INNOVATION IN PALESTINE

By

ABU-KHALAF, KATHIM
DAOUD, MONA

Capstone Project

Submitted to

KDI School of Public Policy and Management

in partial fulfillment of the requirements

for the degree of

MASTER OF PUBLIC POLICY

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Professor Chang, Yu-Sang

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ABSTRACT

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A capstone project on a branch of innovation, specifically on the concept of innovative cities is presented below. This paper is to investigate the novel idea of the design of an innovative and a creative city or country within the geography of the Middle East; the Occupied Palestinian Territory to be exact. The aforementioned concepts are to be tested in light of the existing Israeli occupation, which will give this paper a taste of challenge.

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INTRODUCTION

Innovation is “a new way of doing something” which already exists, and this is where it is differentiated from invention. Innovation is also known as “new commodities, new technologies, new sources of supply, and new types of organization” (Schumpeter, 1942). This change should also have a *good* added value, and we normally call the ones who attempt such innovations as pioneers.(http://www.reference.com/browse/innovaton n.d.) In this paper, we will try to be the pioneers in advancing the idea of innovation to Palestine, to be more specific, we want to apply the concept of an innovative city in Palestine if feasible.

If someone were to pose the question of why innovation? A simple answer would be that since we are limited by scarce resources and we will continue to grow simultaneously, then we are definitely doomed to hit the peak, what happens then? We all die? Or should we start working on preventive measures as was suggested back in the 1970’s when economists predicted that population growth will surpass the world’s resources, hence we saw an aggressive movement that targeted population control, which in turn lead to the decreasing fertility levels in many parts of the world. Innovation offers a new way of looking at the existing resources and provides the means to use them effectively so that we increase productivity and improve performance. “Innovation may be linked to performance and growth through improvements in efficiency, productivity, quality, competitive positioning, market share, etc.”(http://www.reference.com/browse/innovaton n.d.)

Since economic innovation is of significant reference to our work, we'd like to cite Joseph Schumpeter as he defined economic innovation in The Theory of Economic Development, 1934, Harvard University Press, Boston as follows:

1. The introduction of a new good — that is one with which consumers are not yet familiar — or of a new quality of a good.

2. The introduction of a new method of production, which need by no means be founded upon a new scientific discovery, and can also exist in a new way of handling a commodity commercially.

3. The opening of a new market; that is a market into which the particular branch of manufacture of the country in question has not previously entered, whether or not this market has existed before.

4.The conquest of a new source of supply of raw materials or half-manufactured goods, again irrespective of whether this source already exists or whether it has first to be created.

5. The carrying out of the new organization of any industry, like the creation of a monopoly position (for example through trustification) or the breaking up of a monopoly position.

We have been keeping an eye and an ear open for both written and live examples, definitions and uses of innovation, while focusing on the utilization of it in city planning and design. An innovative city is the place in which innovation is being implemented as opposed to the conventional city where the full potential of the place and its residents is not harnessed and this is why such cities are sure to face far more restrictions than would an innovative city. One example of what we believe is innovation was what we saw in Malaysia in regards to waste management; the country uses and reuses just about everything leaving no room for waste. Renovating the existing idea of recycling, they were capable to incinerate waste in an effective way which resulted in enabling them to construct an island! A man-made island which the country plans to use innovatively and effectively, so far they have made it possible to plant trees in it by putting the appropriate stratum of soil, and are working on making it livable, so not only

did they dispose of their waste in an environmentally friendly way, economically productive way, and a healthy way, but they also created an extension to their land with it, which may in the future become one of the world's innovative places. They have also effectively used the combustion energy from the incinerator to generate electricity. Another form of innovative use in Malaysia is that they built a tunnel that is used to alleviate traffic congestion, which closes up for traffic and functions as a water tunnel when there's heavy rain; Malaysia may be the only country with this technology.

The focus is on cities because they are the places that have historically been known to be the centers of the countries, and the heart that pumps and encourages the pumping of new ideas, in addition to higher chances of implementation due to the fact that governments also usually are situated in the main cities, needless to say that they are the main implementing bodies. Nowadays half of the world population resides in cities(http://www.clc.org.sg/pdf/UN-HABITAT%20Report%20Overview.pdf n.d.) and urbanization is on the rise both with its pros and cons, such cons are hoped to be dealt with and maybe resolved via the solution of the innovative city.

Palestine, in the heart of the Middle East, the Holly Land which encompasses the three main world religions, and the country that has been ripped apart by more than sixty years of ravaging occupying powers, now seeks the solution of an innovative place, so let us together begin the journey of exploring the capability of applying this new exciting concept in the even more exciting context of Palestine.

A BRIEF LITERATURE REVIEW

We'd like to begin our literature review with one of the best articles that we have encountered on this topic; the article written by Bettencourt, Lobo, Helbing, Kuhnert, Geoffrey, and West; the article is mostly on the mathematics of innovation. Their article titled:"Growth, Innovation, Scaling, and the Pace of Life in Cities" outlines their rationale, and provides the mathematical model which they think is the best fit to describe or measure the innovativeness of a given city.

Simmie then sheds the light on some actual examples of innovative cities such as Milan and Amsterdam in the book "Innovative Cities". He also revisits what we borrowed previously from Schumpeter.

Komninos brings about the concept of an intelligent city based on that what makes a city intelligent is being innovative, he discusses innovation in different sectors as well as in different geographical locations.

"Each city attempts to find its own distinctive path of development, investing in a particular combination of local industries in order to foster economic growth and to attract visitors and inhabitants wishing to enjoy the buzz and beauty of urban life; for all cities the crucial factor has become the spark of new ideas, in whatever field they might find application. Indeed, creativity seems to have become the ultimate asset of every city in the construction of what makes a city special, or, preferably, more special than other cities." This is what Serena Haddock says in her book "Brand-Building: The Creative City."

Urban ground shifts, the *dynamics of urban creativity*, the *creative city and beyond*, and a *conceptual toolkit of urban creativity* are the main concepts that Charles Landry elaborates on in his book:"The Creative City" published in the year 2000.

Richard Florida in his book "Cities and the Creative Class" touches on the content of the innovative city, namely, its innovative citizens, which of course is an invaluable source to be considered in such a paper.

There is a lot more that the reader will encounter as s/he reads through the paper.

CHAPTER ONE

THE "CREATIVE CLASS" AND THE BOUNDARIES ISSUE

GENERAL CONTEXT

Richard Florida has been proclaiming everywhere he goes; human happiness and feelings of contentment come from three main factors:

1- Partner

2- Job

3- City

This is why he poses the question: *who* is your city? Apparently cities can assume characters that have direct influence on our lives. If the traits of a city match our desires and are parallel to our aspirations, then we're happy living in it, and vice versa. This shows how important it is for a person to think twice about where they choose to live. Florida's focus is on the one layer that is responsible for how *innovative* a place is, specifically what he calls the "creative class" i.e. CREATIVE PEOPLE. Opposite to our creative individuals; Jane Jacobs highlights the concept of "squelchers"- the Uncreative ones- the ones who derail human creativity, the so-called experts that put the "NO" obstacle in the way of creative ideas. Obviously the less of Jacobs' squelchers and the more of Florida's creative class the better chances a city has to become creative. Stolarick found in his research that higher growth rates and higher wages are associated with higher creativity. So cities should, for their own innovation sake, attract the talented, by paving the road for them to come, this can be via establishing high-tech industry locations, and by being

open to immigration, as Pascal Zachay contends. He further says that openness to immigration is the cornerstone of innovation and economic growth. One of the best examples in this arena is that of the United States of America, which has been known for attracting (and sometimes kidnapping!) the talented and the innovative people, America offers an easy entry and life for such individuals and provides them with all the means they may need to excel in their research fields, it is also well-known that the USA is one of the countries that spend enormous funds on R&D.

Actually the diversity and openness of a city are mathematically proven by Robert Cushing to have a strong positive effect on creativity; he tested three major theories of regional growth based on human capital, creative capital, and social capital; the result showed positive correlation between both human capital and creative capital to growth, while social capital had no effect, in fact, social capital and creative capital were negatively related!
(http://www.creativeclass.com/article_library/media/176_-_creative_cities_and_their_new_el.pdf n.d.)

Again, one main element to creating an innovative city is having creative people in it, a diverse variety of people or as Florida puts it:"a group consisting of artists, designers, writers, media people, scientists, innovators and entrepreneurs who have one thing in common: they earn their money by means of creative thinking, designing and producing." Florida also argues that a creative city would have *tolerance*, *talent*, and *technology* along with low entry barriers attracting vibrant people who will help build creative cities. Jane Jacobs supports Florida's opinion by emphasizing the importance of diversifying spatially, socially and economically, in other words, there is a need for varied buildings, an assorted group of people and a variety economic activity. Both Florida and Jacobs agree on that it won't be necessary to build an

innovative city from scratch, and rather that "'New ideas often require old buildings" which means that existing cities can work toward becoming innovative with no need to recreate new cities. We believe that this fact per se is an important aspect of innovation, because being creative would not entail waste of any sort, let alone waste of historic and valuable existing assets.

*"In the creative economy, cities need a healthy business climate as well as a vibrant people climate. Especially the factor 'tolerance' I found is an important condition here. You need low entry barriers to outsiders in order to stimulate the development of new and creative ideas." Richard Florida from "**How to create a creative city? The viewpoints of Richard Florida and Jane Jacobs" by Gert-Jan Hospers and Roy van Dalm***

It has been repeatedly said that vanishing physical limitations and boundaries play a positive role in relation to creativity. So does this imply minimal creativity in an occupied place? This will be tackled once to get into the Palestinian context below.

The bottom line here is: for a city to cultivate its own innovativeness, it needs to have low entry barriers, and less boundaries in the face of immigrants, because diversity seems to act as one of the main drives of innovation. There is another measure used in this context by which people can decide on how attractive a city is known as the coolness index[1] through which a city can be measured for how "cool" it is to be lived in, *in terms of diversity not weather*; for example a city that parents different cultures and subcultures is on the higher end of the coolness index, a more specific example is fostering Bohemians[2]; who are known to be the renegades of the normal, the ones who deviate from what is to what may trigger innovation. (Florida, R. (2002), The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community and Everyday Life, Basic Books, New York. n.d.)

