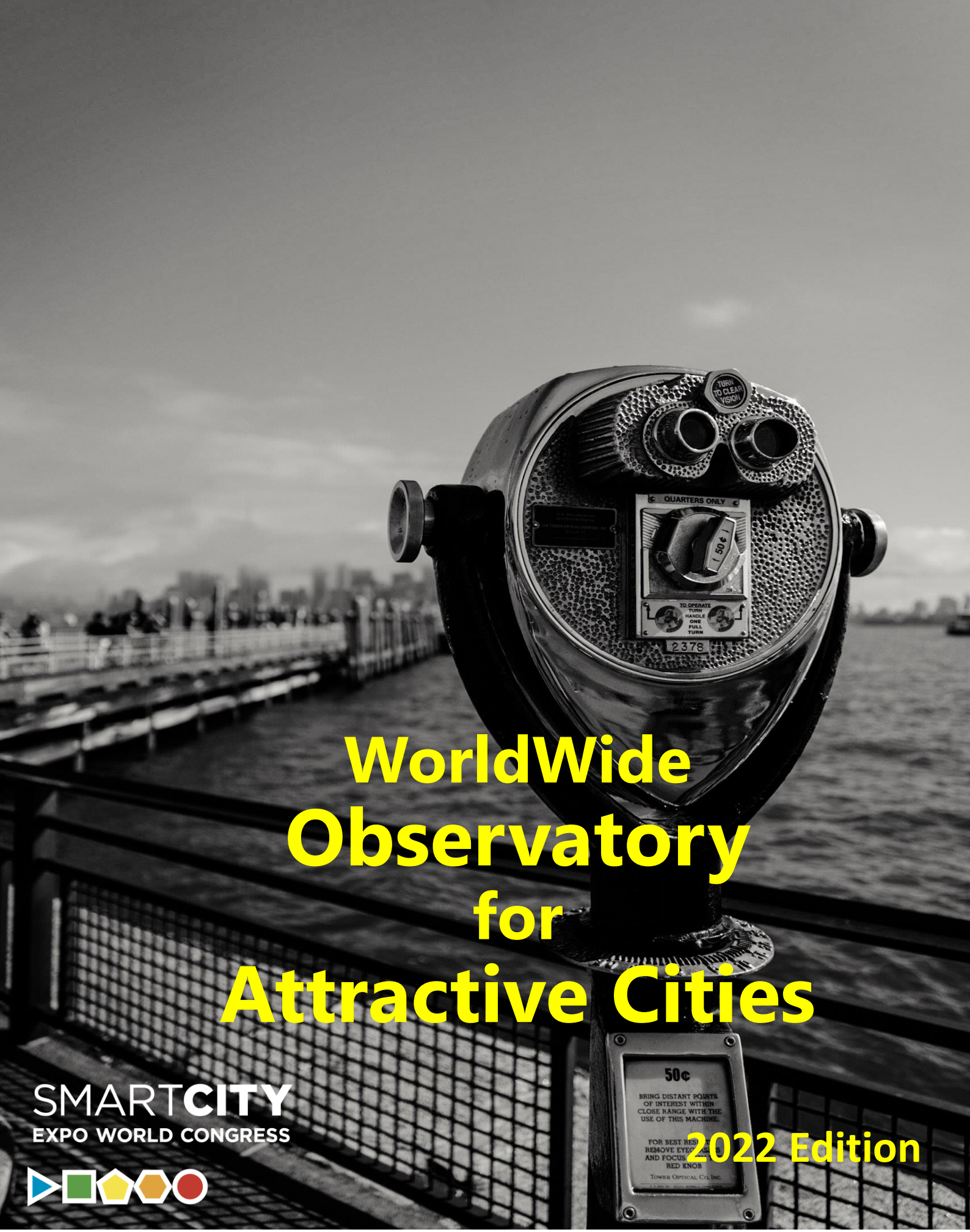

WorldWide Observatory for Attractive Cities

SMARTCITY
EXPO WORLD CONGRESS

2022 Edition

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Barrabés

Foreword

I want to thank Blanca Herreros de Tejada and Marta Meneses, both students at Universidad Francisco de Vitoria. (Madrid) who helped refresh the data model and interpret the changes / evolutions from previous years Observatory.

To my University, Francisco de Vitoria (Madrid) for supporting this research.

To Fira Barcelona, SmartCityExpo & WW Congress for inspiring this challenge.

