “too centralized geographically” (Industry Key Informant #5). This comment is particularly striking considering the importance of place and geographic proximity for clusters as discussed in Chapter 2. As previously mentioned, the application did include four dispersed clusters, so this may also suggest that there was a lack of clear communication on the rationale behind the decision not to fund the Greater Sudbury mining innovation cluster. It may also suggest that there is a disconnect between cluster theory and policy application. The importance of informing decisions with cluster theory was noted by one participant as they mentioned “these things really require theorizing and broadcasting theory ... people do not understand how importantly theory can drive things” (Academic Key Informant #1).

The way in which the Greater Sudbury mining innovation cluster is presented to its targets is critical for the development of both the cluster brand and identity. Building a distinct and unique cluster image around the core attributes mentioned above – namely the region’s mining history and expertise – is a possibility that was mentioned repeatedly in the interviews. The reoccurrence of this is not a surprise considering how intertwined the image of Greater Sudbury is with its mining history and deep hard rock mining. These attributes are ingrained in the collective consciousness of mining in Greater Sudbury, but they should be brought to the forefront of future brand and identity development. One respondent highlighted the necessity of differentiating the strengths of the Greater Sudbury mining innovation cluster from other major mining clusters across the globe. They stated “if you just say you have a mining cluster ... that is absolutely indistinguishable from anything else”

(Industry Informant #8). So, when considering what the strengths of the cluster are, the longstanding expertise in deep, hard rock mining should be incorporated into the brand and identity at all levels of the cluster. According to most participants, Greater Sudbury is one of the world's more challenging regions for mineral extraction, and as one participant put it "it is the hardest rock in the world" (Industry Key Informant #1). But the region's continual innovation and decades of experience position the cluster as being unique in its ability to streamline extraction in such conditions. Essentially, the message that has been and should continue to be the basis of the Greater Sudbury mining innovation cluster brand and identity is: "If it can be done here, it can be done anywhere" (Industry Key Informant #1).

4.3 Challenges of Creating a Cluster Brand and Identity

Each participant was asked about any challenges experienced in the development of a cluster brand and identity. The responses mostly focused on barriers for the cluster to overcome through branding and identity focused initiatives as well as the challenges experienced in prior initiatives. Although there was a range of responses, there were three common themes relating to the challenges mentioned: Place, Collaboration, and Leadership and Representation.

4.3.1 The Challenges of Place

One of the primary themes when participants were asked about the challenges associated with cluster branding and identity was the role of place. As mentioned before, MineConnect – the primary industry association for the cluster – has recently shifted to a "Pan-Northern Ontario" approach. Along with this approach comes a greater geographic scope and brings in a larger number of stakeholders under the branding umbrella. As an industry association whose business model involves membership growth, this shift makes sense for MineConnect and could work in favour of the cluster if effectively managed. A Pan-Northern approach was also recommended in a 2010 Doyletech study focused on promoting the Northern Ontario

supply and service sector as being “world class” with goals of providing smaller players with credibility to enter new markets and differentiating Northern Ontario firms as being “global players” (DoyleTech, 2010, p.20).

Mining in Canada, as referred to by one participant, is seen as a “cluster of clusters” (Industry Key Informant #4), which can be applied to Northern Ontario as well. For example, Greater Sudbury, North Bay, Timmins, and Thunder Bay all have some level of concentration of mining or mining supply and services firms. With the growth of MineConnect’s network to include organizations from each of these municipalities, the range of stakeholder perspectives is likely to grow as well. Interviewing stakeholders from these other regions was outside of the scope of this project and may be an area for further research considering the current involvement of each municipality in the Pan-Northern Ontario approach.

MineConnect’s Northern Ontario shift was discussed by a few participants throughout the interviews. When participants mentioned this shift, they typically referred to challenges associated with the role of place in cluster branding and identity management. More specifically, their responses indirectly alluded to questions of how best to align a regional brand and to what extent a cluster brand should extend its geographic scope. Some participants mentioned that Greater Sudbury “lost [their] branding” (Government Key Informant #1) with the shift to a Northern Ontario approach while others echoed this by suggesting there’s some level of “competing branding” (Industry Key Informant #5) going on between the local and regional levels. While this may be true to an extent, when considering the brand architecture figure and discussion from Chapter 2, we know that brands can coexist and interact at local, regional, and national geographic scopes (Andersson, 2012).

