

A CONCEPTUAL FRAMEWORK FOR MEASURING QUALITY OF LIFE IN DUBAI

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ABSTRACT

The objective of this research paper is to explore the dimensions of Smart City Services in context of Happiness Index of Dubai and to propose a conceptual framework to measure the quality of life in Dubai considering Basic amenities, Culture, Transport Facilities, Governance, Technological Advancement and Physical Environment variables. This is the major theoretical contribution of this research. All these six variables have been taken as indicators of independent variable i.e. smart city services. The conceptual framework presents the relationship between the elements of independent variable i.e Smart city services and dependent variable i.e. Happiness Index of Dubai.

This study is based on secondary data. An extensive and systematic review of literature related to smart city services in Dubai from various secondary data base has been undertaken. To identify the elements of smart city services, more than 100 relevant research papers from reputed Journals were reviewed.

The study is confined to published research papers which are available to us from chosen databases is the foremost limitation of this paper. There may be some published articles which could not be brought to our attention. Consequently, interpretation of the proposed framework in this study may be to some extent limited.

Keywords: Smart City, Dubai, Happiness Index, Smart City Services

INTRODUCTION

More than half of the world's population now lives in urban areas, which lead to facing intractable challenges. This includes increased populations placing massive pressure on city infrastructures; polarized economic growth where and increased greenhouse-gas emissions (GHGs) forcing cities to develop sustainability strategies for energy, transportation, water management, urban planning, eco-friendly building, etc. The economic climate continues to place huge budgetary constraints on cities. The Smart City Framework (SCF) proposed to help stakeholders and city community participant understand how cities operate, and the role of ICT within physical city. The objective of this study is to propose a conceptual framework measuring Dubai happiness index.

Smart Cities as a Model

Castiella (2014) proposed to serve as a starting point to measure Smart Cities performance in accordance with their Smartness level, also the model presented is a starting point for research, based on the study of the dimensions and KPI's from field experience in many cities. Methodological aspects of the model will be analysed in greater depth in subsequent works. The researcher took variables Economy, Mobility, Environment, People, Quality of, living, governance, People, Habitat, tourism and suggested a model.

The Dubai Plan 2021

"The plan addresses the government as the custodian of the city development in all aspects. These perspectives were divided into six themes, each highlighting a group of strategic developmental aims for Dubai, and together forming the city's vision for 2021". (The Executive Council, 2014). The six themes included in the plan are listed below-

The people- A city of happy, creative and empowered people, aimed at nurturing healthy individuals who are educated and well cultured; who are innovative embody the mindset of entrepreneur; individuals who are proud of their culture.

The society- An inclusive and cohesive society, aimed at forging a sustainable multi-cultural society, which is tolerant and inclusive of all cultures.

The experience- The preferred place to live, work and visit, aimed at providing safe and secure experience, and the best of education, healthcare, housing, entertainment, and sports.

The place- A smart and sustainable city, aimed at developing a city, which is environmentally clean, with well-connected city areas and a pioneer in utilizing renewable energy sources.

The economy- A pivotal hub in the global economy, aimed at continuing the sustainable economic growth, making Dubai into one of the world's leading business centres.

The government- A pioneering and excellent government, aimed at making the Government transparent and reliable, along with meeting the demands of individuals and society as a whole.

Objective of the Study

The objective of this research is to propose a conceptual framework based on identified the smart city services under the Dubai Plan 2021 on the overall living experience of the citizens and on the overall Happiness Index of Dubai. The objectives were categorically subdivided into the following components:

1. To examine the evolution of Smart City Services in Dubai.
2. To explore the dimensions of Smart City Services in context of Happiness Index of Dubai.
3. To propose a conceptual framework to measure the quality of life in Dubai.

REVIEW OF LITERATURE

This research examines a comprehensive literature and theoretical framework which directly or indirectly related to concept and development of smart cities and happiness index. It is a well known fact that citizens are consumers today and need to be invested for better results. In this developing world, quality of life is no longer remained restricted to rich and gifted people.

