ENSTU 300: Critical Thinking & Communication in Environmental Studies

The Consequences of Urban Sprawl in Communities in The United States

Trinity Gomez, Environmental Studies Program, California State University Monterey Bay

Retrieved from: fee.org

Introduction

Urban sprawl is a silent conqueror, as urban development's take over ecosystems that once thrived with life and biodiversity to be replaced with pavement and buildings for low density housing. It is complex in its relation to environmental sciences, economics, urbanism and geography, making it a popular topic for many researchers. (Gargiulo, Sateriano, Bartolomei, & Salvati, 2012). The creation of cities through sprawl has brought about many negative implications in these fields, especially those related to environmental sciences and urbanism (Gargiulo, Sateriano, Bartolomei, & Salvati, 2012). The reason these issues are so prominent is because of how the cities are structured and the lifestyle it fabricates (Frumkin, Frank, & Jackson, 2004). The cities were not developed with a framework involving proper public transportation, close necessities to homes, or walkable streets for residents. An increase in physical diseases along with other community health issues are often associated with urban sprawl as well (Frumkin, Frank, & Jackson, 2004).

Suburbia in the United States dates as far back to the late 19th century and took off during the post-World War II era. A variety of factors have contributed to sprawl. The implementation of the GI bill, highway policy, the post-war baby boom, and increased reliance of the automobile for transportation all contributed to urban sprawl's increase, leaving communities to deal with its consequences (Kushner, 2008; Schwartz, n.d.).

Residents, especially those of disadvantaged communities, are experiencing these negative effects (Mirzazad, n.d). From increased respiratory diseases, to declining air quality, insufficient street networking that is unsafe for pedestrians, and an intense reliance on automobiles. These issues are often not seen as being intertwined with improper city development (Mirzazad, n.d). Multiple levels of government along with non-profit organizations also are being affected. To address the negative consequences urban sprawl is having on the environment and communities in the United States, many state and regional governments are implementing and proposing smart growth policies, a framework that promotes sustainable urban development, to minimized the negative implications sprawl has created. Despite these efforts, repercussions of sprawl continue.

In order to find a feasible solution for sprawl, those involved with city development should come together with the effected communities to implement a combination of smart growth policies to minimized its effects.

Background

History

Urban sprawl is defined as the rapid expansion of urban development around a centralized city (Parrillo, 2008). Typically, low density, made up of many single-family households, and small commercial establishments, also referred to as suburbs. At the beginning of the 20th Century, less than 12% of the United States population lived in suburbs; this rose to 52% by the year 2000 (Donnelly, 2008). A culmination of events occurred simultaneously during the post-World War II era that influenced urban sprawl. Veterans received low interest mortgages to buy homes through the GI Bill in 1944; this along with the baby boom, increased the desire for larger living spaces and housing demands throughout the United States (Kushner, 2008). The Federal-Aid Highway Act of 1944 mandated 25% of federal aid to states for the

development of highways (Schwartz, n.d.). This was allocated to create easy access routes to necessities (Schwartz, n.d.). The number of people who owned an automobile also began to rise during this era. Cars started to become mass produced, gasoline prices were generally inexpensive and became readily available to the public (Parrillo, 2008).

Up until this point, much of the population in the United States lived in industrialized cities. Homes, places of work, and all the necessary daily facilities were of easy access prior to urban sprawl (Parrillo, 2008). But, with the emergence of more highways, increased demand for housing and affordable automobile access for many, people had all the resources they needed to move to the suburbs. As suburban areas developed, the rate at which land was being urbanized was growing faster than the population size of the United States (Figure 1) (Resnik, 2010). Homes were getting farther away from places of necessity and public transportation infrastructure such as bus and train systems were insufficient in the suburbs, making automobiles, residents main mode of transportation (Resnik, 2010). Negative effects on the environment from urban sprawl occurred throughout the entire developmental processes, but became more apparent by the late 20th Century (Carson & Bonk, 2000).