Some participants recognized the validity of multiple brand levels and many pointed to Australia and Finland to reference their strong national and sub-national cluster brands as examples for Greater Sudbury and Canada (see Section 2.5, Chapter 2). One participant applauded Australia’s ability to “aggregate” regional cluster brands on a national level but mentioned that Greater Sudbury is “not there, but Sudbury has good intentions” (Industry

Key Informant #6). The strength of Australia's branding on regional and national levels is seen as being a point of competition for Greater Sudbury and Canada as a whole. One participant commented "we are definitely a global mining hub, but we're in a race with Australia and they're winning" (Government Key Informant #1). They further commented that Australia is leading this race because "they are more organized between private sector, government, institutions, and research" which further highlights the importance of strong governance and collaboration.

As discussed, there is merit in assessing the possibility of having multiple coexisting brand levels for cluster organizations to engage with and there are existing elements of a multi-tiered brand already. Multiple participants referenced their use of the "Made in Canada" tagline when conducting international business. One participant mentioned that "Canadianess in itself carries good weight" (Industry Key Informant #5) with international counterparts and potential customers. They also noted that there is a reputation in the mining world that "Canadians are honest business people" and Canada is viewed as being a place of "political stability" and a "safe environment" for conducting business. It became clear through these interviews that the Canadian national brand is effective as a linkage between the Greater Sudbury cluster brand and identity and the two brands are leaned on simultaneously when local companies address potential international targets.

4.3.2 The Challenges of Collaboration

As discussed in Chapter Two, collaboration was mentioned in the literature as a key pillar of cluster branding, identity, and consciousness. Collaboration is both a benefit of clusters that catalyzes innovation as well as an important facet of cluster identity and consciousness. The recognition of the importance of collaboration was echoed in the interviews as well.

Members of the Greater Sudbury cluster have a positive outlook on collaboration and over three quarters of the Industry Key Informants mentioned an increase in collaboration would be received favourably. One participant, a proponent for collaboration, said "we need to see others as not just competitors, but also as facilitators, also as helpers" (Industry Key

Informant #9). This positive sentiment regarding collaboration was common in the interviews, however, so were comments about the barriers to collaboration in Greater Sudbury. One key informant said: “What hurts clusters ... is when people start to think being competitive means not getting along with anyone else around me, but being competitive means you can have your integrators working next door in a synergistic way....” (Industry Key Informant #4). This barrier of prioritizing competition over collaboration is one that lines up well with the discussion in Chapter 2 about the theories of collaboration in clusters and the associated perceived risks for organizations. As is the case with any small business, firms are concerned with covering their own costs and securing their own growth as well as the risks of overdependence and sensitive information exposure. One participant said “everyone has their own vested interests coming first” when referring to ensuring their company is self-sufficient on top of engaging with other cluster members (Industry Key Informant #6). These concerns are valid, however, as mentioned in Chapter 2, it is the role of an effective cluster governance organization(s) to mitigate these types of risks for cluster members.

One key informant further explained,

As silos collectively all of us work away at doing what we want to do because we're you know part of the regional innovation ecosystem, or we're part of the cluster or whatever, and it's not as coordinated as it should be, but the network is pretty well coordinated like the city province and the feds do work together quite well.
(Government Key Informant #2).

This recognition of being part of the cluster as silos and not being as coordinated as it should be is a prime example of the cluster consciousness gap discussed earlier in this paper. This quote also speaks to the need for better cluster governance, which will be discussed further in the following sections.

As it stands now, there seems to be some limitations to furthering cluster collaboration. The preconception, as one informant put it, of stakeholders each having “their own kitchen to cook in” (Industry Key Informant #4) is a barrier (real or perceived) that should be overcome as an effort to strengthen the cluster identity and the resulting benefits

for the cluster more broadly. When discussing collaboration one participant referenced forums in Greater Sudbury that once facilitated communication between companies and remarked “I think it’s extremely important that people are continuously talking” to catalyze collaboration in the cluster (Industry Key Informant #9). It is also clear that there exists a level of recognition of the importance of collaboration among the interview participants. One key informant mentioned “the innovation, of course... requires collaboration” (Industry Key Informant #9) while another added “we need to get together as a group, we need to be rowing in the same direction” (Industry Key Informant #1). Between the existence of some collaboration and this recognition of its importance, there is an environment in which collaboration may be further developed. The tools through which this development may be achieved will be discussed further in section 4.6.

