

**Framing Urban Resilience: A policy and media analysis of three Canadian
Cities**

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. I understand that my thesis may be made electronically available to the public.

ABSTRACT

Urban Resilience, generally understood as the capability to withstand, prepare, and recover from shocks and stresses (100RC, n.d.-b), has risen in popularity as a means of dealing with change and uncertainty in cities. Indeed, a US-based Philanthropic organization, the Rockefeller Foundation, ran a program called 100 Resilient Cities from 2013 - 2019, spending an estimated 167 million USD on this global endeavour. Four cities in Canada participated in the program: Toronto, Vancouver, Montreal and Calgary.

Yet, despite the rising popularity of the concept, urban resilience remains difficult to define, implement, and monitor, with multiple definitions and interpretations in the academic literature. Moreover, despite its recent rise in popularity in planning practice, few studies explore how urban resilience is framed by cities and citizens. Understanding how resilience is understood 'on-the-ground' is critical, as more and more cities integrate this contested concept into planning practice.

This thesis is an empirical exploration of how resilience is framed in three Canadian cities: Toronto, Vancouver, and Calgary. Given that all three cities participated in the Rockefeller Foundation's 100RC program, I hypothesize that they would frame resilience in much the same way. Using content analysis, I examined City Council minutes (n= 135) and national and local newspaper articles (n= 484) in three cities from 2013-2018. I compare resilience narratives across cities, as well as assesses the congruence between local government and media with respect to how they frame resilience.

My findings show varied framings of urban resilience across the three cities. My findings also reveal a lack of congruence between local government and media. Further, the study validates the claims by some academic scholars that resilience works as a "boundary object" (Brand & Jax, 2007;

Star & Griesemer, 1989), but I argue that for appropriate planning and policy within cities, resilience needs to be more descriptive in terms of who/what is at risk.

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

Cities lead social and economic development across the globe with more than 80% contribution to the gross world product (GWP) (UN DESA, 2019). They harness resources to create wealth, build infrastructure, generate employment for over 50% of the world's population. At the same time, they are also anticipated to accommodate about 66% of the global population by 2050 (UN DESA, 2019). To accommodate the accelerated rate of urbanization along with a strive to compete among national and global economies, cities are constantly evolving in the form of ecological and environmental changes, political structure, spatial and demographic changes, or socio-economic change. These changes may impact the functioning and structure of cities and can lead to susceptibilities like social inequality, environmental degradation, natural and man-made disasters, and food securities (Cohen, 2006; Satterthwaite, 2013; World Economic Forum, 2016). To overcome these challenges, many paradigms like Garden Cities (Howard, 1902), Eco-Cities (Register, 1987), Sustainable Development (Brundtland Commission, 1987), and Smart Cities (Shetty, 1997) have evolved (Jong et al., 2015). Urban resilience is one of the latest paradigms in the urban planning lexicon (Davoudi et al., 2012).

Resilience, in its general sense, means the capability to withstand, prepare and recover from shocks and stresses (100RC, n.d.-b; Archer & Dodman, 2015). The concept originated in 1970 in field of ecology (Holling, 1973) and spread across range of disciplines including engineering (e.g. Holling, 1996; Hollnagel et al., 2006; Hosseini et al., 2016), psychology (e.g. Bonanno, 2004; Masten, 2001) , economics (e.g. Martin, 2012; Rose & Liao, 2005), disaster management (e.g. Cutter et al., 2008; Klein et al., 2003; Pelling, 2003), socio-ecological systems (Adger, 2000; Folke, 2006; Gunderson, 2000; Walker et al., 2004), and urban studies (Davoudi et al., 2012; Leichenko, 2011; Sharifi &

Yamagata, 2018). All these domains contributed to the multiple definitions and varying interpretations of resilience. Meerow et al. (2016) found 25 different definitions of resilience and identified six conceptual tensions in these definitions. Therefore, the term is contested in nature.

In the urban context, the term gained momentum during the 1990s and was first discussed in association with climate change at the 2002 World Summit on Sustainable Development in Johannesburg (Lu & Stead, 2013). The integration of resilience and urban planning also came in response to the threats faced by cities due to social and institutional changes under neoliberalism (Eraydin & Taşan-Kok, 2013; Lu & Stead, 2013). Due to various international initiatives like the formalisation of ‘Cities and Subnational Dialogue’ at the UNFCCC COP 19 in Warsaw (2013), the signing of a Global ‘Compact of Mayors’ associated with the UN Secretary General’s Climate Summit in 2014 (Archer & Dodman, 2015) and the UNISDR campaign ‘Making Cities Resilient: My city is getting ready!’ (2010), which intends to “support sustainable urban development by promoting resilience activities and increasing local level understanding of disaster risk” (UNISDR, 2017), resilience became an important concept in urban policy (Evans 2011; Davoudi et al. 2012).

After the World Summit on Sustainable Development with the SDG (Sustainable Development Goal) 11 also known as ‘Urban SDG’ which calls the nation to build ‘inclusive, safe, resilient and sustainable’ cities (UN, 2015), the concept of resilience expanded to incorporate other social, political, cultural and economic shocks and stresses (Borie et al., 2019). In 2013, the Rockefeller Foundation also initiated “100 Resilient Cities” program¹. It earmarked 167 million USD in 2013 to “help cities around the world build resilience to the economic, social, and physical challenges that are gradually becoming part of the 21st century”(100RC, n.d.-b).

¹ In July 2019, The Rockefeller Foundation concluded its 6-year long 100RC program. However, the foundation announced an \$8 million commitment to continue to support the work of Chief Resilience Officers and member cities of 100RC Network (Berkowitz, 2019).

With millions of dollars being invested in research and capacity building to support the resilience building of urban local bodies and civil societies around the world, it is critical to have more ‘on-the-ground’ evidence to understand the relevance of urban resilience in practice. Till now, there is a substantial amount of academic literature on the concept (e.g. Béné et al., 2018; Brand & Jax, 2007; Harris et al., 2017; MacKinnon & Derickson, 2013; Meerow & Newell, 2016; Meerow et al., 2016; Moser et al., 2019; Reid & Botterill, 2013; Vale, 2014) but empirical evidence of how resilience is framed in practice is still limited (e.g. Aldunce, Bórquez, et al., 2016; Borie et al., 2019; Lu & Stead, 2013; Oulahen et al., 2019; Torres & Alsharif, 2017). Also, there are no studies that focus on the framing of urban resilience in the public domain i.e. through mass media.

Realising this potential gap, this thesis intends to explore and compare how resilience is framed in three Canadian cities: Toronto, Vancouver, and Calgary. As these three cities are part of the 100RC network and are integrating resilience concept into their planning practice, this thesis is timely and relevant.

1.2 RESEARCH QUESTIONS AND OBJECTIVES

The objective of this study is to map the different narratives of resilience by local government and popular news media in three cities in Canada: Toronto, Vancouver, and Calgary. These three cities are part of the “100 Resilient Cities” (100RC) program launched by the Rockefeller Foundation in 2013 and they are the largest English-speaking cities of Canada. These cities have a similar population trend but are diverse in terms of the economic base, climate, natural hazards, spatial characteristics, and resilience challenges. By examining these three cities, this thesis intends to investigate the correlation between urban resilience in theory and practice.

The Specific research questions for this study are:

- How is resilience interpreted within and across Canadian cities, specifically: Toronto, Vancouver, and Calgary?
- To what extent are cities' resilience efforts are infiltrated in the public domain? Or, conversely, how are media's interpretations of resilience incorporated in the City resilience strategies?
- To what degree does resilience in practice correlate with our understanding of resilience from academic literature?

To answer these research questions, I undertook content analysis of City Council meeting minutes and newspaper articles from 2013-2018.

1.3 THESIS STRUCTURE

This thesis is organized into seven chapters. The first chapter introduced the research context and purpose of the study. The second chapter discusses the relevant literature on resilience including its origin, and lineages across different disciplines. The third chapter outlines the method used in this study. Chapters four and five present the results of the content analysis of City Council meeting minutes and newspaper articles. Chapter six discusses the results to answer the research questions. Finally, the seventh chapter concludes the study with future directions and recommendations.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

To proceed with the practical understanding, it is first important to explore the literature on resilience. In the following section, I explore the concept of resilience, its origin and lineages across different disciplines; its interpretations by different scholars; and, its relevance in the urban context.

2.2 DEFINING RESILIENCE

Resilience is a derivative of the Latin term “resilire”, which signifies the ability to ‘bounce back’ and recoil (Hosseini et al., 2016). It is typically employed as a metaphor to indicate systems’ resistance towards a stressor to retain its original state (Welsh, 2014). Juan-García et al. (2017) defines stressor as a system pressure induced either by natural or anthropogenic cause and is synonymous with terms such as hazard, risk and disruption used in resilience literature. Resilience is often used in the context of risks to denote stability through strength and flexibility despite adversity (Bruneau et al., 2003).

The term has its origins in the field of material science and psychology (Béné et al., 2018; Davoudi et al., 2012; Sharifi & Yamagata, 2018); however, it became more prominent in field of ecology in 1970s (Holling, 1973). Physical scientists first used it to describe the property of a spring and resistance of materials against external pressure (Davoudi et al., 2012). It was formally defined in physics as “the capacity of a material to absorb energy when it is deformed elastically and then, upon unloading to have its energy recovered”(Béné et al., 2018, p. 118). In psychology, resilience originated in the context of stressful circumstances and their negative impact on vulnerable individuals and groups such as children, and thus it was described as the capacity to cope with

adverse life events and circumstances (Luthar et al., 2000). The term therefore entails both the ability to adjust to “normal” or anticipated levels of stress and to adapt to sudden shocks and extraordinary demands (Bruneau et al., 2003). Over the past four decades, resilience has evolved in diverse fields with discrete definitions relevant to distinct problems and backgrounds (Martin-Breen & Anderies, 2012). Increasingly one finds it in various disciplines of sociology, hazard and disaster studies, economics, business administrations, political science, and urban planning.

2.2.1 INTERPRETATION ACROSS DISCIPLINES

Holling's research (1973) in ecology has been one of the most influential works in developing resilience as a concept. He used ‘resilience’ to describe the performance of ecological systems that were subjected to external disruptions and abrupt changes, and defined it as “measure of the persistence of systems and their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables”(Holling, 1973, p. 14). In ecology, resilience is described as a system’s competency to absorb disruption and reorganize into a fully functioning system. Two decades later, Holling differentiated between two primary ideas – engineering and ecological resilience by proposing the notion of multiple stability domains (Folke, 2006; Holling, 1996). Furthermore, these two conventional outlooks of resilience illustrate the difference between persistence and efficiency; change and constancy; and predictability and unpredictability (Gunderson, 2000).

In engineering terms, resilience is associated with a system’s potential to maintain a steady state or equilibrium following disruptions (Holling, 1973, 1996). Engineering resilience is defined as a system's inherent capacity to adjust its operations according to unpredictable changes and disturbances (Hollnagel et al., 2006). This perspective implicitly positions the system in a global or single equilibrium condition. Equilibrium here refers to a state where a system will not change unless

subjected to a disturbance, also called a 'steady state'. According to Martin (2012), a system is presumed to be in an 'equilibrium state' prior to the disturbance or shock, which alters its path; however, the elasticity and self-correcting forces of the system eventually lead it back to its initial state. In this context, resilience is measured as the capacity to be moved off the path or endure displacement from a steady state, and the speed of return to the pre-shock configuration (Davoudi et al., 2012; Holling, 1996). A system resistant to deviation from the equilibrium state, or which returns to its pre-shock structure rapidly, is considered to be more 'resilient' towards the subjected shock than a system with a more pronounced displacement and slower return period (Barata-Salgueiro & Erkip, 2014; Holling, 1996; Martin, 2012). In other words, the faster the system 'rebounds' or the less it changes, the more resilient it is.

The dimension of resilience is applicable only in linear systems, or on non-linear systems in the vicinity of a steady state where a linear approximation is possible (Folke, 2006). Engineering resilience regards nature as a balanced system with emphasis on change resistance, status-quo preservation, and resource management for optimal functioning (Folke, 2006; Gunderson, 2000). Managing resilience in the engineering domain often requires enforcing static goals on dynamic structures to achieve social, financial and technical objectives, leading them to be "more spatially uniform, less functionally diverse, and more sensitive to disturbances that otherwise could have been absorbed" (Holling, 1996, p. 36). This form of resilience generally pays limited attention to the recurrence, extent of disruptions and the system's spatial distinction. Ultimately, engineering resilience focuses on productivity, consistency and predictability which are desirable attributes for a fail-safe design (Holling, 1996).

Contrary to engineering resilience, ecological resilience discounts the notion of a single and stable equilibrium state and acknowledges the dynamic nature of systems which can bounce back and forth between multiple equilibria to ensure functionality (Folke, 2006; Gunderson, 2000).

Gunderson states it as “the magnitude of disturbance that a system can absorb before its structure is redefined by changing the variables and processes that control behaviour” (2000, p. 426). Ecology considers that the system can face unpredictable changes and uncertainty, therefore, observes the system to be away from the equilibrium (stable state). It considers that disturbances can drive the system to another regime of behaviour, i.e., to another stability domain (Holling, 1996). In other words, a system maintains its integrity and functions during and after external stresses. When the stress becomes too high, the system reaches a tipping point and transforms into another state with new configuration. The resulting new state can be superior or inferior than the pre-shock state, thus representing higher and lower resilience respectively. Resilience, from an ecological viewpoint, is measured as the ‘buffer capacity’ or the “magnitude of the disturbance that can be absorbed before the system changes its structure” (Holling 1996, p.33) instead of just speed (Holling, 1973, 1996; Walker et al., 2004b) . Ecological resilience as opposed to engineering resilience is more responsive, flexible (Pickett et al., 2014), adaptable, and persistent (Adger, 2000). Overall, resilience in this field concentrates on unpredictability, persistence, and change which are the attributes of safe-fail design perspective (Holling, 1996).

The two streams of resilience discussed above are distinct in their approach, but both are grounded in equilibristic and closed systems theory. The equilibristic view of resilience has its roots in the Newtonian perspective of the globe, which considers systems as orderly single mechanical constructs whose behaviour can be anticipated and controlled. White & O’Hare, (2014) have highly criticized this approach and described it as “both simplistic and fatalistic —accepting the status quo, leaving unchallenged current norms of behaviour that drive risky behaviour, and privileging reactive responses to risk” (White & O’Hare, 2014a, p. 937). Scholars have thereby advocated the need to shift from the mechanistic model to a complex adaptive systems perspective (Krasny et al., 2010). Systems here are considered to be inherently complex, distinct, non-linear, unpredictable, and self-

organizing entities (Davoudi et al., 2012) rather than single and linear entity as portrayed in two discussed iterations of resilience. Complex systems theory is the epistemological basis for socio-ecological or evolutionary resilience (Davoudi et al., 2012; Folke, 2006; Wilkinson, 2012).

Socio-ecological resilience integrates social and ecological subsystems and considers that the functioning of a system depends on the interaction of subsystems, rather than the stability of individual components. It is defined as “the potential of a system to remain in a particular configuration and to maintain its feedbacks and functions and involves the ability of the system to reorganize following disturbance-driven change”(Walker et al., 2002, p. 6). Resilience from a social-ecological perspective, however, extends to include the concept that disturbance can create the opportunity for innovation and development. Folke (2006) describes resilience as “[being concerned with] how to persist through continuous development in the face of change and how to innovate and transform into new more desirable configurations” (p. 260). This perspective includes not only a system’s capacity to return to the pre-disturbance state (or multiple states), but also to advance the state through learning and adaptation (Folke, 2006; Klein et al., 2003) thus embracing the potential for renewal, reorganisation and development (Folke, 2006). Carpenter et al. (2001), summarises three properties of resilience: “(a) the amount of change the system can undergo and still remain within the same domain of attraction; (b) the degree to which the system is capable of self-organization; and (c) the degree to which the system can build the capacity to learn and adapt”(2001, p. 766).

This approach has been referred to ' evolutionary ' view of resilience (Davoudi et al., 2012), which involves constant adaptation rather than a bouncing back to equilibrium or normality. It is in fact the capability of complex socio-ecological systems to alter, adapt, and transform in response to risks (Carpenter, Westley, & Turner, 2005). This perspective of resilience suggests that, over time, the very nature of structures can alter without external disruptions. White and O’ Hare (2014a)

acknowledges this approach as a process which reflects upon considering behavioural and institutional changes to attain the optimum adaptive capacity, beyond recovery. Such a perspective counters the established norms and practices to strive for a new normalcy - which is dynamic and more prepared to both avoid and respond to shocks.

Table 2-1 Types of Resilience

	Engineering Resilience	Ecological Resilience	Socio-ecological Resilience
Property	System's potential to maintain steady state or equilibrium following disruptions	Dynamic nature of systems which can bounce forth between multiple equilibria to ensure functionality	Remain in a particular configuration and to maintain its feedbacks and functions and involves the ability of the system to reorganize following disturbance-driven change
Focus	Recovery and Resistance	Buffer capacity, robustness and persistence	Adaptive capacity, transformability, learning and innovation
Characterised by	Return time and efficiency	Ability to withstand shock and maintain function	Ability to reorganise, sustain and develop
State	Single Equilibrium	Multiple equilibria	Integrated system feedback
Systems theory	Equilibristic and closed systems theory	Equilibristic and closed systems theory	Complex systems theory
Post-shock state	Bounce-back	Bounce-forth	Transform
References	(e.g. Holling, 1996; Hollnagel et al., 2006; Hosseini et al., 2016)	(e.g. Holling, 1973)	(e.g. Adger, 2000; Folke, 2006; Gunderson, 2000; Walker et al., 2004)

Resilience within hazard and disaster management studies initially characterized resilience in its engineering sense, as the capacity to absorb and recover from the hazardous event(s)

(Timmerman 1981) through resistance, relief, and recovery approaches. This included measures for preparedness to limit hazard-related damage and loss; and strategies for post-disaster recovery to survive and reorganize with minimum impact and damage. Cutter et al. (2008) asserts that in this domain, instead of adaptive capacity, mitigation is a key construct i.e. actions are taken to reduce or avoid risk or damage. This approach bifurcated the implications of disasters on human systems; therefore, definitions evolved to incorporate social parameters, which addressed resilience as an “intrinsic capacity of a system, community or society predisposed to a shock or stress to adapt and survive by changing its non-essential attributes and rebuilding itself” (Manyena, 2006, p. 446). This definition acknowledged the significance of self-organizing, changing social structure, and responding to a catastrophe through demonstration of adaptive capacity.

Evolutionary/transformational approach in disaster studies view resilience as a degree to which people and societies face disruptive events through anticipation, adaptation, and improvisation capacity; and the ability to innovate or to capitalize on the new opportunities (Paton & Johnston, 2006). The refinement of the definition within disaster studies highlights the usage of the concept both as an outcome and as a process. For instance, when described as the capacity to bounce back or deal with a hazardous case, resilience is regarded as an outcome integrated within vulnerability (Manyena, 2006). Resilience related to the process is more defined in terms of continuous learning and assuming responsibility for better decision making to enhance the ability to manage risks. In disaster risk management, resilience is emphasized as a process with a considerable role of human beings.

Resilience in economics is perceived as the “inherent ability and adaptive response that enables firms and regions to avoid maximum potential losses” (Rose & Liao, 2005, p. 76). It emphasizes on optimal resource allocation, services, and supply chain functioning, and is usually accounted in the form of employment generated or gross domestic product (GDP) (Rose &

Krausmann, 2013). Rose (2007) draws attention to two different outlooks of economic resilience: static and dynamic. The static perspective of economic resilience is defined by an organization's capacity to maintain functionality, like production or manufacturing, regardless of serious shocks. It advocates for the diligent use of remaining resources during the recovery period at any given point of time. However, the dynamic perspective of economic resilience refers to the speed at which a system achieves a desired state after a shock. This pertains to the efficient utilisation of resources over time for repair and reconstruction. Martin (2012) argues for the evolutionary perspective, presenting economic resilience as "the capacity to reconfigure, that is adapt, its structure (firms, industries, technologies, institutions) so as to maintain an acceptable growth path in output, employment and wealth over time" (p. 10).

Another commonly discussed aspect of resilience is its role in promoting sustained responses through organizational structures, to support continuity in response to volatile and uncertain business environment or unforeseen events. Like other disciplines, organizational resilience initially was also related to the ability to withstand and recover from stresses or shocks; traumatic incidents that could have an internal or external impact on an organisation or system. Abesamis et al. (2006) defined institutional and organizational resilience as "formal and informal rules or regulations that are in force to secure the right of resource exclusion and extraction". Contemporary literatures on organizational resilience perceive it as a strategic initiative by businesses to increase competitiveness (Sheffi & Rice Jr., 2005) through anticipatory response and adaptation to industry-changing innovation (Annarelli & Nonino, 2016). Lampel and colleagues (2014) point out that structural flexibility of organisation and accumulation of slack resources by organisations are positive attributes of resilience. Moreover, the locus of decision making has important implication. The more decision-making authority is decentralised downward and outward, the more the organisation tends to be resilient. Smith (2009) comprehends four principles of

institutional resilience: capacity building, self-reliance, accountability and empowerment. Patterson et al. (2007), suggested that collaborative cross-checking could improve organizational resilience. It is an enhanced strategy for resilience building in which at least two organizations or individuals with distinct viewpoints explore the each other's actions in order to assess accuracy and validity.

To this end, resilience is a complex multi-interpretable concept with contested definitions and interpretations. These definitions vary not only across different disciplines, but also within disciplines. However, despite its contested nature, it is now being widely incorporated in the urban context. The following section explores more on the relevance of the concept in urban studies.

2.3 URBAN RESILIENCE

Urban resilience is generally understood as the ability of city or urban systems to tolerate a wide array of shocks and stresses (Leichenko, 2011). Resilience, in urban literature, has been prominently deployed in the context of disaster risk reduction through an equilibristic view, where it was often associated to a system and its ability of absorbing damage and recovering to a pre-disaster state. Furthermore, Zaidi & Pelling (2015), debate that disaster management in urban areas combine the conceptual, quantitative and strategic approaches to perpetuate a resilience vision that depends on accountability for maintenance of 'normalcy' and post-disaster recovery. Inheritance of this equilibristic approach has been challenged by many scholars (e.g. Davoudi et al., 2012; White & O'Hare, 2014b) as it overlooks the continuous institutional and behavioural alterations that occurs in urban systems under which equilibrium is unattainable. In addition, this approach does not challenge the behaviour of system that drives the risk, upholds the status quo and focuses on reactive response to risk (White & O'Hare, 2014a). In this regard, many scholars argue that socio-ecological resilience theory (also termed as evolutionary resilience) is appropriate while incorporating the concept in an urban context (Davoudi et al., 2012; Wilkinson, 2012).

