

Developing Complete Streets inside Cities through the Establishment of Strong Policies

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ABSTRACT: The complete streets movement has been defined as the latest movement for providing safe streets for all modes of transportation and people of all ages and abilities through redesigning streets' spaces. The first phase in planning a successful complete street for any location is establishing a solid policy. To identify the key components of the firm policy, this study surveyed the highest-ranked complete streets policies in North America since the concept of the complete street has emerged in the USA. This study aimed to provide an exemplary policy structure for other societies to use as a model for developing successful complete streets policy in their communities. To support this effort, an integrated literature review made for an inclusive methodological approach. As a result, fundamental approaches to writing and defining an ideal complete street policy are clarified. Also, two characteristics outside the policy elements, which improved the policy's potential for success, are discovered.

Keywords: Complete streets; Complete Street Policy; Policy Main Elements; Policy Types.

INTRODUCTION

In the past century, many authors and scholars, including Kevin Lynch, Jane Jacobs, William H. Whyte, Lewis Mumford, Donald Appleyard, and Jan Gehl, identified streets as physical and social parts of living communities and streets' influence on social contexts, civic activities, motor vehicle movement, and sustainability in human communities (Dehghanmongabadi & Hoşkara, 2020a; George, 2013; Southworth & Ben-Joseph, 2003). Many of these scholars clarified the important role of streets for public realm vitality and supporting all modes with equal priority (Dehghanmongabadi, 2021). By focusing on the part of streets and applying various strategies, communities can bring back active modes of transportation to the streets (Dehghanmongabadi & Hoşkara, 2020a; Litman, 2014; Marti et al., 2013; Scott et al., 2013). This manuscript focuses on the concept of complete streets as a recent movement, which emerged in North America in 2003 (Marti et al., 2013). By concentrating on the redesign of streets, communities can provide more opportunities to bring back active modes of transportation to the streets and increase the safety of streets for

all modes of transportation and users of all ages and abilities (Hui et al., 2017, Dehghanmongabadi, 2021). Within this study, an integrative literature review was conducted to explore how cities can define a strong complete streets policy as the first step towards reaching successful complete streets in their communities.

This research consists of three main steps. In the first step, the study focuses on the complete streets movement for clarifying its background, benefits, and characteristics. Secondly, the complete streets policy structure focuses on identifying the main elements of an ideal policy. After that, a deep investigation of the best complete streets policies throughout North America, announced annually by The National Complete Streets Coalition (Smart Growth of America), is provided. Figure 1 provides the theoretical framework of the research.

MATERIALS AND METHODS

This part describes the methodological approach to investigation, concentrating on how the study has been planned to achieve its intention and respond to its research question.

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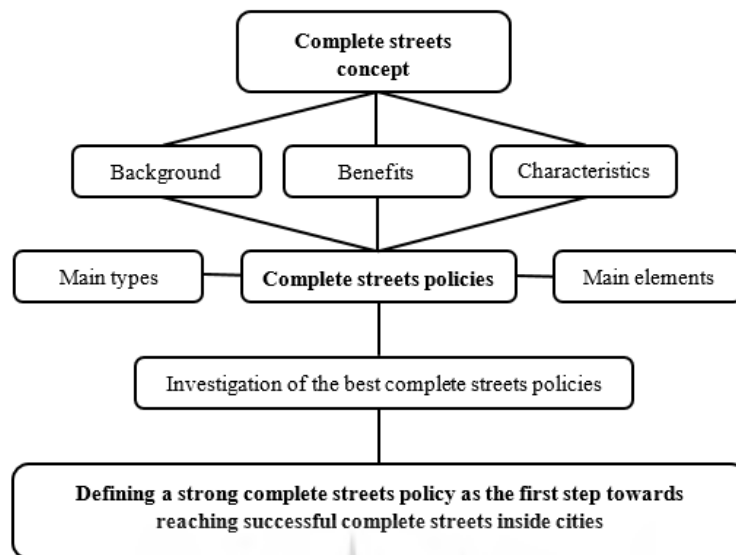


Fig. 1: The theoretical framework of the study

Besides, it presents how the data have been collected and analyzed as a part of the investigation design. This research assesses the concept of 'complete streets' towards providing information about complete streets policies. There are a limited number of researches and projects about complete streets all around the world. Hence, the primary motivation of this study is the tendency to fill the gap in knowledge about the policy of a thriving complete street. Investigations related to urban studies fall into social science and design research; therefore, various research approaches can understand the key concepts, issues, and contexts. This research can be considered social science research since it explores "how things" and "why." It aims to explore a topic, i.e., complete streets, to map it out that may warrant further study in the future.

In the investigation arena, data collection methods can commonly be divided into two groups: quantitative and qualitative methods. The data collection method relies primarily on qualitative techniques through an integrative literature review and documentary research methods for this investigation. An integrative literature review method is the broadest form of research review approach, allowing for the concurrent inclusion of experimental and non-experimental investigations to comprehend a subject and phenomenon fully. Besides, an integrative literature review method can combine data from the theoretical and empirical literature (Whittemore & Knafli, 2005). In general, the literature review method in this study aims to provide a theoretical basis, substantiate the existence of the investigation problem and explain the research as one that offers something novel and original to the cumulated knowledge (Hart, 1998; Levy & Ellis, 2006). The documentary research method is another technique that is used in this study.

This method has been one of the primary data collection techniques of social research since its initial inception. The use of the documentary method denotes the analysis of documents that encompass information about the subject studied (Bailey, 2008). Consequently, for collecting necessary data for achieving the aim of this study, an integrative literature review and documentary research was conducted based on published articles in scientific journals, books, published conference papers, technical reports including design guidelines related to complete streets, and published research works. The keywords used in literature searching are included "Complete streets" and "Complete streets policies."