4.3.3 The Challenges of Leadership and Representation

The third, and most common, theme in the challenges of cluster branding and identity in Greater Sudbury involves cluster representation. Key informants were asked who has managed cluster branding and identity initiatives. Answers about who has been involved in the management and development of the cluster brand and identity ranged and included MineConnect, the City of Greater Sudbury, FedNor, Laurentian University, CEMI, as well as the individuals who were instrumental in the cluster’s early recognition and development, such as David Robinson and Dick DeStefano in the early 2000’s. Some respondents made positive comments about the wide range of stakeholders, whereas others were weary of the sporadic management of the cluster brand and identity. One participant said “we have all the tools to do a good job, but we just need better leadership” and “it feels as though there’s kind of a missing figurehead” (Industry Key Informant #1). This call for leadership and management was a highly prevalent concern in the interview process as a call for a more unified representative body or better coordination for the cluster came up in 10 of the 13 interviews. One participant said “I just don’t see the leadership” (Academic Key Informant #1) while another added “we’re part of the cluster ... but it’s not as well coordinated as it

should be” (Government Key Informant #2). Solving the issue of cluster leadership and representation emerged as a primary concern for most interview participants.

In relation to the primary actors in the cluster, one key informant mentioned “they interact but [they’re] not intertwined” (Industry Key Informant #6). This remark, again, suggests that there are some open channels of communication, but they are not collective as the cluster members may want them to be. Another participant emphasized “we need a collective voice and a collective strategy [the cluster can] all buy into” (Industry Key Informant #1). Further discussion about how this “collective voice” could be developed and managed will take place in the next section where cluster brand management is discussed in more detail.

Another concern voiced by interview participants was representation in government at the provincial and federal levels. Government shifts leading to policy change was cited multiple times as well as the way Northern Ontario is treated in the Provincial government. When discussing a potential cluster management body one participant cited “changes in government ... and if [they] decide to stop spending” as being a concern for relying on government bodies to lead and govern the cluster (Industry Key Informant #5). In reference to the provincial government’s engagement with Northern Ontario, they also noted “if you’re north of the 407, you don’t exist”. This feeling of being forgotten has been cited in earlier research and is a long-standing sentiment in the region (see Hall, 2012). When discussing representation of the cluster in the federal realm, one participant noted “Northern Ontario MP’s are definitely behind it, but they’re not as listened to in Ottawa” (Government Key Informant #1). When participants were asked about who was missing in the management and development of the cluster brand, multiple respondents referred to the federal government. Thus, although there are champions of the cluster at the federal level, more engagement by the federal government was cited as a key challenge.

4.4 Managing the Cluster Brand

As discussed in Chapter 2, having a clear cluster governance structure is important to facilitate collaboration, limit transaction costs, and mitigate risks for cluster organizations. Yet, as seen in the previous two sections, there is no clear cluster manager in Greater Sudbury although there are multiple organizations that come in and out of conducting cluster governance related initiatives – intentionally or not. Having a fluid, undefined governance structure was pointed out by multiple key informants as being a barrier to further developing a cluster brand and identity. Governance plays a crucial role in clusters, as discussed in Chapter 2, but effective governance structures are highly contingent on the needs and structure of the cluster itself. Therefore, the most effective way to explore possible solutions is, first, through understanding the internal perspectives regarding how the cluster should be managed and, more importantly, who should be managing the cluster brand and identity.

When asked about who has been involved in managing the cluster brand and identity, roughly half of the interview participants referenced MineConnect. Some key informants discussed more recent efforts to lead the cluster branding initiatives as one participant noted that “MineConnect has obviously taken charge” while another said “it’s primarily MineConnect” (Industry Key Informant #3; Industry Key Informant #7). MineConnect works heavily in connecting their members to new markets and opportunities they may not have the ability to reach without MineConnect’s services. Their work in this area is viewed quite positively by most interview participants and their recent opening of an office in Elko, Nevada was referenced by multiple key informants as being proof of their effectiveness in expanding the reach of the cluster. In reference to the new Nevada office one participant said “we’re trying to take our cluster and the knowledge and information we have as a group and bring it down there and show not just the value of one company coming in but show the value we have brought to Ontario and bring that to other regions” (Industry Key Informant #8). Again, in reference to MineConnect’s Nevada office, this participant complimented the potential to “move” the value of the Greater Sudbury cluster into other regions through their network. After discussing MineConnect one key informant said “if [the government] had a

body that [they] could fund and contribute to and have a voice, I think that's the [right] approach" (Industry Key Informant #1). Interest and engagement from the government on this level could work to incentivize and expedite the creation of a collective voice and structured governance for the cluster, by the cluster.

Some participants also highlighted other organizations in the region that deal primarily in research and development, innovation, and collaboration. For example, one participant mentioned "CEMI has been a very strong proponent of this idea that companies should work together" (Industry Informant #9), while another added "CEMI is the big one in town that do a lot of effort in bringing the mines and the innovations together" (Industry Key Informant #7). Despite the presence of some potential cluster leaders that are effective in the lines of commercialization and the expansion of market reach, there still remains a perception of a fragmented, unclear governance structure within the cluster.