To my beloved cities, magical places for human social development and solid foundations for mankind's future dreams.

Note to reader: If you had the chance to read the WW Observatory for Attractive Cities 2020 (handle) or 2021 (handle), then you can skip the model description and go directly to 2022 Findings, Chapter 6.

Index

1. Introduction. City Attractiveness Model.

1.1 Why Cities Attractiveness. The Competition for talent

Cities are the epicenter of human activity, the central nervous system of economic growth, social interaction and innovation. In the current context of global stability (both in economy and peace), cities are the hotbed for creativity and human development. We live, indisputably, at the best moment in the history of mankind. Technology allows us to increasingly dominate our environment and enjoy a longer and more comfortable life, yet we must not make an idol of it: it's an enabler, not a destiny.

The main challenge for modern cities is how to become A*ttractive* enough to both retain brilliant brains and draw talented citizens and investors. This will be fundamental for cities that want to play a role in the 4th Industrial Revolution. All of the most prosperous cities have undergone a profound social transformation due to the past industrial revolutions. In all of them, a surge of new disruptive technology affecting the way we work, manufacture, trade, and develop human activity has attracted talented citizens. In addition, this new technology brings with it the creation of highly qualified and well-paid jobs, which then, pushes any given city's attractiveness to new heights. With rampant new technology in place and talented people developing it, we only have to provide them with a place to connect, engage and encounter each other: THE CITY.

Talent is the key to the city's economic development. Without talent or sufficient talent, the city is not innovative, it does not generate enough wealth or employment, it is not a leader in powerful new initiatives. Even worse, the talent attraction has a positive acceleration feedback: talent calls talent but also the opposite, the lack of attractiveness makes talent migrate, so the chances of being attractive are reduced. It is therefore a fierce competition to achieve this resource: talented citizens.

One of the main factors in making this happen is the exercise of tolerance, the door opening to anyone who demonstrates talent and a willingness to contribute to the city's development while respecting local laws and customs. Thus, we can say that the recipe for prosperity of most advanced cities has been determined by the rule of the 3 T's: Technology, Talent and Tolerance (Florida, 2007), with technology being the lynchpin of each industrial revolution and its main enabler.

Western cities need additional human capital. Eastern and emerging countries are working on building up their own human capital (their young populations) and retaining it to serve as the cornerstone of their prosperity.

The main aim of this research is to understand what is being done and what is needed to make a city attractive for these talented citizens. There are many partial studies about employment, safety, happiness, expat treatment, economy, cost of living, etc. but none has attempted to give talented citizens an integrated vision of this new world of cities.

1.2 Research Objectives

The main objective here is to answer how, within a 4th Industrial Revolution framework, the city is competing to become more attractive for talent, and furthermore to define which elements enhance attractiveness, and what options exist for cities to do so. The practical consequences are twofold:

1.- Help citizens choose the best city in the world for them to realize their full potential, realize their goals as a citizen and as a person, and make the greatest possible contribution to society.

2.- Advise mayors and city managers on how to create the most attractive city possible in order to retain and attract talented citizens, and furthermore build a more prosperous, innovative, fair and human city. Help them design, prioritize and implement a:

- ✓ Long-term Transformational Plan
- ✓ Short/Mid-term Improvement/Integrated Plan

1.3 City Attractiveness = City Magnetism x City Profitability

By how cities are prepared and presented to talented citizens and investors, and on the other side, how citizens decide whether to move to another city or not, we can conclude that we are in front of a similar decision process to a marriage or to a purchase. It looks like a marriage because there is a certain compromise between the parties, some love is necessary, or at least attraction, and it is not a decision that lasts a short time. It is not exactly a marriage because one part, the city, simply offer the conditions for the talent to stay or come, but without talent, city will languish then disappear. It is more like a purchase. The talented citizen "buys in" to live in a city and contribute to its economic and human development, and the city "sells" its attractions, advantages, and even offers special advantages, as incentives. There is no economic transaction, although it is clear that a price is paid due to differences in purchasing capacity (net-purchasing power) for the same citizen with the same kind of job but done in different cities. We have, therefore, that it is a human decision process among many alternatives, where mercantilist/trading benefits are involved, but also aesthetic and ethical questions about the possible destination cities. Do I like that city? And what about that city's lifestyle? These seem to be previous questions to those related to terms & conditions (wage, safety, taxes, environmental care, services.)