Salem (2016) took variables of population growth, economic competitiveness, environmental sustainability, quality of life and governance for study on smart city for public value. The purpose was to observe how Dubai government build a smart city and generate a public value and found that initiatives were taken to transform into smart city and a happiest city through their first phase of mega transformation. The factors adopted by the city for transformation was perfect but for measuring happiness with smart city, the government should have conducted a survey to have an idea about what citizens want and how citizens can be happy with smart transformation rather than taking feedback post implementation. It essentially suggests that Dubai government should continuously re-invent itself and adapt to fast-moving technological changes, innovative societal uses and growing public expectations in the digital era.

GNH and GNH Index

Ura, et al (2010) proposed the Gross National Happiness Index of Bhutan and explained the origins of the concept of GNH, its grounding in Bhutanese culture and history, and describes how the concept is being operationalized in the form of the GNH index in some novel and innovative ways. The variables were Psychological Wellbeing, health, time use, education, culture diversity and resilience, good governance, community vitality, ecological diversity and resilience, living standards. The findings were Bhutan's GNH Index is a multidimensional measure and it is linked with a set of policy and programme screening tools so that it has practical applications. Representative sampling allows its results to be decomposed at various sub-national levels, and such disaggregated information can be examined and understood more by organization and citizens for their uses. In the GNH index, unlike certain concepts of happiness in current western literature, happiness is itself multidimensional- not measured only by subjective well-being, and not focused narrowly on happiness that begins and ends with oneself and is can be experienced deeply personally.

Happiness and Health

Borghesi, et al (2012) aimed to establish systematic relationships between the two rapidly growing research streams on the socio-economic determinants of happiness and health. Although they have been pursued quite independently by different communities of researchers, empirical evidence points to very similar underlying causal mechanisms. In particular, in both cases per capita income seems to play a major role only up to a very low threshold, beyond which relative income and other relational factors become crucial for happiness and health. They took variables of Role of Absolute Income and Income Aspirations, The Role of Relative Income and Social Factors, Theory of adaptation, The Role of Ageing and found that The economic growth *per se* is loosing importance for the well-being of citizens in developed countries and should recede from its role of primary policy goal. This goes against the mainstream conviction that economic policy should continue to focus on the maximisation of income growth. The twin paradoxes, however, suggest that this policy target is misleading because the GDP statistics do not take account of crucial factors of well-being. The real paradox is actually that the well-known shortcomings of GDP statistics are still systematically ignored by policy authorities, mass media, many scholars and large parts of public opinion.

They recommended that the analysis of the twin paradoxes suggests that policies directed to invest in environmental and social capital, as well as in education, culture and creative goods are likely to improve both health and happiness of the population. For this purpose, in authors opinion it is particularly important to invest increasingly more in the future in the necessary material and immaterial infrastructures aimed at enhancing social capital. As for material infrastructures, an urban design characterised by many squares and meeting places, an intense cultural life, and a salubrious environment would improve both happiness and health. As for immaterial infrastructures, the availability of a network of services and social facilities may provide an important contribution to reduce stress and morbidity across the population.

Quality of Life and City Competitiveness and Happiness Index

Rogerson (1999) explored initially public and other interest in one type of list-the rating of cities and locations in terms of the quality of life they offer. In particular, the paper focuses on how quality of life has been viewed as part of the profile of a 'competitive city'; one that is successful in attracting the attention of capital, and the ways in which quality of life factors have been identified as influential in patterns of urban growth and development. In the second part of the paper, Author discuss the way that this use of quality of life as part of place promotion and city marketing has placed most emphasis on a rather narrow conception of quality of life, one that is place-based rather than people-based. Arising from the privileging capital' view of quality of life, we open up the discussion to alternative ways of conceiving of quality of life and consider if there are alternative visions of competitive cities which could arise from such conceptualisations. The variables were Environment/Pollution, Atmosphere/Peace and quiet, Climate, Lifestyle opportunities, Employment, Retirement, Housing costs and access, Health care/Public health, Crime/Public safety, Transport/Traffic flow, Education provision/Levels, Recreation, Economy/Business climate, Arts/Cultural diversity, State taxes/Development aid, Commercial space, Proximity to suppliers/market, Food costs/Cost of living, Political involvement, Wages. Findings show that with the evidence pointing to the fact that there are clear links between the attraction of capital and quality of life, it is unsurprising that quality of life has become a part of the promotional tools being employed by city agencies to make their location attractive to different global capital. In so doing, the consequence has been to adopt one definition of quality of life, in terms of place characteristics which are desired by such capital, and thus to disadvantage other groups' views of quality of life. As with many aspects of place promotion and marketing, there are paradoxes within the use of quality of life in this way. Undoubtedly one of the attractions of quality of life in the present phase of capitalism lies in its academic ambiguity (Rogerson, 1995). Encompassing individual and collective elements, public and private roles, and having been used both as a standardised measure of achievement and as a basis for intervention for improvement, it is unsurprising that capital and the state find quality of life ratings so useful.