There was also some desire to have a new voice to brand the cluster. In discussing a potential cluster manager one participant said "I think someone needs to be pulled out of the cluster and actually get tasked with creating that [cluster] brand" (Industry Key Informant #6). They further suggested having an individual entity "without ... vested interests" (Industry Key Informant #6) held by the existing cluster organizations. There is an argument to be made for a new entity that works to synthesize individual organizational efforts to establish a more robust governance structure that services the critical aspects of cluster governance as discussed in Chapter 2. To emphasize the need for a collective strategy for the cluster one participant said "somebody needs to put their hand up and take charge of that" they further added "we need a clear, defined leader" (Industry Key Informant #1). While there was little discussion in the interviews about who specifically this alternative cluster leader could be, the final decision should be made by the regional stakeholders and cluster members themselves.

4.5 Tools to Support Cluster Branding

Chapter 2 discussed different types of tools and interventions cluster governing bodies can employ to solve particular issues related to the cluster brand and identity. Of specific importance to this research are the tools relating to information, networks, and placemaking. As seen in the results thus far, the flow of information, collaborative networks, and issues of place are all highly important themes to the Greater Sudbury mining innovation cluster.

When it comes to the existing tools used for branding and identity building, most respondents from industry mentioned trade shows and trade missions as being popular tools. In reference to a question based on branding tools, one participant said “the international trade shows that were done ... are very important” (Government Key Informant #1) and another participant commented “we’ve had success with both incoming and outgoing trade missions” (Industry Key Informant #5). The Prospectors and Developers of Canada (PDAC) Convention was mentioned by all industrial participants, as well as a few government key informants, as being an important trade show for building up the cluster. One participant lauded the federal support for Northern Ontario companies to showcase at PDAC, they noted “the feds do a decent job with trade shows, primarily PDAC, they host the Northern Ontario Pavilion where they basically pick up the tab for a huge slot of the floor and then for a nominal fee ... you can get a small booth” (Industry Key Informant #5). This “Northern Ontario Pavilion” where Northern Ontarian mining supply and service firms can have booths and demonstrations setup is, according to this participant “very worthwhile” (Industry Key Informant #5). While it may be a worthy venture to attend PDAC, one interview participant did mention that, although there is a designated Northern Ontario pavilion, it “doesn’t look like ... a concerted effort ... there’s no common theme” (Industry Key Informant #9). Moving forward, it could be beneficial to better coordinate the branding, themes, or types of products and services showcased at this trade show.

Trade shows like PDAC, according to the participants, are an important tool for expanding market reach and acquiring new business. As one key informant noted, PDAC itself is “the largest mineral exploration in the world” (Government Key Informant #2) and in

the words of another, trade shows are important for “bringing people to our area to receive our knowledge” of mining (Industry Key Informant #7). However, one participant also mentioned that there is a lot of business that gets done between Northern Ontario or Greater Sudbury based organizations at trade shows abroad. They stated “If Northern Ontario companies ... go to a trade show and it’s in the US or something, it’s amazing how much business gets done between our companies when we’re down somewhere else” (Industry Key Informant #6). Attending these trade shows is of particular interest to cluster members given how much work can be done between themselves as well as international firms, however, one participant noted “One of the challenges with being from Northern Ontario is everything is an international trip, it’s very expensive, just getting out of Sudbury could cost you \$1000, by the time you add the Sudbury leg to your trip it adds up pretty quick” (Industry Key Informant #5). The new trend in having hybrid attendance between in-person and virtual may be a new opportunity for the cluster to attend more of these international events without having to foot the travel costs.

A common response when asked about tools to strengthen branding and identity was reference to the Australian, Chilean, and Finnish mining innovation clusters. As discussed in Chapter 2, multiple participants referred to these clusters as being strong models for the Greater Sudbury region to base potential strategic initiatives for the cluster. After discussing the Australian cluster, one participant highlighted “it’s almost like they have a very strong federal state and less strong regional states” when considering the relationship between the government and the industrial organizations (Government Key Informant #2). As discussed in Chapter 2, there is a very clear strategy stemming from a federally supported organization for the Australian cluster. This clear vision and strategy, along with the previously discussed synergy with cluster governance theory is likely a reason why participants feel that the Australian METS cluster is positioned as a strong model for building a healthy government-industry relationship. Furthermore, their clear strategy is centred around strengthening their brand position in the global mining innovation market. Participants for this study recognized this effort and, in reference to the presence of a Greater Sudbury brand presence at larger

trade shows, one participant mentioned “it pales in comparison to what the Australians would put into something like that” (Government Key Informant #1). Another participant noted that for the Greater Sudbury cluster, “the competition is international” when it comes to the branding of the cluster (Government Key Informant #2).