Like ecological systems, urban systems are dependent on the interaction of different subsystems at multiple spatial and temporal scale (Sharifi & Yamagata, 2018). Any change in functioning of one subsystem can impact the function of other thus urban systems are non-linear in nature. In this sense, socio-ecological thinking in urban resilience moves beyond the sectoral thinking and acknowledges the synergy between natural science and social science (Frank et al., 2017). The socio-ecological perspective of resilience is perceived as process dominated, where a city's adaptive capacity can be enhanced by emphasizing institutional or behavioural change in addition to recovery. Such an approach challenges the current regime to aspire for a new normalcy - one better equipped to prevent shocks or respond to them. Resilience of cities thus depends on the ability of cities to simultaneously maintain anthropogenic functions and the ecosystem (Alberti et al., 2003).

The Resilience Alliance (2007) expands the concept where urban resilience is not just the ability to adjust during uncertainties but also the ability to capitalize on the positive opportunities through these changes. Similarly, '100 Resilient Cities' program by The Rockefeller Foundation defines urban resilience as "the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience"(100RC, n.d.-b).

The academic literature on urban resilience has been productive in providing substantial variation in interpretations and usage of the concept. In a review of urban resilience literature by Meerow and colleagues (2016), 25 different definitions of resilience in the urban context were identified with varying scope and complexity. The authors noted six conceptual tension among these definitions: non-equilibrium vs. equilibrium resilience; negative (or neutral) vs. positive perspectives of resilience; mechanism of change in systems (i.e., transformative, transitional or persistent); general adaptability vs. adaptation; timescale of action; and definition and characterisation of

'urban'. These variations in the conceptual understanding of the term makes it challenging to empirically test or apply the theory. To address these conceptual tensions, they constructed a distinct definition where urban resilience is described as the "ability of an urban system and all its constituent socio-ecological and socio-technical networks across temporal and spatial scales to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change, and to quickly transform systems that limit current or future adaptive capacity" (2016, p. 39)

Their definition incorporates a few important features. First, it emphasizes a non-equilibristic perception which acknowledges transformation - "safe-to-fail", but not "fail-safe". Second, it captures the importance of the temporal dimension. It emphasizes a "systems approach", drawing attention to the complex interrelationships that happen in cities. The authors understand cities as complex adaptive systems, comprised of four components: governance networks, metabolic or resource flows, the built environment and social dynamics. And, lastly, the definition allows for flexibility, which the authors posit is an important feature of resilience as a concept because it allows it to operate as a "boundary object" (Brand & Jax, 2007; Star & Griesemer, 1989).

Similarly, Béné et al. (2018) highlight that definitions of resilience also vary in terms of precision. Different interpretations of resilience vary from very specifically defined, to the generally defined, to the cases where it is not defined at all and have an indefinite meaning. The authors argue that the resilience concept is indeed dynamic and malleable as the description is largely context dependant. The authors also highlight that resilience scholars use the term "resilience" as a goal, an analytical framework, a metaphor, or as an indicator of sustainability. As a goal, resilience is viewed as a positive attribute that cities or other systems aim to achieve through different courses of actions. As an analytical tool, the resilience concept is used to understand the issue and subsequently find a suitable solution. Whereas, as a metaphor, it helps to break the silo and foster integrated approach to planning. Resilience has also been used to support a diversity of approaches

and methods that share little in common, leading the authors to conclude that the term could be applied as a new buzzword to support the status quo. With multiple definitions and usage, the concept of resilience becomes ambiguous in nature.

In contrast, according to Brand and Jax (2007), multiple usage and interpretation of the term resilience implies its function as a “boundary object”(Star & Griesemer, 1989) which enables stakeholders and disciplines to adopt it as per their necessity. Boundary objects refers to objects that can reconcile the needs of divergent actors but maintain a shared identity. They, in turn facilitate collaboration and knowledge transfer. This is particularly relevant to work in urban areas, which are inherently complex and therefore need the involvement of multiple stakeholders and sectors. Many scholars (e.g. Baggio et al., 2015; Gillard, 2016; Meerow & Newell, 2016) have validated the significance of urban resilience as a “boundary object” in the literature.

As a boundary object, there can be a comprehension and communication across sectors, stakeholders, and actors to develop consensus around resilience building (Baggio et al., 2015). However, the ambiguity of the term can dilute the overall objective and can reinforce uneven power relationships. Therefore, some scholars argue for resilience to be more descriptive in terms of ‘resilience of what to what’ (Brand & Jax, 2007; S. Carpenter et al., 2001; Gillard, 2016). Meerow & Newell, (2016), argue for us to critically consider the "five W's" of urban resilience: who, what, when, where, and why.

The literature on urban resilience is also divided on basis of different pathways to build resilience. According to (Chelleri et al., 2015), recovery (continued supply of services and critical infrastructure for recovery from a disaster), adaptation (incremental innovation to accommodate stress the while maintaining the functional integrity) and transformation (disruptive innovations resulting in fundamental structural change) are three main pathways for operationalising resilience.

Selection of appropriate action(s) for each component of an urban ecosystem is context dependant but is also subjective to responses from policy makers. For instance, Vale (2014) points that returning to a pre perturbation state as a goal of “recovery” is generally idealized and with the efforts to direct recovery, an unexamined self-interest is presented. Policy arenas associated with resilience building intensely focus on the engineering perspectives and thus fails to acknowledge the broader interactions between the social ecology of the area. Redman (2014) points out that adaptation is favoured by politicians as it maintains the conventional order to address short-term concerns. It is critiqued that practices around a ‘business-as-usual approach’ is followed and labelled as resilience building. Current crises are often complex, and to confront those through a transformational approach rather than mere recovery is required. However, the transformational approach is avoided as it involves taking substantial risks, seen as expensive, and outcomes are uncertain.

To this end, academic literature has reflected on the contested nature of urban resilience with the multiple definitions, interpretations, usages and different pathways to attain resilience. Yet despite the ambiguity of concept, millions of dollars are being invested in the resilience building programs. More empirical evidence is, therefore, critical to understand the relevance of urban resilience in practice. From this thesis, I want to know how practitioners and media frame resilience? How resilience in practice corresponds to academic literature? Does resilience functions as a boundary object as literature suggests? In the following chapter, I detail out specific research questions and methods used in this thesis.

CHAPTER 3: METHODS

3.1 INTRODUCTION

My thesis adopts content analysis to address the following research questions:

- How is resilience interpreted within and across Canadian cities, specifically: Toronto, Vancouver and Calgary?
- To what extent are cities' resilience efforts are infiltrated in the public domain? Or, conversely, how are media's interpretations of resilience incorporated in the City resilience strategies?
- To what degree does resilience in practice correlate with our understanding of resilience from academic literature?

Content analysis is a research method that systematically reviews or evaluates text, visual or verbal data (Bengtsson, 2016). It is a methodical process to review or evaluate documents which can be both printed and electronic material. This method examines and interprets data to elicit meaning, helping researchers' gain a better understanding of the subject and develop empirical knowledge. The method involves search, selection, assessment, and amalgamation of data contained in documents; resulting in translation of data into new forms such as excerpts, quotations, or entire passages. For content analysis, researchers are required to investigate multiple sources of evidence to seek convergence and validation of data ((Bowen, 2009; Creswell, 2014). The data synthesized are further coded and organized into themes or categories. This method can be both quantitative (manifest analysis) and qualitative (latent analysis). Manifest analysis refers to the count of visible and tangible components whereas latent content analysis refers to the

interpretation of underlying meaning of the content (Bengtsson, 2016; Erlingsson & Brysiewicz, 2017). I employed both manifest and latent content analysis in this thesis.

To examine the interpretation of urban resilience within, and across, three cities in Canada, this study first undertook a content analysis of Council minutes in each of the three cities. The analysis of Council minutes provided the insights of the actions, policies, strategies, projects and, priorities that are being undertaken by each city in their resilience planning process. Further, to examine the infiltration of urban resilience into the public domain (and vice versa), this study undertook a content analysis of news media. Media content analysis is a subset of content analysis, and was introduced as a systematic method to study mass media, initially to study propaganda (Macnamara, 2005). Media has a decisive role in (risk) governance, policy-making, and communication and is an important source for disseminating information (Jönsson, 2011). Media is the link between people and government, providing information on the political process and other issues. Through an analysis of the content of news media, I explored how resilience is framed and communicated in the public domain. It also helped to identify (dis)connects between media and city councils' narratives of resilience. The comparison of media and government narratives is essential for city authorities to identify risks that are currently overlooked in resilience strategy, and for media and public to understand the government initiatives and programs. The methods for data collection and analysis have been detailed in the subsequent sections.

3.2 STUDY AREA

This study used a multisite case study approach for an in-depth understanding of resilience narratives in different cities across Canada. In 2013, The Rockefeller Foundation launched the “100 Resilient Cities” (100RC) program to help cities prepare for and thrive amidst physical, social and economic challenges. The integration of resilience thinking into planning processes by this program

was not limited to acute shocks (like earthquakes, floods and fires), but also included stresses (like aging infrastructure, unemployment, poverty and inequality) that reduce the strength of the cities over time. The 100RC program provided financial assistance to cities so they could hire a Chief Resilience Officer; provided access to tools and resources; and provided membership to the 100RC network (100RC, n.d.-b). The objective of this network was to facilitate the global practice of resilience building through best practices and knowledge sharing. Canada’s four largest cities: Toronto, Vancouver, Montreal and Calgary - were part of The Rockefeller Foundation’s 100 Resilient Cities network and initiated the resilience strategy planning and implementation process.

Taking advantage of this opportunity, I conducted this study using Council minutes and media articles in the three English language Canadian cities participating in the program (Toronto, Calgary, and Vancouver). These three cities have similar population trends (Statistics Canada, 2017); however, they reflect diversity in terms of economic base (Clinkard, 2003, 2004; Kirbyson, 2015), climate, natural hazards, geographical constraints, spatial characteristics (Taylor & Burchfield, 2010) and resilience challenges (100RC, n.d.-c, n.d.-d, n.d.-a). Key statistics of the three selected cities are compiled in Table 3-1 the below:

Table 3-1 Key Statistics of Case study Areas

	Vancouver	Toronto	Calgary
Population, (2016 Census)	631,486	2,731,571	1,239,220
Population density per square kilometre	5,492.60	4,334.40	1,501.10
Land area in square kilometres	114.97	630.2	825.56

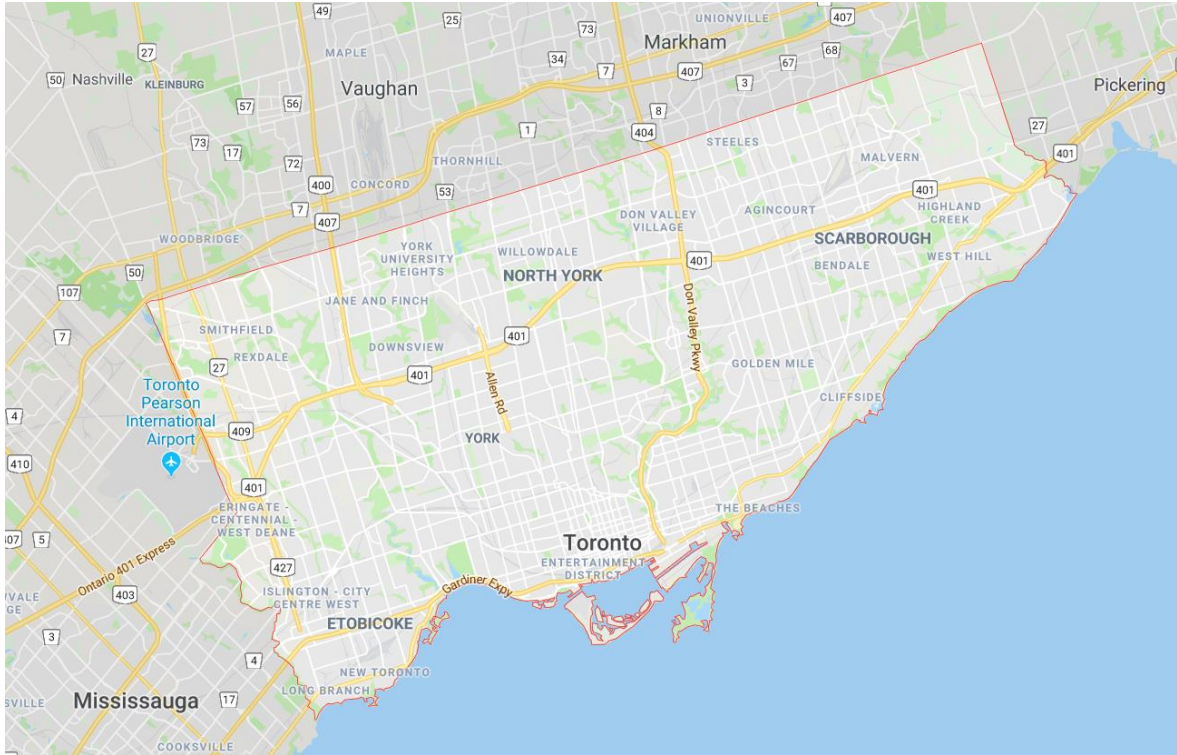
Source: Statistics Canada, 2016 Census of Population

Toronto, situated on the northwest shore of Lake Ontario (

Figure 3-1), is Canada's business and financial capital, a growing financial hub in North America, and a global financial centre (City of Toronto, n.d.; GFCI 25, 2019). Over the years, the City had transitioned from trade to services, and expanded its national and cross-border roles. It is a major corporate headquarters location, a centre for institutional decision-making, and a main destination for foreign investment and joint ventures. Being the economic nerve of Canada, its role is critical for both provincial and national economies (City of Toronto, n.d.) .

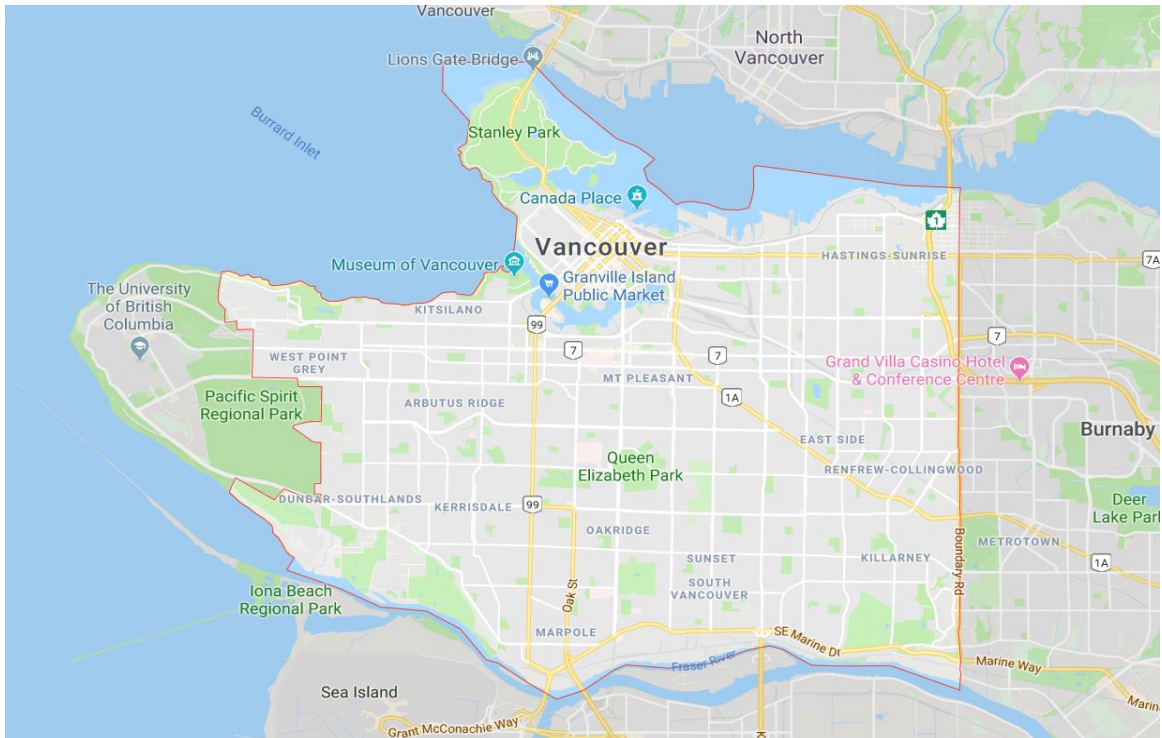
However, its dynamic economy and capacity for job creation co-exists with a social profile of inequality and disparity (Alan Walks et al., 2016). The City is also vulnerable to a number of climate related shocks including rainfall flooding, blizzards, and heat waves (Cheng et al., 2012; Environment and Climate Change Canada, 2017). In recent years, Toronto has faced extreme weather events like ice storm and severe flooding (2013) impacting the social, economic and physical fabric of the city. In response to these catastrophes, with the support of 100RC, the City of Toronto institutionalized resilience planning through ResilientTO in 2016 (100RC, n.d.-c) .

Figure 3-1 Map of City of Toronto



Located on the western coast of Canada (Figure 3-2), Vancouver is the most densely populated city in Canada (Statistics Canada, 2017). The city is geographically constrained by coast mountain range and Pacific Ocean ensuring the upward, rather than outward, growth of the city. The majority of growth in the city has been directed to already-urbanized areas accounting for the high rate of intensification (Taylor & Burchfield, 2010). Rapid urbanisation, coupled with the City's physical growth constraints, has put pressure on Vancouver's housing market (McArthur, 2018). Apart from the lack of affordable housing, the City is also identified as vulnerable to climate change impacts including increased precipitation, sea level rise, flooding, extreme heat, and coastal storms (Environment and Climate Change Canada, 2017). To maintain the high quality of life in the face of rising housing prices and environmental uncertainty it is imperative to have a holistic approach to build citywide resilience for everyone. With support from 100RC, the City of Vancouver started developing a Resilient Vancouver Strategy in 2016 along with other city initiatives (100RC, n.d.-d).

Figure 3-2 Map of City of Vancouver



Calgary, situated in foothills in the Rocky Mountains of Alberta, is the centre of Canada's oil and gas industry. It is a land locked city (Figure 3-3) and with limited physical barriers, growth of the city has largely been through outward expansion and greenfield development (Taylor & Burchfield, 2010). Unlike Toronto and Vancouver, Calgary had a low intensification rate and thus a high degree of consistency in planning. Calgary is vulnerable to economic stresses and uncertainty due to fluctuating oil prices. Increased rates of unemployment, lack of affordable housing, vacancy rates in commercial real estate, and other consequences are closely connected with Calgary's economic vulnerability(100RC, n.d.-a). Calgary's geographic location at the confluence of two glacial fed rivers and near the mountains creates a greater vulnerability to extreme weather events like flooding, intense snowstorms, and drought (Environment and Climate Change Canada, 2017; The City of Calgary, n.d.). In 2013, the City faced the most destructive and costliest floods in Canadian history along the Bow and Elbow river, which resulted in billions of financial losses through infrastructure and property damage and business disruptions. The intended outcome of Calgary's resilience

strategy is to insulate their economy from shocks caused by fluctuating oil prices and develop more robust responses to natural disasters (100RC, n.d.-a).

Figure 3-3 Map of City of Calgary



The goal of assessing three cities was to explore the differences in patterns of the resilience narrative and its coverage, and to have a broader generalization of the concept. I theorized that first, the interpretation of resilience as a concept varies from city to city, based on their challenges and development objectives. Second, I theorized that the framing of resilience in practice differs from academic definitions. It is expected that the review of city council minutes and news media will generate varied of narratives of resilience. It will also elucidate how the discourse around resilience has changed over time (2003 to 2018) in terms of the frequency of usage and meaning of concept.

3.3 DATA COLLECTION

To understand the interpretation of resilience within, and across, these three cities in Canada, I reviewed publicly available city council minutes. City council minutes are the official written or recorded documentation of a meeting of a city council and its committees. They form the legal record of council actions, and provide authorization to implement decisions. As part of the public record, they also provide an open and transparent disclosure of council actions to the municipal residents and stakeholders (Alberta Municipal Affairs, 2017).

Council minutes for the City of Toronto were accessed from www.toronto.ca under the “City Government” section. I started with city council minutes from 31st December, 2018 and worked backwards until I could no longer find any mention of the word “resilien” in any city council minutes. Each City Council minute was scanned using the search term - “resilien*”. The asterisk worked as a truncation device to capture the various forms of the word resilience like resilient and resiliency. There was no occurrence of word “resilien*” in the Council minutes before the year 2013. Year 2013 was also important as the Rockefeller Foundation initiated the 100 Resilient Cities program in the same year. Therefore, all the further screening was done from the year 2013 to 2018 in Toronto, as well as Vancouver and Calgary.

Apart from Toronto’s City Council, I also reviewed minutes of twelve Committees that reporting to City Council, including:

- Audit Committee;
- Board of Health;
- Civic Appointments Committee;
- Community Development and Recreation Committee;
- Economic Development Committee;
- Executive Committee;
- Government Management Committee;
- Licensing and Standards Committee;
- Parks and Environment Committee;

- Planning and Growth Management Committee;
- Public Works and Infrastructure Committee; and,
- Striking Committee.

I replicated this approach in the review of the minutes from the City of Vancouver and the City of Calgary. For the City of Vancouver, the minutes were retrieved from www.vancouver.ca under the “Your Government” section. Unlike the Toronto Meeting Minutes Information System (TMMIS), minutes for Vancouver were not segregated on the basis of meeting type and/or type of document; all meeting minutes and agendas of Council and different Committees are available in one location. Therefore, for systematic screening, the date of the meeting was sorted in a descending order, and similar search strategy was used in minutes until 1st January 2013.

City Council minutes for the City of Calgary were retrieved from www.calgary.ca. Council minutes for Calgary were organized under Council Meetings, Standing Policy Committee Meetings and other meetings. In Calgary, there are four Standing Policy Committee (SPC) that report to Council, namely:

- SPC on Community and Protective Services;
- SPC on Planning and Urban Development;
- SPC on Transportation and Transit; and,
- SPC on Utilities and Corporate Services.

Similar to Toronto and Vancouver, minutes of City Council and Committee meetings in Calgary were retrieved for the period of January 2013 to December 2018.

To understand the extent to, and ways in which, urban resilience is utilized in public discourse (here represented by the news media), I also completed manifest and latent content analysis of newspaper articles. I selected major outlets at both the national and local levels in each of the three cities: Toronto, Calgary and Vancouver. The selection of outlets was based on their influence/circulation (as determined by the Canadian Newspaper Association, <http://www.cna->

acj.ca) and differing political leaning. The political alignment of media was discovered through www.mediabiasfactcheck.com. The list of newspaper sources used for this study is tabulated in the Table 3-2 below.