Tools for Measuring Progress towards Sustainable Neighbourhood Environments

Lombardi, et al (2012) aimed to offer a profound analysis of the interrelations between smart city components connecting the cornerstones of the triple helix. The triple helix model has emerged as a reference framework for the analysis of knowledge-based innovation systems, and relates the multiple and reciprocal relationships between the three main agencies in the process of knowledge creation and capitalization: university, industry and government. This analysis of the triple helix will be augmented using the Analytic Network Process to model, cluster and begin measuring the performance of smart cities. The model obtained allows interactions and feedbacks within and between clusters, providing a process to derive ratio scales priorities from elements. This offers a more truthful and realistic representation for supporting policy-making. The application of this model is still to be developed, but a full list of indicators, available at urban level, has been identified and selected from literature review. Basis was made on Smart Governance, Smart Economy, Smart Human Capital Indicators, Smart Living, Smart Environment. The results obtained from this exercise are interesting but clearly the model requires further implementation and improvement. The main limitations are 1) Influence of the focus group in the definition of the indicators' relationships and weights. 2) High number of indicators and, consequently, high number of pairwise comparisons, resulting in a large amount of time required to achieve a result. 3) Technical problems still included in the beta version of the software used for developing stages 2 and 3 of the ANP application. The assessment exercise illustrated in this paper is a pilot study. It still requires the development of a testing exercise with the participation of main city stakeholders, offering a reflexive learning opportunity for the cities to measure what options exist to improve their performance.

Angelidou (2014) reviewed the factors which differentiate policies for the development of smart cities, in an effort to provide a clear view of the strategic choices that come forth when mapping out such a strategy. The paper commences with a review and categorization of four strategic choices with a spatial reference, on the basis of the recent smart city literature and experience. The advantages and disadvantages of each strategic choice are presented. In the second part of the paper, the previous choices are illustrated through smart city strategy cases from all over the world. The third part of the paper includes recommendations for the development of smart cities based on the combined conclusions of the previous parts. The paper closes with a discussion of the insights that were provided and recommendations for future research areas. Variables were National Versus Local Strategies, Hard Versus Soft Infrastructure Strategies, Geographically based Strategy, Economic Based Strategy. The smart cities' topic is still largely under exploration. The smart city landscape is shaped under local characteristics, priorities and the needs of cities, in addition to global market forces and available technology. This paper has made a comprehensive effort to provide a clearer view of the strategic choices with spatial reference that may play a fundamental role in the design of a smart city strategy. The advantages and disadvantages of each strategic choice were presented, distilled after a comprehensive review of recent smart city literature. These different paths emerge as dual or multi-faceted, leading to a range of decisions that radically differentiate the outcome of the smart city. Different strategies have been implemented in variations through smart city projects globally. Indeed, several proposed or applied smart city strategies lie somewhere in-between the extremes of the available strategic choices.

Summary and Research Gap

From the review of the literature a number of key observations are:

1. The factors adopted by Salem (2016) the city for transformation is perfect but for measuring happiness with smart city, the government should have conducted a survey to have an idea about what citizens want and how citizens can be happy with smart transformation rather than taking feedback post implementation .
2. The samples collected by Abir, et al (2008) were mostly the younger adults, only a few studies have examined happiness in elder population. Yet, the population of older adults is increasing rapidly and studies show that about 43% of elders will use a senior living facility during their lifetime.
3. Ura (2015) found that Bhutan so far has remained a reasonably equitable and sustainable society where the proportion of unhappy people are very low, for the given level of per capita income. However, for the rest of population segment, the government has not done anything substantial.
4. The model suggested by Castiella (2014) talks about the smart city as a whole but may not work for every city as every city has its own culture, environment, usage of renewable energy resources, demographics and geographic conditions so the 40 indicators may not suite every city.
5. There must be some factors in Albino, et al (2015) which should be globally applicable and some should be left on cities independent culture, environment, and geographical area. In this way, the indicators can be applied on any city of choice.
6. Rahman, et al (2016) research relies heavily on theoretical review of existing literature. Conducting citizen survey would have resulted in a better outlook of present situation and where to go from there.
7. The survey questions in Pan, et al (2011) included in the questionnaire from Smart city initiative and ICT application point of view are satisfactorily applicable on Taiwan, however, for cities with low literacy rate, its applicability remains low.
8. The paper by Borghesi and Vercelli (2012) discusses 3 social and environmental policies for promoting happiness and health, while ignoring possible indicators like Psychological well- being, Education, Cultural diversity.
9. For social dimensions in calculating Infrastructure index, the Misra (2015) could have included per-capita income and per-capita expenditure for it to be more comprehensive.
10. The Smart City comprehensive scheme laid out by the Dameri (2015) should include the Economy factor too.
11. The indicators included by the Lombardi, et al (2012) under the revised triple helix model- Participatio n in life- long learning; there is no definition as to what constitutes life-long learning Museum visits per inhabitant, and theater and cinema attendance per inhabitant; these two do not really point out the verticals of smart living. Instead of them, Quality of living index can be used.
12. The two disadvantages pointed out by the Angelidou (2014); a) Small and medium- sized cities having competition from large cities for obtaining funds, and b) Small scale projects not worthy at

city-wide level, are offset by the fact that most of the Smart city initiatives are area- based, and hence, provide flexibility to decide which initiatives would be feasible where.

13. In their paper, Kim and Lee (2013) have given equal weightage to all the indicators and the dataset used for government and environment category is very scarce.

CONCEPTUAL FRAMEWORK

A series of constructs have been developed and these constructs have subsequently been used to develop a framework which is presented at the end of this study and the interrelationships are hypothesized in this study.

MAJOR ELEMENTS OF SMART CITY SERVICES

Basic amenities for living

Dubai Plan 2021 describes the future of Dubai through holistic and complementary perspectives, starting with the people and the society who have always been, and always will be, the bedrock of the city. This perspective describes the characteristics that Dubai's people need to have to deliver on the city's aspirations in all areas, and examines the society needed to support and empower these individuals in achieving their goals. The plan addresses the urban environment including both natural and built assets, and looks at the living experience of the people of Dubai and its visitors as a result of their interaction with this environment and the economic and social services provided. In addition, the plan also focuses on the economy, which is city's development engine and its fuel for its march forward. The hypothesis would be to establish the popularity of Dubai plan 2021.

Culture

Musikanski, et al (2017) suggested that The Happiness Alliance developed the Happiness Index to provide a survey instrument to community organizers, researchers, and others seeking to use a subjective well-being index and data. It is the only instrument of its kind freely available worldwide and translated into over ten languages. This instrument can be used to measure satisfaction with life and the conditions of life. It can also be used to define income inequality, trust in government, sense of community and other aspects of well-being within specific demographics of a population. They again took similar variables Psychological well-being, Health, Time Balance, Community, Social support, education, art, culture, Environment, Governance, Material well-being, Work. Findings were The Happiness Alliance's Happiness Index has been used by over 200 groups since 2011. The survey was developed over a series of four rounds, each of which sought to streamline and clarify the measurement instrument. Based on experience gathered by the use of the Happiness Index for groups since 2011, the Happiness Index has and can serve as a valuable tool for advancing happiness, well-being, quality of life, sustainability, and social change. Researchers, teachers, students, policy makers, community organizers, managers and business leaders, therapists and consultants, speakers and authors, and others are invited to use the Happiness Index in their work. The Happiness Index is one piece of the puzzle that completes a picture conveying the importance of happiness, and the happiness movement as a new environmental, social, and economic paradigm to enhance quality of life and sustainability for all beings. They recommended that When using the Happiness Index for a group, it is most facilely distributed via online, such as web pages, social media sites, newsletters, memos, briefings, or other media. In some cases, the survey is distributed in a paper form as survey takers do not have access to the Internet. The Happiness Alliance provides a downloadable file for printing for these cases. Guides, videos, presentations, and examples based on prior use of the survey instrument by community organizers, researchers, media, non profits and others are provided freely online by the Happiness Alliance. Measuring for Positive Social Change: The data gathered by the index provides measurement of often-excluded concepts such as social justice, where objective data does not always provide a complete picture. Moreover, analyses of varying demographic aspects of a population often reveal unexpected information about who is suffering and who is thriving within a population. The survey can be used, and has been used by communities to measure gaps in well-being according to race, income level, zip code, education, age, gender, and household characteristics. This led to first null hypothesis:

Public Transport Facilities

Karol and Brunner (2009) research is largely a desktop study of subdivision assessment tools developed in Australasia, Great Britain and the United States of America. The paper identified a variety of themes and sub-themes that support assessment tools at both the project design phase and the project operational phase. These themes and sub-themes revolve around one or more of the three pillars of sustainability—namely the environmental, economical and social pillars. The paper firstly compares the themes and sub-

themes of the assessment tools and then relates those themes to a set of sustainability targets produced for a proposed inner suburban housing subdivision in Perth, Western Australia. Variables were Environmental Care, Natural Resource Depletion, Societal Well-being, Economic viability, Units of measure, Measurable Sustainability Targets. This paper has highlighted a number of assessment tools that can be used to measure the level of environmental impact, natural resource depletion, societal well-being and economic viability of land development in urban areas in Australasia, Great Britain and United States. There are common themes emerging in these assessment tools such as the need to restore native vegetation, reduce private car use, reduce the use of non-renewable energy in buildings, minimize waste, improve water efficiency, provide high quality public transport and safe access to a broad range of social facilities. Perhaps in industrialized countries, irrespective of differences in geography, governance and building construction techniques, these are the areas in which first steps towards sustainability will be taken. However there is no consistency in how to measure progress and set benchmarks for achievement. As can be seen in the example from Perth, there are no absolute targets. The suggestions are that If assessment tools for urban development are to become firmly anchored in mainstream statistical data collection systems three factors must be addressed. Firstly it is vital to identify what are the most important measures in a particular locality. Secondly a decision needs to be made regarding what units of measure are to be used. Ideally an international standard should be created that establishes the data input requirements, the reliability and updating facility of the data, and the form of output data in much the same way that financial data protocols are set. Thirdly responsibility needs to be allocated for making substantive responses to the direction of change indicated by the measures.

Governance System

An intrinsic part of human life is group membership – in fact it is this that makes up the identity (or multiple identities) of individuals – their family affiliations, cultural affinities, and so on. As Gellner stated: there is a universal human need to ‘belong, to identify and hence to exclude’. (Gellner, 1964). Such identities are a fundamental influence on behaviour (by the individual and the group), on how they are treated by others, and on their own wellbeing. The family bond serves the most realistic factor in achievement of the happiness.

Technological Advancement

As Stiglitz (2014) noted earlier that changes in technology may affect not only the productivity of domestic work, but also the quality of the work experience. Certain activities, such as cooking, depending on how they are conducted and the circumstances under which they are conducted, may contribute either negatively or positively to a sense of well-being. A long tradition of research has emphasized the importance of leisure-time for quality of life. This points to the importance of developing indicators of both its quantity (number of hours) and quality. Finally, despite the importance of housing for a variety of social outcomes (such as children’s education), no core set of housing indicators currently exists for international comparisons: remedying this situation would require better information on the number of people who are homeless or living in emergency shelters, and on housing quality (e.g. in terms of overcrowding and the availability of local services). The hypothesis based on technological advancement would be:

Physical Environment

Labaki, et al (2017) studied about Dubai’s journey towards becoming the happiest city on earth by embracing technology innovations as key drivers of city experiences. This article also talks about challenges of delivering happiness as Government have long recognised that they also need non-governmental partners in order to drive greater and more sustainable results to their citizens. They took the variables of Embedding positive impact into strategy: 1) economy 2) governance 3) environment 4) living 5) mobility 6) people, establishing enablement platforms, encouraging the formation of coalitions, coordinating execution at scale, measuring and evaluating impact. They found that in the impact economy, organisation will have to master the art of fully leveraging partnership between public and private sectors and civil society to optimize their outcomes. All must be engaged in the creation of shared value. The active search for win-win solutions by exploring areas of overlapping interest with a broader range of stakeholders will enable governments and private sector players to maximize the impact delivered to customers and communities.