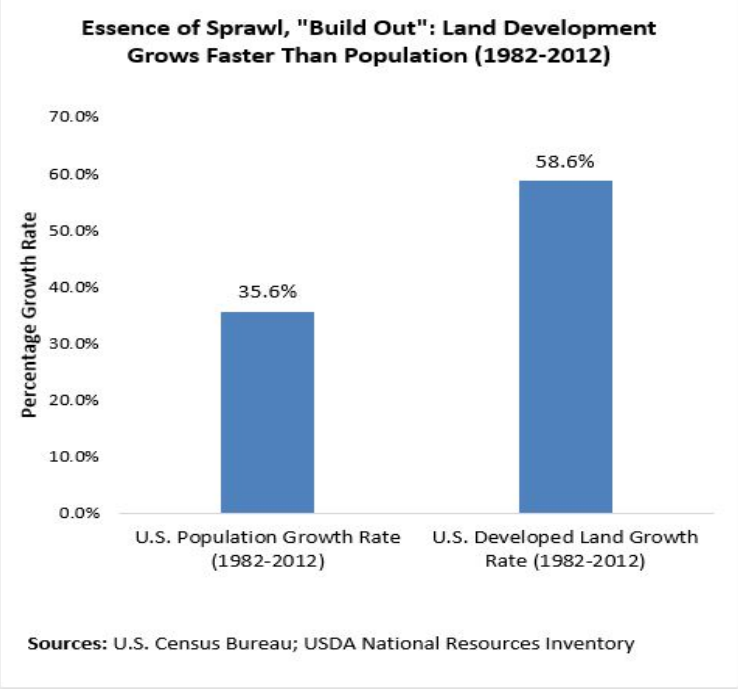

Figure 1: Graph comparing the rate of land growth to the rate of population growth in the United States from 1982-2012.

Scientific Background

The way a city is structured has an impact on all things within and outside of a community such as its people, local, and global environments. Urban sprawl has increased emissions, taken over ecosystems, and reduced ecological resources (Chen, Lu, Liu, & Wang, 2019). It is also estimated that areas that result from urban sprawl produce over 70% of global energy related carbon emissions (Kort, Angevine, Duren, & Miller, 2013).

The improper use of industrial land and transportation land have high impacts on the environment and negatively disrupt the natural carbon cycle (Chen, Lu, Liu & Wang 2019). The energy used in road construction can equal up to one or two full years of emissions from road travel, contributing large amount of CO_2, particulate matter (PM), NOx, and Ozone, into the atmosphere (Kramer, 2013). Urban sprawl has also resulted in loss of wetlands, which are essential for natural water filtration of pollutants and act as a key ecosystem for many species, helping maintain biodiversity, farmlands that house profitable crops and provide food for cities. (Gargiulo, Sateriano, Bartolomei, & Salvati, 2012). As well as, forests and grasslands that act as natural carbon sinks, promote better air quality, and improve the overall health of the environment (Gargiulo, Sateriano, Bartolomei, & Salvati, 2012).

Clean air is a crucial resource for good health. Air pollution from increased use of motor vehicles due to sprawl is threating people's respiratory health (Frumkin, Frank, & Jackson, 2004). Cars and trucks are well known contributors of PM, NOx's, CO_2 and ozone formation (Frumkin, Frank, Jackson, 2004). It is found that people residing in areas of urban sprawl also have higher rates of acute repertory symptoms such as coughing, abnormal lung function, and asthma (Figure 2) (Frumkin, Frank, Jackson, 2004).