With similar clusters establishing their respective positions in the global mining innovation market, the Greater Sudbury cluster is feeling the pressure to ensure they can compete against these clusters to build their global reach. The same participant above added “to compete with the front of mind presence Australia has, you need a brand” (Government Key Informant #2). Multiple participants referenced the high-level of cooperation between government agencies and the private sector as being one of the more admirable traits of the Australian METS cluster. One participant specifically argued “I would love to see both industry and government agree” (Government Key Informant #3) on a brand to present for the mining innovation cluster. Referring back to the discussion in Chapter 2, further developing the “Government supported, Industry led” cluster characteristic that is at the forefront of these similar clusters would likely achieve this goal.

One major distinction between these clusters and the Greater Sudbury mining innovation cluster is their national focus. As discussed in the challenges section above, the connection to a larger geographic brand is a suggestion that has come up, however, it would require getting more organizations to be actively involved across the country. This decision would likely pose some administrative and political challenges, but given the recognition of nationally rooted clusters in mining innovation, it could prove to be an effective move. One participant also mentioned the possibility of removing region from the brand altogether and shifting the brand focus to areas of national expertise in mining. They noted “I wouldn’t want a geographic brand, I want a competency brand” (Government Key Informant #3) – a brand in which Canadian companies would be shown to the world for their solutions to contemporary mining problems. Should a concrete national approach be taken, this brand shift would be worth consideration but would require further research to understand its potential viability.

In terms of a more practical, collaboration focused tool that could be implemented, one participant suggested the creation of a collaborative forum where if one cluster member has a problem or potential lead, they could put it up on this online forum, and another member organization may be able to collaborate and assist in providing a solution. More specifically, they noted:

“If I need a certain design done and don’t have in house capability, if there is a platform where I post this and another company in Sudbury sees it and they contact us say they can do it Having something locally available with [our] expertise would be very beneficial.” (Industry Key Informant #9).

An initiative like this one could be well governed by one of the organizations mentioned earlier in this chapter and it is likely to be well received as there was a consistent call for more collaboration within the cluster from interview participants.

4.6 Summary

Throughout this Chapter, we have explored the internal perspectives about the brand and identity of the Greater Sudbury mining innovation cluster. The discussion of themes that emerged from the key informant interviews led to a discussion of potential solutions, areas for further research, and the existing dynamics of the cluster itself. Understanding the three themes in the challenges faced by the cluster – place, collaboration, and representation – could help overcome the associated barriers. There were many potential pathways referenced in this Chapter that could be put in practice within the cluster. Of particular importance is the establishment of a defined cluster governance structure that would work to catalyze and facilitate further collaboration in the cluster. Nearly all the challenges discussed in this chapter could be mitigated or potentially overcome through effective cluster governance, as supported by the earlier discussion on cluster governance in Chapter 2.

Chapter 5

Conclusion

This research has examined the challenges and opportunities associated with cluster branding and identity in the Greater Sudbury mining innovation cluster. Using the Greater Sudbury cluster as a case study addresses an existing gap in the literature regarding the application of cluster branding and identity theory to mining innovation clusters and more broadly to clusters in Canada. Cluster branding and identity are critical areas under the umbrella of cluster theory that, as shown in Chapter 2, can play an integral role in the success of a cluster. Clusters with strong brands and identities have shown increased capacities for collaboration and innovation. Through the literature review, case study analysis, and semi-structured key informant interviews, this research highlights the challenges with cluster brand and identity. The insight gained from local stakeholders has revealed the importance of strengthened cluster leadership to further develop a cluster brand and identity. This final Chapter will synthesize the key findings of this research and provide areas for future research.

5.1 Key Findings of the Research

As noted throughout this research, the Greater Sudbury mining innovation cluster is experiencing some challenges with its brand and identity. Although the cluster has a level of global recognition and importance, members of the cluster were unable to identify a concrete brand for the cluster. While the cluster does hold some shared attributes that contribute to its identity – including underground hard rock mining expertise as well as being a historical centre for mining – there is no concrete branding and identity strategy to engage with and develop around. A possible barrier to this development is the role of place. With a recent rebranding shift by one industry organization to involve all of Northern Ontario, some members of the cluster questioned the different pathways a cluster brand could take. Discussions of local, provincial, and national brands all appeared during the interviews which

may show a disconnect between the respective visions of the cluster members for a potential brand strategy.