Proposed Research Model

Based on the theoretical perspectives discussed above, a theoretical framework for assessing the impact of smart city services on Happiness Index of Dubai is proposed. Figure 1 demonstrates the proposed research framework.

The proposed research framework for assessing the impact of smart city services on Happiness Index of Dubai shown as in Figure 1 proposes Six major elements of smart city services including (a) Basic

amenities, (b) Culture (c) Public Transport Facilities (d) Governance , (e) Technological Advancement and (f) Physical Environment variables.

Table 1: Summary of Proposed Research Framework

Independent Variable	Elements of Independent Variable	Dependent Variable
Smart City Services	<ul style="list-style-type: none"> • Basic amenities • Culture • Public Transport Facilities • Governance • Technological Advancement • Physical Environment 	Happiness Index of Dubai

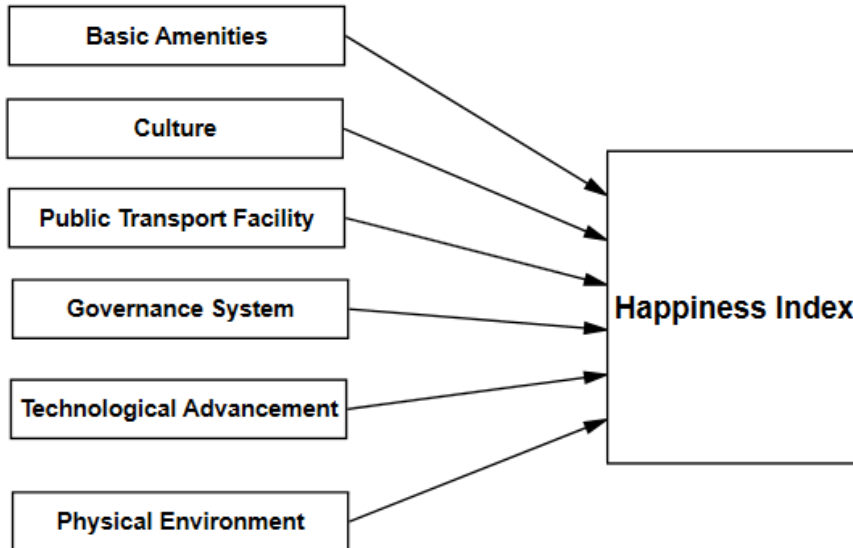


Figure : Conceptual Framework showing Relationship of Elements of Independent variable (Smart City Services) with Dependent Variable (Happiness Index)

PROPOSED HYPOTHESES

On the basis of the above conceptual framework, The following Null and Alternate Hypotheses can be formulated depicting the relationship among the elements of independent Variable (Smart city services) and Dependent Variable (Happiness Index).

Basic amenities for living

H01: The availability of facilities to fulfil Basic amenities for living has no significant impact on Happiness Index.

HA1: The availability of facilities to fulfil Basic amenities for living has significant impact on Happiness Index.

Culture

H02: The Culture has no significant impact on Happiness Index.

HA2: The Culture has significant impact on Happiness Index.

Public Transport Facilities

H03: The availability of Public Transport Facilities has no significant impact on Happiness Index.

HA3: The availability of Public Transport Facilities has significant impact on Happiness Index

Governance System

H04: The Governance system has no significant impact on Happiness Index.

HA4: The Governance system has significant impact on Happiness Index.

Technological Advancement

H05: The Technological Advancement has no significant impact on Happiness Index.

HA5: The Technological Advancement has significant impact on Happiness Index.

Physical Environment

H06: The Physical Environment in country has no significant impact on Happiness Index.

HA6: The Physical Environment has significant impact on Happiness Index.

CONCLUSION

This paper attempts to propose a conceptual framework by recognizing a set of major elements of Smart City Services. The framework shows the relationship between independent and dependent variable. After the extensive review of related literature accessible, the six major elements of Smart City Services were identified that have possibly significant impact on Happiness Index of Dubai. In addition, empirical study is considered necessary to examine the validity of the proposed framework.

A significant relationship is expected between the proposed six elements of Smart City Services and Happiness Index of Dubai. The major limitation of the present study is that it has been confined to published research papers from academic and practitioners which are accessible to us. There may be some articles which could not be brought to our attention, for this reason, explanation of the proposed conceptual framework in the present study may be to some extent limited.

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