Like any human decision involving a compromise between two parties, the motivation to settle in a city due to its attractiveness responds to two main drivers: the emotional and the rational. (Tybout, Calder, 2010) We will call the emotional component City Magnetism ('I like it, I feel comfortable, it enriches me, it inspires me'); and we will label the rational component City Profitability ('it is a good deal, with good city services, well-being is high, cost of living is affordable, conditions match my circumstances, preferences and lifestyle'). In the rational sphere there are no emotions, only purely functional and economic facts. But humans are emotional beings, so the emotional component is very relevant, often the most.

Magnetism **x** **Profitability**

2. City Magnetism

It's the magnetic part that attracts us to a specific city. In essence, a city is a sum of the collective past and present experiences (Marias, Ridruejo, Chueca, 1983) that make up the city's past identity and present dynamism. This emotional component has a lot to do with our tastes, preferences and feelings, and has to match up perfectly with the city's aesthetic and ethical facets.

If we humanize the concept of cities, as a live ecosystem, clearly this emotional component would be the city's soul, while the rational part would be its physical aspects, its body. Cities are not just places and spaces that you can live in, they are living entities with emotional components, they have a 'soul' (Alcalde, 2017). This concept of the soul is part of their DNA, a series of emotional, intangible, and qualitative elements that make them stand out and distinguish them from the rest. It has to do with the environment and, above all, with the people who live there and their lifestyle. The opposite of a Magnetic city is the 'Generic' city (Koolhaas, 1997). An empty city, without history, superficial, sedated, as if it were drugged and numb. A city where the street has died because it is not walked and life happens vertically or in shacks, where the edges are marks of disruption (vertical – horizontal) leaving no opportunity for meeting up, for creative density. A city of fractal repetition where everything that is not strictly useful or functional has no place. A city whose center features formally directed architecture and where the wealth is concentrated leaving a diffuse wide stain of low-income areas around it, accentuating inequality.

2.1 Components of City Magnetism.

City Magnetism can be assessed through some preconditions and three main city components which are driven by the permanent creation of living history.

PreConditions: Language, Landscape, Religion. A main spoken language or the ability to be understood and talk to locals is a major primary enabler/blocker. Landscape (seashore, mountains, both) is also a strong personal preference. And finally, our personal divine dimension, our own confessions need to match or tolerate those found (Religions) on a local level.

Historical methodology can offer us an accurate analysis of any hypothesis about a city, because in itself, it is a repository of history. (Rossi, 1978). Cities are living history. The city must respect and balance the preservation and retention of its historical heritage with modern development. (Pinto, 2009). Therefore, City Magnetism is the result of human action, and covers three moments in time: past, present and future, in an ascending line during progress and prosperity and a descending line during destruction and decline, following the human cycles in a perfect and infinite helix. We could say that to the city "nothing human is alien". (Terence, 163 BC).

Then, we can conclude that a model for City Magnetism can be approached by studying these three major areas:

- Identity (Past)
- Dynamism (Present)
- Strategy (Future)

City Identity (Past): The past marks, defines and writes the city identity in stone. It is like its DNA, the addition of collective contributions from its former dwellers, all adding parts of that DNA, evolving, constantly recombining itself. It can evolve, albeit slowly. It can be transformed, but through a long, complex process.

A city's identity is thus defined by those elements that make up its essence and that have been defined throughout its history, such as its culture, customs, gastronomy, and type of society and government. Also fixed determinants such as geographic location, climate and environment, green spaces, density or the risk of natural disasters come into play. Additionally, a city has to nurture its reputation (Reputation Institute, 2017), its external or projected image, its branding, through the impacts it makes on media, often by organizing cultural or sporting events.

A city needs its own projected image, an advertising claim that is highly imageable (apparent, readable, visible). The goal is to become a city with a high chance of evoking a strong image in an external observer (Lynch, 1960). To approximate a model of measurable variables for a city's projected image, we turn to the different specialization areas that UNESCO attributes to a creative city: "Crafts & Folk Art, Design, Film, Gastronomy, Literature, Music and Media Arts" (UNESCO Creative Cities, 2019).