In this investigation, based on the annual announcement of the best complete streets policy by the National Complete Streets Coalition (Smart Growth America), the top ten guidelines from 2011 until 2016 in North America were selected (Table 1). Table 1 presents general information about the best policies, including the city's name, population, policy score, year of policy publication, and type of policy.

The six highest rank policies (the highest from each year) were picked for detailed examination among these selected policies. The examinations focused on evaluating how these highest ranked policies considered the main elements of policy and noted the strengths of each policy. Brief information on selected policies and their related cities are provided in Table 2.

Literature Review

The term "Complete Streets" was conceived in 2003 by Barbara McCann, a staff member of the advocacy group America Bikes (George, 2013; Gill, 2014; Scott et al., 2011). This term helped communicate the capacity of cycling infrastructure within the

Table 1: List of the top ten best complete streets policies of each year between 2011 until 2016 based on (The Best Complete Streets Policies of 2016, 2017)

	Name	Year	Population	Policy score	Policy Type
* 1	Missoula, MT	2016	66,788	100	City resolution
2	Wenatchee, WA	2016	31,925	100	City legislation
3	Brockton, MA	2016	95,314	100	City legislation
4	Hull, MA	2016	10,293	98.4	City policy adopted by an elected board
5	Mansfield, MA	2016	23,184	98.4	City policy adopted by an elected board
6	Sherborn, MA	2016	4,119	98.4	City policy adopted by an elected board
7	Bridgewater, MA	2016	26,563	96.8	City policy adopted by an elected board
8	Brookline, MA	2016	58,732	96.8	City policy adopted by an elected board
9	Chester, MA	2016	1,337	96	City policy adopted by an elected board
10	Muskogee, OK	2016	38,616	96	City policy adopted by an elected board
*11	Reading, PA	2015	88,082	100	City executive order
12	West Hartford, CT	2015	63,268	94.4	City resolution
13	Park Forest, IL	2015	21,975	92.8	City Resolution
14	South Bend, IN	2015	101,190	92.8	City Resolution
15	Longmeadow, MA	2015	90,329	92.8	City legislation
16	Weymouth, MA	2015	53,743	92	City policy adopted by an elected board
17	Omaha, NE	2015	408,958	88.8	City policy adopted by an elected board
18	Vincennes, IN	2015	18,423	88	City legislation
19	Ashland, MA	2015	16,593	87.2	City policy adopted by an elected board
20	Natick, MA	2015	30,510	87.2	City policy adopted by an elected board
*21	Ogdensburg, NY	2014	11,344	92.8	City legislation
22	Troy, NY	2014	50,129	91.2	City legislation
23	Lakemoor, IL	2014	6,017	88.8	City resolution
24	Dawson, MT	2014	8,966	88.8	City policy adopted by an elected board
25	Austin, TX	2014	790,390	88.8	City legislation
26	Acton, MA	2014	21,929	87.2	City policy adopted by an elected board
27	Middleton, MA	2014	8,987	87.2	City policy adopted by an elected board
28	Reading, MA	2014	24,747	87.2	City policy adopted by an elected board
29	Salem, MA	2014	41,340	87.2	City policy adopted by an elected board
30	Stoughton, MA	2014	26,962	86.4	City policy adopted by an elected board
*31	Littleton, MA	2013	8,924	94.4	City policy adopted by an elected board
32	Peru, IN	2013	11,417	92.8	City policy adopted by an elected board
33	Fort Lauderdale, FL	2013	165,521	89.6	City policy adopted by an elected board
34	Auburn, ME	2013	23,055	88	City policy adopted by an elected board
35	Lewiston, ME	2013	36,592	88	City policy adopted by an elected board
36	Baltimore, MD	2013	805,029	86.4	City policy adopted by an elected board
37	Portsmouth, NH	2013	21,233	86	City policy adopted by an elected board
38	Piqua, OH	2013	20,522	82.4	City policy adopted by an elected board
39	Oakland, CA	2013	390,724	81.6	City legislation
40	Hayward, CA	2013	144,186	80.8	City policy adopted by an elected board
*41	Indianapolis, IN	2012	820,445	89.6	City legislation
42	Hermosa Beach, CA	2012	19,596	85.6	City policy adopted by an elected board
43	Huntington Park, CA	2012	58,114	85.6	City policy adopted by an elected board
44	Ocean Shores, WA	2012	5,569	84.8	City legislation

Continuie of Table 1

	Name	Year	Pupulation	Policy score	Policy Type
45	Northfield, MN	2012	20,007	83.2	City resolution
46	Portland, ME	2012	66,194	80.8	City policy adopted by an elected board
47	Oak Park, IL	2012	51,878	80	City legislation
48	Trenton, NJ	2012	84,913	78.4	City resolution
49	Clayton, MO	2012	15,939	75.2	City legislation
50	Rancho Cucamonga, CA	2012	165,269	73.2	City legislation
*51	Baldwin Park, CA	2011	75,390	92.8	City policy adopted by an elected board
52	New Hope, MI	2011	20,339	88	City policy adopted by an elected board
53	Hennepin County, MI	2011	m 1.212	81.6	City policy adopted by an elected board
54	Birmingham, AL	2011	212,247	79.2	City resolution
55	Bellevue, NE	2011	53,936	78	City resolution
56	Cook County, IL	2011	m 5.246	77.6	Ordinance
57	Roanoke, VI	2011	97,032	76.8	City policy adopted by an elected board
58	Azusa, CA	2011	48,799	76.8	City policy adopted by an elected board
59	Big Lake, MI	2011	10,360	76	City policy adopted by an elected board
60	Blue Island, IL	2011	23,785	76	Ordinance