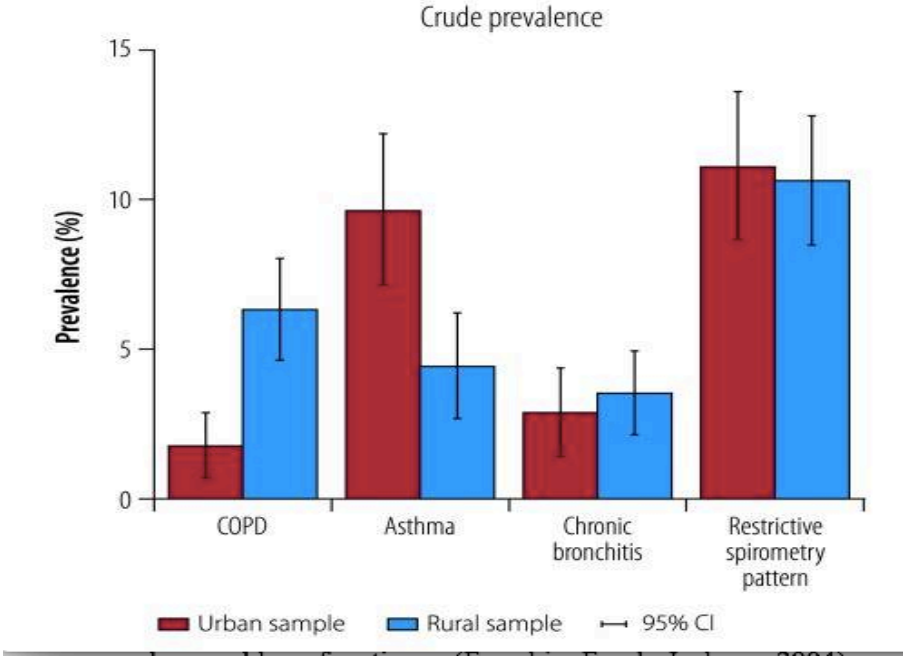

Figure 2: Prevalence of respiratory disease in urban and rural samples.

The major change in land use has radically changed methods of transportation as mention previously resulting in a major decrease in physical activity in adults and children. Cars are now the main mode of transportation for daily necessities, whereas prior to the large population living in areas of sprawl, people often walked, biked or took public transportation to get to their daily needs (Frumkin, Frank, Jackson, 2004). In 2001, only 45.4 percent of adults and 61.5 percent of children were reaching the recommended standard for physical activity. Sprawl had created a sedentary lifestyle and the numbers of people dealing with obesity and type 2 diabetes rose to the point of epidemic (Frumkin, Frank, Jackson, 2004).

Policy Context

Urban sprawl is a widespread issue across the United States, and many local and state governments have begun to adopt smart growth reforms to combat sprawl and its effects on communities. Smart growth can look different in every area they are implemented (Cooper, 2004). A broad definition may include, “Compact neighborhoods that combine housing, offices, schools and other amenities linked by public transportation and sidewalks,” though not all policy

entails such aspects (Cooper, 2004, 469). In Maryland, Governor Parris Glendening took on and initiated the Smart Growth and Neighborhood Conservation Act of 1997 (Cooper, 2004). The policy involved an approach known as infilling; cities in the state were "required to deny or limit subsidies for new roads, sewers and schools outside state-identified smart growth areas" (Cooper, 2004, 473). This was intended to improve the use of public transportation, reduced driving, and create shopping, dining and entertainment centers that were easily accessible through biking or walking (Cooper, 2004). Despite the positive impacts that this act encouraged, there were many critiques from the residents that had been living in the area for a long time. Some felt as though their quality of life was reduced by the necessary reforms to abide to the Smart Growth and Neighborhood Conservation Act (Cooper, 2004). The overall initiative also ran the possibility of having an opposite effect of the goals for smart growth because some feared that the act would increase congestion and crowds rather than reducing them (Cooper, 2004).

Some smart growth legislation at the federal level have not been as successful in passing to become law. On February 12, 2003, Senator Mark Udall introduced the Urban Sprawl and Smart Growth Act to the House of Representatives. The bill would have required the Council of Environmental Quality to conduct a study on urban sprawl and smart growth, taking into consideration the environmental assessments of a minimum of 15 federal agencies (H.R. 748, 2003). The purpose for the act was to get the federal government involved in the prevention of urban sprawl despite growth management being a state or local issue (Urban sprawl and smart growth study act, H.R. 748). This bill was introduced twice, once in 2002 and again in 2003; despite multiple efforts it never was enacted into a law.

Places where smart growth legislation have been successfully implemented are few and are often flawed, creating issues related to the legislation itself. The state of Oregon is the largest smart growth region in the United States. Urban growth boundaries under Oregon Senate Bill 100 require all Oregon cities and counties to create a comprehensive land use plan to control urban expansion onto farm and forest areas (Christensen & Rojas, 2019). The law expanded on Senate Bill 10 which required land use plans that followed 10 state goals (Abbott, n.d). These bills are particularly significant in Portland, where urban growth boundaries have been redrawn multiple times, taking into consideration urban reserves which are regions directly outside the

boundary, exception land which are neither rural or urban areas, Marginal land, and farm or forest land (Christensen & Rojas, 2019). The goals of these boundaries are to slow down urban sprawl, protect natural open areas, and farmlands. Smart growth in Oregon has been the pioneer for many of the other programs being developed in other states (Christensen & Rojas, 2019).