Another finding from the interviews was the recognition of the importance of collaboration on the part of cluster members, who also noted a desire for better coordinated collaboration moving forward. Key informants also emphasized the need for a clearer and more visible leader for the cluster. The role of effective governance in the development of a cluster brand and identity strategy cannot be understated. As discussed in Chapter 2, cluster governance is a crucial aspect of cluster development that must be understood for a cluster to succeed. Additionally, strong cluster governance works to facilitate communication and knowledge flows within the cluster, provide both virtual and physical spaces for research and development, and commercialize regional innovation – to name a few of the benefits of a strong cluster governance strategy. While these are all critical success indicators of any cluster, cluster governance is also important for the further development of a cluster brand and identity. Cluster governing bodies can use a clear, co-created cluster identity to facilitate communication and collaboration between its members which is closely linked with increased innovative capacity. This will be critical to expediting a shift to low carbon economies.

Finally, this research also found that the cluster does have some effective tools to develop a cluster brand and identity. Continuing to attend trade shows like PDAC will be crucial for cluster members to access global markets while also catalyzing interactions between cluster members themselves. Attending trade shows was noted as a primary tool for displaying the clusters offerings, but could use some further development to showcase a cohesive brand and identity strategy. Bringing the cluster members onto global platforms under a common brand and identity would also likely prove to strengthen the global recognition of the cluster and its brand and identity. Additionally, as discussed further in the next section, the cluster could assess the tools being used by the Australian METS cluster to potentially adopt similar successful strategies.

5.2 Areas for Further Research

This research has provided a foundation for understanding the existing challenges faced by the Greater Sudbury mining innovation cluster in relation to cluster branding, identity, and consciousness. However, there are some areas for further research that remain, including exploring the possible governance structures for the Greater Sudbury mining innovation cluster as well as a potential analysis of the viability of adopting a similar branding model to the Australian METS cluster in the Canadian mining context.

First, it may be worth examining the potential pathways for the creation of a new leadership entity for the Greater Sudbury mining innovation cluster. Although the interviews conducted for this project uncovered some desire for a new governing entity, it is still unclear how such an entity would look, operate, and how it would develop. Understanding the possible structures of this new entity would be important for its potential implementation. Conducting this research would likely lead to a governing body for the cluster that is informed by the perspectives, needs, and desires of the cluster members while also being closely linked to the literature.

Furthermore, given the repeated referencing to the strength of the Australian METS cluster, there is an opportunity to conduct research to examine the viability of employing a similar strategy in Canada. Having a national mining cluster brand with regional sub-clusters may or may not be effective in the Canadian context, but it would require further research to better understand its practicality. This research could involve examining other potential or existent mining clusters in Canada to comprise this possible sub-clusters pathway. A dialogue with the federal government would also be needed for the purpose of gauging their level of interest in implementing a similar strategy to Australia's METS cluster. If a shift in the brand architecture is undesirable, research could be conducted on the specific branding and identity building tools used by the METS cluster that could help in the creation of an effective branding and identity strategy for the Greater Sudbury mining innovation cluster. In addition to the existing tools at the cluster's disposal, an analysis of successful tools used

in the Australian context may provide insight into the next steps for the development of the Greater Sudbury mining innovation cluster brand and identity.

5.3 Summary

In summary, as discussed in Chapter 2, Andersson (2012) argues that cluster development is not always linear and a cluster that grows in size and economic contribution won't necessarily develop assets like cluster consciousness and identity. Andersson (2012), however, also discusses the importance of knowing which of the four stages of development a cluster is most aligned with in order to enact effective policy tailored to the developmental needs of the cluster. Given the lack of cluster consciousness and internal recognition of the cluster and identity as well as the tangible growth of the cluster, the Greater Sudbury mining innovation cluster is not easily aligned with one particular stage. It has the critical mass of clustered firms that Andersson (2012) associates with established and mature clusters, however, it is experiencing some of the branding and identity issues that he outlines as being related to embryonic and declining clusters. Understanding the developmental stage of the cluster is imperative to the results and discussion of this project as the needs and suitable cluster initiatives are heavily influenced by the stage of growth of the cluster. The complex, non-linear growth process along with the wide network of stakeholders in the Greater Sudbury mining innovation cluster makes this context truly important to better understand moving forward how the members of the cluster engage and interact with the cluster brand and identity.