*Highest-ranked policies
m = millions

Table 2: Information on top selected policies for each year from 2011 to 2016

Name Of city	Year of Policy	Description	References
Baldwin Park	2011	This city is located in Los Angeles County, California. According to 2010 census data, the population of Baldwin Park was 75,390. Its city council approved Administrative Policy #027 with a subject of Complete Streets Policy on 07/20/2011. This policy was ranked number 1 among 146 policies that were adopted in 2011	(City of Baldwin Park, 2011; Seskin et al., 2012)
Indianapolis	2012	This city is the capital city of Indiana, and the population of this city was 820,445 in the 2010 census. This city proposed a Complete Streets Policy that was approved on 05/31/2012. The National Complete Streets Coalition ranked it number one among more than 130 communities that adopted complete streets policies in 2012	(City of Indianapolis, 2014; Bhatt & Ryan, 2012; Seskin & Gordon-Koven, 2013)
Littleton	2013	As a small city in Massachusetts, according to 2010 census data, its population was only 8,924. This city proposed a Complete Streets Policy that was approved on 12/16/2013 and ranked by The National Complete Streets Coalition as the number one complete streets policy among more than 80 communities that adopted complete streets policies in 2013	(Town of Littleton, 2013; Seskin & Murphy, 2014)
Ogdensburg	2014	This city is located in New York and has a population of 11,344 based on the 2010 census data. The Complete Streets Policy of this city was approved by City Council on 13/02/2014 and was ranked by The National Complete Streets Coalition as the number one complete streets policy among more than 70 jurisdictions adopting complete streets policies in 2014	(City of Ogdensburg, 2014; Atherton et al., 2016)
Reading	2015	It is one of the largest cities in Pennsylvania, and the population of this city in the 2010 census data was 88,082. This city provided a Complete Streets Policy on 29/06/2014, and The National Complete Streets Coalition ranked its policy number one among more than 82 adopted Complete Streets policies in 2015	(Town of Reading, 2014; Atherton et al., 2016)
Missoula	2016	It is located in Montana, and according to 2010 census data, the population of this city was 66,788. This city provided a Complete Streets Policy on 09/12.2016 that was ranked by The National Complete Streets Coalition as the number one complete streets policy in 2016 among 222 new Complete Streets policies	(The Best Complete Streets Policies of 2016, 2017; The City of Missoula, 2016)

existing transportation system. After some time, the term and concept expanded to include pedestrian planning and all forms of motorized transit planning in addition to cycling planning (George, 2013; Gill, 2014; Kingsbury et al., 2011). At the heart of the complete streets concept, a multimodal transportation system allows users to choose their transport modes based on the types of trips. The opportunity to choose is the foundation for improving services, safety, performance, and comfort in all modes of transportation for both drivers and non-drivers (Burden & Litman, 2011; Marti et al., 2013; PARSONS, 2014).

The Complete Streets movement defines a street as something for everyone's use (Burden & Litman, 2011; Cui, 2013; McCann, 2013; Vandegrift & Zanoni, 2018). It considers the needs of all users by balancing access for people of all ages, abilities, ethnicities, and incomes, including those that use the street as a public space for leisure or to socialize (Cui, 2013; Kingsbury et al., 2011; Macdonald et al., 2010). However, the focus of complete streets is not just on individual streets. In essence, its focus is on changing the process of the decision-making, planning, designing, building, and operating of all streets (Laplante & Mccann, 2008; Rauf & Quarter, 2010; Skoworodko, 2012; Vandegrift & Zanoni, 2018). A complete street is defined as a street that is planned, designed, and operated to be safe, convenient, and comfortable for all users, including drivers, pedestrians, bicyclists, and transit riders of all ages and abilities (Burden & Litman, 2011; George, 2013; Hui et al., 2017; Macdonald et al., 2010; Mooney et al., 2018; Scott et al., 2011). By redefining the intention of streets, the Complete Streets movement promises to make communities more livable and sustainable (Anderson et al., 2015; Kingsbury et al., 2011; Zavestoski & Agyeman, 2015). Providing and adapting complete streets principles can benefit the communities in different ways (Cui, 2013; Dehghanmogabadi & Hoşkara, 2020b). The benefits of complete streets fall into six categories (Figure 2), and they are explained in the following.

1. Contribute to environmental health, healthy community, and green design

The complete streets concept provides an opportunity to encourage a multimodal transportation system and direct

specific attention to active modes. It can persuade people to choose different modes of transportation that produce fewer pollutants (noise, air, soil, water), use fewer natural resources, reduce traffic congestion, decreases roads and parking costs, and support more active lifestyles for improved public fitness and health (Anderson et al., 2015; Burden & Litman, 2011; George, 2013; Litman, 2014; Macdonald et al., 2010; PARSONS, 2014; Vandegrift & Zanoni, 2018). Green infrastructure, integral parts of complete streets such as street trees and stormwater, mitigate the environmental impact of runoff and other effects of transportation.

2. Contribute to convenient access and transportation equity and safety

The complete streets movement creates infrastructure and a physical roadway layout, keeping all users of different transport modes in mind by increasing users' ability to reach the required destination and providing equal access for all users (Kingsbury et al., 2011). Thus, complete streets equally accommodate pedestrians, bicyclists, automobile drivers, and transit users by providing appropriate space for all modes and their users. Besides, complete streets aim to expand and improve mobility and accessibility options and offer treatments to children, older adults, and disabled travelers through policies and design approaches. This encourages people to use alternative modes of transport to reduce private cars (Burden & Litman, 2011; Cui, 2013; Litman, 2014). Moreover, users' safety and comfort levels are significant incomplete streets since paying attention to these aspects can be tools for attracting non-motorized users and users of public transit services (Marti et al., 2013; McCann, 2013). Improving the levels of comfort and safety will provide more significant opportunities for vulnerable users (children, older adults, and disabled people) to be more independent and active in their environment (Burden & Litman, 2011; Scott et al., 2011). Thus, the complete streets movement focuses on safety, comfort, accessibility, mobility, and equity values for people of all abilities and modes of travel. It will increase livability and quality of life in communities (Burden & Litman, 2011; Marshall & Garrick, 2011; Marti et al., 2013).