Stakeholder Perspectives

Non-profit Perspective

A relatively new international nonprofit called Congress for the New Urbanism (CNU) has many active projects in the United States to combat sprawl. They are concerned with continued post WWII urban development practices causing a detriment to the environment and economy. The organization's goals according to their website are "to diversify neighborhoods, to design for climate change, and to legalize walkable places" (McKeag, 2019). The CNU recognizes the unbearable costs that urban sprawl is creating such as a rise in energy costs, physical health costs, and environmental damages: "The long-term economic impacts of environmental damage caused by sprawling, high-emissions development, including climate change, have been assessed by many entities…The loss of so-called 'ecosystem services' – such as purification of water and air – could total many billions of dollars" (Holtzclaw, & Leinberger, n.d.). One of their current projects helping resolve this issue is called Sprawl Retrofitting; the program was built to develop sprawled areas and transform them into high-performing walkable cities. Which they proved is possible through existing policy and wish to propose more of (The Congress for the New Urbanism, 2017).

Regional Government Perspectives

A regional government group in Portland Oregon known as the Metro Council is the entity that enforces and facilitates urban growth boundaries along with other environmental, transportation, and social justice projects, all to improve the livability of the Portland area. The former Metro Council President Tom Hughes wrote in his foreword on behalf of the Metro Council, "the climate is changing, and we need to continue to reduce greenhouse gas emissions

and work for clean air and clean water." As part of the goals for Metro Council to partake in while further developing Portland within urban growth boundaries (Hughes, 2018). The Metro Council has been combating sprawl and its effects in Portland since 1997 and is one of the leading cities of the U.S. in new urban development. Current Metro Council President Lynn Peterson discusses the significant challenges Portland is facing at her inauguration "Air quality, especially in the summer is some of the worst in the nation, traffic congestion steals time from our families and pollutes the environment…" (Christensen, n.d).

Property Rights Group Perspectives

Although smart growth policies have been effective in reducing sprawl and mitigating its negative effects, not all people agree with smart growth practices. A property rights group, The American Dream Coalition, feel that smart growth policy is intrusive; they hold a strong position against smart growth boundaries (Cooper, 2004). Former coalition leader and current coalition treasurer made a statement about livability of cities partaking in these policies, "I don't see it as a livable place to live. Our message is, don't emulate Portland" (Cooper 2004). The executive committee is made up of 10 people from across the U.S., all of them coming together "to defend freedom, mobility, and affordable homeownership against the threat of over-reaching government at all levels." They accomplish this through conferences and presentations in different states (American Dream Coalition, n.d.). The coalition identifies the American Dream as having the ability to own a single-family home, having access to automobiles for access to higher paying jobs, and protecting property rights for economic freedom (American Dream Coalition, n.d.). Per their website, the coalition's goal is to defend these aspects that make up the American Dream for all citizens across the United States and "smart growth is one of the greatest threats to American mobility, affordable housing, and freedom today."

Local Perspectives

Citizens' perspective of urban sprawl varies depending on the person's values and concerns. Former suburb resident Jacob Brostoff "hated growing up in the suburbs. [He] found the isolation and monotony of that environment oppressive" (Clarren, 2002). Now he lives in Orenco Station, a de-sprawled city in Oregon that is "nothing like traditional suburbia." He

enjoys the walkability of the city and how all the necessities are easily accessible (Clarren, 2002). Another Orenco resident, Janis Steinfeld, who formally lived in a 4,200 square foot home, wanted a change in her living style and feels as though "It has simplified [her] life dramatically – [She doesn't] have to deal with traffic or house or yard maintenance" (Clarren, 2002). She states that the only drawback is "I wish I had room for a great big dog. I used to have a big yard. The big yard and dog kind of go together" (Clarren, 2002).

Urban sprawl especially effects people living in disadvantaged communities. They often do not have a voice in what they feel their community needs improvement on, especially when it comes to topics of pollution and community health. (Mirzazad, n.d). Some recent efforts in California by the Strategic growth council are helping bring up some of these communities being severely impacted by the consequences of urban sprawl, "Even though the need is great in Watts, we have never had significant investment in our community. We're finally getting a chance to make our community all that it can be after being overlooked for so long. Watts is worth it and Watts is rising!" -Perry Crouch, Watts gang task force board member (Mirzazad, n.d). Unfortunately, not all disadvantaged communities have this representation.