As it pertains to sustainability management, and as mentioned in Chapter 1, the mining industry and mining supply and services sector will play a critical role in the transition to a low carbon economy. However, as also discussed earlier, the mining industry is often seen in a negative way by the general public. This highlights a need to strengthen the brand and identity of the mining industry in Canada, including the mining innovation cluster in Greater Sudbury, particularly its role in the low carbon transition. With the USA's recent

signing of the Inflation Reduction Act – that includes a significant portion of money for North American battery mineral industries – the Canadian mining industry could play a pivotal role (CBC, 2022). More specifically, the Greater Sudbury mining innovation cluster could work to strengthen its position with a clear brand and identity as a means of communicating the cluster’s value amidst this rapidly changing policy landscape. Additionally, the cluster should work to develop a brand and identity for the cluster that focuses on being a global leader in mining knowledge and expertise. As one key informant stated “the mines of the future are not going to be in our own backyard” (Industry Key Informant #4), however, establishing a global reach for the Greater Sudbury mining innovation cluster’s expertise could contribute to the long-term sustainability of the cluster and broader regional economy.

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Appendices

Appendix A

Questions

1. Tell me about your organization and its role within the mining innovation cluster in Sudbury or the mining industry?

2. Does the Sudbury mining innovation cluster have an identity and brand?

If yes, answer the following questions:

- a. Can you describe the key attributes of the cluster identity and brand?
 - i. Have any assets in Greater Sudbury influenced this identity and brand? If yes, how?*
- b. Why was the cluster identity or brand created?
- c. Who was involved in developing the identity and brand? (prompt for who was missing)
- d. What tools were used to develop the identity and brand?
 - i. What were the motivations behind using each tool?*
 - ii. Were they focussed on developing an internal connection to the brand or focused on the external image?*
- e. Who is involved in managing and marketing the identity and brand? (prompt for who is missing)
- f. How is the identity and brand marketed?
 - i. Is there a concrete marketing strategy for the cluster?*
 - ii. Is there a website for branding initiatives?*
- g. Who is the main target(s) for the branding and marketing initiatives?
 - i. How are these targets approached and engaged with? (Conventions, networking events, or through promotional tactics)*
 - ii. Is there any evidence of how these targets perceive the cluster?*

- h. Has any of this changed over time? (e.g. objectives, targets, tools)
- i. Can you identify some challenges experienced in developing the cluster brand?
(Prompt for internal or external challenges – e.g. problems with collaboration or lack of exposure/competitiveness)
- j. Can you identify some potential opportunities with developing the cluster brand?
 - i. *Has it led to internal opportunities within the cluster? (e.g. increased collaboration, uniting around brand)*
 - ii. *Has it led to external opportunities for the cluster? (e.g. export development, trade, competitiveness)*

If no, answer the following questions

- a. What are the key attributes of the cluster?
 - i. Do its members share common motivators, attributes, missions?
 - b. What assets in Greater Sudbury could influence this identity and brand?
 - b. Who should be involved in developing a cluster identity and brand?
 - c. What tools should be used to develop a cluster identity and brand?
 - d. Who should be involved in managing and marketing the identity and brand?
 - e. How should the identity and brand be marketed?
 - f. Who should the main target(s) be for the branding and marketing initiatives?
3. Is having a cluster identity and brand important for the mining innovation cluster? Why or why not? (e.g. internal importance, external importance)
4. Are there any challenges with marketing the mining innovation cluster? Why or why not? (prompt on whether negatives aspects of the mining sector (e.g. social, environmental concerns) impact cluster identity and branding, prompt for whether governance (e.g. who should manage the cluster identity and brand) challenges impact identity and branding)

Appendix B

Email Invitation to Participate

Subject Heading: Invitation to Participate in Mining Innovation/Cluster Branding Research

Dear _____,

My name is Matt Burdett and I am a graduate student in the School of Environment, Enterprise and Development at the University of Waterloo, supervised by Dr. Heather Hall. I am conducting interviews for my Master's thesis entitled *Cluster Branding and Consciousness in the Mining Innovation Sector in Greater Sudbury*. The purpose of this research is to explore the challenges and opportunities with creating a cluster identity and brand for the mining innovation cluster in Greater Sudbury, Ontario. Given your role as _____ with _____, I feel that you are well suited to provide insight into this topic and I would like to invite you to participate in this research.

If you decide to volunteer for this study, your participation will consist of an interview that is approximately 60 minutes, and will take place over the telephone or virtually using video software at a mutually agreeable time. During the interview you will be asked questions on the state of branding and marketing initiatives in the Greater Sudbury mining innovation cluster, the process involved in creating and implementing a cluster brand, and any challenges and/or opportunities with cluster branding. With your permission, I would like to audio-record the interview to ensure accurate transcription and analysis.