3. Contribute to lower motor vehicle traffic speeds and

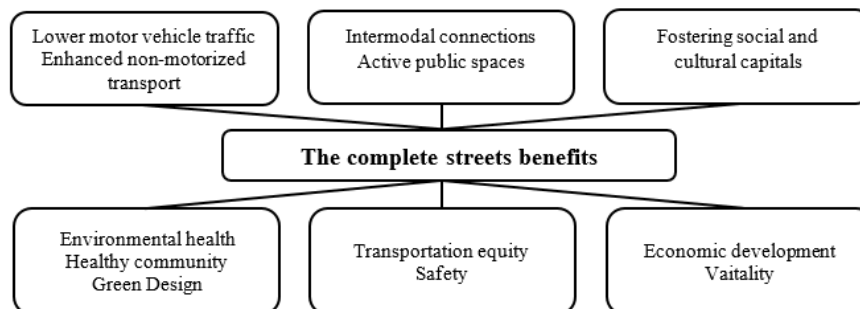


Fig. 2: The benefits of complete streets

enhanced non-motorized transport

Complete streets generally will reduce traffic speeds by using various policies, treatments, and design approaches that directly improve walking, cycling, and the conveniences of public transit services (Burden & Litman, 2011). Complete streets are based on pedestrian scale, and movement since pedestrians play a critical role in the vitality of urban settlements and all trips, no matter the model, including a pedestrian component.

4. Contribute to economic development and vitality

By applying the complete streets concept, the cost of infrastructure will be reduced. By designing a more accessible and safe transportation network amid residential areas, shopping destinations, offices, restaurants, public transport stations, and entertainment venues, local economic vitality and level of public investment and commercial activities will increase (Burden & Litman, 2011; Cui, 2013). Complete streets increase foot traffic, provide safe access to business areas, and contribute to a more attractive and vital economy. Moreover, retail sales and land values also increase after applying the complete streets concept. It offers different, less costly transportation modes that have financial benefits for people, governments, and families (Burden & Litman, 2011; Sadler, 2010; Zavestoski & Agyeman, 2015).

5. Contribute to intermodal connections and active public spaces

The complete streets strategy encourages a comprehensive, integrated, and connected network for all modes and street connectivity. It contributes to mode shift from motorized to non-motorized modes and invites people to take walks and use alternative modes of transport versus their private cars (George, 2013; Marti et al., 2013). As such, public spaces are designed for people, not cars, to offer more opportunities for residents to have easy, safe, and convenient access to public spaces (Marti et al., 2013; Scott et al., 2011). By considering all models and their connections, complete streets will increase transport system efficiency and more active public spaces (Burden & Litman, 2011; Hui et al., 2017).

6. Contribute to fostering social capital and communities

Complete streets offer a significant opportunity for residents to be involved in their communities and interact and reach community destinations (Cui, 2013; Marti et al., 2013). Complete streets foster strong communities by achieving social equity, building social capital, and increasing residents' sociability and community cohesion (Litman, 2014; Scott et al., 2011). The complete streets term is conceptual and changeable from place to place by considering the context of the road and its location. The design of complete streets also must be flexible in considering existing, and future development and contextual transportation needs because communities have different needs, characteristics, and users (Downing, 2013). Hence, organizations and agencies that apply complete streets must consider each project within the overall transport system (Downing, 2013; Gill, 2014). The concept of complete streets expands and improves infrastructure and facilities. It

provides transportation options by considering all modes of transportation, aims to increase levels of accessibility, and addresses the needs of all users of different ages, abilities, and incomes (Downing, 2013; Gill, 2014). Complete streets connect all modes of transport through well-designed and managed transportation networks that contribute to mobility, economic vitality, social cohesion, active and healthy communities (Cui, 2013; Downing, 2013). There is no common or standard template for adapting complete streets for every street; however, there are several design features related to complete streets. The application of design features shall be flexible and based on the community's vision for its transportation sector (Cui, 2013; Gill, 2014).

McCann and Rynne (2010) argued that complete streets represent more than physical changes to the streets. It stands for a change in transportation planning, designing, maintenance, and funding decisions. McCann & Rynne (2010, 24) clarified, the first step in providing a comprehensive process for planning complete streets is defining a strong, straightforward, and accountable written policy. Meanwhile, a firm policy of complete streets encourages projects to be planned and designed to meet the needs of every type of user based on how they are traveling; this allows the community to save money, accommodate more people, and create an environment for all to travel safely. American Bikes Organization defined a complete street policy as one which "ensures that the entire right of way is routinely designed and operated to enable safe access for all users" (McCann & Rynne, 2010).

Besides, having a complete streets policy signifies that a community intends to design and build a transportation system that offers safe and attractive transportation options to significant destinations such as home, work, and school (McCann & Rynne, 2010; McCann & Seskin, 2012). With complete streets policies, communities worldwide can see their streets as places for more than just a way to pass cars and people. In 2003, the National Complete Streets Coalition, a program of Smart Growth America, defined the Complete Streets movement. This program supports communities throughout North America in developing, adopting, and implementing their own complete streets policies (Dehghanmoghaddi & Hoşkara, 2020b; Seskin & Gordon-Koven 2013). The number of complete streets policies in the United States has grown since the first evaluation of Complete Streets Policies by The National Complete Streets Coalition in 2005 until 2016 (Figure 3).