[1] See annex V
[2] See annex V

PALESTINIAN CONTEXT

Given that Palestine has been a passage; a link between East and West, and that it lies in the heart of the world, this strategic position has enabled it to house a variety of cultures, and all three main religions throughout history. Dominated by the Arab and Islamic culture, it still is home for Christianity, and Judaism, it also has been intimately mixed with the European and American cultures via inter-racial marriages, immigration, and its strategic location that attracts people from all destinations and walks of life. The issue of boundaries is a thorny one here, because Palestine's boundaries are under Israel's control, which limits Palestine's diversity. Despite this fact, the international community in the oPt (Occupied Palestinian Territory) has been growing, as of mid 2010 the international community in the oPt accounts for more than 43% of the whole oPt population, another indicator of this is tourism; it has increased from 310,000 in 2000 up to 387,000 in 2008[3], which may not seem as a substantial increase, but given the restraints on Palestine, any increase is substantial. (http://data.un.org/CountryProfile.aspx?crName=Occupied%20Palestinian%20Territory n.d.)

There is no doubt that Palestine has a consortium of talent, and that it is a very attractive place, which can be used to create innovative cities in, or even to create an innovative country, especially that it is a very small country (an approximate population of four million on an estimated 6,020 km²). Some of these talents have been coming to life in many forms and examples such as:

[3] These figures do not include tourists to Jerusalem, because the numbers of who goes in and out of Jerusalem are under Israeli control that we have no access to.

- The Edward Sa'ed national conservatory of music, which attracts artists from all over the world, and together with other Palestinians, they spread for love of classical music into the Palestinian society via their teaching programs and via concerts and music festivals[4].
- The Franco-German cultural center, which fuses the French and German cultures into the Palestinian community, and amongst its many activities, it holds conferences, documentary film shows, exhibitions, and lectures[5].
- Al-Kamandjati, the violinist in English, and obviously from its name, it has been a center of artistic and musical innovation in the heart of Ramallah's old city[6].
- Al-Qattan Foundation, this foundation also enriches the Palestinian community with providing a milieu for creativity[7].
- Khalil Sakakini cultural center[8].
- Ramallah Cultural Palace[9], "The Ramallah Cultural Palace is the first and only cultural centre of its kind in the Palestinian territories. The centre contains state-of-the-art facilities including a 736-seat auditorium, conference rooms, several exhibition halls designed to handle anything from intimate poetry recitals, to film premieres and big-ticket music events."
  (http://www.jerusalemites.org/jerusalem/cultural_dimensions/71.html)

These places and many more have been like honey to bees, it attracts the talented, and they produce more creativity as a result of rendering them with the appropriate venues.

[4] http://ncm.birzeit.edu/new/page.php
[5] http://www.ccf-goethe-ramallah.org
[6] http://alkamandjati.com/accueil
[7] http://www.qattanfoundation.org/en
[8] http://www.sakakini.org
[9] http://www.jerusalemites.org/jerusalem/cultural_dimensions/71.htm

There are also contests that motivate writing skills, along with publications that spread the word about where to find what in Palestine especially in regards to creativity, innovation, investments, and the fertile grounds for growth on many levels. "This Week in Palestine"[10] has been a leading publication that covers a wide spectrum of events in Palestine from the everyday matters all the way up to detailed articles on more crucial Palestinian intricacies.

The oPt has also been seeing growth in business innovation indicated by the increase of investment in the business sector and the rise of some Palestinian semi-corporations such as: PALTEL Gr., the Arab Palestinian Investment Company, the Palestinian Economic Council for Development and Reconstruction (PECDAR), the Palestinian Securities Exchange, Ltd., the Palestine Development and Investment Ltd., and Wataniya Palestine. Parallel to this is the rise of research institutes such as the Applied Research Institute, PASSIA, MIFTAH, AMIN, Palestine Family Net, Palestine Mapping Center, and Palestine Wildlife Society[11].

Additionally, Palestine "*has already begun to acquire sovereign cyberspace recognition. A difficult three-year international debate resulted in the "Occupied Palestinian Territory" being official assigned the two-letter suffix, ".ps" in the ISO 3166-1 list for the representation of names of countries or territories. The successful struggle to attain country code 970 led the way for the Internet Corporation for Associated Names and Numbers (ICANN), the international corporation that manages the country code Top-Level Domain (ccTLD) system on the internet, on 22 March 2000, to assign Palestine its unique country identifier. ".ps," in line with other sovereign nations such as .fr for France and .ca for Canada.*"(TWIP, issue No. 141, January 2009)

[10] http://www.thisweekinpalestine.com
[11] For more information on the institutes listed here, please visit their websites

In terms of statistics; the following table gives an idea on relevant Palestinian numbers, please bear in mind that the oPt occupies an area of 6,020 km^2 and has a population of 3,982,397 (as of the 2007 census) this includes Jerusalem.

(Table 1)

Business ICT (2007)	
Percentage of enterprises that use computers	21.1%
Percentage of enterprises that use electronic transactions	3.1%
Number of (IT) specialists per 100 employees	3.5%
Culture (2006)	
No. of mosques (in operation)	2,228
No. of churches	160
No. of newspapers (in operation)	13
No. of theaters (IO)	9
No. of museum (IO)	8
No. of cultural centers (IO)	161
Information and Communication Technology	
Availability of TV sets	95.3%
Availability of satellite dish for households with TV sets	80.4%
Availability of computers at home	32.9%
Availability of internet at home	15.9%
Persons (10 years and over) who have access to the internet	18.4%
Persons (10 years and over) who use computers	50.9%
Percentage of households that have a mobile phone	81.0%
Percentage of households that have a telephone	50.8%
Hotels (3^{rd} quarter, 2009)	
Room occupancy rate	39.7%
Bed occupancy rate	33.7%
Education (2007/2008)	
Illiteracy rate for persons 15 years and over (2007)	5.9%
Illiteracy rate for persons 15-29 years (2007)	0.9%
No. of schools	2,488
No. of school teachers	43,556
No. of school students	1,109,126
Students per class (schools)	32.2%
Drop-out rate (schools 2005/2006)	1.2%
Repetition rate (schools 2005/2006)	3.0%

(Palestinian Central Bureau of Statistics)

As good as this sounds, there are limitations to be considered: the boundaries dilemma is one, which will need a political solution, and some stability. It is worth posing the question: if

Palestine were to have high-tech industries and business parks, will Israel still allow the Diaspora Palestinian[12] and international "creative class" to come in? Given that this will help the Palestinian economy to grow through means other than leaning on the Israeli economy (e.g. 88.7% of Palestinian exports are from Israel, and 73.5% of its imports are to Israel). (http://data.un.org/CountryProfile.aspx?crName=Occupied%20Palestinian%20Territory n.d.)

At the time being this is not an issue for Israel because most of the diversity in Palestine has been geared toward peace, some art, consultation to the government (which is very weak, and lacks capacity) and work with the civil society in mostly humanitarian areas.

Another limitation is the fact that the oPt is fragmented and divided into smaller sections by the inner borders; Israeli checkpoints, the apartheid wall, Israeli settlements, and that the Gaza strip has been totally cut off[13].

CONCLUSION

In conclusion to this chapter, we'd like to say that Israel will always stand in the way of Palestine's improvement; accordingly, the Palestinians will have to think innovatively to utilize the diversity they have along with the fact that Palestinians are highly educated (literacy rate of 94% in adults age 15 and above (http://data.worldbank.org/country/west-bank-and-gaza n.d.) in order to create innovative cities within the fragmented oPt. so the answer to the boundaries question above is that we believe that an occupied region can still have innovation in it, but it may be limited and constrained.

[12] Approximately five million Palestinians live away from their homeland (Diaspora) http://en.wikipedia.org/wiki/Palestinian_diaspora

[13] Please visit http://www.youtube.com/watch?v=6ewF7AXn3dg for a two minute video that explains the situation

CHAPTER TWO

CULTURAL ECONOMY AND COMPARATIVE ADVANTAGES

"Human cleverness, desires, motivations, imagination, and creativity are replacing location, natural resources and market access as urban resources. The creativeness of those who live in and run cities will determine the future success" (Landry 2000) there is no better and more optimistic idea for the Palestinian situation; this should be the ethos by which Palestinians live. This is especially relevant because the oPt lacks resources but has people. The population of Palestine has been consistently growing:

(Table 2)

Governorate	Palestinian Territory	West Bank	Jerusalem	Gaza Strip
1997	2,783,084	1,787,562	320,809	995,522
1998	2,871,568	1,838,807	325,033	1,032,761
1999	2,962,226	1,891,171	329,274	1,071,055
2000	3,053,335	1,943,658	333,451	1,109,677
2001	3,138,471	1,992,577	337,278	1,145,894
2002	3,225,214	2,042,306	341,108	1,182,908
2003	3,314,509	2,093,381	344,982	1,221,128
2004	3,407,417	2,146,400	348,941	1,261,017
2005	3,508,126	2,203,738	353,157	1,304,388
2006	3,611,998	2,262,735	357,424	1,349,263
2007	3,719,189	2,323,469	361,743	1,395,720
2008	3,825,512	2,385,180	368,394	1,440,332
2009	3,935,249	2,448,433	375,167	1,486,816
2010	4,048,403	2,513,283	382,041	1,535,120

http://www.pcbs.gov.ps/Portals/_pcbs/populati/GOVER1997-2010E.htm

With more manpower, Palestine can tackle innovation from the comparative advantage perspective, but before we delve into this point, we want to point out that in the nowadays highly globalized world, urban development, and hence innovation in cities, faces three main issues:

1- Urban regions and cities are gaining more power and magnitude.
2- National governments are increasingly losing their capacity to respond to economic challenges from the global level through traditional policy measures.
3- There is a growing importance of the sub-national level decision making where urban decision makers are from both the private and public sectors.
(Kulonpalo n.d.)