Table 3-2 List of selected news paper

News Paper	Region	Media Bias
The Globe and Mail	National	Right - Centre Bias
National Post	National	Right - Centre Bias
Toronto Star	Toronto	Left-Centre Bias
The Toronto Sun	Toronto	Right - Centre Bias
The Province	Vancouver	Right - Centre Bias
The Vancouver Sun	Vancouver	Right - Centre Bias
Calgary Herald	Calgary	Left-Centre Bias
Calgary Sun	Calgary	Right - Centre Bias

Source - www.mediabiasfactcheck.com

I used Factiva, a global news database, to search for relevant articles within the eight news outlets listed in Table 3-2. I selected articles from 1st January 2013 to 31st December 2018. The time frame for the articles was kept in conformity with the time frame determined for my analysis of city council minutes. The search term “Resilien* and (City or Urban)” was used in the free text search field, with region filter specific to Toronto, Calgary and Vancouver. The search term used for the newspaper analysis is different from that used for scanning city council and committee minutes, as the essence of urban is already embedded in the city council minutes. Further the filter based on name of newspaper was applied.

Overall, the result yielded 587 articles in Toronto with 183 duplicates, leaving 404 articles to review. In Vancouver, there were 419 articles with 45 duplicates resulting in 374 net articles to review. While in Calgary, there were 412 articles with 21 duplicates resulting in 391 net articles to review. Total of 1,169 articles in Toronto, Vancouver and Calgary were itemized in Microsoft Excel

for further sorting and analysis. The results of the corresponding search for every newspaper is tabulated in Table 3-3 below.

Table 3-3 Search results of newspaper articles

Area	News Paper	Number of Articles	Duplicates	Net Articles
Toronto	The Globe and Mail	86	15	71
	National Post	21	3	18
	Toronto Star	415	165	250
	Toronto Sun	65	0	65
Vancouver	The Globe and Mail	126	27	99
	National Post	24	9	15
	The Province	82	4	78
	The Vancouver Sun	187	5	182
Calgary	The Globe and Mail	69	16	53
	National Post	10	4	6
	Calgary Herald	251	1	250
	Calgary Sun	82	0	82

3.4 DATA SORTING, CODING AND ANALYSIS

Search results of city council and committee minutes were itemized in Microsoft Excel and each result was assigned attributes such as meeting number, year and the context of discussion. Similarly, news articles were itemized in excel and attributes such as city, article title, newspaper outlet, author, year and political leaning were assigned. Excerpts from the extracted city council minutes were screened and excerpts where the term “resilience” did not provide any context, or it occurred in the title of agency or business unit, were excluded. Some council minutes had multiple (different) discussion of resilience. In that case, the meeting minute was counted multiple times. Similarly, for newspaper articles, articles on sport, entertainment, events, birth and death notices, personal stories, duplicates and opinion pieces were eliminated.

After sorting and organizing data, I initiated a hybrid approach to data coding (Bowen, 2009; Creswell, 2014; Williams, 2007). Deductive coding and inductive coding are the two main processes of data coding. Deductive coding starts with a specific set of themes and data is analyzed on the

predetermined structure, whereas inductive coding starts with detailed analysis of the sources and generate concepts and ideas as themes emerge. (Kaefer et al., 2015).

For multi-level analysis, a combination of both deductive and inductive coding, was applied. First, for the deductive coding I used five dimension of Urban Resilience: 1) Built Environment and Infrastructure; 2) Society and Well Being; 3) Governance and Institution; 4) Economy and; 5) Natural Environment (adopted from Sharifi & Yamagata, 2016).

The 'built environment and infrastructure' dimension refers to all human-made aspects of the surroundings. It includes buildings; managed landscapes such as parks; and, infrastructure that supports human activities, such as: utility networks, transport system, and telecommunication. Narratives under this dimension are concerned with the robustness, efficiency of buildings and infrastructure, and continuity of services during shocks or stresses. The 'natural environment' dimension deals with the vulnerability of ecological and biophysical systems. This dimension is mainly related to quality, availability and conservation of resources and natural ecosystems (Sharifi & Yamagata, 2016).

The economic dimension of urban resilience relates to the economic conditions of a city or community in terms of economic structure, the stability of livelihood, income and asset distribution within populations. The 'society and well-being' dimension relates to aspects that meet the functional needs of the community and improves the well-being of the community. This dimension includes intangible aspects such as: safety, equity, diversity, community bonds, and social support that influence the livelihoods and survival of communities. Last, the 'governance and institutions' dimension refers to the institutional mechanisms and decision-making processes that administer a city or community. This dimension is mainly related to the process of risk governance, and includes

narratives like: contingency planning, resource management, collaboration, research & development, and capacity building (Sharifi & Yamagata, 2016).

Each City Council minute reference and newspaper article was read and categorised into these five dimensions. Many newspaper articles were labelled under multiple dimensions on the first read through, but on the second read there were moved to one dominant dimension. Further, the inductive nodes (narratives) were assigned to each city council minute reference and newspaper article based on the prominent context. The inductive nodes were continuously refined throughout the coding process to form a coherent pattern. Inductive codes here represent the narratives of resilience. The narratives in this study are the attributes or actions that local government and media consider important to build resilience in the city.

Further, it was noted in literature that to operationalise resilience it is important to understand resilience in terms of “what to what” (Carpenter et al., 2001) i.e. what system is being considered against what kind of threat and stressors, and what is the approach towards building resilience. Therefore, each city council minute reference and newspaper article were analysed from the perspective of “resilience of what” and “resilience to what”.

After manually coding city council minutes and newspaper articles in a Microsoft Excel worksheet, each cell was reviewed using the ‘sort and filter’ tool to remove inadequacies in terms of spellings, duplicity, overlapping or missing categories for consistent analysis. All statistical analyses were conducted in Microsoft excel using pivot tables. These results are presented in the form of graphs and tables in the following chapters. However, to analyze and visualize “resilience of what” and “resilience to what”, I used the Sankey diagram, also known as Alluvial graph. These graphs were created on Rawgraphs (<https://app.rawgraphs.io/>), which is an open source data visualization

platform. The following two chapters present the results of the content analysis of City Council minutes and newspaper articles.

CHAPTER 4: RESULTS: COUNCIL MINUTES ANALYSIS

This chapter presents the findings of content analysis of city council meeting minutes for three cities in Canada: Toronto, Vancouver, and Calgary. Over the six-year period (2013-2018), references to resilience in all three cities have increased in policy discussions signifying the growing recognition of the concept. The content analysis of city council minutes resulted in diverse narratives around resilience in all three cities. In Toronto, resilience was associated with 17 different narratives. In the City of Vancouver, term resilience was associated with ten different narratives, while in the City of Calgary, there were only eight narratives. The narratives in each city are detailed out in subsequent sections.

4.1 CITY OF TORONTO

I reviewed the meeting minutes of the City Council of Toronto, and also of the 12 committees that report to the Council. From the year 2013 to 2018, there were 19 city council minutes and 53 committee minutes that discussed the agenda of resilience. Out of 12 committees that report to city council, only six committees: Board of Health, Community Development and Recreation Committee, Community Development and Recreation Committee, Parks and Environment Committee, Planning and Growth Management Committee and Public Works and Infrastructure Committee - had the penetration of word resilience in their meeting. In a total of 72 meeting minutes (minutes of both council and committees), there were a total of 83 references to resilience (11 meeting minutes had multiple references with different contexts). The temporal distribution of these references (Figure 4-1) indicates that overall there has been an increase in the number of discussions from 2013 to 2018, but the trend has not been consistent throughout. The maximum number of the references (28/83) were recorded in the year 2017, which coincides with the year when the City hired its Chief Resilience Officer (CRO) to develop their City Resilience

Strategy – ResilientTO, and the Council unanimously approved the Toronto’s climate action strategy, TransformTO, to reduce carbon emissions and transform to low-carbon Toronto by 2050. A series of actions followed in 2017 in connection with TransformTO and ResilientTO.

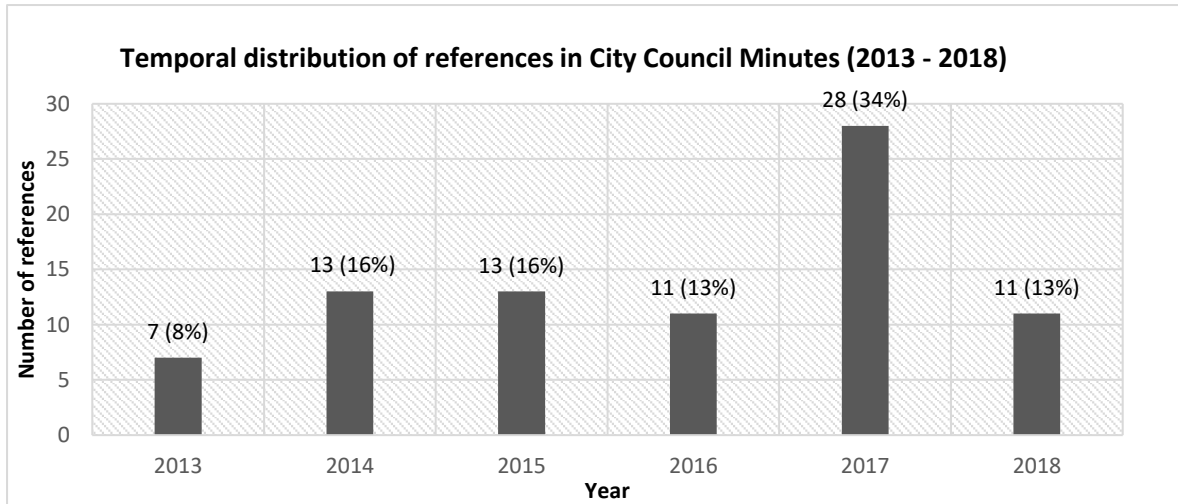


Figure 4-1 Temporal distribution of references in City of Toronto Council Minutes (2013 - 2018)

4.1.1 NARRATIVES OF RESILIENCE

Upon categorising 83 references under five selected dimensions, I found that discussion was majorly divided between three dimensions: “governance and institutions”, “built environment and infrastructure”, and “society and well-being” with 27, 25, and 25 number of references respectively. In contrast, the “natural environment” and “economy” were the least appeared dimensions with only fine and one references respectively. The temporal distribution of thematic dimensions (from 2013 to 2018) indicates that “society and well-being” has been the only dimension that appeared consistently throughout every year, whereas the economic dimension appeared only once in 2013. The number of references on the “governance and institutions” dimension was consistent from 2013 to 2016, followed by a sharp increase in 2017 and no appearance in 2018. “Built environment and

infrastructure” is the only dimension which has shown a consistent increase from no reference in 2013 to seven reference in 2018.

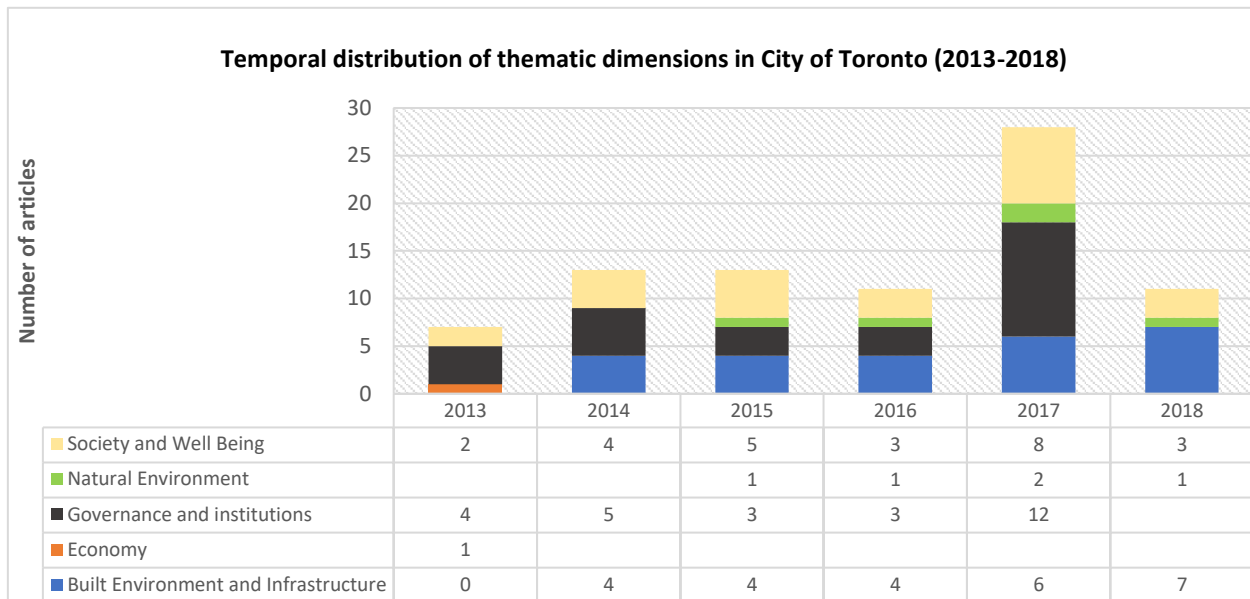


Figure 4-2 Temporal distribution of thematic dimensions in City of Toronto (2013-2018)

Further, the breakdown of these dimensions (tabulated in Table 4-1) reveals that the discussion around “governance and institutions” was dominated by “climate action”. Examples of “climate action” references included Toronto Public Health's (TPH) five-year (2015-2019) *Climate Change and Health Strategy* to assess and respond to the health and social impacts of climate change; *TransformTO: Climate Action for a Healthy, Equitable and Prosperous Toronto* and; Resilient City: Preparing for a Changing Climate to formulate policies that promote resilience and self-sufficiency to deal with changing weather patterns. The Council also acknowledged the need to explore partnership opportunities with the private sector and broader public sector, such as telecommunications, private utilities, healthcare units, and banking and insurance industries, in the implementation of collective action that increases Toronto’s resilience to a changing climate and extreme weather. A few excerpts in this context include:

*"City may pass by-laws respecting climate change mitigation and adaptation in order to more effectively enable actions, such as but not limited to, reducing greenhouse gases through increased waste diversion, improving energy efficiency and ensuring greater **resiliency** of infrastructure and buildings" (Toronto City Council, 2015)*

*"Toronto Public Health's (TPH) Climate Change and Health Strategy for Toronto identifies specific actions and sets out a direction to better understand and respond to the health effects of climate change. This five-year strategy (2015-2019) includes actions to support climate mitigation, adaptation and **resilience** activities at the City. The strategy recognizes that while the approach to addressing climate change health risks is broad, different assessment, analysis and engagement techniques need to be applied to specific health risks to address each one effectively." (Toronto Board of Health, 2016)*

*"Resilient City - Preparing for a Changing Climate [...] Toronto has and is forecast to experience altered patterns of extreme weather as a result of climate change. Enhancing the **resilience** of Toronto's infrastructure and services to these changing weather patterns to reduce the risk of damage and associated costs, injury and emergency situations is a priority of City Council." (Toronto Parks and Environment Committee, 2016)*

Out of 25 references under the "built environment and infrastructure" dimension, "green infrastructure and low impact development" was a main narrative with 13 references particularly focused on encouraging eco-roofs in the city to "help make Toronto more resilient and better adapted to climate change". The narrative "robustness of public infrastructure" was mainly focused on the resiliency of energy systems towards power outages and extreme weather events through measures like storm hardening, conversion of overhead lines to underground, and local energy conservation solutions. Finally, the third narrative: "transport infrastructure" reflected on the Congestion Management Plan (2016-2020) and Downtown Mobility Strategy. The objective of these was to ensure resilient infrastructure to accommodate increasing travel demand; to have continuous operation during the emergency events such as flooding and power outages; and, to promote safe, efficient, and sustainable travel to strengthen the city's economic competitiveness and environmental resiliency. A few excerpts in this context were:

"Downtown Energy Strategy (the Strategy) [...] to set out a series of actions that will achieve reductions in overall greenhouse gas (GHG) emissions, address

*constraints within the electricity distribution grid and enhance **resilience** to area-wide power outages." (Toronto Planning and Growth Management Committee, 2018b)*

*"Green roofs and cool roofs – known collectively as 'eco-roofs' – help make Toronto more **resilient** and better adapted to climate change. Eco-roofs reduce urban heat and its associated energy use." (Toronto Planning and Growth Management Committee, 2018a)*

*"[To add] 'green infrastructure and low impact development' to the strategies municipalities should be encouraged to develop to improve **resilience** to climate change" (Toronto Planning and Growth Management Committee, 2016)*

A closer look at the narratives under “society and well-being” reveals that out of 25 references on this dimension, 13 references were focused on a “robust healthcare system” to promote child and youth and Toronto seniors’ resiliency towards health risks. The second most prevalent narrative - “Social inclusion, rehabilitation and development” centred around the resiliency of community, child and youth, and tenant groups towards social injustice. Some examples of the “social inclusion, rehabilitation and development” narrative included outreach programs for tenant groups to develop internal capacity and improve resiliency; *Toronto For All - A Public Education Initiative to Support Civic Resiliency*; and, *The Toronto Youth Equity Strategy: Building Resilience and Supportive Systems* to promote inclusion and create support systems for youth with identity challenges. The coding result also suggests that the Toronto City Council acknowledged the need for “food security and accessibility” through community food resilience action plans for vulnerable neighbourhoods with critical food access issues.

The economic dimension had only one reference in six years, which was related to the stability of industries in times of recession. Whereas the “Natural environment” dimension with only five references focused on the resiliency of Toronto’s ravine system and associated ecosystem and biodiversity against urban and environmental threats through strategies like the Biodiversity

Strategy and Pollinator Protection Strategy. All the dimensions and narratives are tabulated in Table 4-1, below.

Table 4-1 Dimensions and narratives of Resilience in City of Toronto

Dimension and Narratives	Number of References	Percentage (%)
Built Environment and Infrastructure	25	30.1%
Green infrastructure and low impact development	13	52.0%
Robustness of public infrastructure	9	36.0%
Transport Infrastructure	3	12.0%
Economy	1	1.2%
Economic Stability and Growth	1	100.0%
Governance and institutions	27	32.5%
Budgeting and Financial Resource Allocation	1	3.7%
Capacity building	2	7.4%
Climate action	13	48.1%
Comprehensive city building	2	7.4%
Emergency preparedness	6	22.2%
Fostering partnership and collaboration	2	7.4%
Regulation and enforcement	1	3.7%
Natural Environment	5	6.0%
Conservation of Natural Ecosystems and Biodiversity	5	100.0%
Society and Well Being	25	30.1%
Accommodating refugees and immigrants	1	4.0%
Food security and accessibility	3	12.0%
Prevention of crime and violence	1	4.0%
Robust healthcare system	13	52.0%
Social Inclusion, development and rehabilitation	7	28.0%
Total	83	100.0%

4.1.2 RESILIENCE OF WHAT TO WHAT?

I used the Sankey diagram to visualise resilience of what to what. The nodes on the left side represent the identified systems that need to be resilient (resilience of what), and nodes on the right side represent the threats and stressors that the system should be resilient to (resilience to what). These nodes are arranged in the decreasing order of their occurrence. Subsequently, the link between the two nodes represents “resilience of what to what” and the width of the line is directly proportional to the number of occurrences.

Assessment of meeting minutes in the City of Toronto resulted in 16 systems under the 'resilience of what' category and 13 different threats and stressors under the 'resilience to what' category. Their linkages resulted in 31 different combinations of "resilience of what to what". As seen in Figure 4-3, top five threats and stressors were: 1) Climate change and associated threats, 2) health risks, 3) extreme weather events, 4) urban and environmental threats, and 5) social injustice. The dominant theme found in meeting minutes was to enhance the City's resilience to climate change followed by child and youth resiliency towards health risks. A few distinct and less frequent themes emerged were: "resilience of newcomers to the urban environment", "resilience of ravine systems to urban and environmental threats", and "resilience of tenant groups to social injustice".

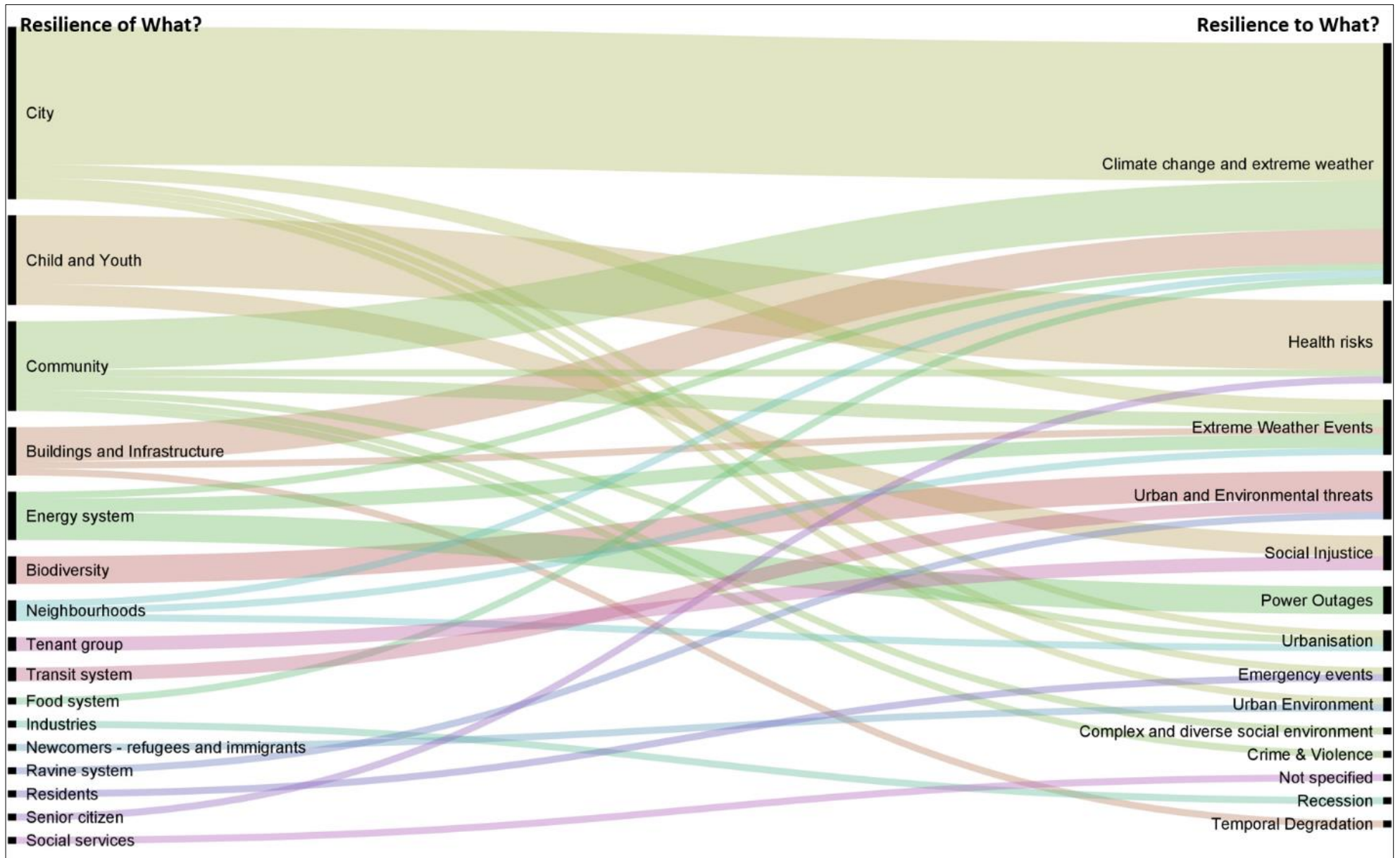


Figure 4-3 Sankey diagram of "resilience of what to what" in City of Toronto

4.2 CITY OF VANCOUVER

In the City of Vancouver, there were 502 meeting records between 1st January 2013 to 31st December 2018. It was surprising to note that in these six years, there were only 16 meeting minutes that had the presence of the word resilience (and all its forms). The screening of these minutes resulted in 14 net relevant references (a few meeting minutes had multiple references with different contexts, while a few were excluded as the word resilience did not provide any context or just depicted the title of a business unit). The temporal distribution of these references (Figure 4-4) indicates that the appearance of the word resilience started in minutes from the year 2016. In the same year, the City of Vancouver was awarded membership in the 100 Resilient Cities Network (100RC) to become more resilient to the physical, social, and economic challenges. In 2017, the city hired its Chief Resilience Officer (CRO) to develop a City Resilience Strategy. This validated the increase in a number of references in the following years.