This growing interest in the complete streets concept shows that more communities use complete streets approaches (Atherton et al., 2016; Seskin & Gordon-Koven, 2013; Stefanie Seskin & Murphy, 2014). Based on a comprehensive survey of studies and practices throughout the United States, the National Complete Streets Coalition defined the main elements of an ideal complete streets policy. These elements are categorized as the ten interconnected components shown in Figure 4 (Smart Growth America, 2016; Dehghanmoghaddi &

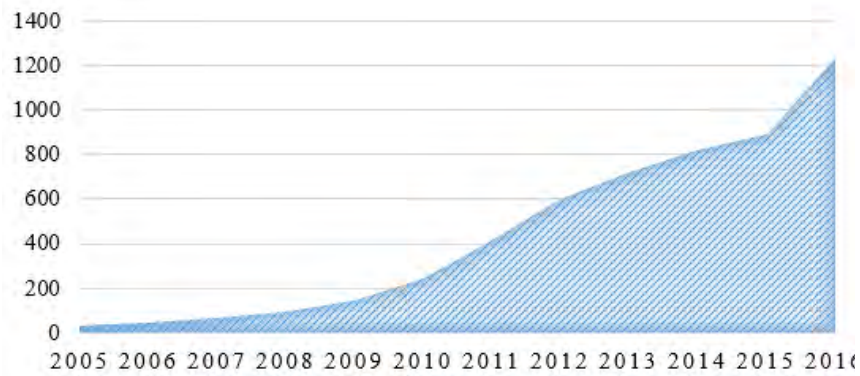


Fig. 3: Complete Streets policies adopted over time ("The Best Complete Streets Policies of 2016", 2017)

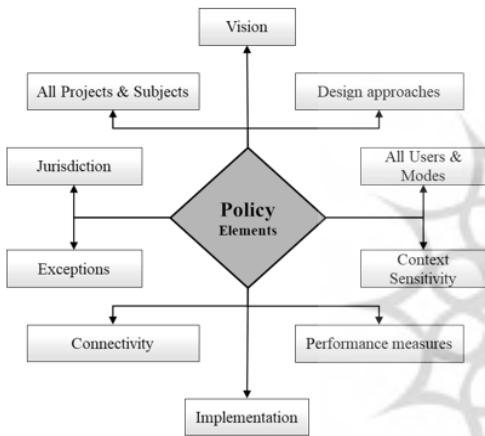


Fig. 4: Main elements of complete streets policy based on "Smart Growth America" (2016)

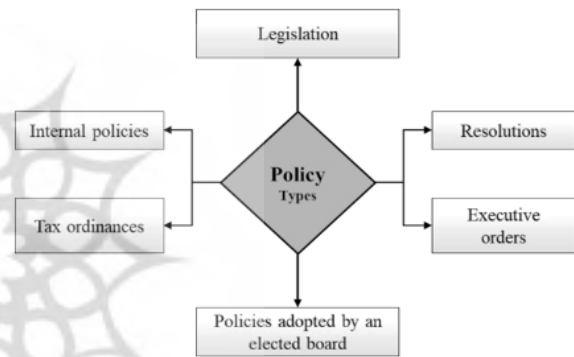


Fig. 5: Main types of complete streets policy (Atherton et al., 2016; McCann & Rynne, 2010)

Hoşkara, 2020b; SANDAG, 2014; Seskin & McCann 2013).

As indicated before, adapting an excellent and strong complete streets policy is the first step in organizing all the agencies that manage activities related to transportation with a common perception of policy and program objectives (Carissa Schively & Cindy 2013). The National Complete Streets Coalition recognizes various types of statements as official commitments to a complete streets approach. These official commitments include "legislation, resolutions, executive orders, internal policies, policies adopted by an elected board, and tax ordinances" (Atherton et al., 2016; McCann & Rynne, 2010). These are also recognized as types of complete streets policies (Figure 5).

The legislation includes documents requiring all types of users to be considered in all transportation developments when changing city codes or statutes. Resolutions are non-binding formal declarations from a jurisdiction's legislative office, and executive orders are high-level commands delivered by a mayor or administrator. Internal policies are those approved

by the management of a jurisdiction's transportation agency or department without explicit action from an elected body. Policies defined by an elected board are usually developed by a group of stakeholders and accepted by a chosen leading organization via an approving resolution or ordinance. Tax ordinances are law-making or voter-approved ordinances to fund complete street plans. Moreover, a few societies also merge complete streets into transportation master plans or street design guidance and standards (Atherton et al., 2016; Seskin & McCann 2013). Based on all the information provided above and summarized selected policies provided in separate charts in the appendix, a comprehensive discussion and recommendation are provided to achieve the main aim of this study.

RESULTS AND DISCUSSION

Evaluation of the highest-ranked policies provides very comprehensive information for policymakers on how to write a strong policy and what dimensions and aspects must

be considered and named in the main body of the policy. The following section outlines the important considerations about each element of a complete street policy which should be reflected in strong complete street policies.

Vision: An exciting and strong vision statement is indispensable to specify why and how the community wants to complete its streets to achieve intended targets. In the vision statement, the primary purpose must be stated for complete streets policy adoption. There are no two similar policies, and visions are not one-size-fits-all. Accordingly, clarity in writing of vision makes it easy to understand the goals and intent of policy for those responsible for implementing policy (Litman, 2014; McCann & Seskin, 2012; Seskin & McCann, 2013). Based on the summaries provided for the selected policies, the main keywords must be mentioned in the body of visions to clarify the policies' intents and objectives. These are elucidated in Table 3.

All Users and Modes: The policy must characterize all modes include walking, cycling, public transit, and automobiles, plus all users, including pedestrians, cyclists, and transit passengers of all ages and abilities. Accordingly, a policy is a complete streets policy when it has a clear statement supporting pedestrians and bicyclists who are genuine users of the transportation system. Offering more modes besides walking and cycling can help to define a stronger policy (McCann & Seskin, 2012; Seskin & McCann, 2013). Furthermore, in a great complete street policy, the needs of people with different

abilities and various ages must be considered (McCann & Seskin, 2012; Seskin & McCann, 2013). According to the evaluation of the selected policies, the main keywords used in the body of policies to support all users and modes are summarized in Table 4.