This is pertinent to the Palestinian situation mainly because the government lacks capacity, so with the help of the qualified public, the whole country can pool into decision making and policy design that can generate the necessary underpinnings for building an innovative state simultaneously with building a state. Such policies can rely heavily on the "culture economy", if a country like Palestine can't take advantage of this, then no country can! The way this can be done, according to J. Kulonpalo, is through flagship projects that are based on consumption related activities such as:

1- Tourism: Palestine can take advantage of its strategic, attractive, and significant-on-many-levels location. Much work in infrastructure is needed to make it a more appealing and easy place to live in and visit, and while major infrastructure requires time and enormous money flows to show results, decorative and relatively easier steps can still be taken to better and elevate standards, such as focusing on main streets; widen sidewalks, better illumination, tree-planting and more vegetation, adding street furniture (e.g.

monuments, art pieces, historical pieces, trash bins, benches, hydrants…etc.) the government can announce for a competition for better street designs, this way they get the public involved, extend the feel of ownership which promotes sustaining good street looks, along with making room for innovative ideas to surface. The government can also offer a platform in which innovators can meet, face-to-face interactions build trust, and this encourages creativity.(M. d'Ovidio, Brand Building, the creative city)

a. Heritage: Having had an interesting past and being a crossroad of many civilizations for hundreds and thousands of years ago, Palestine has turned into a mosaic of cultures. Everything from its people to its architecture reflects a colorful heritage and an amalgamated culture.(http://www.travelpalestine.ps/site/Culture-Heritage.php n.d.)
b. Arts: which encompass a wide variety ranging from paintings to international art exhibitions[14].
c. Conventions: through which Palestine can draw attention to its cause, its case, and its story. This can be one venue in which Palestine can market itself and shed the light on its core values; what Vicari Haddock calls "branding a city."

2- Sports.
3- Culture and entertainment: catalyst factors such as the wide use of English, in addition to having Arabic and Hebrew as two main spoken languages pave the road for entertainment and cultural activities to be carried out smoothly. Moreover, the societal fabric in Palestine is distinguished by its intimacy due to the proximity factor, and the dependency on much of the face-to-face interactions, which build trust, this gives birth to Simmie's idea of embeddedness, which means that the social characteristics of economic

[14] Please visit http://www.palestine-art.com/index.html, http://www.resistanceart.com/, http://www.jerusalemites.org/artist/index.htm, http://www.middleeastbooks.com/pact/index.html, and http://www.stationmuseum.com/Made_In_Palestine/Made_In_Palestine.htm for more information.

behavior are a product of interactions of actors embedded in society, consequently such interactions lead to specialized innovation based on each region (due to close interactions). This region-specific innovation "may be characterized by localized technology learning (Feldman and Florida 1994) which benefits from knowledge spillovers which are facilitated by proximity, and are also, therefore, region specific." (James Simmie, innovative cities)

We must say that work related to the above has been taking place and is on the rise. This takes us back to the comparative advantage perspective; if Palestine takes what it is good at and presents it in its original cultural context then it is unique, absolutely unique to Palestine, which gives it a comparative advantage and enhances its economy. To be more exact, we will list some of what Palestine is well-known for, and hopefully with the right media coverage and marketing methodology, it or at least some of it can become exclusive to it:

- Stone and textile production
- Construction material production
- Agro-industry esp. olives and olive oil
- Food processing
- Handicrafts such as olive-wood carvings and mother-of-pearl souvenirs
- Metal products
- Chemical industries
- Pharmaceuticals
- Plastics
- Medium and high tech

(http://www.piefza.org/a_pal_industries.htm n.d.) &
(http://clpmag.org/content/pages/factsheets/palestine.php n.d.)

This is a good place to share an example of an already proclaimed creative city, which can be used as a model for Palestine to follow; the creative city of Finnish Helsinki:

"The International Council of Societies of Industrial Design (Icsid) designated Helsinki as the World Design Capital for the year 2012 on November 25th, 2009. Design is a factor deep-rooted in the urban lifestyle of Helsinki. Design is manifest in the everyday lives of Helsinki citizens in many ways, ranging from home furniture and items that represent old Finnish design traditions to modern urban solutions in the city and contemporary interior design. The creative sector is re-shaping Helsinki's economy and enhancing the citizens' quality of life. Design seen from a broad perspective – in city planning, architecture, industrial design and service design – plays an integral role in the development of Helsinki, city services and consumer products. International Design Foundation is responsible for the planning and execution of the World Design Capital Helsinki 2012 project. The foundation manages all international rights and brands related to the project. It also supervises compliance to the international organizing agreement signed earlier this year. Good design makes citizens' lives more pleasant and easier. It helps to make businesses more competitive, and it offers rewarding experiences to all.

Design sectors:

- Architecture
- Interior design
- Urban design
- Sustainable design
- Industrial design

- Communication design” (http://www.wdc2012helsinki.fi/en/etusivu n.d.)

CONCLUSION

In conclusion to this chapter, we would like to reaffirm the importance of making the best out of what Palestine is good at, and tailor, strengthen, and media-cover it extensively so that Palestine can harness the most out of its comparative advantage. This is made possible by dipping it all in Palestine’s rich culture then take it out and use it as the building block for its cultural economy, which once adopted, will ensure the appropriate and necessary scheme to erect a uniquely innovative Palestine.

CHAPTER THREE

WHAT MAKES A PLACE INNOVATIVE/CREATIVE?

Charles Landry lists the building blocks of an innovative city as follows:

1- **Visionary individuals:** within the Palestinians there many individuals with a vision, but what needs to be done in this regard is gather these individuals together and integrate their independent visions into one toward the development of Palestine. Palestinians are scattered between: the West Bank, Gaza strip, and the Diaspora Palestinians in Jordan, Lebanon, Syria, the Gulf, the United States of America, Canada, and more. The Palestinian government, out of its keenness to create an innovative Palestine, should establish a platform in which Palestinians can have productive visionary meetings which should result in tangible short and long – run plans for the establishment of the country. One such plan is the PRDP (Palestinian Reform and Development Plan) not close to being comprehensive, but it is a start on the right path, it can be one place where innovative planning can commence.

2- **Creative organizations:** Palestinian organizations need more capacity building, not in terms of educational skills, or knowledge, but more in the application field. So far there has been an abundance in capacity building and development projects in the oPt, the most recent one is UNDP's capacity building project for five Palestinian ministries as a pilot study. The main obstacle in the way of Palestinian innovation are Jacob's squelchers who put obstacles in the way of creativity, furthermore, such obstacles also serve Israel's existence in the region.

3- **Political culture sharing and clarity of purpose:** this one is probably difficult to attain in the oPt at the time being, the current Fatah-PNA government in the West Bank is apprehending and suppressing any potential opposition, it has been accused of corruption and of conspiring with Israel. The Hamas government in the Gaza Strip is being pounded day in and day out because it has been enlisted on the terrorism list according to the Israeli and American definitions, and the whole Gaza Strip has been annexed, marginalized, persecute, murdered, demolished right in front of the whole world, and no one (but for some peace activists) is lifting a finger. This atmosphere is not conducive to political openness and consequently not ready to have a clear purpose.

4- **Follow a determined not a deterministic path:** unless Fatah and Hamas, and the other relatively less significant affiliations, reunite, plan together for a Palestinian State, and simultaneously an innovative one, the Palestinian people's path will be pre-determined by Israel and Western powers, just like it has been for years now.

5- **Leadership is widespread permeating public, private, and voluntary sectors.**

6- **Appreciation of cultural issues; a key to the ability to respond to change successfully.**

7- **Key actors must be:**

- **Open minded**
- **Willing to take risks**
- **Willing to listen and learn**
- **Have the capacity to work with local distinctiveness and to find strength in apparent weaknesses**

Landry's understanding of creativity comes from:

1- THE POWER OF THINKING: ideas that shape our mindset are what should be targeted for the sake of building an innovative place, or the first part that should be targeted at least. Meaning the questions at hand are how flexible are the citizens of the place? How accepting of new ideas are they? And how willing are they to adopt and implement such new ideas? Given that the Palestinians were forced outside their homeland, this gave them the opportunity to get exposed to many cultures and life styles; which makes them more susceptible to change.
2- IMPACT OF CULTURE AS A CREATIVE RESOURCE: Landry also contends that cultural evolution shapes urban development, and that there is an intrinsic link between creativity and the development of culture:

> "*Culture is the panoply of resources that show that a place is unique and distinctive. The resources of the past can help to inspire and give confidence for the future. Even cultural heritage is reinvented daily whether this be a refurbished building or an adaptation of an old skill for modern times: today's classic was yesterday's innovation. Creativity is not about a continuous invention of the new, but also how to deal appropriately with the old*." (Landry, the creative city)

What is great about the way Landry thinks is that he gives what exists its weight, he doesn't reinvent the wheel, rather he encourages use of what is; upgrading it, linking it to new technologies to generate economic profit. He also mentions the creative concept of "Factor Four – doubling wealth and halving resource use." Factor four focuses on the most efficient way of using resources given new technologies, so that four times the wealth can be produced by using resources effectively, one example he lists is how electronic trade reduces travel costs. In our opinion this concept can also be linked to the economies of scale concept to be discussed at a later stage, and this is especially relevant and useful to the Palestinian case because of the

dilemma of lack of resources that it faces given Israel's restrictions and continuous depletion of Palestinian resources. Landry also puts this idea in the form of "doing more with less", again, just perfect for the Palestinian context, and a good example of it is what is happening in Gaza; the government there has been very supportive of creative and innovative ideas, people are making the best of the sea part in which they're allowed to fish, they have started some recycling projects which resulted in building a tour train in the city of Gaza, and although minimal amounts of aid reach Gaza, they have been very effective due to the good governance of Gaza's current government.(Al Jazeera, news report, October,2010). In the West Bank, on the other hand, efforts of renovation and rebuilding are increasing as well; the government on this end is also trying to expand leg room for Palestinian innovation and openness to new ideas. Of course, as unfortunate as this may be, Palestinian renovation, innovation, and creativity are always under Israeli mercy, they can come in unannounced and wreck in seconds the work of years, but Palestinians have started and will continue to build and rebuild.