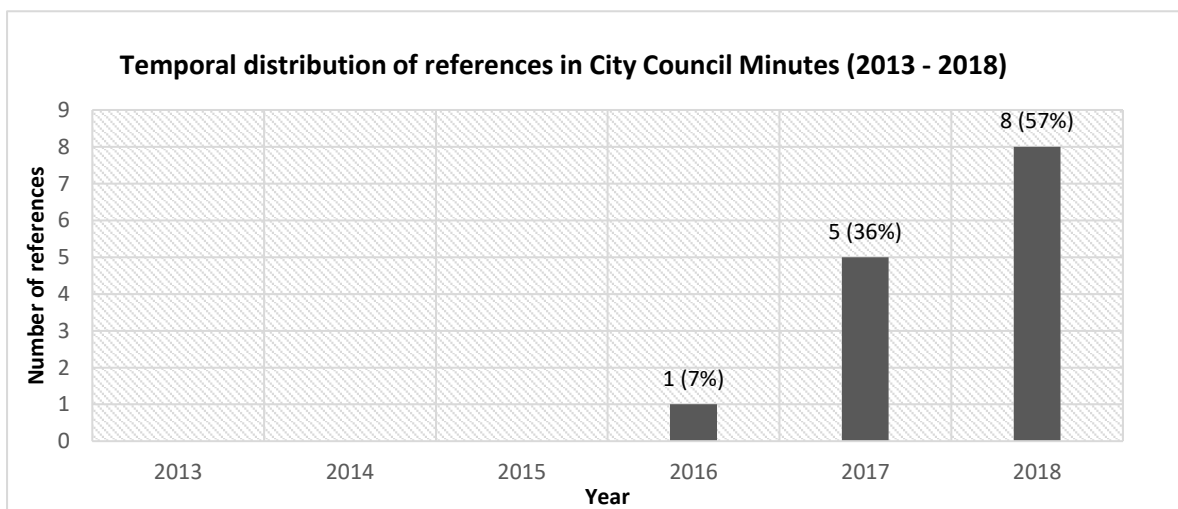


Figure 4-4 Temporal distribution of references in City of Vancouver Council Minutes (2013 - 2018)

4.2.1 NARRATIVES OF RESILIENCE

Upon categorising 14 references under five selected dimensions, it was found that discussion was divided between three dimensions: “built environment and infrastructure”, “governance and institutions”, and “society and wellbeing” with five, four, and four references respectively. Whereas there was only one reference for economic dimension and no reference for the natural environment. The temporal distribution of thematic dimensions from 2013 to 2018 is shown in (Figure 4-5). Due to the limited number of references in the City of Vancouver, it is difficult to comprehend the trend or shift in the narrative over time.

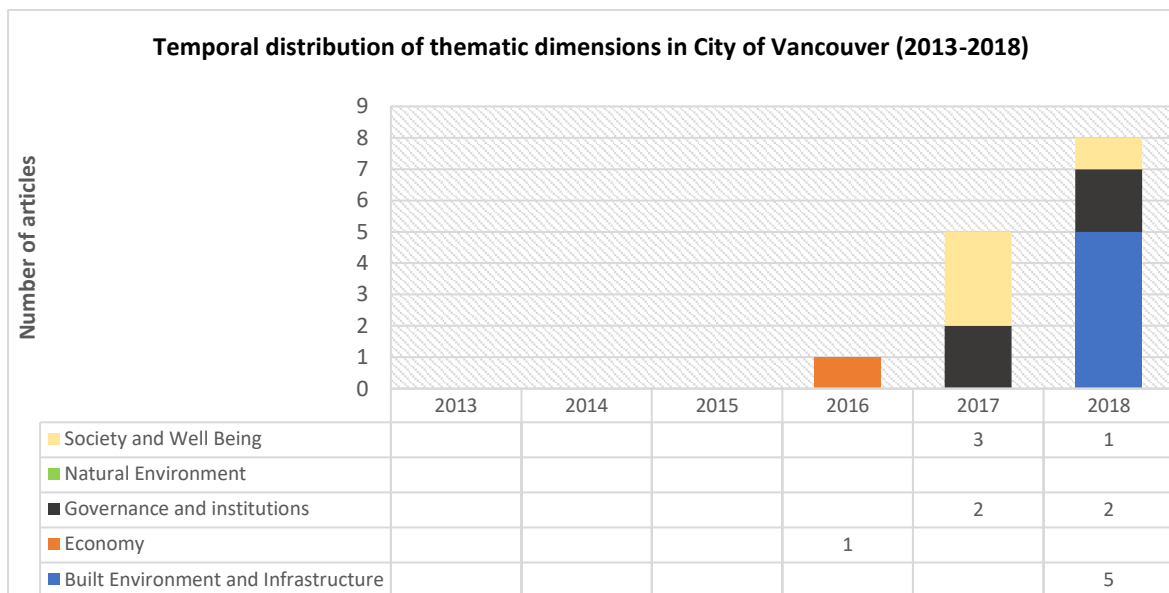


Figure 4-5 Temporal distribution of thematic dimensions in City of Vancouver (2013-2018)

The breakdown of these dimensions into narratives is tabulated in Table 4-2. The discussion around the “built environment and infrastructure” was dominated by the “robustness of public infrastructure” to augment the resilience of building and infrastructure against the stress (temporal degradation) and shocks (floods, earthquakes, and other disasters). Under the “society and wellbeing” dimension, major discussion was related to “social inclusion, rehabilitation and development” of the indigenous community. For example:

“In the interval since 2013, the City has declared itself a City of Reconciliation and significant work has been done to advance social, economic, environmental and other policies that to recognize the inherent courage, **resilience** and rights of indigenous people and help ensure that the local First Nations are once again visible in their traditional homelands”(Vancouver City Council, 2017)

The results show that Council also acknowledged the need for “food security and accessibility” through the Vancouver Food Strategy for vulnerable neighbourhoods with critical food access issues and have resilient and equitable food systems. Under the “governance and institutions”, discussion was centred around “emergency preparedness” through *Earthquake Preparedness Strategy* and neighbourhood “capacity building” through the *Resilient Neighbourhoods Program*. The Council also acknowledges the need for “organisational coordination” between Provincial and Local government to enable resilient flood management planning and infrastructure efforts. Finally, the only reference under the economic dimension emphasised on enabling the green economy, also termed as “innovation economy”, through urban planning, social policy, and modernizing regulations to create a more resilient economy.

Table 4-2 Dimensions and narratives of Resilience in City of Vancouver

Dimension and Narratives	Number of References	Percentage (%)
Built Environment and Infrastructure	5	36%
Green infrastructure	1	20%
Land use and urban design	1	20%
Robustness of public infrastructure	3	60%
Economy	1	7%
Investment in green economy	1	100%
Governance and institutions	4	29%
Budgeting and financial Resource Allocation	1	25%
Capacity building	1	25%
Emergency preparedness	1	25%
Organisational coordination	1	25%
Society and Well Being	4	29%
Food security and accessibility	1	25%
Social Inclusion, development and rehabilitation	3	75%
Total	14	100.00%

4.2.1 RESILIENCE OF WHAT TO WHAT?

Assessment of meeting minutes in the City of Vancouver resulted in seven systems under the ‘resilience of what’ category and nine different threats and stressors under the ‘resilience to what’ category. Their linkages resulted in 12 different combinations of “resilience of what to what” (Figure 4-6). As per the empirical data, floods and social injustice are two dominant threats recognised. The dominant use of resilience was to enhance city’s resilience to floods and the resilience of indigenous communities to social injustice. Other narratives included: “resilience of buildings and infrastructure to temporal degradation”, “resilience of the economy to economic cycles” and “resilient food systems”.

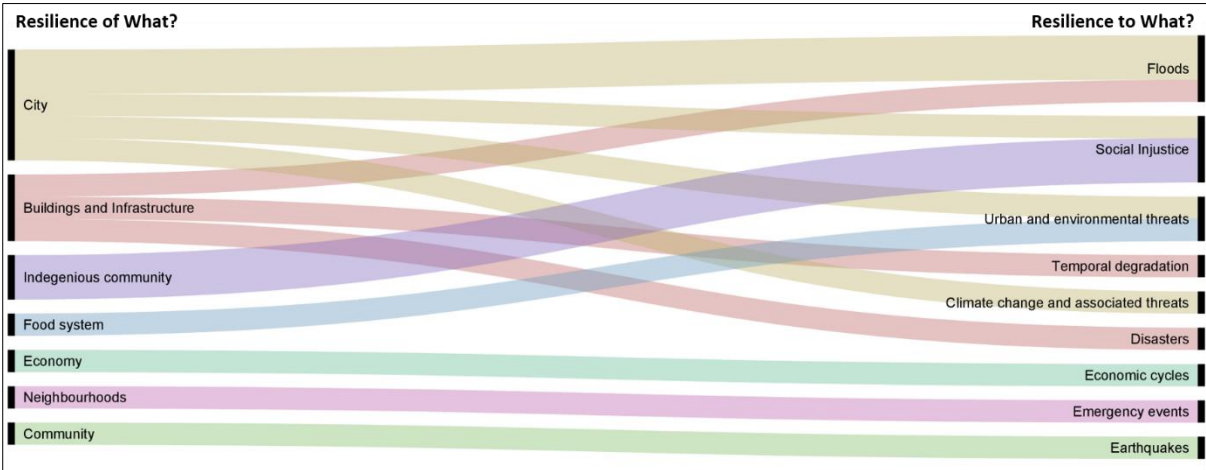


Figure 4-6 Sankey diagram of "resilience of what to what" in City of Vancouver

4.3 CITY OF CALGARY

In the City of Calgary, I reviewed the meeting minutes of the City Council and the four Standing Policy Committees (SPCs) that report directly to the Council. The four SPCs in Calgary included: 1) Community and Protective Services Committee; 2) Planning and Urban Development; 3) Transportation and Transit; and, 4) Utilities and Corporate Services. From the year 2013 to 2018, there were 40 Council minutes and seven Committee minutes on the agenda of resilience. It was surprising to note that there was no penetration of the word resilience in the meeting minutes of the SPC on Planning and Urban Development and the SPC on Transportation and Transit. In a total of 47 meeting minutes, there were 49 relevant references to resilience (five meeting minutes had multiple references with different contexts while few were excluded as word resilience did not provide any context or just depicted the title of the business unit).

The temporal distribution of these references (Figure 4-7) indicates that overall there has been an increase in the number of discussions from 2013 to 2018, with only one reference to resilience in 2013 to nine references in 2018. In 2013, the city faced the most destructive and costliest floods in Canadian history along the Bow and Elbow river, which resulted in billions of financial losses through infrastructure and property damage and business disruptions. Following the 2013 floods, the City of Calgary was involved in recovery, damage repair, services restoration, and strategies to prepare for the next extreme flood. In this regard, the Council approved resourcing of a resilience team in November 2013, and established the River Flood Mitigation Program to manage future flood risks. This validates the sharp increase in the number of references in the year 2014.

Further, in the year 2014, the global economy faced one of the largest oil prices declines (also known as oil crash of 2014), which continued till the year 2016. Calgary, centre of Canada's oil and gas industry, was hard hit by this global downturn and faced loss of economic and business

activities, high unemployment rates, and high real estate vacancy rates. In order to recover from economic downturn, series of initiatives and strategies took place in the year 2015 which justifies the maximum number of references in the year 2015.

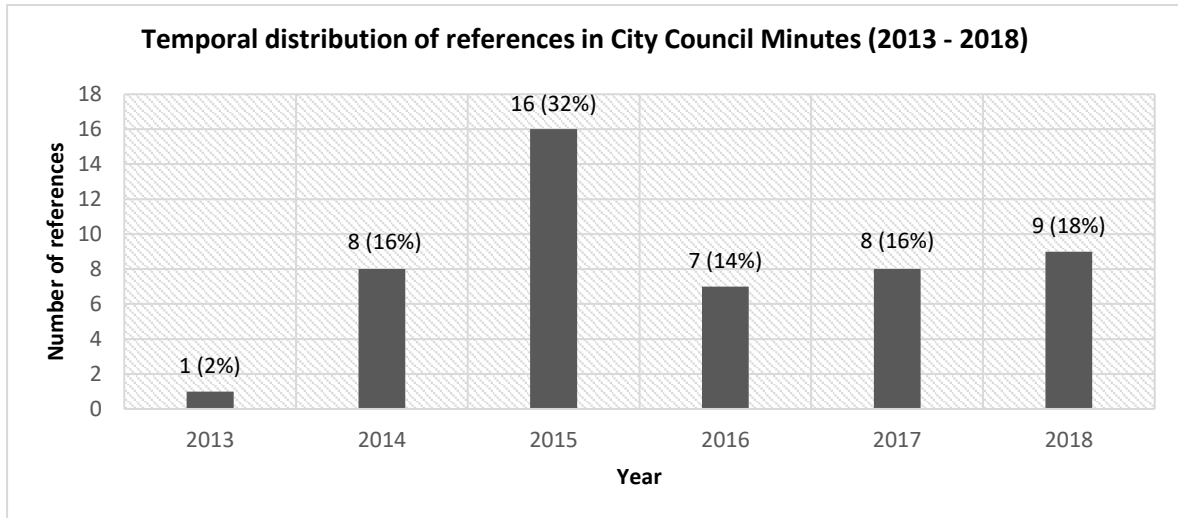


Figure 4-7 Temporal distribution of references in City of Calgary Council Minutes (2013 - 2018)

4.3.1 NARRATIVES OF RESILIENCE

On categorising 49 references under five selected dimensions, I found that the discussions were divided between only two dimensions: “governance and institutions” and “economy” with 33 and 13 references respectively. Whereas, the other three dimensions had only one reference each in a period of six years. The temporal distribution of thematic dimensions from 2013 to 2018 (Figure 4-8) indicates that “governance and institutions” has been the only dimension that appeared consistently throughout every year. In contrast, the economic dimension appeared in the year 2015 (in response to the economic downturn of 2014) with six references and consistently decreased thereafter with only one reference in 2018.

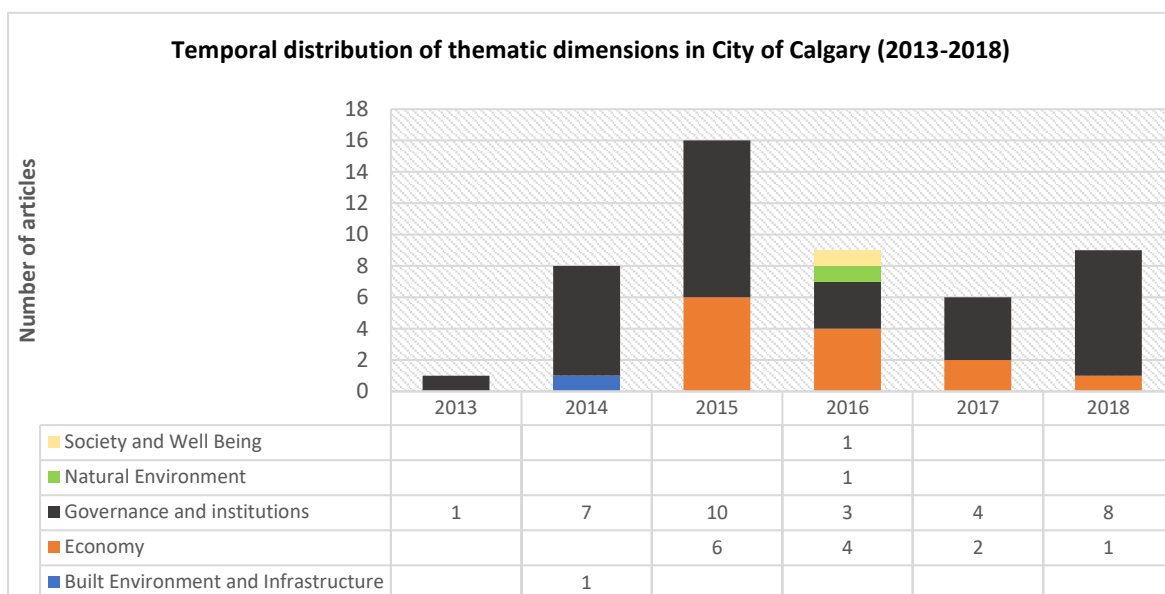


Figure 4-8 Temporal distribution of thematic dimensions in City of Calgary (2013-2018)

The breakdown of these dimensions is tabulated in Table 4-3. Out of total 49 references, 24 references were related to “emergency preparedness” to build community and city’s resilience to flooding through *Flood Resiliency and Mitigation Plan* and *Alberta Community Resiliency Program* (The City of Calgary, n.d.). Recommendations under these plans and programs included flood protection standards, large scale infrastructure projects such as dams or diversion, infrastructure upgradation, and watershed management strategies. The narrative “budgeting and financial resource allocation” was related to the resilience budget to help the City recover from the economic downturn.

The discussion under economic dimension was centred around the resilience of the economy amid economic downturn through *The Community Economic Resiliency Fund* and *Economic and Financial Resiliency Plan*. The only reference under the “natural environment” dimension was focused on the management of public spaces and urban greens through the Biodiversity Strategy in order to promote ecological resilience. The narratives under “built environment and infrastructure”

were on the resiliency of IT services in the midst of disaster. Finally, the one reference under “society and well-being” was on providing social support to enhance resiliency of vulnerable population towards economic downturn.

Table 4-3 Dimensions and narratives of Resilience in City of Calgary

Dimension and Narratives	Number of References	Percentage (%)
Built Environment and Infrastructure	1	2%
ICT infrastructure	1	100%
Economy	13	27%
Economic stability and growth	13	100%
Governance and institutions	33	67%
Budgeting and financial resource allocation	4	12%
Climate action	3	9%
Comprehensive city building	2	6%
Emergency preparedness	24	73%
Natural Environment	1	2%
Conservation of natural ecosystems and biodiversity	1	100%
Society and Well Being	1	2%
Social inclusion, development and rehabilitation	1	100%
Total	49	100%

4.3.1 RESILIENCE OF WHAT TO WHAT?

Assessment of meeting minutes in the City of Calgary resulted in seven systems under the ‘resilience of what’ category and eight different threats and stressors under the ‘resilience to what’ category. Their linkages resulted in 11 different combinations of “resilience of what to what”. As seen in Figure 4-9, Floods and economic downturn were the major threats recognised in the City minutes. The dominant context in the city, according to the city minutes, was to enhance city’s resilience to floods and resilience of the economy to an economic downturn. Other context that emerged in the city were “resilience of city to climate change and associated threats”, “resilience of city to social, economic and environmental challenges”, and “resilience of IT services during disasters for continued operation”.

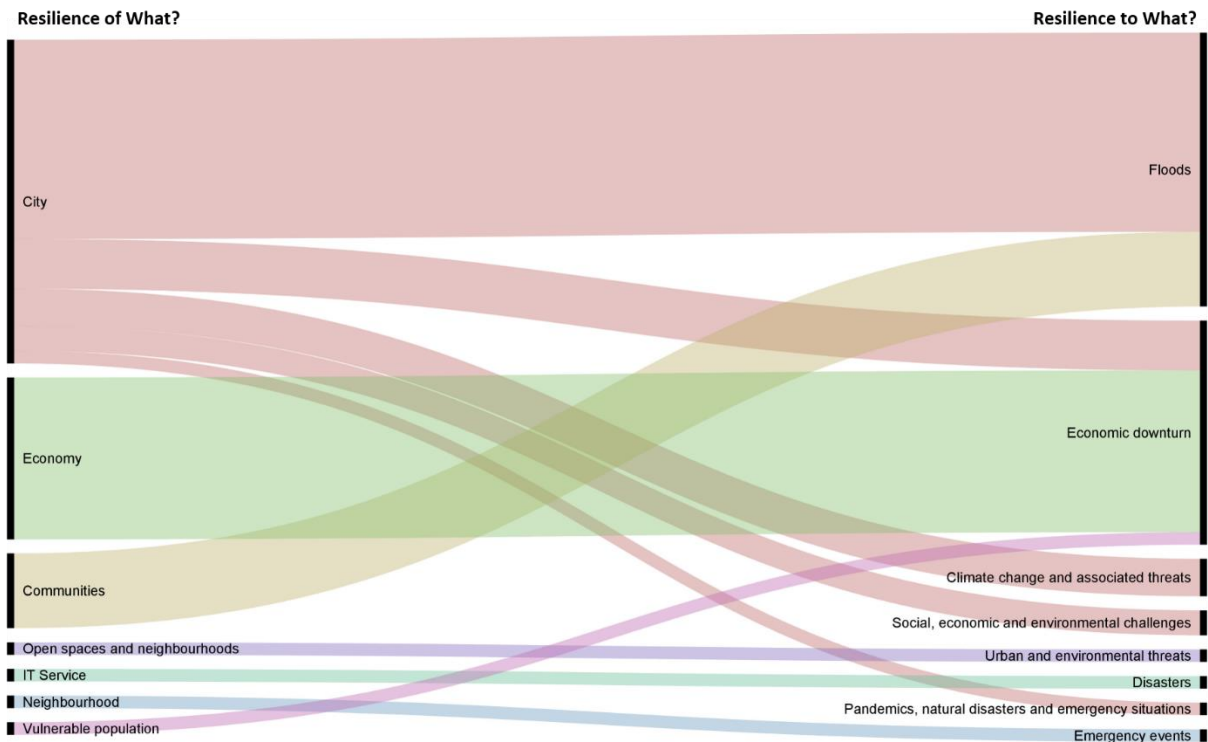


Figure 4-9 Sankey diagram of "resilience of what to what" in City of Calgary

4.4 SUMMARY

In the analysis of city council minutes, it was observed that the City of Vancouver had limited usage of the term in their official discussion. On the other hand, Calgary was very specific in their resilience narratives, whereas Toronto had numerous distinct narratives. In Toronto, climate action; green infrastructure and low impact development; and a robust healthcare system were the prominent narratives. In the City of Vancouver, term resilience was more related to 'robustness of public infrastructure' and; 'social inclusion, development, and rehabilitation'. In the City of Calgary, in contrast, resilience themes were more focused on the shocks faced by the City and were mainly associated with emergency preparedness in response to flooding and economic stability and growth amidst an economic downturn. While analysing the resilience discussions from a more descriptive perspective (in terms of resilience of what to what), a more specific context emerged. It gave more

clarity on what the potential threats for the city are, which threat is most prioritised and also the resilience of what system is prioritised (whose resilience is privileged).