All Projects and Subjects: The focus of the policy must be on all types of transportation projects to design a multimodal street, and all subjects include planning, design, maintenance, and operations for all new and existing streets and amenities. Accordingly, an ideal complete streets policy places attention on all projects related to transportation developments as chances to generate a harmless and more accessible transport system for everyone (McCann & Seskin, 2012; Seskin & McCann, 2013). The evaluation of selected policies extracted the following keywords that must be included in the body of policies for consideration in all projects and subjects (Table 5).

Exceptions: Providing a practical policy in the real world needs a well-defined and clear process for handling exceptions about necessities for all modes, and accommodating all schemes is essential. The following three exceptions that limit the potential and weaken the policy were used in selected policies:

- Application of policy on paths where particular users of pedestrian malls and interstate freeways are not necessary;
- The cost of executing a policy is inappropriate to the need;
- A documented absence of present and upcoming demand.

In addition to having exceptions in an excellent complete streets policy, it must be clear which entity is responsible for

Table 3: Keywords must be reflected in writing a strong vision

Strong vision	
1	Considering users of all ages and all abilities
2	Providing safe and high access streets
3	Providing a multimodal transportation system
4	Offering convenience and reliable mobility
5	Designing efficient amenities
6	Considering economic development and well-being

Table 4: Keywords must be considered to define a strong statement for all users and modes element

All Ages and Abilities	
1	Children
2	Seniors
3	Persons with disabilities
All Modes	
1	Motorists
2	Transit users
3	Bicyclists
4	Delivery and service

Table 5: Keywords must be considered in providing a strong statement for all projects and subject elements

All project improvement	
1	Streets
2	Bridges
3	Parking lots
4	New privately built roads
5	Right-of-way acquisition
6	All publicly and privately funded projects
7	Retrofits
8	Reconstruction
9	New construction
10	Repair
11	Rehabilitation
All project phases	
1	Policies
2	Programming
3	Planning
4	Designing
5	Operation and maintenance

approving exceptions. Establishing this process will provide clarity and transparency for staff responsible for implementing the policy (McCann & Seskin, 2012; Seskin & McCann, 2013).

Connectivity: The policy identifies the essential requirement of building a comprehensive, integrated, and well-connected network for all transport modes since connectivity of a roadway network is the main feature for individuals who are unwilling to take indirect routes. Thus, a successful complete street policy provides a situation where everyone has safe movement throughout the transportation network (McCann & Seskin, 2012; Seskin & McCann, 2013).

Jurisdiction: Providing a complete street network is not easy since many companies and agencies work independently to build new roads. Thus, defining a way for agencies to work with other private or government organizations and developers funding the projects. The application of policy must be understandable for all agencies that manage activities related to transportation (McCann & Seskin, 2012; Seskin & McCann, 2013).

Design approaches: To implement complete streets, using the most up-to-date and best design standards and guidelines to achieve maximum flexibility in design approaches. However, striking a balance between users' needs and transportation modes is the main aim of design approaches (McCann & Seskin, 2012; Seskin & McCann, 2013).

Context Sensitivity: Consideration of the surrounding community characteristics plays a crucial role in the success of a complete street policy. Existing context, land use, and current and expected transportation needs are essential in

decision-making. Hence, adapting streets to fit the character of the surrounding neighborhood, having a comprehensive understanding of context, and using local stakeholders during the decision-making process are necessary.

Performance measures: Complete Streets policy must define several ways and standards to measure the success of procedures. These standards can also refer back to the vision statement of the policy (Litman, 2014; McCann & Seskin, 2012). By evaluating the selected policies, the following ways are offered to measure policy success:

- Novel infrastructure associated with Pedestrian, Cycling, Disabled people, and Public transportation;
- Number of new curb ramps and greenery components along streets;
- Number of people commuting by bicycle and walking in daily life;
- Number of children walking or bicycling to educational institutions;
- Number of new multimodal street projects;
- Number of crashes, injuries, and fatalities by all modes of transportation;

Implementation: Naming the particular steps for policy implementation is essential, but taking a policy from paper to practice is challenging. To meet this challenge, based on the selected policies, the main steps for implementing a complete streets policy are identified as (McCann & Rynne, 2010; McCann & Seskin, 2012):

- Developing appropriate strategies, approaches, and guidelines in all types of projects through consideration of

complete streets principles;

- Updating and changing the approaches of all city departments' existing and coming projects based on defined policies;
- Providing an appropriate supportive technical document,
- Assessing the best available projects to design novel strategies and guideline principles;
 - Enhancing the people's knowledge of the importance of complete streets through different educational approaches such as T.V. and internet-based seminars, workshops, and conferences.
 - Presenting educational programs to enhance the level of understanding of experts, community leaders, and decision-makers on complete streets' principles and approaches;
 - Defining novel methods to measure the level of growth and performance;
 - Planning new approaches to collect essential data about all users on the streets to search for additional performance measures;
 - Clarifying all funding sources to support the implementation process;
 - Presenting an annual report on implementation progress.

CONCLUSION

The complete streets concept intended to shift the concentrated design of streets from optimizing auto-based performance toward attention to all modes and all users of all ages and abilities on the streets. To this end, defining a strong and straightforward written policy is the first phase in providing a clear process for supplying complete streets.