We also want to refer to some planning indicators mentioned by Landry that should be taken into account as a creative city is being constructed:

- Criteria for assessing the capacity of innovation in a given city need to be clarified.
- How linked are educational and training policies to innovation in the city at hand?
- Monitoring and evaluation of funds given for innovation and creativity.
- Which good practice strategies are suitable for the city at hand?
- Is the city's urban policy conducive to innovation?
- Assessment of organizational capacity to handle innovativeness.
- Time scale to achieve innovativeness in the city at hand.

Competitiveness (measured by GDP per Head = labor productivity * employment intensity) can also be another indicator used to measure creativity of a city (Nicos Komninos, Intelligent Cities)

Komninos also goes on giving a list of attempts that can be followed to give birth to innovation:

1- Providing support for clusters in traditional or new industries.
2- Creating knowledge-intensive clusters in central-city areas that host producer services, financial services, company HQ's, new tertiary activities like software and multimedia.
3- Constructing science and technology parks that host R&D institutes, innovative firms, technology transfer and use of technology organizations, innovation fund provision business, and provision of technological information foundations.
4- Supporting more extensive technopolises combining science and technology parks, industrial districts, and producer services.

(Komninos, intelligent cities)

Moreover, a favorable culture of innovation and strong entrepreneurial attitudes toward innovation are foundational for innovation to take place. (James Simmie, innovative cities)

A question arises now that we have mentioned the points above: why is innovation concentrated in some places more than others?

Marshall's innovation and agglomeration theory explains the answer as follows:

Firm expansion is dependent on pools of common factors such as: land, labor, capital, energy, sewage systems, and transportation. The better these are the more attractive for firms to establish and specialize, which leads to lower prices and higher productivity. (Marshall 1890)

Innovative firms also grow at faster rates as is proven by Perroux (1955).

According to the 2007 Smart Cities Final report; there are six characteristics that build an innovative city:

1- Smart Economy
2- Smart People
3- Smart Governance
4- Smart Mobility
5- Smart Environment
6- Smart Living

(Caragliu, A; Del Bo, C. & Nijkamp, P (2009). "Smart cities in Europe". Serie Research Memoranda 0048 (VU University Amsterdam, Faculty of Economics, Business Administration and Econometrics). http://ideas.repec.org/p/dgr/vuarem/2009-48.html. n.d.)

Which we will look into in more depth as we go further in this paper.

Different studies show that the key indicator that controls what a city would look like is its *population*, this proves that it is critical to study the trends that the population rate follows, and whether it increases or decreases affects different life parameters in different ways such as if population increases per capita then innovation rate increases along with crime rate, while the demand on certain infrastructure decreases. This is essential for policy makers to set realistic targets for local policy. The population of cities has been boosting; by the year 2000, seventy percent of the developed world and forty percent of the developing world had resided in cities, given that cities form only 0.3% of all land. This surge poses both advantages such as:

1- Economies of scale in infrastructure
2- Facilitate optimized delivery of social services such as health, education and government services

3- Increased division of labor

4- Growth of occupations geared toward innovation and wealth creation

It also poses challenges such as:

1- Urban heat island effects[15]

2- Increase in greenhouse gas emissions

3- Psycho-social problems[16]

(http://www.pnas.org/content/104/17/7301.long n.d.)

We must note that urban indicators such as: demographics, socio-economic indicators, and behavioral indicators, all are scaling functions of city size, and may follow a variety of mathematical formulas such as Zipf's law[17]. What Bettencourt, Lobo, Helbing, Kuhnert, Geoffrey, and West have illustrated in their "Growth, innovation, scaling, and the pace of life in cities" article lays down the foundation of most of the mathematical work of this paper and much of the information disclosed above was extrapolated from it. They begin with studying an analogy to cities in Biology, namely, they compare the pace of life in cities to the pace of biological life in living beings based on their mass (as opposed to population in cities) they found

[15] The term "heat island" describes built up areas that are hotter than nearby rural areas. The annual mean air temperature of a city with 1 million people or more can be 1.8–5.4°F (1–3°C) warmer than its surroundings. In the evening, the difference can be as high as 22°F (12°C). Heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and mortality, and water quality. http://www.epa.gov/heatisld

[16] Classic urban theory suggests that living in highly urbanized areas of the city results in social isolation, social disorganization, and psychological problems. http://onlinelibrary.wiley.com/doi/10.1002/1520-6629(199210)20:4%3C353::AID-JCOP2290200409%3E3.0.CO;2-Z/abstract

[17] Please see annex II

that metabolic rate decreases as mass increases[18] [19] which signifies economy of energy consumption i.e. larger organisms consume less energy, time, and mass. Generally and biologically speaking, the pace of biological life slows down with the increasing size of organisms. To compare this biological paradigm to our real life city situation, let's begin by defining what a city is:

"Integrate economic and social units, usually referred to as unified labor markets, comprising urban cores and including all administrative subdivisions with substantial fractions of their population commuting to work within their boundaries"
(http://www.pnas.org/content/104/17/7301.long n.d.)

Or "an incorporated administrative district established by state charter" (wordnetweb.princeton.edu/perl/webwn) or "A city is a relatively large and permanent settlement, particularly a large urban settlement" (Goodall, B. (1987) The Penguin Dictionary of Human Geography)

Now that we know what a city is, and that we have already seen the comparison to Biology, the question that emerges is what is the relation?

The answer is a bit mathematical:

[18] Let β be metabolic rate, and let M denote Mass, then β ≈ M^3/4. For physiological times (e.g. life spans, turnover times, times to maturity) scale as M^1-β ≈ M^1/4, while associated rates (e.g. heart rates, evolutionary rates) scale as M^β-1 ≈ M^-1/4.
[19] Resting heart rate of a mouse is 500/minute, for man; 70/minute, for an elephant; 28/minute. http://www.thaifocus.com/elephant/heartbeat.htm

Let N(t) be the measure of city size at time t. The material resources (e.g. energy, infrastructure) or measures of social activity (e.g. wealth, patents, pollution) denoted by Y(t) follow a power law scaling function as follows[20]:

$Y(t) = Y_o N(t)^{\beta}$ the fact that it follows a power scaling function, given the scale invariance property that such functions enjoy, projects into reality in the form that a large city may simply be a multiple of a small city.

β is our main concern at this point, it tells us what the function means as this exponent changes:

$\beta \approx 1$ (linear) the function in this case describes individual needs such as household water consumption, a house, a job…etc.

$\beta \approx 0.8$ (sub-linear) the function here describes material needs such as infrastructure, this is where the function also shows economies of scale, and this is exactly where it matches with the biological analogy we discussed earlier.

$\beta \approx 1.1\text{-}1.3$ (super-linear) the function now describes social currencies such as wealth, innovation, and information, and it exhibits increasing returns with population size.

According to the article, indicators following the $\beta > 1$ property were the most, such as innovation and information, their pace accelerates with size, these have no equivalent in Biology, this also shows that knowledge spillovers drive growth which drives urban agglomeration which in turn means that larger cities are associated with higher productivity.

From the urban growth equation[21] and the behavior of β we can observe the following:

[20] Please see annex III for more information on power law scaling functions
[21] See annex IV

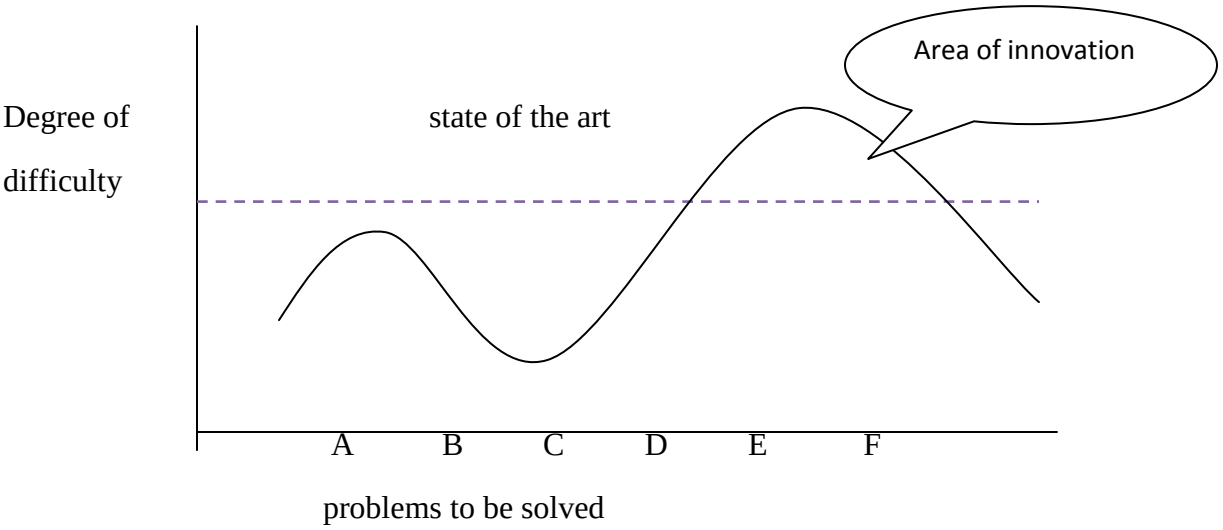
(Table 3)

Classification of scaling exponents for urban properties and their implications for growth

Scaling exponent	Driving force	Organization	Growth
$\beta < 1$	Optimization, efficiency	Biological	Sigmoidal: long-term population limit
$\beta > 1$	Creation of information, wealth and resources	Sociological	Boom/collapse: finite-time singularity/unbounded growth; accelerating growth rates/discontinuities
$\beta = 1$	Individual maintenance	Individual	Exponential

What this means in plain English is: individual needs like jobs exponentially increase as population increases, while demand on infrastructure, which resembles what happens in Biology, increases up to a limit then there's an approximate linear relation. But the special part, the core of this paper, is the indicators with a beta greater than one, what happens here is unlimited increase, within a specific period of time with a specific amount of resources, when resources run thin, this increase collapses, and the only means to save the process of prosperity is innovation that recreates the cycle and initiates another surge keeping the city in the wealth and knowledge creation phase, until another collapse is about to be reached, then innovation again has to be used for regeneration, this way a possible collapse is pushed into the future and the city can enjoy a prolonged prosperous lifespan. (http://www.pnas.org/content/104/17/7301.long n.d.)