City Dynamism (Present): *"What is the City but the people?"* (Shakespeare, 1609) This aspect describes a city's psychology and ethics, how people make a living, and what the relationships among its inhabitants are like… The present represents City Dynamism. If identity lays the foundations of Magnetism, Dynamism marks the actions. A city attracts me because of its identity. When I arrive it delights me, welcomes me, motivates me, encourages me, moves me, helps me, or it does just the opposite all based on its Dynamism or lack thereof. The identity of a city is like a travel agent's brochure; Dynamism is the excursions that I can take at the destination.

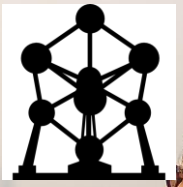
We divide City Dynamism into four different indicators. First, competitiveness: those elements that measure the action, relationships, city creativity and motion, those elements which turn it into a social and economic hotbed creating complex interrelations of human development. Second, we measure how a city treats those who come, the expatriate, how easy or difficult social integration is in that city. Third, we also measure the city's ethical principles and social equity, inclusiveness and justice. And fourth, we evaluate equality.

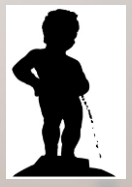
City Strategy (Future): How can the future become a driver for a city's attractiveness? What do we expect from a city with a future? We expect it to have a solid plan (a SmartCity Plan), which includes strategies to cope with city challenges.

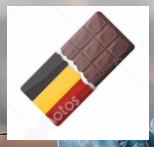
What makes that plan work? The rule of city prosperity, the 3 T's (Technology, Talent, Tolerance). We need investment in innovation as a fundamental and permanent driver and, of course, talent (human capital), too.

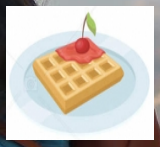
City Identity (Past)

- History
- Govern Basics
- Reputation
- GeoLocation Conditions
- Food/Gastronomy
- Branding





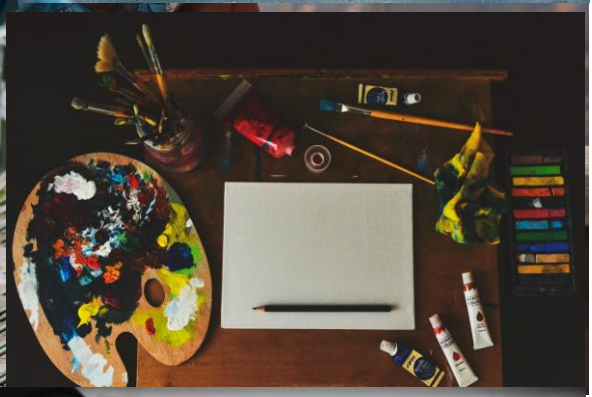






City Dynamism (Present)

- Competitiveness
- Expats Experience
- Ethics
- Equality

City Strategy (Future)

- Human Capital
- SmartCity Plan
- Innovation





3. City Profitability

The world is a marketplace of cities where citizens, depending on their preferences at that moment, decide to 'buy' a city and move there to live, and in this light, it makes sense that they give more value to employability when leaving the University, or to social services when they reach retirement age. Priorities vary based on their family dependencies (children or seniors) as well.

City Profitability is associated with the concept of 'is moving there a good deal?'. This is the non-emotional part, more related to a city's pure merits (economic and performance indicators).

City Profitability consists of: a city performance component (functions, services, variable elements that a city provides to the citizens and that are tangible and valuable) and an economic component (citizens' ability to acquire things or the net purchasing power that a citizen will attain in that city compared to others). It is, in short, a deal. So, City Profitability (yield) is made up of the combination of services offered by a city and the cost of living in that city. We name this implicit, virtual agreement between you and your city the Citizenship Contract.