CHAPTER 5: RESULTS: NEWSPAPER ANALYSIS

This chapter presents the findings of the content analysis of newspaper articles in the Cities of Toronto, Vancouver, and Calgary. Discussions around resilience have also increased in the media from 2013-2018. In review of 484 articles in three cities, I found more diverse narratives than the narratives by the local government. In Toronto, resilience was associated with 28 different narratives. In the City of Vancouver, term resilience was associated with 19 different narratives while in the City of Calgary, there were 21 narratives. The media analysis helped to discover the association of resilience with some unconventional narratives such as culture and heritage; sustainable agriculture; trade and commerce; real estate market; and, inclusive and diverse society by planning for both migrants and refugees. The narratives in each city are detailed out in subsequent sections.

5.1 CITY OF TORONTO

In the initial review of 404 retrieved articles, 147 articles were found relevant for further analysis averaging only 24 articles per year. Temporal distribution of articles from 2013 to 2018 (Figure 5-1) indicates that the overall frequency of discussion of resilience in news media has increased from 15 articles in 2013 to 68 articles in 2018. 46% (68/147) of the discussion was in the year 2018. This surge in the number of articles in 2018 is due to mass violence events: Toronto van attack and Danforth mass shooting that occurred in the City of Toronto in the year 2018.

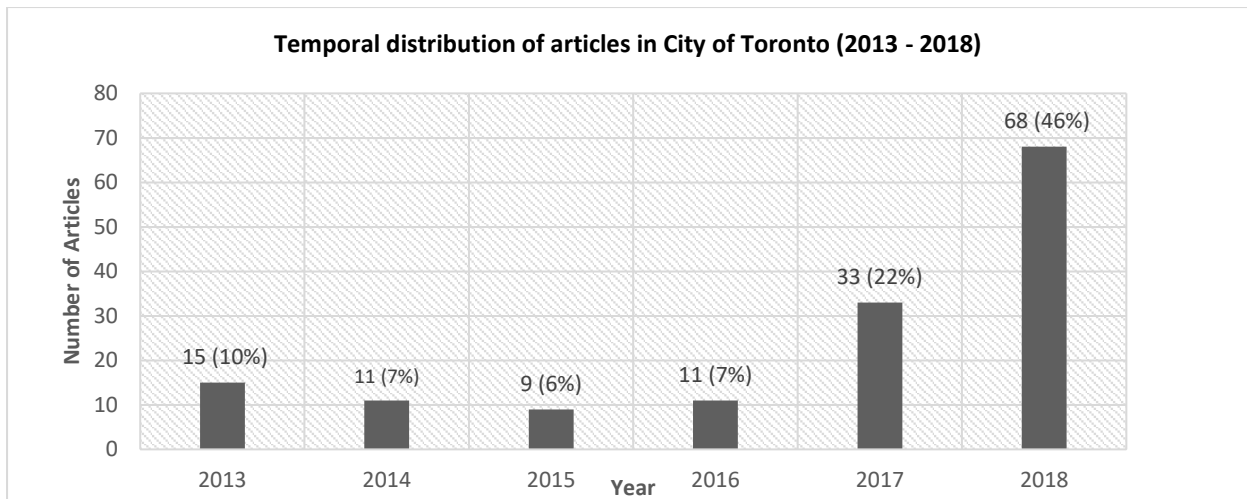


Figure 5-1 Temporal distribution of articles in City of Toronto (2013 - 2018)

Of 147 net articles, 37 articles (25.2 %) were from national outlets (National Post and The Globe and Mail), while the more coverage was from local outlets (Toronto Star and Toronto Sun) with 110 articles accounting to (74.8 %) of the total articles. Further segregating the articles based on the political leaning, 54 articles (36.7%) were from right – centre biased news outlets, while left-centre biased media had a share of 63.3% of total articles i.e., 93 articles. The overall statistics are provided in Table 5-1

Table 5-1 Overall Statistics of Newspaper data in City of Toronto

News Paper	Level	Media-Bias	Number of Articles	% of Total Article (n =147)
The Globe and Mail	National	Right - Centre Bias	31	21.1%
National Post	National	Right - Centre Bias	6	4.1%
Toronto Star	Local	Left-Centre Bias	93	63.3%
Toronto Sun	Local	Right - Centre Bias	17	11.6%

5.1.1 NARRATIVES OF RESILIENCE

The findings indicate that overall, “society and wellbeing” is the prominent dimension in the City of Toronto with 60 articles (40.8%) between 2013 to 2018. “Built environment and

infrastructure” appeared in 35 articles (23.8%), followed by “economy” and “governance and institutions” with 22 and 15 articles, respectively. “Natural environment” has been the least appeared dimension with only 15 articles in the period of six years reckoning to only 10% of the total discussion. Distribution of articles according to dimension is represented in Figure 5-2.

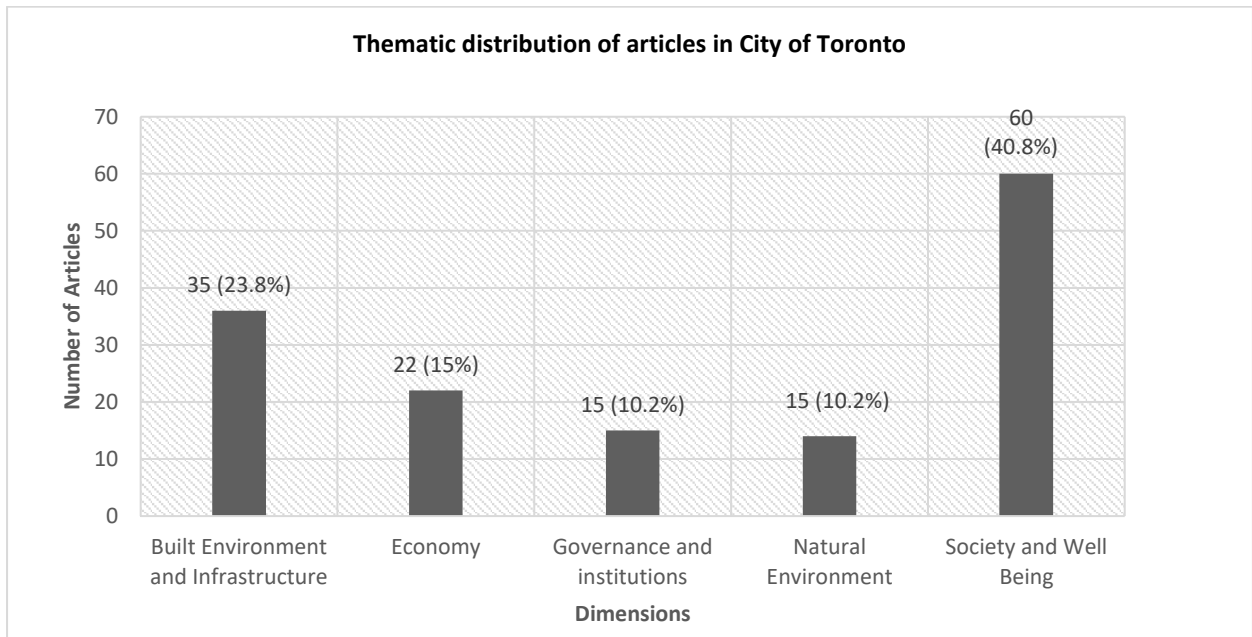


Figure 5-2 Thematic distribution of articles in City of Toronto

Further, from the temporal distribution of the five thematic dimensions from 2013 to 2018 (Figure 5-3), it can be observed that the distribution is uneven. However, temporal distribution shows the shift in priority over time: from “built environment and infrastructure” dimension having the highest share and with no presence of discussion on “society and well-being” in 2013 to highest discussion on “society and well-being” in 2018. As already mentioned, the rise of the “society and

well-being” dimension in 2018 is due to the occurrence of mass homicide events in the city. This indicates that narratives of resilience are influenced by the events that occurs in the city.

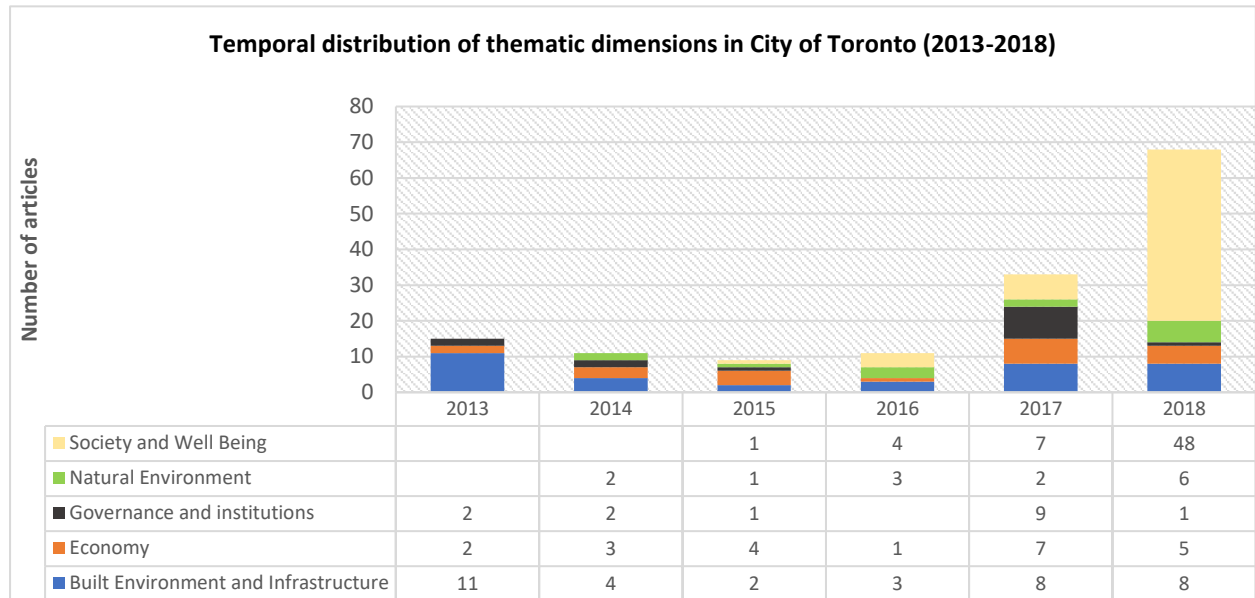


Figure 5-3 Temporal distribution of thematic dimensions in City of Toronto (2013-2018)

a) Society and Well Being

“Society and wellbeing” get the highest coverage in the City of Toronto in comparison to other themes. A closer look at the narratives (Table 5-2) reveals that out of 60 articles on this dimension, 35 articles (58%) were focused on “prevention and reduction of crime and violence” in the city. In the year 2018, the City of Toronto has witnessed an increased number of mass shootings and terror attacks like van rampage on busy streets. To strengthen the role of city in dealing with these events, articles have highlighted the need for actions such as law enforcement and tougher gun laws; modernisation of policing; post-traumatic support system for the community, and reducing pedestrian vulnerability through urban design and streetscaping.

On the other side, to build resilience, articles highlighted the need to focus on roots of the problem that include racism, poverty, social exclusion, and to direct the measures towards individuals that are at risk in involving in crime and violence. Therefore, articles have reflected on the need to undertake measures such as social reconditioning, community engagement programs, skill development, mental health support, academic exchanges and employment opportunities for youths, and also need to address poverty in order to counterfeit crime and violence.

The second highest narrative under this category was “Social inclusion, development, and rehabilitation” with 15 articles. The focus under this sub theme was to provide support to child and youth, indigenous groups, LGBT communities, minorities and marginalised groups, women and other social groups to be resilient against urban environment, social injustice (this included all kind of injustice in the form of discrimination, inequity, and exclusion) and; modernisation and gentrification of the City. Other narratives included “preservation of culture and heritage”, “accommodating newcomers (refugees and immigrants)”, “robust health care system”, and “affordable housing for all”. These narratives have been listed in Table 5-2

b) Built Environment and Infrastructure

Out of 35 articles that discussed “Built Environment and Infrastructure”, the majority (20 articles i.e. 60%) focused on the “robustness of public infrastructure” i.e., enhance resistance and fortify them against threats of climate change and extreme weather events specifically floods and ice storms in City of Toronto. Many articles have specifically concentrated on the resilience of the power supply and distribution networks against power outages, increasing energy demands, and funding constraints faced by municipality. Other narratives included “climate-positive urban development”, “comprehensive city building”, “building codes and building designs”, and “green infrastructure”.

Resilience measures have generally focused on engineering solutions by investing in new infrastructure projects and by upgrading and maintaining aging infrastructures. The emphasis has also been given on flood mitigation measures, flood-risk reducing incentive programs, storm management, privatization of public infrastructure, and smart growth by integrating technology and urban design. A few excerpts under this dimension are:

*“In cities and towns, municipal planners and building owners should factor **resiliency** into their design and construction, [...] Among its efforts, the Intact Centre is working with the Standards Council of Canada to develop codes for flooding-proofing homes, communities and commercial buildings” (The Globe and Mail, 2018)*

*“Toronto Hydro and the City's Urban Forestry department have developed a joint working group to address the resiliency of hydro distribution lines by reviewing current line clearing practices with respect to tree limbs and branches from hydro poles and exploring the potential use of more **resilient** infrastructure. [...] An Emergency Social Services Working Group has been established, with approved terms of reference to improve and increase vulnerable resident's access to City services during an emergency” (The Globe and Mail, 2014)*

c) Economy

The economic dimension in the City of Toronto focused on two narratives: “economic stability and growth” and “housing market stability and affordability” with seven articles each. The narrative “economic stability and growth” have generally focused on making economy and labour resilient to economic cycles, economic downturn, and labour market exclusion through diversification of trade and investment partners, creating new opportunities for resilient jobs through foreign investments, and market based fiscal initiatives. Similarly, the focus of “housing market stability and affordability” has been to stabilise the housing market (which includes demand, supply, and affordability) against the economic downturn and dynamic government policies. Other narratives included “income and poverty”; “stability of financial systems”, and “diversified trade and commerce”.

d) Governance and Institutions

“Governance and institutions” dimension was dominated by discussion on “climate action”, “governance structure and strong leadership”, and “budgeting and financial resource allocation” with four, four, and three articles in this dimension (n =15). Articles on these subthemes emphasized on City government’s “reticence to fully implement Toronto's long-term climate action plan, called TransformTO”(Toronto Star, 2017d). Articles have explicitly critiqued the incompetence of the government in addressing climate change in the City. Under the cover of climate change initiative, the City government was criticized for their business-as-usual approach of investing in large scale infrastructure projects which supports the political motive rather than practical solution.

*“What politicians from the federal and provincial governments to Toronto council tell us are climate change initiatives today, are what used to be known as capital spending on infrastructure. Incompetent spending on infrastructure, leading to gridlock, poorly maintained roads and bridges and public transit, built for political reasons rather than practical ones, all damage our environment. Especially so when they come in late and over budget, as these projects routinely do, which increases greenhouse gas emissions and reduces the government's fiscal capacity to respond to what used to be called not climate change, but weather damage. [...] The real problem in Toronto - and across the country - is that our politicians have traditionally underfunded the maintenance and repair of public infrastructure - including roads, bridges and public transit - failing to keep them **resilient** in the face of weather damage, as well as the damage caused by use over time.” (Toronto Sun, 2017)*

“Given the historic flooding that Toronto is currently experiencing, it is ridiculous that Mayor John Tory and his executive committee oppose the city’s proposed stormwater management charge. Scrapping this plan shows that Mayor Tory is more interested in appeasing large-scale developers and shopping-centre owners than positioning Toronto as a leader in equity and sustainability in the face of climate change.” (Toronto Star, 2017c)

In addition to climate action, articles have reflected on the disproportionate funding and budget allocation for social support services for the marginalised and vulnerable groups. In an article it was pointed even though millions of dollars are earmarked in grants to support marginalised students but “almost half that money isn’t being spent on them and is instead diverted to cover other

expenses as the cash-strapped board struggles to balance its budget” (Toronto Star, 2017a) another article says – “In Toronto, we patch with duct tape; Politicians prefer to reject cuts instead of make the bold moves they claim city needs”(Toronto Star, 2017b).

Other narratives under governance and institutions were: “emergency preparedness”, “fund research and collaboration”, “community engagement”, and “skill development”.

e) Natural Environment

The “natural environment” dimension received only 10% coverage overall in six years from 2013 to 2018. Nine out of 15 articles on natural environment were focused on the “conservation of natural ecosystem and biodiversity”. The discussion point of this narrative was to protect Toronto’s biodiversity, ravines, and wetland from the adverse effects of rapid urbanisation, large scale developments, environmental threats, and climate change and its associated threats. It was pointed that in Toronto *“almost all of the significant wetlands within the watershed have been drained or filled to support urban development. The six tributaries of the lower river have mostly disappeared, buried by fill or encased within sewage infrastructure”* (The Globe and Mail, 2016) and also that climate change is impacting the natural habitat and life cycles of plants, animals, and other organisms which is a critical challenge to environmental sustainability.

In this context, articles articulated the need for actions such as conservation of wetlands and riverfront development; water quality improvement measures and pollution monitoring; and, protection and expansion of biodiversity to build resilience. The other six articles were on “management of public spaces and urban greens” which focused on protecting urban green from similar threats through forest management strategy, wetlands and watershed management, and though diversification of urban forest and native tree species.

Table 5-2 Dimensions and narratives of Resilience in City of Toronto

Dimensions and Narratives	Number of Articles	Percentage (%)
Built Environment and Infrastructure	35	23.8%
Building codes and building designs	3	8.6%
Climate-positive urban development	5	14.3%
Comprehensive city building	4	11.4%
Data management for service efficiency	1	2.9%
Green infrastructure and low impact development	2	5.8%
Robustness of public Infrastructure	20	57.1%
Economy	22	15.0%
Economic stability and growth	7	31.8%
Real estate market	2	9.1%
Stability of financial institutions	3	13.6%
Trade and commerce	1	4.5%
Housing market stability and affordability	7	31.8%
Income and poverty	2	9.1%
Governance and institutions	15	10.2%
Budgeting and financial resource allocation	3	20.0%
Climate action	4	26.7%
Community engagement	1	6.7%
Emergency preparedness	1	6.7%
Fund research and collaboration	1	6.7%
Skill development	1	6.7%
Governance structure and strong leadership	4	26.7%
Natural Environment	15	10.2%
Conservation of natural ecosystems and biodiversity	9	60.0%
Management of public spaces and urban greens	6	40.0%
Society and Well Being	60	40.8%
Community engagement	1	1.7%
Culture and heritage	5	8.3%
Affordable housing for all	1	1.7%
Prevention and reduction of crime and violence	36	60.0%
Robust healthcare system	1	1.7%
Social development and rehabilitation	15	25.0%
Accommodating refugees and immigrants	1	1.7%
Total	147	100%

5.1.2 RESILIENCE OF WHAT TO WHAT?

I used the Sankey diagram to visualise resilience “of what to what”. The nodes on the left side represent the identified systems that need to be resilient (resilience of what), and nodes on the

right side represent the threats and stressors that the system should be resilient to (resilience to what). These nodes are arranged in the decreasing order of their occurrence. Subsequently, the link between the two nodes represents “resilience of what to what” and the width of the line is directly proportional to the number of occurrences.

Assessment of articles in Toronto resulted in 36 systems under the ‘resilience of what’ category and 32 different threats and stressors under the ‘resilience to what’ category. Their linkages resulted in 67 different combinations of “resilience of what to what”. As seen in Figure 5-4, top five threats and stressors identified were: 1) crime and violence, 2) climate change, 3) extreme weather events, 4) social injustice, and 5) urban challenges. The dominant context in the City, according to news articles was to build the community resilience to crime and violence, followed by enhancing City’s resilience to climate change, urban challenges, and extreme weather events. Few distinct and less frequent narratives emerged were: “resilience of newcomers to labour market exclusion and social safety-net exclusion”, “resilience of emergency housing to migrant influx”, and “resilience of health system to the aging population and funding constraints”.