Review and evaluation of the best complete streets policies in North America from 2011 to 2016 have shown that most of the communities that followed the complete streets approaches and reached the highest rankings are small cities with populations under 100,000, and most of their policies were adopted by an elected board of local stakeholders and policymakers. Accordingly, completing and applying complete streets policies in small cities, suburban areas, and smaller urban neighborhoods have more potential for success. Furthermore, policies defined by an elected board consisting of local participants and researchers accepted by a chosen and leading organization are more effective and efficient. Moreover, evaluation of the highest-ranked policies provides knowledge about the structure of the main body of a strong complete streets policy. It shows how policymakers must define a clear and understandable policy for those responsible for policy implementation. This process clarified the main keywords, dimensions, and aspects that must be considered for each ideal complete streets policy element. The evaluation of these policies illustrates that there has been much growth in policy enactment in recent years. Current policies highlight all modes and users with a firm emphasis on performance measures and implementation steps. Besides, the best approaches for big cities can be proposed to divide the cities into small areas

according to the neighborhood's borders or defined urban areas through municipality divisions and provide related policies based on the area's characteristics. Further research can address more details on the process of providing a strong policy for big cities and to explain and evaluate elements or define new elements for advancing policies.

REFERENCES

- City of Baldwin Park. (2011). *City of Baldwin Park: Complete Streets Policy*. Retrieved 10 August 2020 from Baldwin Park: <http://eatbettermovemore.org/sa/policies/pdf/text/201110051804330.BaldwinParkCompleteStreets.pdf>
- City of Indianapolis. (2014). *City of Indianapolis: Complete Streets Policy*. Retrieved 8 August 2020 from Indianapolis: http://media.cygnus.com/files/base/MASS/document/2015/07/IMPO_FINAL_Complete_Streets_Policy_March_2014.pdf
- City of Ogdensburg. (2014). *ARTICLE III: Complete Streets*. Retrieved 18 August 2020 From Ogdensburg, New York: <https://www.smartgrowthamerica.org/app/legacy/documents/cs/policy/cs-ny-ogdensburg-ordinance.pdf>
- Smart Growth America. (2016). *The best Complete Streets policies of 2015*. Retrieved 15 August 2020 from Washington, D.C.: <https://www.smartgrowthamerica.org/app/legacy/documents/best-cs-policies-of-2015.pdf>
- The Best Complete Streets Policies of 2016. (2017). *The Best Complete Streets Policies of 2016*. Retrieved 13 August 2020 from Washington, D.C. <https://smartgrowthamerica.org/app/uploads/2017/06/best-complete-streets-policies-of-2016-1.pdf>
- The City of Missoula. (2016). *Resolution Number 8098: A Complete Streets Policy*. Retrieved 19 August 2020 from Missoula: <http://www.umt.edu/sell/cps/baci/imx/RES8098.pdf>
- Town of Littleton. (2013). *Town of Littleton: Complete Streets Policy*. Retrieved 25 August 2020 from Littleton: http://www.littletonma.org/filestorage/19479/27936/28058/Littleton_Complete_Streets_Policy_Final_12.02.13.pdf
- Town of Reading. (2014). *Town of Reading: Complete Streets Policy*. Retrieved 22 August 2020 from Reading: <https://www.smartgrowthamerica.org/app/legacy/documents/cs/policy/cs-ma-reading-policy.pdf>
- Anderson, G., Searfoss, L., Cox, A., Schilling, E., Seskin, S., & Zimmerman, C. (2015). Safer Streets, Stronger Economies: Complete Streets Project Outcomes From Across the United States. *ITE Journal*, 85(6), 29-36.
- Atherton, E., Eveleigh, M., Chang, Y., Dodds, A., Lutenegeger, B., & Rodriguez, M. (2016). *The Best Complete Streets Policy 2015*. Retrieved 20 August 2020 from: <https://www.smartgrowthamerica.org/app/legacy/documents/best-cs-policies-of-2015.pdf>
- Bailey, K. (2008). *Methods of social research*: Simon and Schuster.
- Bhatt, N., & Ryan, M. (2012). *Indianapolis: Complete Streets*. Retrieved from Washington, D.C. Retrieved 17 August 2020 from: http://old.smartgrowthamerica.org/documents/Comp_Streets_Indy_Ordinance.pdf
- Burden, D., & Litman, T. (2011). *America needs Complete Streets*.

ITE Journal, 81(4). 36-43.

Slotterback, C., & Zerger, C. (2013). *Complete Streets from Policy to Project: The Planning and Implementation of Complete Streets at Multiple Scales*. Retrieved 13 August 2020 From: <http://www.dot.state.mn.us/research/TS/2013/201330.pdf>

Cui, M. (2013). *Complete Streets Code For Roadway Facility Improvement In College Park Campus, The University Of Maryland – A Context-Sensitive Approach*. Retrieved 10 August 2020 From: <https://drum.lib.umd.edu/handle/1903/14314>

Dehghanmongabadi, A. (2021). Enhancing the Level of Walkability in Streets: The Case of Salamis Street, Famagusta, Cyprus. *International Journal of Transportation (IJT)*, 9(1), 23-34.

Dehghanmongabadi, A., & Hoşkara, Ş. (2020a). Determinative Variables toward Promoting Use of Active Modes of Transportation: Enhancing Level of Sustainable Mobility in Communities. *SAGE Open*, 10(3), 2158244020961118.

Dehghanmongabadi, A., & Hoşkara, Ş. (2020b). An integrated framework for planning successful complete streets: Determinative variables and main steps. *International Journal of Sustainable Transportation*, 1-14.

Downing, N. (2013). *Moving Toward Completion: Barriers to Complete Streets Implementation in Metropolitan Boston*. Retrieved 14 August 2020 from Massachusetts: <https://dl.tufts.edu/catalog/tufts:21894>

George, S. (2013). *A Complete Streets Analysis and Recommendations Report For the City of Bakersfield, California*. Retrieved 11 August 2020 From: <http://digitalcommons.calpoly.edu/cgi/viewcontent.cgi?article=2037&context=theses>

Gill, P. (2014). *Framing a Complete Streets Checklist for Downtown Historic Districts and Character Neighbourhoods a Case Study of the Warehouse District, Winnipeg, Manitoba*. Retrieved 12 August 2020 from: <https://mspace.lib.umanitoba.ca/handle/1993/30185>

Hart, C. (1998). *Doing a literature review: Releasing the social science research imagination*. London: SAGE Publications.