3.1 Citizenship Contract.

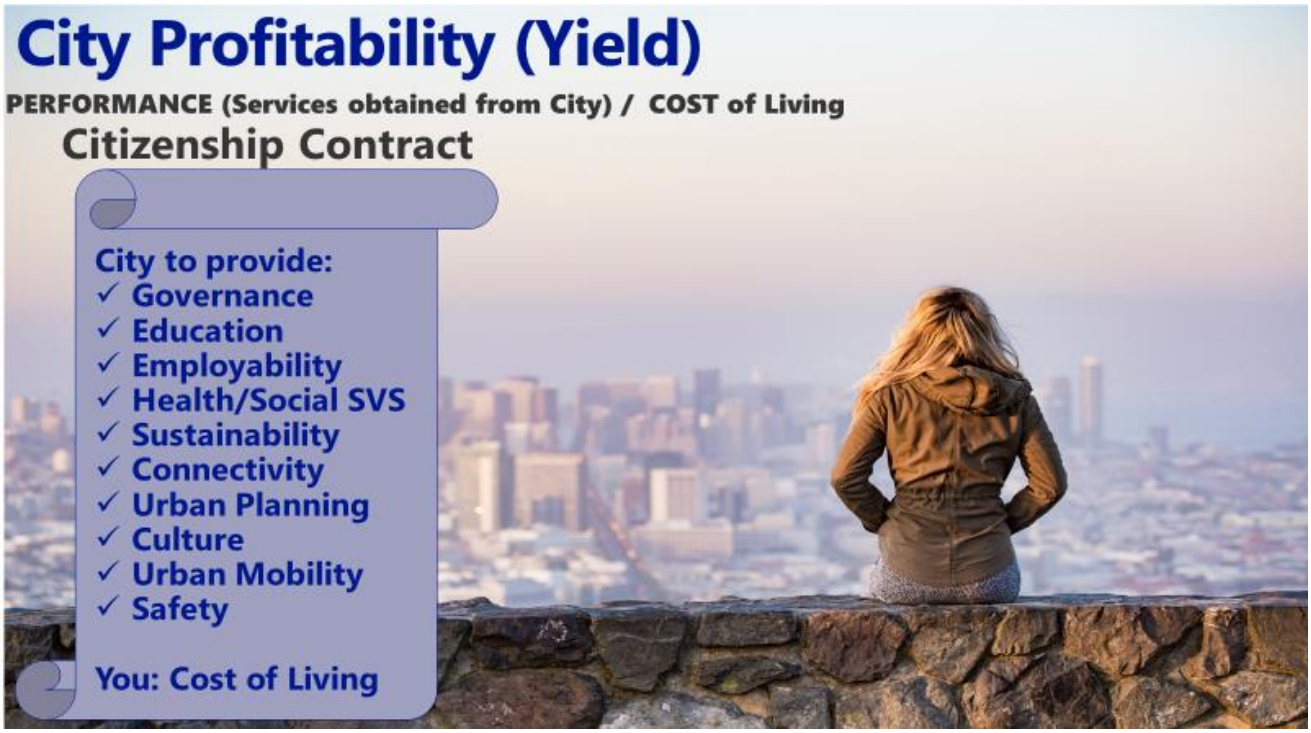
Modern cities increasingly resemble Greek city-states. Despite the differences that social achievements have brought to our society during these 25 centuries, cities want to and must redefine the terms of their agreement with their citizens: the **citizenship contract**. It is a virtual contract that we all implicitly hold with our city. It is the value proposition that our city offers both to us and to the possible talent who wants to become established in our city. It is the list of gives and takes that our city has, like a billboard of city's offerings. It is a contract because the city offers us a series of services, benefits and development opportunities in competition with other cities in the world, in exchange for our contribution to the city's common project. This contribution has many facets, not only our taxes, but our generation of wealth, ideas, creativity, competitiveness, values, experience, co-creation, city development and drive to achieve its future goals. This is what millennials are evaluating now, and what local talented citizens weigh before deciding to emigrate in search of better opportunities.

3.2 Components of City Profitability.

To define the citizenship contract, we must detail the series of benefits and services the city offers us. This is the list of performance indicators to evaluate in which we group all the quantifiable services that a city can offer us into 10 areas:

- DIGITAL GOVERNMENT: A democratic, efficient, transparent, participatory, digitalized city government. Digital government as a service.
- EDUCATION: Lifelong training. Quality business schools, professional training and development.
- EMPLOYABILITY: The demand for talent.
- CONNECTIVITY: Internet infrastructure. 4G / 5G deployment.
- HEALTHCARE / SOCIAL SERVICES
- ENVIRONMENTAL SUSTAINABILITY: Water and energy efficiency. Air quality. Carbon emissions reduction, carbon neutral plans. Circular city.
- CULTURE-TOURISM: Culture as a city service, not traditions or emotions, but valuable services.
- URBAN MOBILITY: Traffic, public transportation. Mobility as a service.
- URBAN PLANNING: Urbanism as a city service.
- SAFETY: Physical and virtual safety

Then, we have to weigh these aspects against the cost of living in that city, or, in other words, the final net purchasing power (amount of things that I could buy with my final, after-tax income). Therefore, it is about comparing (multiplying) what I get from the city with what I get from my professional activity. The higher the result, the more profitable it will be for me to move to live in that city.