So innovation has to serve as a potential solution to problems (esp. of growth) that may be faced, Komninos calls innovation an island, and has a figurative way to put as follows:



The Smart Cities Final Report discusses the topic from another angle; it focuses on *comparison* between cities to determine their smartness. It also offers a good rubric that we will use in our research and shall explain as follows:

The report's definition of a smart city is based on how much of six specific characteristics it has, these characteristics are based on 30+ factors which are measured using seventy some indicators. The characteristics are:

1- **Smart economy & industry:** especially these in the IT and communication technology fields, in addition to industries that are based on smart ICT. Silicon Valley is a good example of a place with smart IT[22]. But this example is to be used with caution, we're not saying that if a country lacks the American version of Silicon Valley, then it is not innovative like Tom Friedman said, the response to that comes from James Zogbi who says, innovation is comparable to its place of origin, meaning every city can have its own

[22] http://www.siliconvalley.com/index.html

distinctive form of innovation. It is worth pointing out that technological innovation involves the key term of transformation within an organization of:

- *Production processes (through information technology, automation, energy saving systems);*
- *Products (new products and services, new product models, improved quality, shorter life cycle of products); and*
- *Organization (flexibility, just in time delivery systems, lean production, networks, optimization of producer-supplier relations, etc.) (Komninos, intelligent cities)*

2- **Smart people:** inhabitants of the city are well educated and, generally & relatively speaking, smarter.

3- **Smart living:** this includes secure and safe living standards.

4- **Smart governance:** this refers to a smart relation between the government and the citizens via e-government and e-democracy programs.

5- **Smart mobility:** where the use of technology is predominant in everyday urban life for example a modern transportation technology which improves mobility and is based on ICT. Additionally, "This usage is centered on the utilization of networked infrastructure to improve economic and political efficiency and enable social, cultural and urban development"(Hollands, R. G (2008). "Will the real smart city please stand up?". City 12 (3): 303–320 n.d.) Where the term infrastructure indicates business services, housing, leisure and lifestyle services, and ICTs (mobile and fixed phones, satellite TVs, computer networks, e-commerce, internet services), and brings to the forefront the idea of a wired city as the main development model and of connectivity as the source of growth.(Komninos Nicos (2002). Intelligent cities: innovation, knowledge systems and

digital spaces. London: Spon Press n.d.) The critical role of high-tech and creative industries in long-run urban growth is stressed. This factor, along with *soft infrastructure* (knowledge networks, voluntary organizations, crime-free environments, after dark entertainment economy) is the core of Richard Florida's research. (Florida, R. L. (2009). "Class and Well-Being". http://www.creativeclass.com/creative_class/2009/03/17/class-and-well-being/. Retrieved 17 March 2009,7:38am EDT. n.d.) The basic idea is that "creative occupations are growing and firms now orient themselves to attract ‘‘the creative'". While the presence of a creative and skilled workforce does not guarantee urban performance, in a knowledge-intensive and increasingly globalised economy, these factors will determine increasingly the success of cities. (Nijkamp, P. (2008). "E pluribus unum". Research Memorandum, Faculty of Economics (Amsterdam: VU University Amsterdam). n.d.) A strategy for creating a competitive environment which would increase local prosperity and competitiveness is another aspect in this field; an example of this is business led urban development that focuses on building business parks as smart cities.(http://en.wikipedia.org/wiki/Smart_city#cite_note-11 n.d.)

6- **Smart environment:** this entails green policies and efficient and sustainable use of energy[23]. Furthermore, Sustainability is seen here as a major strategic component of smart cities. The move towards social sustainability can be seen in the integration of e-participation techniques such as online consultation and deliberation over proposed service changes to support the participation of users as citizens in the democratization of decisions taken about future levels of provision. (Deakin, M (2010). Reddick, C. ed. "Review of City Portals: The Transformation of Service Provision under the

[23] **Sustainable energy** is the provision of energy that meets the needs of the present without compromising the ability of future generations to meet their needs. http://en.wikipedia.org/wiki/Sustainable_energy

Democratization of the Fourth Phase". Politics, Democracy and E-Government: Participation and Service Delivery (Hershey: IGI Publishing). n.d.) Environmental sustainability is important in a world where resources are scarce, and where cities are increasingly basing their development and wealth on tourism and natural resources: their exploitation must guarantee the safe and renewable use of natural heritage. This last point is linked to business led development, because the wise balance of growth-enhancing measures, on the one hand, and the protection of weak links, on the other, is a cornerstone for sustainable urban development. People need to be able to use the technology in order to benefit from it (see absorptive capacity). When social and relational issues are not properly taken into account, social polarization may arise as a result. The debate on the possible class inequality effects of policies oriented towards creating smart cities is, however, still not resolved. (Poelhekke, S (2006). "Do Amenities and Diversity Encourage City Growth? A Link Through Skilled Labor". Economics Working Papers (San Domenico di Fiesole, Italy: European University Institute) ECO2006/10. n.d.) It is the issues raised by sustainability can determine the very notion of a 'smart' city in contrast to a digital or an intelligent city. (Caragliu, A; Del Bo, C. & Nijkamp, P (2009). "Smart cities in Europe". Serie Research Memoranda 0048 (VU University Amsterdam, Faculty of Economics, Business Administration and Econometrics). http://ideas.repec.org/p/dgr/vuarem/2009-48.html. n.d.)

These six pillars are essential, but lubricants that oil intermediaries between vital institutes on innovation are as essential, such intermediaries are; collaboration between businesses and universities, business networks such as supplier-producer relations, innovation-finance institutes, and disseminating information from smaller to larger companies. (Komninos, intelligent cities)

These traits are defined more accurately using factors and measuring indicators as in the table below: P.S. this report was applied to cities in Europe

(Table 4)

CHARACTERISTIC	FACTOR	INDICATOR
SMART ECONOMY	Innovative spirit	R&D expenditure in % of GDP Employment rate in knowledge-intensive sectors Patent applications per inhabitant
	Entrepreneurship	Self-employment rate New businesses registered
	Economic image & trademarks	Importance as decision-making centre (HQ etc.)
	Productivity	GDP per employed person
	Flexibility of Unemployment rate	labor market Proportion in part-time employment
	International Embeddedness	Companies with HQ in the city quoted on national stock market Air transport of passengers Air transport of freight
SMART PEOPLE	Level of Qualification	Importance as knowledge centre (top research centers, top universities etc.) Foreign language skills
	Affinity to life long learning	Book loans per resident Participation in life-long-learning in % Participation in language courses
	Social and ethnic plurality	Share of foreigners Share of nationals born abroad
	Flexibility	Perception of getting a new job
	Creativity	Share of people working in creative industries
	Cosmopolitanism/	Voters turnout at European

	Open-mindedness	elections Immigration-friendly environment (attitude towards immigration)
	Participation in public life	Voters turnout at city elections Participation in voluntary work
SMART GOVERNANCE	Participation in decision-making	City representatives per resident Political activity of inhabitants Importance of politics for inhabitants Share of female city representatives
	Public and social Services	Expenditure of the municipal per resident in PPS Share of children in day care Satisfaction with quality of schools
	Transparent Governance	Satisfaction with transparency of bureaucracy Satisfaction with fight against corruption
SMART ENVIRONMENT	Attractiveness of natural conditions	Sunshine hours Green space share
	Pollution	Summer smog (Ozon) Particulate matter Fatal chronic lower respiratory diseases per inhabitant
	Environmental Protection	Individual efforts on protecting nature Opinion on nature protection
	Sustainable resource management	Efficient use of water (use per GDP) Efficient use of electricity (use per GDP)
SMART LIVING	Cultural facilities	Cinema attendance per inhabitant Museums visits per inhabitant Cultural facilities Theatre attendance per inhabitant

	Health conditions	Life expectancy Hospital beds per inhabitant Doctors per inhabitant Satisfaction with quality of health system
	Individual safety	Crime rate Death rate by assault Satisfaction with personal safety
	Housing quality	Share of housing fulfilling minimal standards Average living area per inhabitant Satisfaction with personal housing situation
	Education Facilities	Students per inhabitant Satisfaction with access to educational system Satisfaction with quality of educational system
	Touristic Attractiveness	Importance as tourist location (overnights, sights) Overnights per year per resident
	Social cohesion	Perception on personal risk of poverty Poverty rate
SMART MOBILITY	Local Accessibility	Public transport network per inhabitant Satisfaction with access to public transport Satisfaction with quality of public transport
	(Inter-)national Accessibility	International accessibility
	Availability of ICT infrastructure	Computers in households Broadband internet access in households
	Sustainable, innovative and safe transport systems	Green mobility share (non-motorized individual traffic) Traffic safety Use of economical cars

(http://www.smart-cities.eu/download/smart_cities_final_report.pdf n.d.)