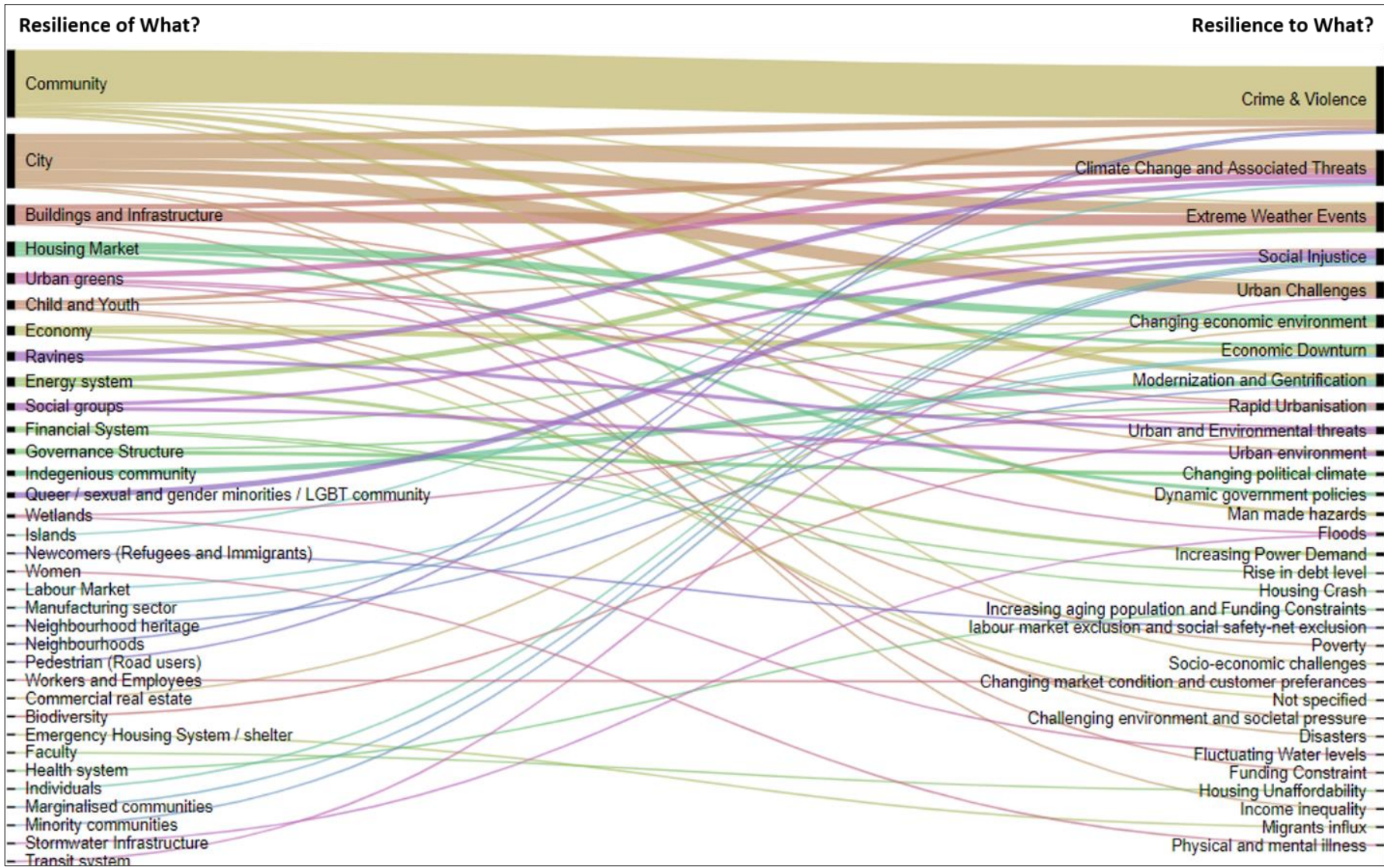


Figure 5-4 Sankey diagram of "resilience of what to what" in City of Toronto

5.2 CITY OF VANCOUVER

In the initial review of 374 retrieved articles in the City of Vancouver, 139 articles were relevant for further analysis averaging only 23 articles per year. The temporal distribution of articles from 2013 to 2018 (Figure 5-5), indicates that the overall frequency of discussion of resilience in news media has increased from 16 articles in 2013 to 25 articles in 2018. In the year 2016, the coverage trend slightly decreases even though Vancouver was selected to be part of the 100 Resilient Cities program pioneered by the Rockefeller Foundation. The highest number of articles were in the year 2017 which also coincides with the year of appointment of Chief Resilience Officer in the City of Vancouver.

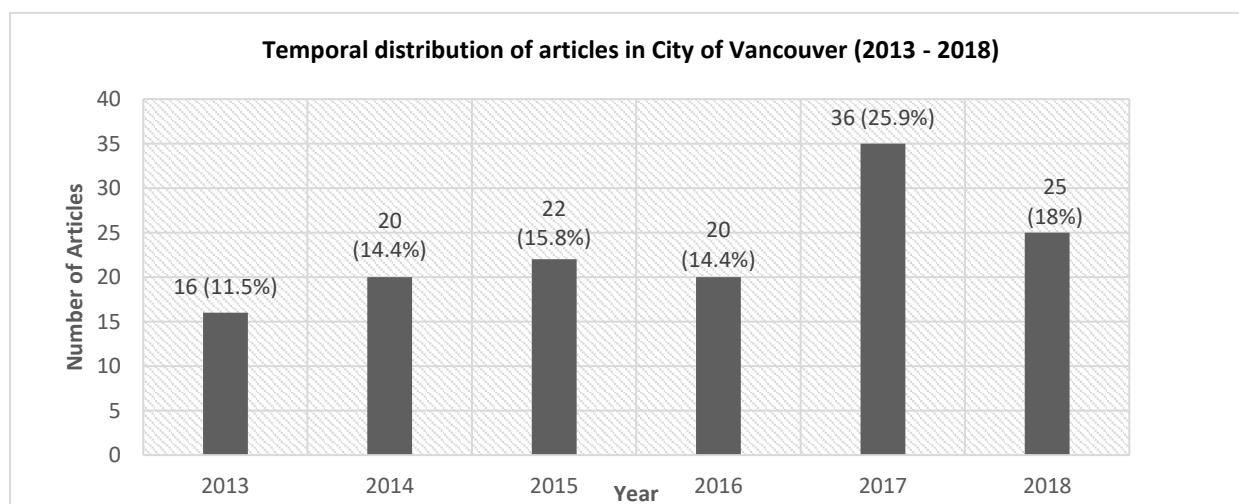


Figure 5-5 Temporal distribution of articles in City of Vancouver (2013 - 2018)

In a review of 139 articles, 41 articles (29.5%) were from national outlets, while the majority of the coverage was from local outlets with 98 articles accounting to 70.5% of the total articles. Unlike Toronto, all four outlets in Vancouver analysed were right – centred media. The descriptive statistics are provided in Table 5-3.

Table 5-3 Overall Statistics of Newspaper data in City of Vancouver

News Paper	Level	Media-Bias	Number of Articles	% of Total Article (n =139)
The Globe and Mail	National	Right - Centre Bias	35	25.2%
National Post	National	Right - Centre Bias	6	4.3%
Vancouver Province	Local	Right - Centre Bias	27	19.4%

Vancouver Sun	Local	Right - Centre Bias	71	51.1%
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5.2.1 NARRATIVES OF RESILIENCE

On clustering the articles under five selected dimensions, it was observed that overall “governance and institutions” dimension has a major share of discussion in the City of Vancouver with 46 articles (33.1%) between 2013 to 2018. This is due to the increased focus on emergency preparedness for possible catastrophic earthquakes and sea-level rise in the City of Vancouver. “Economy” appeared in 32 articles (23%) followed by “society and well-being” and “natural environment”, with 29 and 18 articles respectively. “Built Environment and Infrastructure” has been the least appeared dimension with only 14 articles in the period of six years, estimating to only 10% of the total discussion. The distribution of articles according to dimension is represented in Figure 5-6.

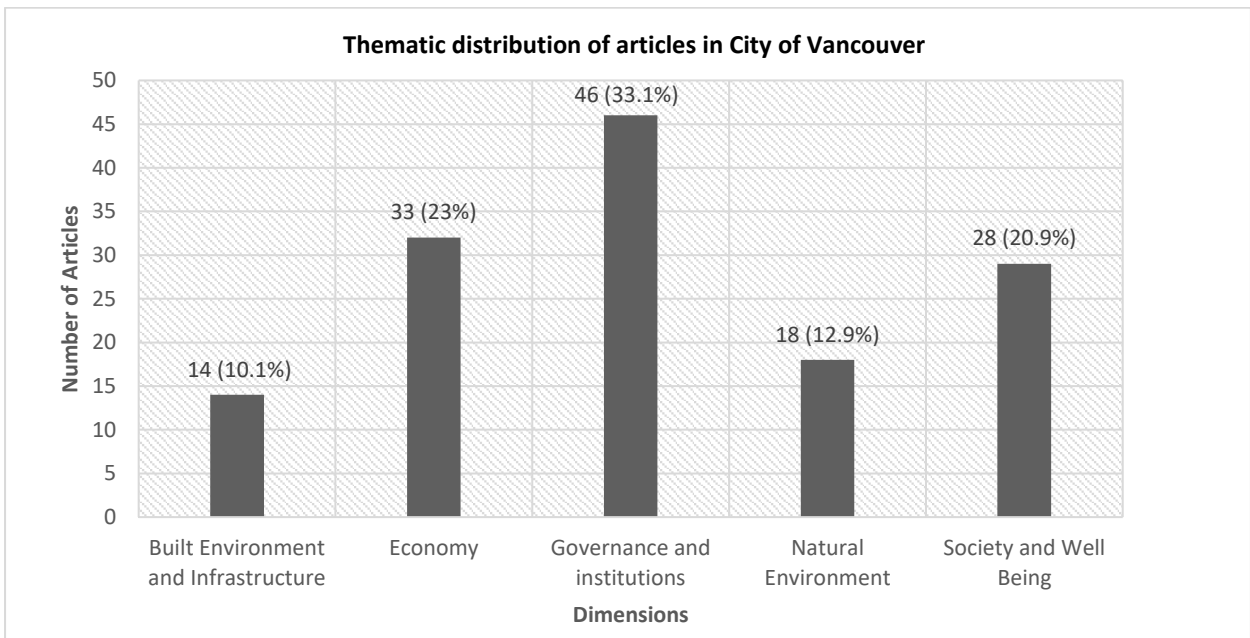


Figure 5-6 Thematic distribution of articles in City of Vancouver

From the temporal distribution of the five thematic dimensions from 2013 to 2018 (Figure 5-7), it can be observed that there has been an uneven distribution of discussion of different dimensions throughout the period. Further, the proportion of each dimension has fairly remained constant throughout, with “governance and institutions” being the most discussed while “built environment and infrastructure” being the least discussed dimension. Therefore, the trend does not reflect any change in priority over time.

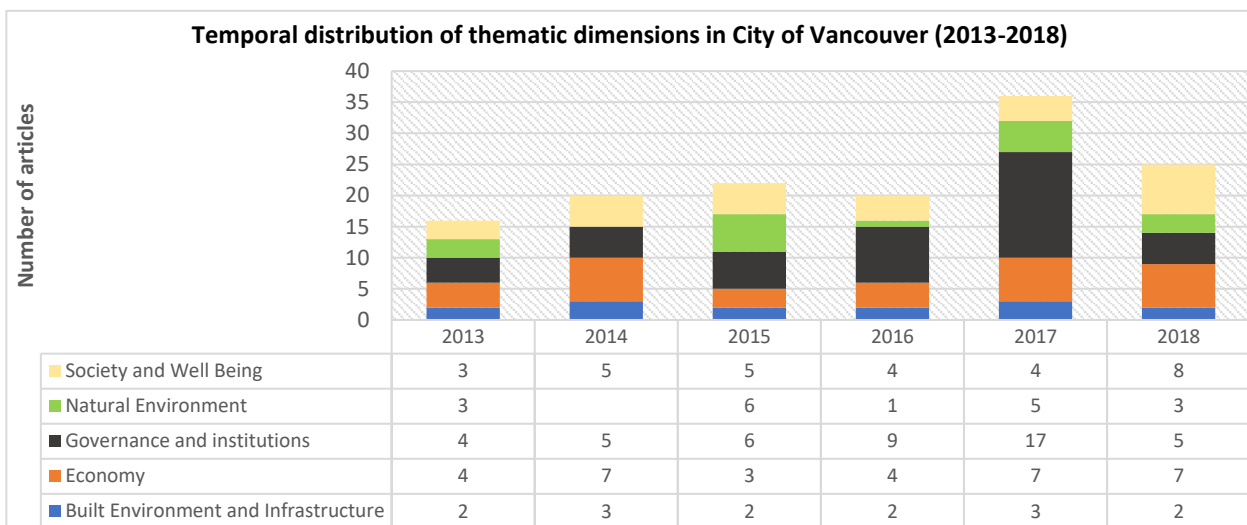


Figure 5-7 Temporal distribution of thematic dimensions in City of Vancouver (2013-2018)

a) Governance and Institutions

In Vancouver, “governance and institutions” gets the highest coverage with 46 articles in a period of six years from 2013 to 2018. Looking at the breakup of this dimension (Table 5-4), 16 articles were based on the “emergency preparedness”. Emergency preparedness is a proactive planning practice that includes policy, governance and institutional measures for disaster risk reduction and aid in response and recovery. Vancouver faces threats from a multitude of natural and manmade hazards (catastrophic earthquakes, wildfires, and extreme weather events) in terms of both likelihood and impact. Articles have reiterated the emphasis on emergency preparedness put

forth by the City authorities through their seismic risk assessment plan, community wildfire protection plan, and recovery strategies.

The second highest coverage under this dimension was “climate action” with 12 articles. Discussions were centred around improving energy efficiency and emission reduction through green initiatives, innovation and design, and renewable energy sources to mitigate climate change. The narrative related to “comprehensive city building” and “fund research and collaboration” had equal coverage with eight articles each. Overall objectives under these narratives was to address economic, technological, financial, social, and environmental aspect in the City to build urban resilience through partnerships and innovation.

b) Economy

Out of 33 articles that were based on economic dimension in the City of Vancouver, 21 articles were related to “Housing market stability and affordability”. Articles have highlighted that housing affordability is a major stress in the City which is influenced by factors such as economic cycles, investment-driven housing demand and underutilised residential properties. The housing market is an economic growth driver and its stability (which includes demand, supply and affordability) against the economic downturn and dynamic government policies is crucial for long term economic resilience. The rest of the coverage under this dimension was “economic stability and growth” and “stability of financial institution” with seven (22%) and four (13%) articles, respectively. The overall focus of these articles was on resilience of economy and financial institutions to economic stresses and shocks through economic diversification, creation of jobs and investment opportunities, and regulatory policies and systems.

c) Society and Well Being

The “society and well-being” received the third highest coverage in news articles related to the City of Vancouver. A closer look at the sub-dimensions reveals that out of 2 articles on this dimension, 17 articles were related to “social inclusion, rehabilitation, and development”. The focus under this narrative was to provide support to child and youth, indigenous groups, minorities and marginalised groups, homeless and other communities to be resilient against social injustice (this included all kind on injustice in form of discrimination, inequity and exclusion) urban environment, and; modernisation and gentrification of the City. “Accommodating immigrants and refugees” was the next prominent subtheme under this dimension where the idea is to integrate newcomers successfully in the community through programs and initiatives like capacity building, language support, skill development, and job training. An excerpt from an article state:

“ensure refugees are able to successfully and sustainably settle in their new home communities, while also balancing fairness to others in need to ensure the best outcome possible for Canadian society as a whole.”

The rest of the coverage under this theme was spread across “preservation of culture and heritage” through awareness programs on indigenous knowledge and traditions, and art and cultural events; “affordable housing for all” and “community engagement” subthemes.

d) Natural Environment

The “natural environment” dimension received nearly 13% coverage overall in six years from 2013 to 2018. Nine out of 18 articles on the natural environment were focused on “conservation of natural ecosystem and biodiversity”, and seven articles were on “management of public spaces and urban greens”. Under these narratives, articles articulated the need to protect biodiversity, natural ecosystem, urban greens (parks and urban forests) from the adverse effects of urbanisation, climate change, wildfires, and extreme weather events through community awareness programs, habitat

restoration, forest management strategy and futureproofing park infrastructure. Apart from these two narratives, it was interesting to note the presence of “sustainable agriculture” in two articles that advocated for sustainable agriculture practices to reduce the reliance on fossil fuels and make food systems and urban agriculture resilient to climate change and environmental threats.

e) Built Environment and Infrastructure

The “built environment and infrastructure” dimension received the least coverage with only 14 articles out of total 139 articles in the City of Vancouver. The breakup of this dimension reveals that seven articles focused on “robustness of public infrastructure” i.e., enhance resistance and fortify building and infrastructure against threats of climate change, extreme weather events, and hazards, specifically earthquakes and wildfires in City of Vancouver. Five articles were on “transportation infrastructure”, which emphasized the integrated transit network that is safe and accessible for all road users as well resilient to the rapid urbanisation and disasters. The remaining two articles were on “large scale economic infrastructure”, which were related to building and upgrading port infrastructure to safeguard ports in Vancouver against sea level rises and climate change as they are the important economic drivers of Canada.

Table 5-4 Dimensions and narratives of Resilience in City of Vancouver

Dimension and Narratives	Number of Articles	Percentage (%)
Built Environment and Infrastructure	14	10.1%
Large scale economic infrastructure	2	14.3%
Robustness of public infrastructure	7	50.0%
Transportation infrastructure	5	35.7%
Economy	33	23.7%
Economic stability and growth	8	24.2%
Stability of financial institutions	4	12.1%
Housing market stability and affordability	21	63.6%
Governance and Institutions	46	33.1%
Climate action	12	26.1%
Comprehensive city building	8	17.4%
Emergency preparedness	16	34.8%
Fund research and collaboration	8	17.4%

Green initiatives	2	4.3%
Natural Environment	18	12.9%
Conservation of natural ecosystems and biodiversity	9	50.0%
Management of public spaces and urban greens	7	38.9%
Sustainable agriculture	2	11.1%
Society and Well Being	28	20.1%
Accommodating immigrant and refugees	4	14.3%
Community engagement	2	7.1%
Culture and heritage	3	10.7%
Housing affordability	3	10.7%
Social inclusion, development and rehabilitation	16	57.1%
Total	139	100%

5.2.2 RESILIENCE OF WHAT TO WHAT?

Assessment of articles in the City of Vancouver resulted in 26 systems under the ‘resilience of what’ category and 19 different threats and stressors under the ‘resilience to what’ category. Their linkages resulted in 59 different combinations of “resilience of what to what”. As seen in Figure 5-8, the top five threats and stressors identified were: 1) climate change and associated threats, 2) urban challenges, 3) social injustice, 4) earthquakes, and 5) changing economic environment. The dominant context in the City, according to news articles, was to build the City’s resilience to urban challenges that appeared in 16 articles. This was followed by the “resilience of city to climate change and associated threat” in 13 articles and “resilience of buildings and infrastructure to earthquakes” in 10 articles. As clearly seen in the figure below, the housing market has been the second most discussed system of interest in the City of Vancouver, which needs to be resilient to changing economic environment, economic downturn, and dynamic government policies. Other distinct contexts that emerged were: “resilience of the indigenous community to modernisation and gentrification”, “resilience of urban agriculture to climate change”, and “resilience of newcomers to urban environment”.

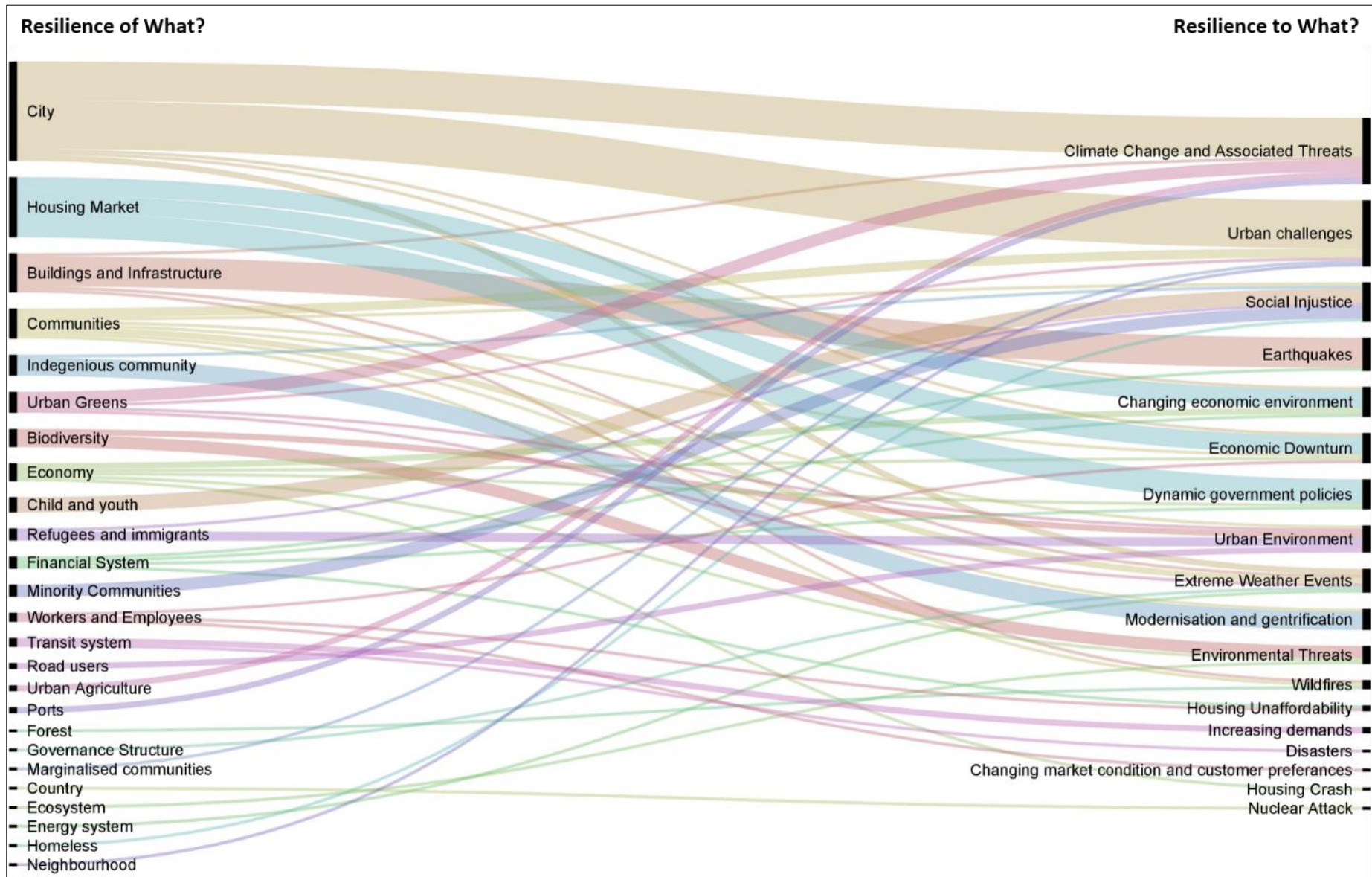


Figure 5-8 Sankey diagram of "resilience of what to what" in City of Vancouver

5.3 CITY OF CALGARY

In the initial review of 388 retrieved articles, 198 articles were found relevant for further analysis averaging 33 articles per year. Temporal distribution of articles from 2013 to 2018 (Figure 5-9) shows that there was no discussion of resilience in the year 2013, while articles on resilience appeared five times in 2014. The sudden rise in the number of articles in 2015 was due to the global oil crash of 2014, which had a major impact on the City of Calgary. From 2015 to 2018, there has been a consistent discussion on resilience in the City of Calgary.