4. City Attractiveness Model

4.1 Cities Selection Criteria

We decided to increase our initial 2020 Analysis (made of 140 Cities), up to the world's top 175 most attractive cities according to international studies in a model made up of more than 100 indicators.

City selection criteria: Top cities in the Quality of Living Ranking (Mercer, 2019) and IESE's Cities in Motion (Berrone, Ricard, 2020) and cities scoring over 50 (no personal risk or severe living restrictions) on the Global Liveability Index (The Economist, 2021). The first two are superior quality reports featuring a wealth of details and indicators, coming from very well-known, highly reputable sources, while the Liveability Index's minimal threshold corresponds to a basic fact: nobody wants to go and live in a city where their life will be threatened, or basic living conditions are severely restricted.

4.2 Set of Indicators.

67 indicators for City Magnetism, selected from international bodies, previously published key studies/analysis, and our own work will be used for this research. Each of the 175 cities selected is also analyzed with data taken from city websites and their published SmartCity plans.

33 indicators make up the model for City Profitability (selected from international bodies, already published studies/analysis, and the author's own work).

The total number of evaluated indicators is 100, but many of them include a large number of subindicators, raising the total number of analyzed city dimensions to around 500. The selection of indicators to use follows the metanalysis methodology: researching all available indexes, then choosing those best matching previous criteria while avoiding biases. See the full list of used indicators and components in Figure 1

Our objective is not to create yet another ranking of cities. Cities hate rankings, unless they come out on top. As the concept of attractiveness is quite personal, the most attractive city for me may not be as attractive for another person depending on the different scale of values we use to weigh a city's performance indicators, different aesthetic, personal preferences (mountains or seashore or both, spoken languages, religion...), and personal status (family dependencies, children, elder people in their care…). The model we present allows for comparisons between cities in the same geo cluster, and obtains each city's "attractiveness radiography" which helps prioritize areas that are in need of improvement, and also provides a list of cities that best fit a particular citizen's values and preferences.

Area	W	Subarea	W	Class	W	Indicator	Subindicator	Entity
Magnetism	User Input	Identity		History. Culture		Age	Foundation	Own Work
						UNESCO	World Heritage	UNESCO
						Top Museums		Own Work
				Government Basics		Democracy Index		V-DEM INSTITUTE
						Safe City Index		HUDSONS
				Reputation		Reputation		Reputation Institute
				Space. Density		% Natural Space		OECD. Better Life Index
						Density (inh/km2)		Demographia
				Climate		Avge. Temperature Desviation	Gradient	Climate-Data.org, Climatemps
						Avge. Precipitation Desviation	Gradient	Climate-Data.org, Climatemps
						Avge. Daily Sunshine		Climate-Data.org, Climatemps
				Geo Risk		Natural Disaster Risk		WorldRiskReport
				GeoEconomics		GDP Proximity	%WW	Own Work
				Gastronomy		Food Security Index		The Economist
						Guru Restaurant		Guru Restaurant
						Michelin Guide and Guru	#Rest/Minh	Via Michelin
				Branding. External Image		Music		Own work (Wiki, Youtube)
						Movies		Own Work (IMDB, Movielocations.com)
						Sports	Soccer Basketball Other Sports Events, Marathons	UEFA NBA Xploresports
						Main Events	Olympics	Olympics org
							Universal Expo	Bureau International des Expositions
							Cultural Events	Day Zero Project
	User Input	Dynamism		Competitiveness		Creativity Index		Martin Prosperity
						Global Competitivenes	Economic	IMD
						Global Talent Competitiveness	Talent	INSEAD - GTCI
				Expat Social Experience		Life Style - Quality		HSBC Expat Explorer
						Getting Settled		InterNations
				Ethics. Well-being		Happiness		Happiness Report
						World Giving Score		Charities Aid Foundation
						Civic Engagement		World Bank
						Work-Life Balance		KISI
				Equality		GINI Index		WorldBank
						Gender	Female Graduates	INSEAD - GTCI
							Gender Development Gap	INSEAD - GTCI
							Leadership opportunities for women	INSEAD - GTCI
						Tolerance	Tolerance Minorities	INSEAD - GTCI
							Tolerance Immigrants	INSEAD - GTCI
						Poverty		World Bank
	User Input	Strategy		Human Capital		Population Age Average Per Country		World Data
						Ranking Human Capital		IESE Cities Motion
				Smart Cities Plan		Plan Smart Cities	15 Areas	Own Work
				Innovation		R&D (% GDP)		INSEAD - GTCI
						Global AI Index		Tortoise
						Innovation Cities		WIPO (World Intellectual Property Organization)