Federal Government Perspectives

Although urban sprawl is typically a state or local issue, the federal government also is being affected by sprawl and holds the opinions of their voters and fellow political colleagues on said topic. Washington Senator Maria Cantwell introduced the Smart Cities bill in which she claims it will "replace aging infrastructure" with "smart infrastructure" to "…improve the livability and health of residents" along with other benefits (Cantwell, 2017). The technology to create more sustainable cities exists and the legalization of these methods is crucial to improve many aspects of life in the United States. Washington representative Suzan DelBene says, **"**The investments and policy improvements we propose here can improve the quality of life in our communities, reduce pollution and spur job-growth in 21st century jobs" (Cantwell, 2017). The attitudes from federal government bodies in Washington are largely in agreeance with the increase in smart growth infrastructures for America.

Table 1. Stakeholder Perspectives

Stakeholder group and representatives	Representative Examples	Stakeholder Value Typology	What does the stakeholder value or contribute?	What are the concerns of the stakeholder?
International nonprofit	Congress for the New Urbanism	Moralistic Aesthetic Utilitarian Ecologistic	Anti-sprawl efforts New urbanism	Infrastructure development Environment Livability
Regional Government	Metro	Utilitarian Ecologistic	Urban growth boundaries	Environment Economy Traffic pollution
Cities and their Communities	Residents	Utilitarian Ecologistic Aesthetic	Homes Lifestyle	Livability Personal Health Convenience
Federal Government	Senator Maria Cantwell Representative Ben Ray Lujan	Ecologistic Economistic	Voter opinions Laws and regulation	Economy Government Sustainability
Property Rights Group	American Dream Coalition	Negativistic Dominionistic	Economy American Dream	Freedom Property Rights

Discussion

Smart policies and development do not have a uniform definition and can be implemented in a variety of ways. Three policy options that seek to minimize or mitigate the effects of sprawl include requiring a framework with street networking and retrofitting, enforcing urban growth boundaries, and community led smart development.

Table 2: Evaluation of Policy Options

Criteria	Policy Option 1: Require a framework for street networking and retrofitting	Policy Option 2: Enforce urban growth boundaries	Policy Option 3: community led smart development
Criteria 1: Walkable and bikeable streets	(+) More accessible public transit (+) Increased walkability (+) Less automobile dependency	(+) prevents expansion onto forest land (+) efficient land use	(+) housing, jobs and key destinations within walking or biking distance (+) reduction in fossil fuels for energy
Criteria 2: Economic Cost	(-) Costly maintain local shops if population density is low from sprawl	(-) Higher housing costs (+) local gov costs decrease for public services	(+) includes the creation of affordable housing (-) more gov funding
Criteria 3: Fosters Sustainable Practices	(+) fosters sustainable lifestyles (+) Sustainable transit increase (-) harder to change in already developed cities	(+) promotes preservation of open space (+) increased walkability and public transit	(+) communities become environmentally conscious (+) alternative energies
Criteria 4: Improve Community Health	(+) improvement of air quality (+) reduced air pollution related health problems (+) Increased physical health from walking/biking (+) local environment health improvement	(+) walkability helps peoples physical health (+) Develops sense of community	(+) empowers communities most effected pollution

Option 1: Requiring Easy Access to Daily Necessities

This policy recommendation would require new developing communities to design street networks prior to the application of individual transportation links (CNU, 2016). Automobiles are a significant contributor of CO_2 emissions, which make up the vast majority of greenhouse gases (EPA, 2019). They are directly linked to climate change and reduce overall air quality; urban sprawl has fostered an automobile reliant life style due to a lack of other convenient and active forms of transportation within communities. This insufficiency is also linked to a rise in obesity, diabetes and other health related issues (CNU, 2016). Creating policy where the skeleton of the street network is designed to promote suitable public transit along with walkable and bikeable streets can help reduce these health and environmental issues that are related to sprawl (Table 2). The nonprofit organization, Congress for the New Urbanism, is currently working on sustainable street networking projects in order to completely reform the design and operation of regional transportation infrastructure so that it can be looked at from a network approach rather than as individual transportation components (McInelly, 2012).