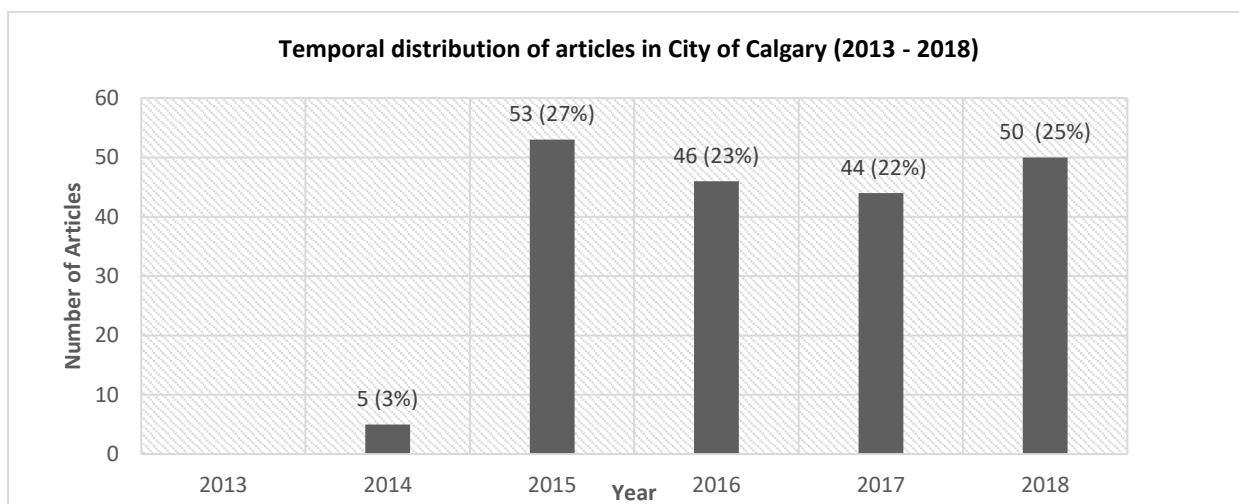


Figure 5-9 Temporal distribution of articles in City of Calgary (2013 - 2018)

Of the 198 net articles, 27 articles (13.6 %) were from national outlets (National Post and The Globe and Mail), while the majority of the coverage was from local outlets (Calgary Herald and Calgary Sun) with a total of 171 articles accounting to 86.4% of the total articles. Further segregating the articles based on the political leaning, 66 articles (33.3%) were from right – centre biased news outlets while left-centre biased media had a share of 66.7% of total articles i.e., 132 articles. The overall statistics are provided in Table 5-5

Table 5-5 Overall Statistics of Newspaper data in City of Calgary

News Paper	Level	Media-Bias	Number of Articles	% of Total Article (n =198)
The Globe and Mail	National	Right - Centre Bias	26	13.1%
National Post	National	Right - Centre Bias	1	0.5%
Calgary Herald	Local	Left-Centre Bias	132	66.7%
Calgary Sun	Local	Right - Centre Bias	39	19.7%

5.3.1 NARRATIVES OF RESILIENCE

In the City of Calgary, “economy” was the most prioritised dimension with 80 articles (40.4%) to build resilience against economic downturn and declining oil prices. The second most discussion (25.8%) was clustered under “governance and institutions” dimension with an objective of emergency preparedness following the occurrence of major floods in 2013. This was followed by “society and well-being” and “built environment and infrastructure” 21.2% and 10.6% of total articles, respectively. “Natural environment” was the least appeared dimension with only four articles in the period of six years reckoning to only 2% of the total discussion. Distribution of articles according to dimension is represented in Figure 5-10.

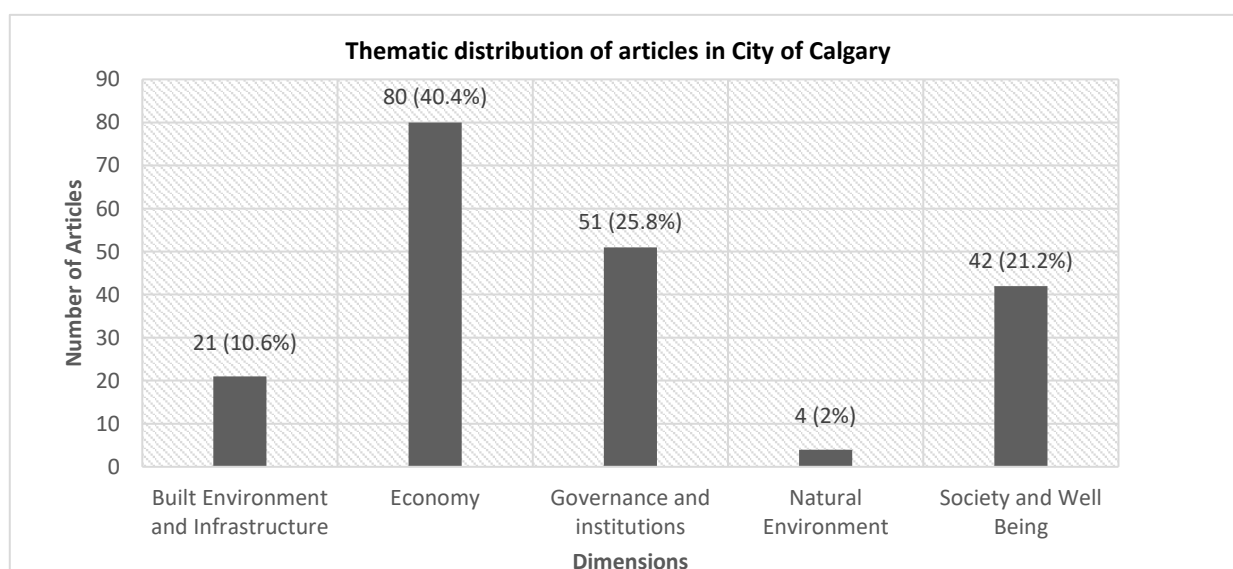


Figure 5-10 Thematic distribution of articles in City of Calgary

Further, from the temporal distribution of the five thematic dimensions from 2013 to 2018 (Figure 5-11), it can be observed that there has been an uneven distribution of discussion of different dimensions throughout the period. Since there are no articles in 2013 and only five articles in 2014, observations are made from the period 2015 to 2018. In these four years, the proportion of dimensions has been consistent with the “economy” being the highest and “natural environment” being the lowest.

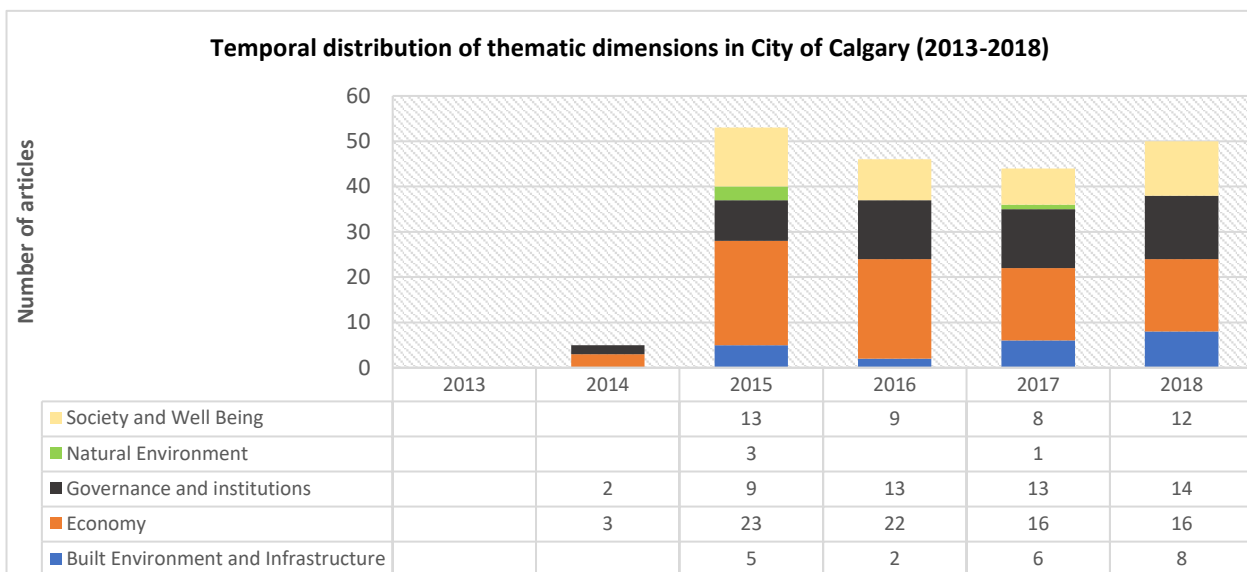


Figure 5-11 Temporal distribution of thematic dimensions in City of Calgary (2013-2018)

a) Economy

The “economy” gets the highest coverage (40%) in the City of Calgary in comparison to other themes. In the year 2014, the global economy faced one of the largest oil prices declines (also known as the oil crash of 2014), which continued till year 2016. Calgary, centre of Canada’s oil and gas industry, was hard hit by this global downturn and faced loss of economic and business activities, high unemployment rates, and high real estate vacancy rates. This justifies the high presence of economic dimension in newspaper articles. A closer look at this dimension (Table 5-6) reveals that discussion was dominated by three sub themes: “Economic stability and growth”, “business

continuity, stability and preparedness”, and “housing market stability and affordability”. The discussion under these subthemes was centred around economic recovery and resiliency of city, community, housing and other real estate market, businesses, and entrepreneurs to cope with economic shocks, dynamic government policies, and disasters. Articles restated the need for response and recovery through measures such as fiscal measures, economic diversity, innovation and entrepreneurship, business preparedness plans for emergency, and creating new opportunities for resilient jobs through foreign investments. A few excerpts under this dimension are:

*“During hard times, manage carefully, but think ambitiously. Combine caution with optimistic long-term planning for the recovery. We cannot afford to define our **city’s** soul only through the volatility of our economic cycles, our highs and lows, our excesses and constraints. This time, let us use our ingenuity to emerge stronger, kinder and more **resilient**.”* (Calgary Herald, 2016)

“Business continuity and preparedness isn’t just about a big flood or some significant weather event. It could be as simple as a power outage, or snow, or a fire next door needing you to vacate your business [...] A business continuity plan gives you that backup, makes you understand exactly the steps that you need to go through when you’re affected, whatever the emergency is.” (Calgary Herald, 2015)

b) Governance and Institutions

The “governance and Institutions” is the second highest discussed dimension, with 51 articles (26%). 30 out of 51 articles under this dimension were on “emergency preparedness”. In 2013, the city faced the most destructive and costliest floods. The flood resulted in billions of financial losses through infrastructure and property damage and business disruptions. In addition to floods, Calgary is also vulnerable to extreme weather events, ice storms, and wildfires. Flood of 2013, along with the economic downturn of 2014, led to increased focus around emergency and recovery planning to make Calgary more resilient – both in terms of weathering economic shocks and natural disasters. Emphasis under this subtheme was on the flood mitigation plan, measures, and infrastructure projects. “Budgeting and Financial Resource Allocation” was the second most appeared narrative with 11 articles. The remaining articles were spread across “climate action”,

“fund research and collaboration”, and “comprehensive city building”, reflecting the need for city to survive and thrive amid challenges posed by climate change and urbanisation through research, innovation, and partnerships.

c) Society and Well-Being

The “society and well-being” get the third highest coverage in the City of Calgary. Further, breakdown of this dimension reveals that out of 42 articles on this dimension, 26 articles (62%) were categorised under “social inclusion, rehabilitation and development” sub-dimension. In Calgary, 2013 floods and economic downturn had a devastating and disproportionate impact on the community. In this context, the discussion was focused on building resilience of youths, vulnerable adults, and marginalised and minority communities to disasters, economic downturn, and its social impact (trauma, addiction and mental illness, social injustice in form of inequity and exclusion) through social support, skill development, mental health and PTSD counselling services, and outreach programs. Articles on addiction and mental health support had a substantial appearance in Calgary. The next prominent subdimension was “prevention and reduction of crime and violence” through law enforcement and social inclusion to prevent extremism and radicalisation. “Accommodating immigrants and refugees” was the sub dimension where the idea is to integrate newcomers successfully in the community through programs and initiatives like capacity building, language support, skill development, and job training. The remaining articles under this dimension focused on “community preparedness” and “affordable housing for all”.

d) Built Environment and Infrastructure

Out of 21 articles that discussed “Built Environment and Infrastructure”, 15 articles focused on “robustness of public infrastructure” to enhance the resilience of buildings and infrastructure to floods, extreme weather events, and increased demands due to urbanisation. Resilience measures,

as reflected in articles, were generally focused on engineering solutions by investing in new infrastructure projects or by upgrading and maintaining aging infrastructures. Four articles were on “transportation infrastructure” that emphasized the robust transit system that are resilient to floods and urbanisation. The remaining two articles were on “land use and urban design” and “accessible infrastructure for people with disabilities”.

e) Natural Environment

The “natural environment” dimension had the least coverage with only four articles in six years from 2013 to 2018. Two articles were related to “conservation of natural ecosystem and biodiversity” to build the City’s resiliency towards floods and urbanisation. Whereas the remaining two articles were on “sustainable agriculture” to make food systems resilient to climate change and environmental threats.

Table 5-6 Dimensions and narratives of Resilience in City of Calgary

Dimensions and Narratives	Number of Articles	Percentage (%)
Built Environment and Infrastructure	21	10.6%
Accessible infrastructure for people with disabilities	1	4.8%
Land use and urban design	1	4.8%
Robustness of public infrastructure	15	71.4%
Transport infrastructure	4	19.0%
Economy	80	40.4%
Business continuity, stability and preparedness	26	32.9%
Economic stability and growth	28	34.2%
Housing market stability and affordability	22	27.8%
Real estate market	4	5.1%
Governance and institutions	51	25.8%
Budgeting and financial resource allocation	11	21.2%
Climate action	5	9.6%
Comprehensive city building	2	3.8%
Emergency preparedness	30	59.6%
Fund research and collaboration	3	5.8%
Budgeting and financial resource allocation	11	21.2%
Natural Environment	4	2.0%
Conservation of natural ecosystems and biodiversity	2	50.0%
Sustainable agriculture	2	50.0%

Society and Well Being	42	21.2%
Accommodating immigrant and refugees	5	11.9%
Community preparedness	4	9.5%
Affordable housing for all	1	2.4%
Prevention and reduction of crime and violence	6	14.3%
Social development and rehabilitation	26	61.9%
Total	198	100%

5.3.1 RESILIENCE OF WHAT TO WHAT?

Assessment of articles in the City of Calgary resulted in 22 systems under the ‘resilience of what’ category and 19 different threats and stressors under the ‘resilience to what’ category. Their linkages resulted in 51 different combinations of “resilience of what to what”. As seen in Figure 5-12, the top five threats and stressors identified were: 1) economic downturn, 2) floods, 3) changing economic environment, 4) urban challenges, and 5) climate change and associated threats. The most prominent narrative in the City, according to news articles, was to enhance the capacity of the City to cope with floods. This was followed by the “resilience of housing market to the economic downturn” in 20 articles, “resilience of the economy to economic downturn” in 14 articles and resilience of the City and community to economic downturn with 13 articles each. Other distinct narratives included: “food system resilient to environmental and urban threats”, “resilience of people with disabilities to the urban environment”, and “resilience of the community to crisis and trauma”.

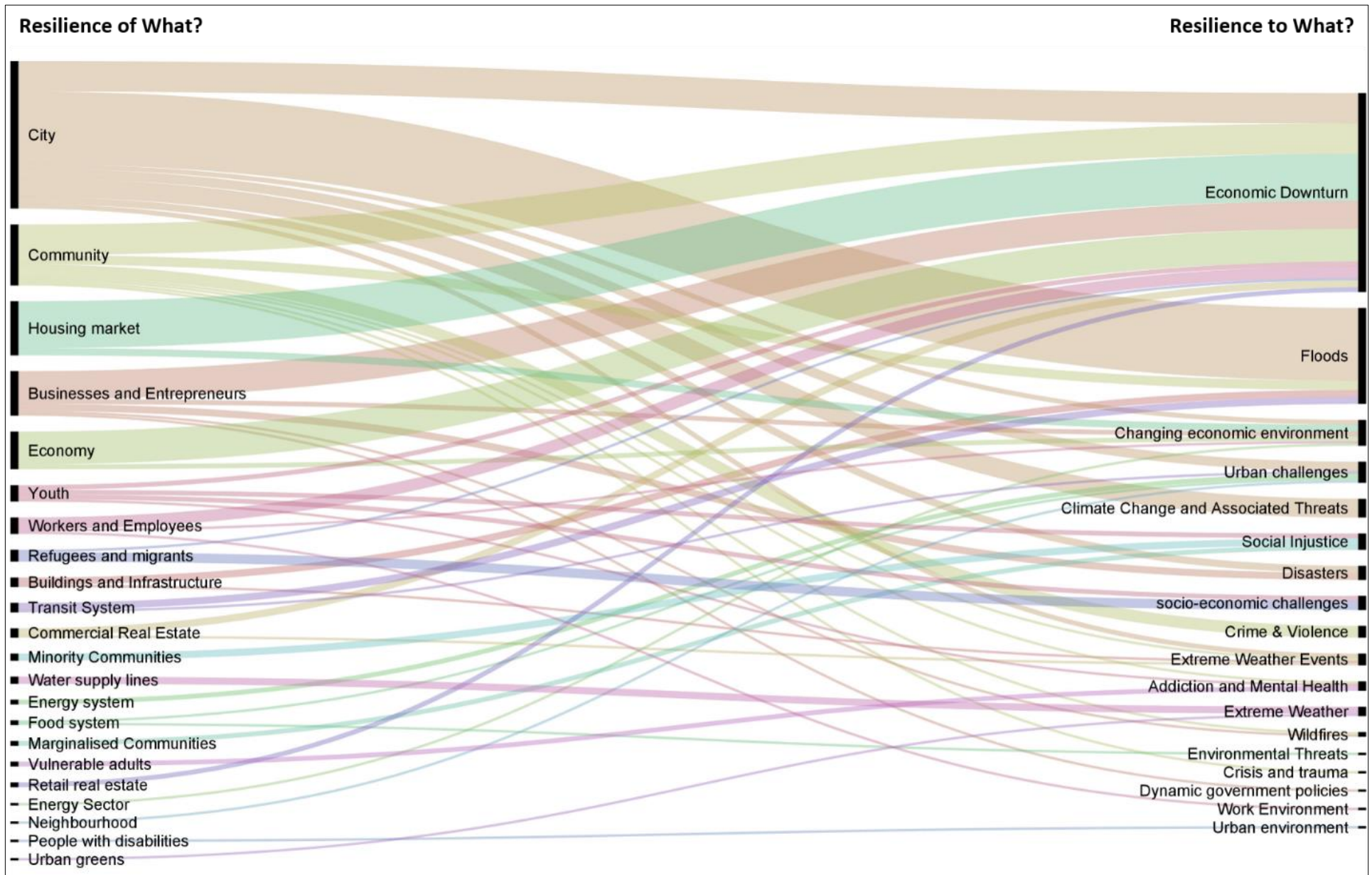


Figure 5-12 Sankey diagram of "resilience of what to what" in City of Calgary

CHAPTER 6: DISCUSSION

Prior studies on urban resilience have focused on understanding the multiple meanings and interpretations of the term (Meerow et al., 2016; Moser et al., 2019; Reid & Botterill, 2013), underlying characteristics and principles (Béné et al., 2018; Brand & Jax, 2007), assessment frameworks (Sharifi & Yamagata, 2016) and relevance (Harris et al., 2017; MacKinnon & Derickson, 2013; Meerow & Newell, 2016; Vale, 2014). However, there are limited studies (e.g., Aldunce et al., 2016; Borie et al., 2019; Lu & Stead, 2013; Torres & Alsharif, 2017) available that investigates the narratives of urban resilience in practice. Also, there are no studies that focus on the interpretation of urban resilience in the public domain i.e., through mass media. In this study, I, therefore, aimed to contribute to this evolving field of urban resilience by addressing this gap through analyses of resilience narratives within local government and popular media within and across three cities in Canada: Toronto, Vancouver, and Calgary. This chapter is divided into two sections: first, I discuss my research findings across cities, and second, I discuss my findings in light of existing urban resilience literature.

6.1 NARRATIVES OF URBAN RESILIENCE ACROSS CITIES

Over the six years between 2013-2018, the discussion around resilience has increased in both internal policy discussions and popular media. This signifies the growing recognition and evolution of the resilience concept in the three urban cities under study. In each city, as per the temporal trends seen in prevailing chapters, the occurrence of an emergency event catalysed the resilience related discussion. For instance, in the City of Toronto, the importance of resilience was acknowledged in response to severe flooding in 2013. In 2018, the Toronto van attack and the Danforth mass shooting triggered an increased focus on resilience in popular media. Similarly, in Calgary, strategies around resilience were incorporated into city agendas in light of severe floods in

2013 and the economic downturn of 2014. Therefore, acute shocks have been the primary motivation for the integration of resilience ideology in urban planning practice in Canada. This, in policy literature, is also recognized as an agenda-setting driven by a “focusing event” (Kingdon, 1984). The theory of “focusing event”, conceptualized by John Kingdon in 1984, is referred to as a critical, sudden, and rare events that lead to attention and potential policy change (Birkland, 1998). According to Kingdon, focusing events gain their agenda-setting power by aggregating the damage and thereby trigger the opening of “policy window” (Béland & Howlett, 2016; Birkland, 1998; Farley et al., 2007; Kingdon, 1984). It is worth noting that cities’ involvement in the 100RC program by The Rockefeller Foundation have also impacted the prominence of the concept.

My analysis across three cities found a range of resilience narratives. These narratives, as stated earlier, represent the attributes or actions required in the city to be resilient. During the analysis, I found that the City of Vancouver had limited usage of the term in their official discussion. It should be noted that I am not stating that Vancouver is not undertaking resilience-building activities, but rather that they have not openly adopted the terminology in their council discussions. On the other hand, Calgary has been specific in their resilience narratives, whereas Toronto had numerous distinct narratives. In Toronto, resilience was associated with 17 different narratives (Table 4-1). Among these, climate action; green infrastructure and low impact development; and robust healthcare system were the prominent narratives. In the City of Vancouver, term resilience was associated with ten different narratives (Table 4-2), but the term was more related to ‘robustness of public infrastructure’; and, ‘social inclusion, development and rehabilitation’. In the City of Calgary, in contrast, resilience themes were more focused on the shocks faced by the City, and were mainly associated with emergency preparedness in response to flooding, and economic stability and growth amidst an economic downturn (Table 4-3). The difference in narratives reflects

that institutional context, focusing events, stressors, and development objectives frame the narratives of resilience.