ADDITIONAL PRE-CONDITIONS:	Landscapes		Own Work
	Language		Infoplease
	Religion		Own Work

Figure 1a. City Attractiveness Indicators. Magnetism. Source: Author

Profitability	50	Services	User Input	Digital Government		Online Service Index	eGovernment Survey	United Nations
						eParticipation Index	eGovernment Survey	United Nations
						Digitalization of Government	eGovernment Survey	United Nations
			User Input	Education. LifeLong Training		Quality of Management Schools		INSEAD - GTCI
						Prevalence of Training in firms		INSEAD - GTCI
						Employee Development		INSEAD - GTCI
			User Input	Employability		LinkedIn Talent Hiring Demand	Talent Insights	LinkedIN
						Employability		INSEAD - GTCI
			User Input	Connected City		4G LTE	Mobile Connectivity index	GSMA
						5G LTE	Mobile Connectivity index	GSMA
						Internet Speed		INSEAD - GTCI
						ICT Infraestructure		INSEAD - GTCI
			User Input	Health/Social SVS		Social Expenditure (% GDP)		OECD
						Life Expectancy at age 60	WHO	World Health Organization
						Physicians (per 1k)		INSEAD - GTCI
						Public Health Expenditure (%GDP)		OECD.
			User Input	Environmental Sustainability		Carbon Neutrality Plan		Own Work
						Sustainable City Index		Arcadis
						Environment		INSEAD-GTCI
			User Input	Culture-Tourism		Culture Creative Jobs %	Libraries, musems and other cultural activities	ILO
						City Destination		Euromonitor International
			User Input	Urban Mobility		Traffic INRIX Congestion		INRIX
						TOM TOM Congestion %		TOM TOM Index
			User Input	Urban Planning		Urban Planning		IESE Cities Motion
			User Input	Safety		Safe Cities Index		The Economist
	50	Cost Of Living. Net Purchase Power	50	Net Real Income		Avg Wages/month	SINGLE, No CHILD	UNECE, ILOSTAT
						Direct Tax + Social Contributions		OECD
						Indirect Tax		OECD
			50	Cost Of Life		Purchase Power Parity Plus Rent (NY=1)		Numbeo

Figure 1b. City Attractiveness Indicators. Profitability. Source: Author

Main data sources updates vs 2021 Edition have been:

Added Indicators:

- Magnetism.Dynamism.ExpatSocial.GettingSettled
- Magnetism.Strategy.Innovation.Global AI Innovation Index
- Profitability.Services.Urban Mobility.TOMTOMCongestion%

Deleted Indicators (obsolete):

- Magnetism.Dynamism.ExpatSocial.PeopleAround
- Magnetism.Dynamism.ExpatSocial.Relationship/SocialLife
- Magnetism.Strategy.Innovation.Innovation Cities Index
- Profitability.Services.Urban Mobility.SmartParking / CarSharingServices / CitiesinMotion
- Profitability.Services.Safety.CitiesinMotion
- Profitability.Services.Safety.PersonalSafety

Changed sources at:

- Magnetism.Identity.Branding.Music / Movies / Sports
- Magnetism.Dynamism.GlobalCompetitiveness
- Profitability.Services.Environmental Sustainability.Sustainable City Index
- Profitability.Services.Environmental Sustainability.Environment Index

Would you like to give it a try? Take either of these apps and enter your city preferences / scale of valued performance to get your short list of best fitting cities:

(If you can't install it, then look for AttractiveCities in your Apps store)

Android Store. https://play.google.com/store/apps/details?id=com.barrabes.attractivecities

IOS Store. https://apps.apple.com/es/app/attractive-cities/id1487782051

5. City Attractiveness Research

5.1 Surveys.

Surveys. To prove that the model works and that all its components are relevant, we carried out two surveys at two SmartCities events, so our audience brought twofold advantages: they are quite familiar with the concept of city performance, and we can consider them all as talented citizens.

- Survey of 4,500 participants at an event (NordicEdge, 2018), Stavanger (Norway). Sep2018 attendees. The largest SmartCities event in the Nordic countries.