The promotion and creation of digital cities, virtual innovation islands, and intelligent cities elevates the country to better grounds that will of course make it innovative for one, another gain is what follows innovation: unlimited economic growth. One way to implement this is by building science parks, Komninos gives an illustrating outline as of how to build and evaluate a science park:

(Table 5)

Science park module:	**Science park evaluation module:**
Background analysis: ▪ Economic background ▪ Key organizations involved ▪ Available technology resources ▪ Local/regional property market ▪ Assessment of prospective sites **Market analysis:** ▪ Assessment of market potential ▪ Definition of target market ▪ Market testing **Outline strategy:** ▪ Potential roles ▪ Main strategic opinions ▪ Main elements of strategy ▪ Broad assessment of financial availability ▪ Organizations involved in strategy **Detailed development plan:** ▪ Strategic focus ▪ Organization and management ▪ Property provision ▪ Services provision ▪ Networking provision ▪ Promotional plan ▪ Budget and funding plan ▪ Implementation plan	**Relationships between actors:** ▪ The links between tenant companies ▪ The interactions between tenant companies and their environment (local, national, international). In particular, has the park facilitated the development of international links? ▪ The links between tenant companies and the local scientific and technological environment ▪ The motivation of local actors (existing, new, or intensified cooperation between universities and economic development agencies, local research and companies, etc.) **Business and job creation:** ▪ Nature and number of businesses created on the park ▪ Nature and number of jobs created on the park ▪ Analysis of job qualifications compared with the local situation ▪ Nature and number of jobs created in relationship with the park **Technology transfer:** ▪ Businesses created on the basis of technology transfer ▪ Number of research contracts in tenant companies ▪ Technology transfer between firms ▪ Attraction of technological resources on the park **Services proposed by the park to tenant companies:** ▪ Information ▪ Promotion

	▪ Managerial support ▪ Business development ▪ Partner search ▪ Assistance in networking ▪ Technical support and facilities **Image of the park as perceived by:** ▪ Tenant companies ▪ Companies located in its vicinity ▪ Researchers and scientists ▪ Local government ▪ Bodies and companies located away from the park's vicinity **Expectations of the stakeholders in the development of the park:** ▪ Quality of the environment ▪ Existence of services ▪ Financial expectations ▪ Facilitation of networking ▪ Facilitation of business

(Komninos, intelligent cities)

CHAPTER FOUR

CONCLUSION, POLICY IMPLICATIONS AND RECOMMENDATIONS

Innovation in Palestine; a dream or a reality?

This is what dawned on us as we thought of a proper conclusion to this paper. What we have done so far is look at the literature and applications of this topic in general and in Palestine as our case-study. As was illustrated, there were three main criteria according to which we would like to test, if applicable, whether Palestine is innovative or not, whether it can become innovative or not, and finally what does it need to become innovative. The criteria are that of Charles Landry, the six-point rubric from the "smart cities" report, and finally, work of Bettencourt and his colleagues.

Before we do that we must discuss some of the barriers and costs of innovation in general and then the ones exclusive to the Palestinian case:

Costs and barriers of innovation:

- Financial resources
- Resources in general
- People that stand in the way of innovative ideas
- Entry barriers
- Expensive technology
- Lack of motivation

In addition to these obstacles, in Palestine we face:

- The Israeli occupation
- Weak governance
- Scattered population – Diaspora
- Lack of some necessary infrastructure
- Vulnerable economy
- Lack of sufficient and effective social services

Now we are ready to start testing against the three criteria mentioned above:

CRITERION ONE:

CHARLES LANDRY

Charles Landry has a seven point criterion that we have already discussed in full detail in Chapter Three above and have also applied it to the Palestinian context. As a result, according to this criterion Palestine is NOT currently innovative. Out of the seven points, only one has been implemented in Palestine, and it fails to meet the other six. Accordingly our main policy implication is: the Palestinian people have to come to a consensus on "who" should represent them and run their country, this also must be respected world-wide regardless of whether Israel approves of it or not[24]. Such an elected government has to offer an effective and applicable plan and actual results within a pre-agreed on period of time. If it fails to meet these conditions, a new government has to be put in its place. For this to become a reality; the Palestinian coalitions must reunite.

[24] In 2006, the Palestinians voted for Hamas leaders to take over the government, but since Hamas has been enlisted as a terrorist party (just like every other Islamic group has been called even if no extremism is involved) by Israel and its strongest ally the USA; pressure was put on the Palestinians from within and by cutting all external aid and relations to force Hamas to give up the government which it got legitimately by a democratic and an unbiased majority of votes.

CRITERION TWO:

SMART CITIES FINAL REPORT

In each of the six pillars they've used in this report, we will focus on the factors that apply to the Palestinian case, and then make our recommendations given the full picture:

(Table 6)

SMART ECONOMY	
Entrepreneurship	21.4% self employed persons
Productivity	7% increase in GDP*
Flexibility of unemployment rate	19%, 166th in the world*
Innovative spirit	65% in the services field*
International embeddedness	Palestinian Stock Market: http://www.p-s-e.com/psewebsite/english/default.aspx
SMART PEOPLE	
Level of qualification	10 traditional universities* 1 open university 13 university colleges 19 community colleges Illiteracy rate 15 years and over 5.9%* Illiteracy rate 15-29 years 0.9%* 10% of all Arab graduates are Palestinians* Foreign languages: mainly English, French, Hebrew, and some German
Affinity to life-long learning	% of graduates of higher education and vocational training of persons 15 years and over is 14.5%*
Social and ethnic plurality	As was discussed earlier and due to the attractiveness of Palestine, the social fabric holds many ethnicities
Flexibility	Perception of getting a new job – highly difficult
Participation in public life	74.6% voting turnout Highly engaged in voluntary work – no numerical data available
SMART GOVERNANCE – not enough evidence to show Palestine satisfies this pillar due to the political instability and turbulence as was described above.	
SMART ENVIRONMENT	
Attractiveness of natural resources	Long sunshine hours (avg. of 12 hours during the summer and 10 during the winter) Low share of green spaces – due to lack of land resources – occupation dilemma
Pollution	Low levels of pollution – no numerical data available
Sustainable resource	83 cubic meters per Palestinian (as opposed to an average of app.

management	500 liters per capita in the US and app. 200 liters in Germany)* Palestine uses only 0.019% of the world's share of electricity*
SMART LIVING	
Cultural facilities	Please see table (1)
Health conditions	76 hospitals 1.9 doctors/1000 2.7 nurses/1000 1.3 beds/1000
Individual safety	Very low due to occupation
Housing quality	Average number of rooms in housing units is 3.6* Avg. number of persons per room is 1.7*
Education facilities	Please see table (1)
Touristic attractiveness	Highly attractive + please see table (1)
Social cohesion	Percentage of households below poverty line is 57.3%* No. of individuals below poverty line 2,303,840* % of households that lost more than ½ their income during Al-Aqsa intifada is 51.6%* % of households that indicated their need for assistance is 67.0%* Avg. monthly per capita expenditure in the oPt is 95.4*
SMART MOBILITY	
Local accessibility	Taxi abundance but lack of quality in some cases – no numerical data available*
Availability of ICT infrastructure	Please see table (1)

http://www.pcbs.gov.ps

http://www.pic-palestine.ps/userfiles/file/pdfs/labour_force_survey_en.pdf

https://www.cia.gov/library/publications/the-world-factbook/geos/we.html

http://www.findaschool.org/index.php?Country=Palestine

http://en.wikipedia.org/wiki/Education_in_the_Palestinian_territories#Higher_education

http://www.jstor.org/pss/2536225

http://en.wikipedia.org/wiki/Elections_in_the_Palestinian_National_Authority

http://www.ifamericansknew.org/cur_sit/water.html

http://www.data360.org/dsg.aspx?Data_Set_Group_Id=757

http://www.tititudorancea.com/z/ies_palestine_electricity_consumption.htm

(*) we have picked a parallel indicator to that in the report

Analysis and policy recommendations:

As is seen in table 6; Palestine actually has some hope in the innovation field, according to this criterion, because it possesses/matches some of the desired indicators for a place to be innovative. Comparing table 6 to table 4 above, we have come up with the following conclusions and recommendations:

SMART ECONOMY

For Palestine to boost its economy and elevate it to the smart level, the government should:

- Lower the unemployment rate by:

1- Focusing on job-creating projects.

2- Encouraging the education system to adopt and make more appealing the educational fields that the country needs, e.g. the medical field, mental health, & physical therapy.

3- Invest in facilitating the work environment of the private sector so that it can comprehend some of the labor force.

- Establish R&D labs.
- Improve the customer-service skills in the 65% services fields.
- Negotiate with Israel on resolving the control over the borders, so that Palestine opens up to international trade and open its markets to the appropriate FDI.
- Establish an airport, a train system, and an inner-city metro/tram to connect to the international world, and the national one respectively. As a first step, this should be done within the major Palestinian cities- area A[25] (Ramallah, Nablus, Jenin, Hebron, & Bethlehem) and Jerusalem has to be dealt with in a more sensitive manner. A second step

[25] See annex VI

would be connecting the cities (this would require a solution to the Israeli barriers and checkpoints, along with the illegal Israeli settlements in the oPt).

SMART PEOPLE

The focus here should be given to the "creative class"; the government has to put forward its best efforts to keep the Palestinian creative class within its boundaries. Offer them with the facilities they need, and comparable life-standards as to those in the places to which they're attracted (this would mean an overhaul to the country, which is not easy to attain in short periods of time, what we're suggesting here is that the government starts taking tangible baby-steps toward achieving this goal, and that it should also keep this in mind as it puts its national plans)

SMART GOVERNANCE

Two words: unite and reform.

SMART ENVIRONMENT

Since the region is not known for high pollution rates, and due to the mild weather conditions, along with the fact that Palestinians don't have much access to resources, all this makes Palestine environmentally smart. Our recommendation is that the government continues to urge the people to consume water in austerity, and also harness rain water by building the necessary infrastructure. Rain water is probably the only water resource that Israel doesn't have its hand over.

SMART LIVING

Palestine lacks necessities in this arena, and it is far from becoming innovative here unless the basic infrastructure is made available:

- More hospitals are needed.
- Clinics and medical centers in each governorate are needed.
- Qualified medical staff and medical supplies are needed.
- Incorporate the handicapped into all places, facilities, and into the society
- More cultural and entertainment amenities are needed: malls, movie theaters, community centers, parks, amusement parks, tutoring facilities, libraries, bookstore, shopping plazas, clubs, etc.
- The government should focus on not losing additional land by mimicking the Jewish-like-settlements on all the outskirts and by attracting people to them by applying the state-of-the-art standards that these settlements follow, offer financial compensation in relevance to the safety/danger of the spot, and connect them to the major cities. This way not only would Palestine reserve its land, but it would promote a higher standard of living that fosters future innovation and maybe peace.
- Give each city incentives to compete on the national level for the creation of innovative and applicable ideas/projects, which the government can later implement. Such incentives are: renovating each city's center; connection to suburbs and other cities via a better transportation system; financial subsidies; improved infrastructure (water and waste water, roads, telephone lines, internet, power, etc.)
- Increase the number of microfinance projects in order to eradicate or at least lower poverty levels.
- Empower local universities to become internationally renowned (additional faculties, research centers and laboratories, better and more dormitories, strengthen the existing

special transportation lines, more parking spaces, widen the curricula, attract creative staff, etc.)