I would like to assure you that the study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Board. However, the final decision about participation is yours.

Please read the attached Information Letter for more details regarding what your participation will involve. If you would like to participate, or you require additional information to assist you in reaching a decision about participation, please do not hesitate to contact me.

Sincerely,

Matt Burdett

Appendix C

Information Letter

Research Study Title: Cluster Branding and Consciousness in the Mining Innovation Sector in Greater Sudbury

Student Investigator: Matt Burdett (School of Environment, Enterprise and Development, University of Waterloo)

Faculty Supervisor: Dr. Heather Hall (School of Environment, Enterprise and Development, University of Waterloo)

This letter is an invitation to consider participating in an interview for a study entitled “*Cluster Branding and Consciousness in the Mining Innovation Sector in Greater Sudbury*”. The purpose of this research is to explore the challenges and opportunities with creating a cluster identity and brand for the mining innovation cluster in Greater Sudbury, Ontario. I would like to provide you with more information about this research and what your involvement would entail if you decide to take part.

Research Study Information: Clusters have captured the attention of researchers and policy makers over the last several decades. From high tech clusters like Silicon Valley to the marine supercluster of Atlantic Canada, clusters have often been synonymous with regional economic development and innovation. However, there is little research on marketing clusters in Canada and even less literature on marketing clusters linked to natural resource industries, like mining. Given this gap, this research will explore the challenges and opportunities of cluster branding and marketing using a case study of the Greater Sudbury mining innovation cluster. More specifically, this research seeks to answer the following questions: (1) What are the benefits of having a cluster identity and brand? (2) What are the challenges associated with creating a cluster identity and brand? (3) Who should

manage and promote a cluster identity and brand? (4) What tools could be used to develop a cluster identity and brand?

Your Participation: To better understand the challenges and opportunities of cluster branding and consciousness in the mining innovation sector in Greater Sudbury, I am conducting interviews. Given your knowledge and experience with the mining sector, I feel that you are well suited to provide insight into this topic and I would like to invite you to participate in this study. If you decide to volunteer for this study, your participation will consist of an interview. This interview will take approximately 60 minutes to complete and will take place over the telephone or virtually using video software (e.g. Teams) at a mutually agreeable time. During the interview you will be asked questions on the state of branding and marketing initiatives in the Greater Sudbury mining innovation cluster, the processes involved in creating and implementing a cluster brand, and any challenges or and opportunities with cluster branding. With your permission, I would like to record the interview to ensure accurate transcription and analysis. Participation in this study is voluntary. You may decline to answer any of the interview questions if you so wish. Further, you may decide to withdraw from this study within one month of your interview without any negative consequences by advising the researcher.

Potential Benefits: The potential benefits by participating in this study include providing insights for local, regional, and provincial policymakers and members of the Greater Sudbury mining innovation cluster on branding initiatives and their potential opportunities. This research will also assist stakeholders in the mining innovation cluster by identifying possible ways to create a cluster consciousness which could promote innovation and economic development.

Potential Risks, Privacy and Confidentiality: Your name will not appear in any reports resulting from this study without your explicit permission. However, with your permission, anonymous quotations will be used which will identify a general category from the Triple Helix (e.g. Government Key Informant #1; Industry Key Informant #1; Academic Key Informant #1). There is a possibility that due to your particular role and the small number of organizations in the mining innovation cluster, that

an individual might be able to ascertain your identity. As a result, I cannot guarantee complete anonymity but there is minimal risk to participate in this study.

For interviews conducted via video software (e.g. Zoom), when information is transmitted over the internet privacy cannot be guaranteed. There is always a risk your responses may be intercepted by a third party (e.g., government agencies, hackers). University of Waterloo researchers will not collect or use internet protocol (IP) addresses or other information which could link your participation to your computer or electronic device without first informing you. You will have the option of using the video function during the interview. If you choose to turn your video on and you consent to recording the interview, the video file will be deleted after the interview is transcribed. Only the audio file will be retained and used for data in this research.

Your identity will be kept confidential. Data collected during this study will be retained for at least one year on a password protected personal computer.

The results of this research will be published in a master's level thesis and may be published in standard academic outlets such as journals, conference presentations, briefs and reports, and in community presentations and reports.

Ethical Approval: This study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Board (REB #43695). If you have questions for the Board contact the Office of Research Ethics.

Questions, comments, or concerns: For all other questions or if you would like additional information to assist you in reaching a decision about participation, please contact myself by email or my supervisor, Dr. Heather Hall.

I very much look forward to speaking with you and thank you in advance for your assistance in this research.