Other projects known as "15 minute neighborhoods" are also being researched in many communities. The city initiative Growing Up Boulder worked with local schools to research the feasibility of the 15-neighborhood concept for children in a community. It was found that play areas, equipment, and safe welcoming public spaces within a 15 minute walking distance were desired by students (Mintzer, Mendoza, Chawla & Dellepiane, 2016). Other cities adopting this practice include Detroit and Portland. Detroit is upgrading existing vacant homes and creating medium density housing to bring up housing per acre in order to support local retail that will supply daily necessities for residents in the city (Detroit Free Press, 2016). Retrofitting is one way that helps cities that are lack a framing for street networking (Detroit Free Press, 2016).

Option 2: Enforce Urban Growth Boundaries

This policy option is one that would require the establishment and enforcement of urban growth boundaries to promote efficient use of land and public facilities within a set area (Christensen, Zheng, & Rojas, 2019). Urban growth boundaries help prevent over pavement of natural environments like forests that act as carbon sinks for CO_2 emitted into the atmosphere, along with other natural environments. Setting these boundaries also forces communities to optimize space in an efficient and sustainable manner (Christensen, n.d). Regional governments such as Metro in Portland, Oregon, have been successful in their urban growth boundary practices but have had complaints about rising costs of housing due to boundaries (Table 1) (Christensen, n.d). The practice has become costly for the residents and are causing

them to move outside of the growth boundaries of Portland which defeats the purpose of the practice. If urban growth boundaries were to be implemented on a large scale, there would need to be a way to prevent a rise in housing costs to make the communities a more equitable place to live.

Option 3: Community Led Smart Development

Community led smart development combines the perspectives of people in a community with the expertise of local or regional government entities who coordinate with state agencies to improve the overall development of the area. This option allows for the members of a community who feel most impacted by the effects of sprawl to have a voice that will be heard and taken into high priority when developing or redeveloping a city (Table 1). Government entities such as the California Strategic Growth Council have taken this initiative to communities most impacted by pollution through a project called Transformative Climate Communities (Mirzazad, n.d). This program funds community led development that will accomplish improvements in the environment, public health, and generate economic benefit in disadvantaged communities (Mirzazad, n.d). This method sets the foundation for a successful sustainable community, it not only brings in smart infrastructure but because of the strong residential involvement, people will be more environmentally conscious, want to take better care of their city and its facilities, they will develop a sense of pride for their city, and pushing for policy will become easier with the support the community (Table 2). Some of the possible projects proposed by the Transformative Climate Communities program include affordable housing, bicycle and pedestrian facilities, health and well-being projects, and tree planting projects (Mirzazad, n.d). Currently this option is seen mostly in disadvantaged communities, but the methods can be used in all types of demographics. Government funding would need to be increased to fund many of these projects, but with strong community involvement less people may be against a possible tax increase or would even possibly participate in creating other projects for funding.

Recommendation

My recommendation that I feel would most efficiently combat the negative effects of urban sprawl would be to combine policy options 1 and 3. Having strong support and community involvement is a key factor to creating successful smart developments and reducing the negative consequences of urban sprawl. Community led smart development fosters sustainable life styles, addresses air quality related health issues and directly addresses the communities most effected by sprawl. Combining policy option 1 with 3 would retrofit already existing cities, allowing for more access to local necessities and public transportation, prevent urban sprawl in new

developing cities and improve health issues within the community. Methods from option 1 would create the framework for a city that is based off the street network design which allows for safe walking and biking areas, accessible public transit, and decreased the reliability of automobiles because necessities are within close distances. Although urban growth boundaries are still a viable option, they run the risk of creating divisions in social equity due to the high cost of housing they create, pushing lower demographics out of the set regions. Options 1 and 3 helps all demographics and ultimately improves environmental and community health most efficiently.

Conclusion

Urban sprawl is an issue that is deeply interconnect to many of the issues seen in cities and their communities. From air pollution, respiratory diseases, to obesity and diabetes, if urban sprawls effects continue to be ignored community and environmental health continue to fall. Due to the complexity of the problem reaching beyond the scope of environmental and health related issues, those involved with city development should come together with the most affected communities to implement a combination of smart growth policies to minimized its effects. This is crucial for addressing each communities individual sprawl related impacts. Making them the priority could significantly reduce the effects overall in the United States.

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