- Enrich the educational system with more flexible applications in addition to the existing strong curriculum. Create local-level competitions amongst schools on all levels.

SMART MOBILITY

- Increase people's exposure to and use of ICT.
- Establish an airport.
- Establish a local metro-system.
- Establish a bus-system.
- Organize and subsidize the existing taxi-system.

CRITERION THREE:

BETTENCOURT, LOBO, HELBING, KUHNERT, GEOFFREY, AND WEST – GROWTH, INNOVATION, SCALING, AND THE PACE OF LIFE IN CITIES

Although this article suggests an easy mathematical way to prove whether a place is innovative or not; and if not, how to make it so, as was explained above in chapter three, we unfortunately will not be able to use it due to lack of necessary data to run the needed regression analysis. But we can refer to the conclusions they've come up with, and specifically the conclusion that if a city focuses on innovation and wealth creation (when $\beta>1$) then it can have an infinite population growth in a finite amount of time without running into a collapse. This means the Palestinian government as it builds a state should simultaneously put significant

weight on the creative/innovative & wealth creation sectors. For Palestine to be the first ever innovative country, it should plan and implement in accordance with what the "innovative" sectors require, this way not only will we have an independent, free, and sovereign Palestinian State, but also an innovative one.

A final word, back to Marshall's agglomeration theory, the Palestinian government has to provide the necessary infrastructure that attracts innovative firms, hence innovation, such as the suitable sewage system, transportation, etc. in each of the oPt's major cities, once one firm is established many more will follow, and consequently innovation is bound to be the ultimate result.

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ANNEXES

ANNEX I:

Economies of Scale:

"Economies of scale" is a long run concept and refers to reductions in unit cost as the size of a facility and the usage levels of other inputs increase. Diseconomies of scale are the opposite. The common sources of economies of scale are purchasing (bulk buying of materials through long-term contracts), managerial (increasing the specialization of managers), financial (obtaining lower-interest charges when borrowing from banks and having access to a greater range of financial instruments), marketing (spreading the cost of advertising over a greater range of output in media markets), and technological (taking advantage of returns to scale in the production function). Each of these factors reduces the long run average costs (LRAC) of production by shifting the short-run average total cost (SRATC) curve down and to the right. Economies of scale are also derived partially from learning by doing.

http://en.wikipedia.org/wiki/Economies_of_scale

Returns to Scale:

The term returns to scale arises in the context of a firm's production function. It refers to changes in output resulting from a proportional change in all inputs (where all inputs increase by a constant factor). If output increases by that same proportional change then there are constant returns to scale (CRS). If output increases by less than that proportional change, there are decreasing returns to scale (DRS). If output increases by more than that proportional change, there are increasing returns to scale (IRS). Thus the returns to scale faced by a firm are purely technologically imposed and are not influenced by economic decisions or by market conditions.

http://en.wikipedia.org/wiki/Returns_to_scale

Economies of Scale vs. Returns to Scale:

“Economies of scale” is related to and can easily be confused with the theoretical economic notion of returns to scale. Where economies of scale refer to a firm's costs, returns to scale describe the relationship between inputs and outputs in a long-run (all inputs variable) production function. A production function has constant returns to scale if increasing all inputs by some proportion results in output increasing by that same proportion. Returns are decreasing if, say, doubling inputs results in less than double the output, and increasing if more than double the output. If a mathematical function is used to represent the production function, and if that production function is homogeneous, returns to scale are represented by the degree of homogeneity of the function. Homogeneous production functions with constant returns to scale are first degree homogeneous, increasing returns to scale are represented by degrees of

homogeneity greater than one, and decreasing returns to scale by degrees of homogeneity less than one.

If the firm is a perfect competitor in all input markets, and thus the per-unit prices of all its inputs are unaffected by how much of the inputs the firm purchases, then it can be shown that at a particular level of output, the firm has economies of scale if and only if it has increasing returns to scale, has diseconomies of scale if and only if it has decreasing returns to scale, and has neither economies nor diseconomies of scale if it has constant returns to scale. In this case, with perfect competition in the output market the long-run equilibrium will involve all firms operating at the minimum point of their long-run average cost curves (i.e., at the borderline between economies and diseconomies of scale).

If, however, the firm is not a perfect competitor in the input markets, then the above conclusions are modified. For example, if there are increasing returns to scale in some range of output levels, but the firm is so big in one or more input markets that increasing its purchases of an input drives up the input's per-unit cost, then the firm could have diseconomies of scale in that range of output levels. Conversely, if the firm is able to get bulk discounts of an input, then it could have economies of scale in some range of output levels even if it has decreasing returns in production in that output range.

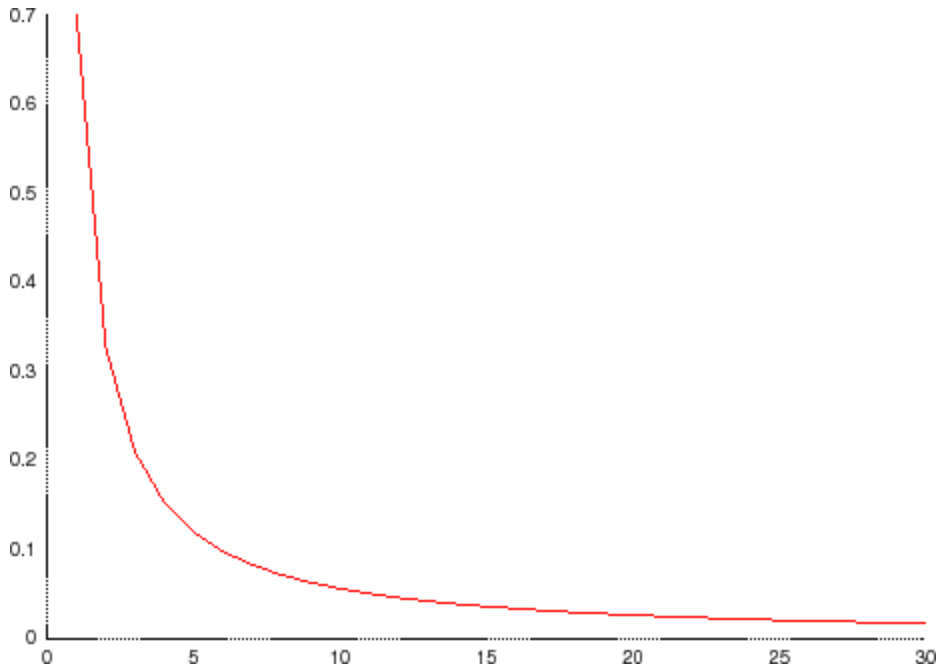
http://en.wikipedia.org/wiki/Economies_of_scale

ANNEX II:

Zipf's law (named for Harvard linguistic professor George Kingsley Zipf) models the occurrence of distinct objects in particular sorts of collections. Zipf's law says that the ith most frequent object will appear $1/i^\theta$ times the frequency of the most frequent object, or that the ith most frequent object from an object ``vocabulary'' of size V occurs

$$O(i) = \frac{n}{i^\theta H_\theta(V)}$$

times in a collection of n objects, where $H_\theta(V)$ is the harmonic number of order θ of V.



(generated by GNU Octave and gnu plot)

Figure 1: A typical Zipf-law rank distribution. The y-axis represents occurrence frequency, and the x-axis represents rank (highest at the left)

Zipf's law typically holds when the ``objects" themselves have a property (such as length or size) which is modeled by an exponential distribution or other skewed distribution that places restrictions on how often ``larger" objects can occur.

An example of where Zipf's law applies is in English texts, to frequency of word occurrence. The commonality of English words follows an exponential distribution, and the nature of communication is such that it is more efficient to place emphasis on using shorter words. Hence the most common words tend to be short and appear often, following Zipf's law.

The value of θ typically ranges between 1 and 2, and is between 1.5 and 2 for the English text case.

Another example is the populations of cities. These follow Zipf's law, with a few very populous cities, falling off to very numerous cities with a small population. In this case, there are societal forces which supply the same type of ``restrictions" that limited which length of English words are used most often.

A final example is the income of companies. Once again the ranked incomes follow Zipf's law, with competition pressures limiting the range of incomes available to most companies and determining the few most successful ones.

The underlying theme is that efficiency, competition, or attention with regards to resources or information tends to result in Zipf's law holding to the ranking of objects or datum of concern.

http://planetmath.org/encyclopedia/ZipfsLaw.html

ANNEX III:

A power law is a special kind of mathematical relationship between two quantities. When the number or frequency of an object or event varies as a power of some attribute of that object (e.g., its size), the number or frequency is said to follow a power law. For instance, the number of cities having a certain population size is found to vary as a power of the size of the population, and hence follows a power law. The distribution of a wide variety of natural and man-made phenomena follow a power law, including frequencies of words in most languages, frequencies of family names, sizes of craters on the moon and of solar flares, the sizes of power outages, earthquakes, and wars, the popularity of books and music, and many other quantities.

A power law is any polynomial relationship that exhibits the property of **scale invariance**. The most common power laws relate two variables and have the form

$$f(x) = ax^k + o(x^k),$$

Where *a* and *k* are constants, and $o(x^k)$ is an asymptotically small function of x^k. Here, *k* is typically called the *scaling exponent*, where the word "scaling" denotes the fact that a power-law function satisfies $f(cx) \propto f(x)$where *c* is a constant. Thus, a rescaling of the function's argument changes the constant of proportionality but preserves the shape of the function itself. This point becomes clearer if we take the logarithm of both sides:

$$\log\left(f(x)\right) = k \log x + \log a.$$

Notice that this expression has the form of a linear relationship with slope *k*. rescaling the argument produces a linear shift of the function up or down but leaves both the basic form and the slope *k* unchanged.