Hui, N., Saxe, S., Roorda, M., Hess, P., & Miller, E. J. (2017). Measuring the completeness of complete streets. *Transport Reviews*, 38(1), 73-95.

Kingsbury, K. T., Lowry, M. B., & Dixon, M. P. (2011). What makes a "complete street" complete? A robust definition, given context and public input. *Transportation research record*, 2245(1), 103-110.

Laplante, J., & McCann, B. (2008). Complete Streets: We Can Get There from Here. *ITE Journal*, 78(5), 24-28.

Levy, Y., & Ellis, T. J. (2006). A systems approach to conduct an effective literature review in support of information systems research. *Informing Science*, 9.

Litman, T. (2014). Evaluating Complete Streets. Retrieved from British Columbia: <http://www.vtpi.org/compstr.pdf>

Macdonald, E., Sanders, R., & Anderson, A. (2010). *Performance Measures for Complete, Green Streets: A Proposal for Urban Arterials in California*. Retrieved 16 August 2020 from: <https://www.smartgrowthamerica.org/app/legacy/documents/cs/impl/uctc-completestreets-measures.pdf>

Marshall, W. E., & Garrick, N. W. (2011). Evidence on Why Bike-

Friendly Cities Are Safer for All Road Users. *Environmental Practice*, 13(1), 16-27.

Marti, M., Giese, J., & Kuehl, R. (2013). *Complete Streets Implementation Resource Guide for Minnesota Local Agencies*. Retrieved 23 August 2020 From: <http://www.dot.state.mn.us/research/TS/2013/2013RIC02.pdf>

McCann, B. (2013). *Completing Our Streets the Transition to Safe and Inclusive Transportation Networks*: Island Press/Center for Resource Economics.

McCann, B., & Rynne, U. (2010). *Complete Streets: Best Policy and Implementation Practices*. Retrieved 24 August 2020 From: <https://www.smartgrowthamerica.org/app/legacy/documents/cs/resources/cs-bestpractices-chapter5.pdf>

McCann, B., & Seskin, S. (2012). *Complete Streets Policy Analysis 2011*. Retrieved 21 August 2020 from Washington, DC: <https://trid.trb.org/view/1212459>

Mooney, S. J., Magee, C., Dang, K., Leonard, J. C., Yang, J., Rivara, F. P., ... & Quistberg, D. A. (2018). "Complete Streets" and Adult Bicyclist Fatalities: Applying G-Computation to Evaluate an Intervention That Affects the Size of a Population at Risk. *American journal of epidemiology*, 187(9), 2038-2045.

PARSONS. (2014). *Complete Streets Evaluation Process in the city of Henderson*. Retrieved 15 August 2020 From http://www.rtcnv.com/wp-content/uploads/2012/06/RTC-COH-Complete-Streets-Evaluation-Process-Final-May-2014_rev1a.pdf

Rauf, R., & Quarter, W. (2010). *Complete Streets: A Case Study of Boulder, Colorado, and the Great Streets Initiative*. Retrieved 10 August 2020 From https://www.uc.edu/cdc/niehoff_studio/programs/great_streets/w10/reports/complete_streets_report.pdf

Sadler, W. (2010). *Complete streets make healthier people: Reforming street design policies to combat obesity*. Retrieved 15 September 2020 From Denver: https://www.cnu.org/sites/default/files/sadlerb_cnu18.pdf

SANDAG. (2014). *Regional Complete Streets Policies*. Retrieved 12 September 2020 from https://www.sandag.org/uploads/publicationid/publicationid_1909_18570.pdf

Scott, M., Beck, C., & Rabidou, B. (2011). *Complete Streets in Delaware: A Guide for Local Governments*. Retrieved 8 September 2020 from <http://www.ipa.udel.edu/publications/CompleteStreetsGuide-web.pdf>

Scott, M., Patterson, T., & Nau, N. (2013). *Formulating a Framework to Plan for Complete Communities in Delaware*. Retrieved 10 September 2020 From Delaware: <http://www.ipa.udel.edu/publications/CompleteStreetsGuide-web.pdf>

Siskin, S., & Gordon-Koven, L. (2013). *The Best Complete Streets Policies of 2012*. Retrieved 30 August 2020 From <https://www.smartgrowthamerica.org/app/legacy/documents/cs-2012-policy-analysis.pdf>

Seskin, S., & McCann, B. (2013). *Complete Streets local policy workbook*. Retrieved 28 August 2020 From: <https://www.smartgrowthamerica.org/app/legacy/documents/cs-local-policy-workbook.pdf>

Seskin, S., & Murphy, C. (2014). The Best Complete Streets

Policies of 2013. Retrieved 27 August 2020 From <https://www.smartgrowthamerica.org/app/legacy/documents/best-complete-streets-policies-of-2013.pdf>

Seskin, S., McCann, B., Rosenblum, E., & Vanderwaart, C. (2012). *Complete Streets Policy Analysis 2011*. Retrieved 9 August 2020 From: <https://www.smartgrowthamerica.org/app/legacy/documents/cs/resources/cs-policyanalysis.pdf>

Skoworodko, C. (2012). *Planning for Complete Streets A Comparative Evaluation of Three Transportation Master Plans*. Retrieved 18 August

2020 From: <http://hdl.handle.net/1974/7083>

Southworth, M., & Ben-Joseph, E. (2003). *Streets and the Shaping of Towns and Cities*. Washington, DC: IslandPress.

Vandegrift, D., & Zanoni, N. (2018). An economic analysis of complete streets policies. *Landscape and Urban Planning*, 171, 88-97.

Whittemore, R., & Knafl, K. (2005). The integrative review: updated methodology. *Journal of advanced nursing*, 52(5), 546-553.

Zavestoski, S., & Agyeman, J. (2015). *Incomplete Streets London and New York*: Routledge.

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