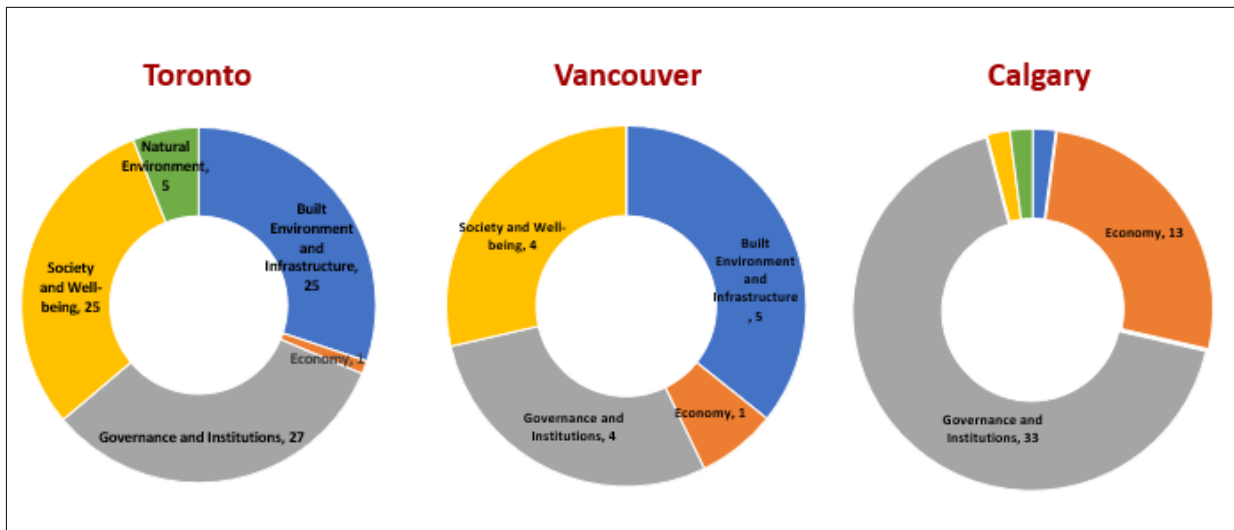


Figure 6-1 Distribution of thematic dimension in three cities: Toronto, Vancouver, and Calgary

Further, my findings indicate that even within specific resilience narratives, the context can vary depending on what system is being considered (resilience of what) against what kind of threat / disturbance (resilience of what) and by whom the action is being mobilised. For instance, climate action was a prominent narrative that emerged in the City of Toronto. For Toronto’s Public Health department, the essence of this narrative was focused on community resilience to climate change health risks. In this regard, the department developed a five-year (2015-2019) Climate Change and Health Strategy plan to assess and respond to the health and social impacts of climate change (Toronto Board of Health, 2016). For the Planning and Growth Management division, the climate action narrative focused on the City’s climate resilience through land use planning and green infrastructure programs like Eco-roof Incentive Programs (Toronto Planning and Growth Management Committee, 2018a). In contrast, the Parks and Environment division in the City was inclined towards the resilience of infrastructure and services to changing weather patterns along

with the goal of transition to a low-carbon Toronto by 2050 (Toronto Parks and Environment Committee, 2016).

In a similar observation, the ‘social inclusion, development and rehabilitation’ narrative emerged in all three cities. However, plans, policies, and actions varied depending on the target group considered (in other words whose resilience was privileged) and on what threat was prioritised. In Toronto, measures under this narrative were directed towards youth resiliency to assist youth in coping with identity challenges and creating support systems to help them resist the frustration and disillusionment that leads to involvement in crime and violence (Toronto Community Development and Recreation Committee, 2014). In Vancouver, the context of this narrative was specific towards the rights and resilience of indigenous communities (Vancouver City Council, 2017). In contrast in Calgary, the context was to provide social support to the community impacted from the economic downturn through skill development, mental health support, funding and outreach programs (Calgary City Council, 2017).

This evidence shows that the concept of resilience is malleable to adapt to local needs. This thereby validates the claim by Brand & Jax (2007) and reiterated by other scholars (Baggio et al., 2015; Gillard, 2016; Meerow & Newell, 2016), that resilience serves as a “boundary object” (Star & Griesemer, 1989). As a boundary object, it provided flexibility to different departments in cities to frame their own agendas and work towards a common goal of building resilience. However, the operationalisation of resilience in practice requires a clear specification in terms of “resilience of what” and “resilience to what” (Carpenter et al., 2001). It also depends on who is involved in the decision-making process as different actors have different priorities (Meerow & Newell, 2016).

6.1.1 REFLECTIONS FROM NEWSPAPER ANALYSIS

Analysis of newspaper articles in three cities resulted in varied narratives which, the city should incorporate to be resilient. Similar to city council minutes, the prominence of the resilience concept has also increased in media over time. Traditional narratives such as climate action, emergency preparedness to withstand shocks, the robustness of public infrastructure, and economic stability were prominent in all three cities. However, the media analysis helped to discover the association of resilience with some unconventional narratives that are not strongly discussed in the resilience literature, such as: culture and heritage; sustainable agriculture; trade and commerce; real estate market; and, inclusive and diverse society by planning for migrants and refugees. Analysis revealed that the priorities of these narratives varied across cities, as well as differed from the priorities of the city government.

In the City of Toronto, the analysis of 147 articles resulted in 28 narratives compared to 17 narratives in council minutes. Prevention of crime and violence; robustness of public infrastructure; and, social inclusion, development and rehabilitation were three most appeared narratives in the media. Comparative analysis reveals that both city government and newspaper promoted different narratives, and thus lacked congruence. For instance, for Toronto, climate action was a major narrative in order to enhance the resiliency of city and its infrastructure towards climate change and associated threats. However, this narrative was not substantially discussed by the media. Also, narratives of food security and accessibility; and, robust healthcare system which were considerably acknowledged by the City, were also absent in news media discussion. Likewise, discussions in media were inclined towards the prevention of crime and violence with around 36 articles, whereas there was only one reference to this narrative in Council minutes.

In the City of Vancouver, as discussed above, the resilience terminology was not used in City Council minutes. The amount of data retrieved from Vancouver city minutes was limited for relevant comparison with newspaper articles. However, analysis of 139 articles in Vancouver resulted in 19 narratives where housing market stability and affordability; emergency preparedness; and, social inclusion, development and rehabilitation were three most appeared narratives. The housing unaffordability appeared as one of the major stress in the City and thus, the media paid a great attention to the resilience of the housing market to economic shocks as well as dynamic government policies. This narrative was, however, not portrayed by the City. Again, I do not want to imply that the City has not taken efforts to deal with the issue of unaffordable housing, but rather they do not categorize their actions under the resilience umbrella.

In comparison to Toronto and Vancouver, Calgary showed a better congruence of narratives by the City and newspaper articles. Both, the City government and news media had the similar focus on the economic stability amid the economic downturn and emergency preparedness in response to floods. It is worth noting that few prominent narratives that emerged in media analysis such as: housing market stability; and, business continuity and preparedness did not appear in the city analysis. Comparison of narratives across cities is tabulated in the Table 6-1.

Further, media has a decisive role in (risk) governance, policymaking, and communication. They are an important source of disseminating information and serves as a link between the political system and the social system. People receive information on government policies, strategies, and actions from the media source therefore, media is liable to provide complete and accurate information. While reviewing the newspaper articles for this thesis, I observed that first, media provides no detailed understanding of what the term resilience entails in the city context. Second, cities' resilience efforts were not effectively infiltrated in the public domain. Analysis of council minutes gave an overview of resilience building strategies in the cities such as: ResilientTO,

TransformTo, Youth Equity Strategy, and Alberta Community Resilience Program. Communication of these plans, policies, and programs to mass public or the target groups is important for the public to realize their part to improve resilience and thereby achieve desirable policy outcomes. However, these initiatives were not openly discussed in the public platform.

Third, news media had limited coverage on cities' involvement with the 100RC program. The discussion on the 100RC program appeared only when the respective cities hired their Chief Resilience Officer (CRO) to help coordinate city's resilience efforts across city departments. The appointment of CRO was criticized by the media in Calgary and Vancouver. For Calgary, it seemed to be an additional pressure on their economic resources while Vancouver criticized the influence of foreign entity in their civic affairs. This indicated the lack of awareness of the program. Excerpts in this context are:

"When city hall's expenses are at an all-time high, one would expect positions to be eliminated, instead of increasing. Being a chief implies having underlings - more expense. And the statement, "We have to be collaborative and interconnected, in order to prepare for and recover from the shocks and stresses that Calgary faces and will face," is to me, the usual bureaucratic bafflegab." (Pyrik, 2017)

*"But **resilience** is more than recovery from earthquakes, fires and floods, we're told by 100 **Resilient** Cities, but encompasses other stresses cities face such as high unemployment, overtaxed public transit systems, violence, food and water shortage and, of course, the mother of all challenges, climate change. Indeed, so vague are the parameters of the job that it could include anything. But before we get into the issue of jargon versus substance, we must address the matter of foreign influence in civic affairs. Vancouver's chief **resilience** officer position will be funded by a two-year grant from the Rockefeller Foundation. [...] Should a foreign entity have its own paid employee working at City Hall?" (Vancouver Sun, 2017)*

Further, I also noticed that the media was apprehensive in reporting the underlying challenges in the city. It was more evident in the case of Toronto, where media created an image of positive resilience while subdued the potential threats. In the reporting of mass violence events, media had dominantly portrayed the community to be resilient and discussed the responsive and

preventive measures for these events. For instance, it was noted that for the increased frequency of vehicle attacks, urban design measures were required for pedestrian safety. But the overall stand of media was that embedding security bollards on public spaces will instill a sense of fear and will undermine the freedom of movement. Similarly, for mass shooting events media highlighted the views of some proponents that advocated for measures like tougher gun laws and transformative change in policing system. But the major essence of media was biased towards just social reconditioning of those involved in crime. Overall the media marketed that city and community were resilient and created an aura of *“pseudo resilience”*. For instance:

*“We're dealing here with a city that is in mourning, But we're strong and we're **resilient** and we're, I think, showing the world how Toronto responds in times like these.” (Blackwell, 2018)*

*“While our city will always be **resilient** in the face of such attacks, it does not mean such a cowardly act committed against our residents is any less painful” (Toronto Star, 2018)*

In a study by Kaika (2017), the author argues that praising community or city as resilient by media and policy-makers portrays that the community is capable of undergoing more suffering. It is, therefore, necessary that instead of describing systems as resilient measures should be taken to fix things that create the need for them to be resilient (Kaika, 2017).

To this end, the media should be more informed about city strategies and should disseminate more comprehensive information to the public. People should be clearly made aware of potential threats and risks as well as their roles in the resilience building process in the city. The following section compares the findings with the academic literature.

6.2 CORELATING URBAN RESILIENCE IN PRACTICE WITH LITERATURE

There are various definitions of resilience across different academic domains (e.g., Folke, 2006; Holling, 1996; Martin, 2012; Walker et al., 2004). Engineering resilience (equilibristic), ecological resilience (adaptive), and socio-ecological resilience (transformative) were three prominent understandings of resilience. The general essence of these definitions ranged from resilience as a return to the previous (exact) state, to resilience as maintaining the same state and identity by adjusting structure, and/or resilience as bouncing forward and transforming to new states. These academic definitions had well defined and distinct attributes. Analysis of council minutes and newspaper articles in three cities (Toronto, Vancouver, Calgary) did not reflect any explicit definition of resilience. However, it was evident that building resilience in practice does not rely on a single academic definition, but instead embraces the characteristics of multiple fields.

For instance, In Calgary, after the devastating floods in 2013, different physical and social measures were undertaken for flood management and recovery. These measures included hardening of buildings, flood resilient infrastructure, protection of flood plains, enhancement of riparian areas, capacity building, and PTSD counselling for affected communities and flood investments to recover economic losses. It thereby integrated notions from the engineering perspective to recover and restore services; psychosocial perspective to support the affected communities; ecological perspective to adapt; economic perspective to limit economic losses; and, managerial and institutional approaches to exert control over future uncertainties. Cities are complex systems composed of different subsystems. These subsystems require different interventions. Therefore, resilience as a concept can be viable in practice only if it simultaneously incorporates attributes of different domains. But again, the interpretation of resilience in practice is also dependant on who/what is at risk.

In academic literature, the resilience concept had not only various definitions but also multiple usages. Scholars used the term “resilience” as a goal, an analytical tool, a metaphor, and as an indicator (Béné et al., 2018). However, through my research, I observed that resilience in practice is generally deployed as a goal or as a positive attribute that cities aim to achieve. Practitioners and policy-makers identify plans, policies or actions that ensure the city and its subsystems are ‘resilient’ or become ‘resilient’. This finding is supported through the examples noted below. In all the instances stated below, resilience is the ultimate goal. But it is still not clear on how resilience will be measured? What is considered as a resilient state? How much resilience is considered ideal?

*“To review Toronto's Ravine system in the context of potential development impacts, including shadowing of tall buildings, to ensure the **resiliency** of the Ravine System and associated ecosystems.” (Toronto City Council, 2017)*

*“The struggle to make Vancouver an inclusive, **resilient** and vibrant city will continue. We recognize that even during the darkest days of racial discrimination and prejudice, there were those brave enough to stand up against injustice. Through such everyday acts of firmness and resolve, our city has become a better place, and will continue to become a better place for all of our citizens.” (Vancouver City Council, 2017)*

*“Parks’ Biodiversity Strategy provides a framework for The City to foster more **resilient**, biologically diverse open spaces and neighbourhoods that support positive outcomes for Calgarians, visitors, wildlife and plant communities, and use this as a longer term approach to address that challenge.”(Calgary City Council, 2017)*

Moreover, urban resilience literature highlights two main approaches to operationalise resilience in practice: adaptation and transformation (Chelleri et al., 2015; Redman, 2014). Adaptation referred to incremental measures to accommodate shocks and stresses without changing the identity of the system, whereas transformation referred to radical measures that result in change of the fundamental structure of the system (Chelleri et al., 2015; Redman, 2014). From my analysis, I observed that most actions were adaptive in nature and dealt with specific issues like food security issues in Vancouver, power outages in Toronto, and economic instability in Calgary. In these

cases, the general focus was to reduce vulnerability, enhance coping capacity, and increase overall resilience without any radical restructuring of the urban system. This, however, seemed that standard practices to address the usual concerns are being termed as resilience building.

In response to disruptive shocks, I found cities' measures were typically biased towards technocratic interventions, whether it was seismic retrofit in response to earthquake in Vancouver or flood preventive infrastructure in Calgary and Toronto. Actions were more focused on the resilience of physical systems (buildings and infrastructure) than the social and ecological systems of the city. For instance, Calgary's 2017 The Alberta Community Resilience Program (ACRP) was a multi-year grant program that aimed to promote long-term community resilience to floods and droughts. The core focus of the program was to provide funding for critical infrastructure² projects while other projects were not eligible.

Moreover, media points out that policy-makers are more inclined towards new infrastructure projects than upgrading the old infrastructure or any other strategy as they are more apparent to the public and triggers their political motive.

“Naturalization of the river’s edges and imagines relocating old infrastructure, more buyouts of property owners, limiting new development, closing of old infrastructure sites and returning them to the river. “There are a lot of different ways of going at the issue, and they need to be assessed,” [...] Some major projects have already been put in motion, though critics argue they are more about gratifying political impulses than meeting infrastructure needs. In the wake of the 2013 storm, the Prentice government (Calgary) was focused on big infrastructure works, the sort of project that brings the sense of reassurance – and the political payoff – that more nuanced strategies do not.” (Bozikovic, 2015)

The transformative change was observed in the governance structure of cities post its involvement with the 100RC program. Through the resilience planning process, all three cities

² Critical infrastructure includes water, wastewater, and stormwater works, as well as infrastructure used to access those services (including roads and transportation corridors, commercial and residential areas).

initiated to move beyond the functional silo-mentality and acknowledged the need for collaboration with private sectors and organisational coordination within different departments and across levels of government. However, various actors involved in the process have their own set of objectives, diverse values, different nature, range, and depth of interest. Resilience, as a “boundary object” can facilitate interdisciplinarity and communication between diverse actors to achieve a common goal (Brand & Jax, 2007). But at the same time, the involvement of a different groups of actors in the process can result in bureaucratic politics i.e., power relations among the actors. This can bring in conflict over whose vision prevails or what is a desirable outcome and who is at benefit or loss with that construct. Power relations among actors can thereby lead to trade-offs and exclusionary practices (Olsson et al., 2015).

In addition, the association of term resilience with all aspects of planning issues does not give exclusivity to this process. The planning process has always accounted for chronic stresses in the city but had limited accountability towards climate change and acute shocks. The incorporation of resilience in planning has increased responsibility towards climate change and disasters. But with focus on divergent issues, resilience is turning as a new word to the old planning process. Further, many scholars (e.g., Aldunce, Beilin, et al., 2016; Harris et al., 2017; Hung et al., 2016) have emphasized the importance of community participation in resilience building. However, during the analysis, I found limited discussion on the involvement of the community in the resilience building process. This lack of discussion portrays a perspective that the involvement of community is limited in the decision-making process and resilience efforts are defined by city authorities. This, again makes me question if resilience planning is a duplicity to the already existing planning process?

Table 6-1 Narratives of resilience across cities

Dimensions	Narratives	Local Government			News Media		
		Toronto	Vancouver	Calgary	Toronto	Vancouver	Calgary
Built Environment and Infrastructure	Accessible infrastructure for people with disabilities						1
	Building codes and building designs	1			3		
	Climate-positive urban development				5		
	Comprehensive city building				4		
	Data management for service efficiency				1		
	Green infrastructure and low impact development	13	1		2		
	ICT infrastructure			1			
	Land use and urban design		1				1
	Large scale economic infrastructure					2	
	Robustness of public infrastructure	9	3		20	7	15
	Transportation infrastructure	3				5	4
Economy	Business continuity, stability and preparedness	1					26
	Economic stability and growth			13	7	8	29
	Housing market stability and affordability				7	21	22
	Income and poverty				2		
	Investment in green economy		1			2	
	Real estate market				2		4
	Stability of financial institutions				3	4	
Trade and commerce				1			
Natural Environment	Conservation of natural ecosystems and biodiversity	5			9	9	2
	Management of public spaces and urban greens			1	6	7	

	Sustainable agriculture					2	2
Society & Well Being	Accommodating immigrant and refugees	1			1	4	5
	Community engagement				2	2	
	Culture and heritage				5	3	
	Food security and accessibility	3	1				
	Housing affordability				1	3	1
	Prevention and reduction of crime and violence	1			36		6
	Robust healthcare system	13			1		
	Social inclusion, development and rehabilitation	7	3	1	15	16	26
	Governance and Institutions	Budgeting and financial resource allocation	1	1	4	3	
Capacity building		2	1		1		
Climate action		13		3	4	12	5
Comprehensive city building		2		2		8	2
Emergency preparedness		6	1	24	1	16	33
Fund research and collaboration		2			1	8	3
Governance structure and strong leadership					4		
Organisational coordination			1				
Total		83	14	49	147	139	198

CHAPTER 7: CONCLUSION

This thesis was an empirical exploration to understand the relevance of urban resilience in practice. The objective of this study was first, to map the narratives of resilience by local government and popular news media in three cities in Canada: Toronto, Vancouver, and Calgary. Second, to explore how resilience in practice correlates with our understanding of resilience from academic literature.

This thesis began with understanding the academic lineages of the resilience concept. Resilience is recognised as the ability to withstand, prepare, and recover from shocks and stresses (100RC, n.d.-b). The concept has evolved in diverse fields with discrete definitions relevant to distinct problems and backgrounds. However, engineering, ecological, and socio-ecological resilience were three prominent domains of resilience. The general essence of these definitions ranged from resilience as a return to the previous (exact) state, to resilience as maintaining the same state and identity by adjusting structure, and/or resilience as bouncing forward and transforming to new states. Literature reflected on different usage of the concept as a goal, an analytical tool, a metaphor and as an indicator. Due to the flexibility of the concept, resilience has been associated as a “boundary object”(Brand & Jax, 2007; Star & Griesemer, 1989) in the literature. With all this background, this thesis was interested to know how practitioners and citizens frame the term resilience. How these academic understandings work in practice and if resilience functions as a boundary object in practice also?

The study used content analysis and a multisite case study approach to answer the primary research questions. The study was conducted in three cities of Canada: Toronto, Vancouver, and Calgary because these cities were selected to be part of the “100 Resilient Cities” (100RC) program launched by the Rockefeller Foundation, and they are the largest English-speaking cities of Canada.

These cities had a similar population trend but were diverse in terms of the economic base, climate, natural hazards, spatial characteristics, and resilience challenges. I examined the City Council minutes and four major outlets at both the national and local levels in each city from 2013-2018. The year 2013 also coincided with the launch year of the 100RC program.

Over the six years between 2013-2018, the discussion around resilience has increased in both internal policy discussions and popular media. Findings resulted in varied narratives across three cities. These narratives were shaped by institutional context, focusing events, stressors, and development objectives. The resilience-related discussions in all three cities were initiated in response to the shocks faced by the city, but now it is associated with numerous aspects like food security, law and order, housing affordability, and trade and commerce. The association of resilience with all contexts of planning actions has diluted the essence of the concept. Consequently, resilience planning tends to turn into a new name for the old planning process. This thesis suggests that the resilience concept should have more focus on shocks and climate change associated threats, which were earlier not accounted in planning processes and paradigms. This view is, however, based on the analysis of the council minutes and media articles only. This thesis has not assessed the final resilience strategic plans published by the Cities in the year 2019.

The media analysis reflected on the disconnect between government and media narratives. It was found that the city's resilience efforts were not effectively infiltrated in the public domain. Moreover, the media was apprehensive in clearly reporting the underlying challenges in the city. It is imperative that the media should be more informed about city strategies and should disseminate more comprehensive information to the public. People should be made aware of potential threats and risks as well as their roles in the resilience-building process in the city.

Further, this study suggests that resilience in practice does not depend on silo definition but incorporates the attributes of definitions from multiple domains. The results also provided compelling evidence that the resilience concept is malleable to adapt to local needs. It thereby serves as a 'boundary object' and allows flexibility to different departments in the City to frame their agendas and work towards a common goal of building resilience. However, the development and implementation of urban resilience policies require resilience to be more descriptive in terms of who/what is at risk and what is the potential risk.

Overall, resilience theory used as principle must be specifically defined in the context of planning by the local government. Moreover, policymakers should clarify how they work towards resilience building through particular actions and should facilitate effective means to communicate comprehensive information to the public.

7.1 STUDY LIMITATIONS AND FUTURE RESEARCH

There were a few limitations to the study. The study relied entirely only on the secondary data from City Council meeting minutes and newspaper articles from popular media outlets. It did not include reports from business, philanthropic, and other organizations that are working for resilience building in the city. Besides, the newspaper was the only communication channel considered while other mass communication mediums like news broadcast and social media were not reviewed. Follow-up work can include a review of other mentioned data sources. Future research can also validate the empirical findings of this study directly from the actors involved in the resilience-building process and the public using research methods like interviews and surveys.

This study indicated that resilience activities in cities are undertaken by multiple city departments and other external stakeholders. Therefore, resilience planning requires effective

collaboration and cross-sectoral coordination within different departments. However, this study fails to capture how these different actors collaborate and coordinate for informed decision making and implementation of resilience strategies. Future studies can examine the collaboration process and analyse the interaction network of autonomous actors through methods like social network analysis.

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