Power-law relations characterize a staggering number of naturally occurring phenomena, and this is one of the principal reasons why they have attracted such wide interest. For instance, inverse-square laws, such as gravitation and the Coulomb force, are power laws, as are many common mathematical formulae such as the quadratic law of area of the circle. However much of the recent interest in power laws comes from the study of probability distributions: it's now known that the distributions of a wide variety of quantities seem to follow the power-law form, at least in their upper tail (large events). The behavior of these large events connects these quantities to the study of theory of large deviations (also called extreme value theory), which considers the frequency of extremely rare events like stock market crashes and large natural disasters. It is primarily in the study of statistical distributions that the name "power law" is used; in other areas the power-law functional form is more often referred to simply as a polynomial form or polynomial function.

Scientific interest in power law relations stems partly from the ease with which certain general classes of mechanisms generate them. The demonstration of a power-law relation in some data can point to specific kinds of mechanisms that might underlie the natural phenomenon in question, and can indicate a deep connection with other; seemingly unrelated systems. The ubiquity of power-law relations in physics is partly due to dimensional constraints, while in complex systems, power laws are often thought to be signatures of hierarchy or of specific stochastic processes. A few notable examples of power laws are the Gutenberg-Richter law for earthquake sizes, Pareto's law of income distribution, structural self-similarity of fractals, and scaling laws in biological systems. Research on the origins of power-law relations, and efforts to observe and validate them in the real world, is an active topic of research in many fields of science, including physics, computer science, linguistics, geophysics, sociology, economics and more.

Scale invariance

The main property of power laws that makes them interesting is their scale invariance. Given a relation $f(x) = ax^k$, scaling the argument x by a constant factor causes only a proportionate scaling of the function itself. That is,

$$f(cx) = a(cx)^k = c^k f(x) \propto f(x).$$

That is, scaling by a constant simply multiplies the original power-law relation by the constant c^k. Thus, it follows that all power laws with a particular scaling exponent are equivalent up to constant factors, since each is simply a scaled version of the others. This behavior is what produces the linear relationship when logarithms are taken of both $f(x)$ and x, and the straight-line on the log-log plot is often called the *signature* of a power law. Notably, however, with real data, such straightness is necessary, but not a sufficient condition for the data following a power-law relation. In fact, there are many ways to generate finite amounts of data that mimic this signature behavior, but, in their asymptotic limit, are not true power laws. Thus, accurately fitting and validating power-law models is an active area of research in statistics.

http://en.wikipedia.org/wiki/Power_law

ANNEX IV:

Urban Growth Equation:

Growth is constrained by the availability of resources and their rates of consumption. Resources, Y, are used for both maintenance and growth. If, on average, it requires a quantity R per unit time to maintain an individual and a quantity E to add a new one to the population, then this allocation

of resources is expressed as $Y = RN + E\,(dN/dt)$, where dN/dt is the population growth rate. This relation leads to the general growth equation: $$\frac{dN(t)}{dt} = \left(\frac{Y_0}{E}\right)N(t)^{\beta} - \left(\frac{R}{E}\right)N(t). \qquad [2]$$ Its generic structure captures the essential features contributing to growth. Although additional contributions can be made, they can be incorporated by a suitable interpretation of the parameters Y_0, R, and E. The solution of Eq. **2** is given by

$$N(t) = \left[\frac{Y_0}{R} + \left(N^{1-\beta}(0) - \frac{Y_0}{R}\right)\exp\left[-\frac{R}{E}(1-\beta)t\right]\right]^{\frac{1}{1-\beta}}. \qquad [3]$$

This solution exhibits strikingly different behaviors depending on whether β <1, >1, or = 1: When β = 1, the solution reduces to an exponential: $N(t) = N(0)e^{(Y_0 - R)t/E}$, whereas for β <1 it leads to a sigmoidal growth curve, in which growth ceases at large times ($dN/dt = 0$), as the population approaches a finite carrying capacity $N_\infty = (Y_0/R)^{1/(1-\beta)}$. This solution is characteristic of biological systems where the predictions of Eq. **2** are in excellent agreement with data. Thus, cities and, more generally, social organizations that are driven by economies of scale are destined to eventually stop growing.

http://www.pnas.org/content/104/17/7301.long

ANNEX V:

Coolness index:

The Universal Coolness Index (UCI) is a formula that evaluates each number according to its interesting properties. The UCI has a maximum of 100.0, and its minimum depends on the number of properties being tested. Currently, the lowest UCI on record is under 12.5%.

A number cannot score 0% on the UCI because, by definition, it becomes cool as soon as it is identified as the "least cool" number.

The formula for the UCI is well-protected though curious number crunchers are invited to attempt to reverse engineer it.

Cool Numbers currently defines six tiers of coolness. The tier that a particular number falls into depends on its UCI score.

1. **Extremely cool *(Hall of Fame material)***: 99% or higher.
2. **Very cool *(Gallery material)***: 95.0% - 98.9%
3. **Cool**: 90% - 94.9%
4. **Almost cool**: 75% - 89.9%
5. **So-so**: 50.0% - 74.9%
6. **Definitely uncool:** 49.9% or lower.

http://www.coolnumbers.com/UCI.html

Bohemianism:

The term has become associated with various artistic or academic communities and is used as a generalized adjective describing such people, environs, or situations: *bohemian* (*boho*—informal) is defined in *The American College Dictionary* as "a person with artistic or intellectual tendencies, who lives and acts with no regard for conventional rules of behavior."

Many prominent European and American figures of the last 150 years belonged to the bohemian counterculture, and any comprehensive 'list of bohemians' would be tediously long. Bohemianism has been approved of by some bourgeois writers such as Honoré de Balzac, but most conservative cultural critics do not condone bohemian lifestyles.

The New York Times columnist David Brooks contends that much of the cultural ethos of upper-class Americans is Bohemian-derived, coining the paradoxical term "Bourgeois Bohemians" or "Bobos."

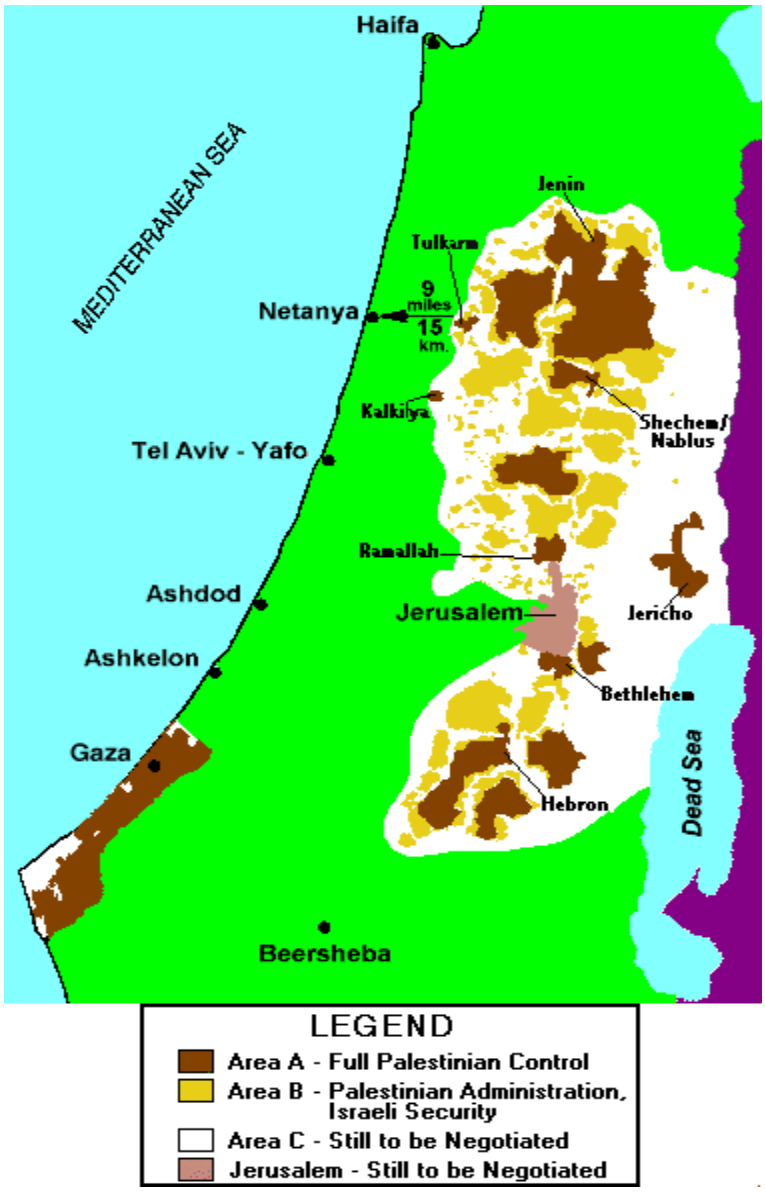
The Bombshell Manual of Style author, Laren Stover, breaks down the Bohemian into five distinct mind-sets/styles in *Bohemian Manifesto: a Field Guide to Living on the Edge*. The Bohemian is "not easily classified like species of birds," writes Stover, noting that there are crossovers and hybrids. The five types are:

- Nouveau: bohemians with money who attempt to join traditional bohemianism with contemporary culture
- Gypsy: drifters, neo-hippies, and others with nostalgia for previous, romanticized eras
- Beat: also drifters, but non-materialist and art-focused
- Zen: "post-beat," focus on spirituality rather than art

http://en.wikipedia.org/wiki/Bohemianism

ANNEX VI:

The map below shows the areas of the West Bank over which the Palestinian Authority (PA) has jurisdiction according to the interim agreements between Israel and the PLO, as of December 2000. Explanatory notes follow.



In **Area A (brown)**, the main Arab urban areas, Israel has fully withdrawn. The PA has complete control over all civilian administration, and its paramilitary police force is in charge of security.

In **Area B (yellow)**, the Arab towns and villages, the PA has full civilian authority but it shares security responsibility with Israel. Joint Israel-PA patrols operate here.

Area C (white) consists mainly of uninhabited desert regions to the east and south. All Jewish communities and Israeli military bases are also part of Area C, as enclaves. Furthermore, Area C includes all the main roads between Jewish communities and also between the Arab towns in Areas A and B.

The **pink region** marks the current municipal boundaries of Jerusalem.

http://www.iris.org.il/oslo_2000.htm