- Survey of 21,334 participants (SmartCity Expo & WW Congress, 2018), Barcelona (Spain). Nov2018 attendees. The largest SmartCities event in the world. Due to the large response (n=1550), the data obtained will be used to fine tune weights on Magnetism and Performance for global analytics and main ranking reference / chapter 6.2 Honors Board.

Reliability: High. The intention is not to develop a technical scientific analysis, but a human sciences study. Results will vary from citizen to citizen or for different life statuses (age, dependencies). The model obtained from the two surveys reaches 95% Confidence, <2% error.

5.2 Survey results.

Our target average respondent-age was 42 years old, half of them with children (51%) and a quarter of them with elder people in their care (25%). It is an unbalanced gender sample with 67% male, however that is consistent with a very male-driven technology market.

On Magnetism: Dynamism (present) rules, then come Identity (past) and then Strategy (future). Identity and Dynamism are significantly more important than Strategy, confirming the trend that a city's future and potential are less valued than its present facts or its experience gained from Identity. This result is easily associated with the Southern European lifestyle, which is most interested in the present moment, with a loving eye for the past and less emphasis on the future. However, the differences are not so large as to consider Strategy (future) as irrelevant seeing as this survey was world-wide in nature. Identity (past) becomes more and more appreciated as people get older (the over-50 crowd). And in terms of gender, men and women agree on Magnetism, which means they have essentially the same preferences for aesthetics, education and customs.

On Profitability. In city services (see figure 2), we can very clearly identify three zones: high (positions 1 through 4) scoring more than 8.30, then mid (positions 5 & 6), then low (7 through 10). There are appreciable changes among the different age ranges studied, but these services always fall within these general zones. All 10 areas studied are relevant, as all scored a minimum of 3.5 out of 5 on average in our original survey on importance, meaning that we can say that none are irrelevant, and none have a much higher score when compared to the rest.

The main top area is Urban Mobility, as everybody recognizes this city service is crucial to keeping a city alive. As such, we have named it the 'city bloodstream'. Since we define a city as a point in space/time where people meet with and encounter each other, and this service makes that possible, we are not surprised that it is the most appreciated. Then Health/SocSVS, Environmental Sustainability and Safety follow, all grouped together, separated by a small variation in scores. Safety is the top factor for those over 60. After those come the Education and Employability group; it is a little surprising that they are not rated even higher. To help interpret the data, we assume that our attendees are so talented that they face no challenges in these aspects. In any case, Education jumps up to position 3 for younger citizens, which seems reasonable. Employability falls to the bottom position for those aged more than 60, as they are about to retire. Urban Planning, Governance, Connected City, and Cultural Services occupy the lowest positions. I was personally expecting to see Connected City finish higher; maybe the audience did not understand the concept and the disruptive implications that 5G will bring, or maybe they consider this as a static, obvious service like water or energy, and see little to no difference among cities. Governance and Urban Planning are not perceived as star city services, but rather as business as usual, as regular tasks that must be guaranteed, not as brilliant services that citizens perceive as new, innovative or disruptive.

CITY SERVICES - SCALE OF VALUES	RK	1-10
URBAN MOBILITY / TRANSPORTATION	1	10,00
SOCSERVICES / HEALTH	2	9,04
ENV. SUSTAINABILITY	3	8,95
SAFETY (PHYSICAL/VIRTUAL)	4	8,37
EDUCATION	5	7,67
EMPLOYABILITY	6	7,11
URBAN PLANNING	7	4,78
GOVERNANCE	8	2,85
CONNECTED CITY	9	1,83
CULTURAL SVS / TOURISM	10	1,00

Figure 2. City Performance/Services Ranking for SmartCityExpo Attendees. Source: Author

By gender, we find almost the same rankings with only a few differences near the top, for instance, women position Health/SocSVS at number 1 and men situate EnvSustainability at number 2. Those with children give more consideration to EnvSustainability (thinking about the planet we leave for them, perhaps); those without follow the average. People with someone elderly in their care put Health/Social Svs on top, as expected; those without boost the score of EnvSustainability. Finally and sadly, Culture/Tourism is the least appreciated city service. This is clearly a major pending issue for most of our cities: how to serve as a kind of permanent university for citizens by constantly offering, incentivizing and promoting cultural services. A more skilled society is always a more prosperous one, and the opposite is true, too.

5.3 City Attractiveness Ranking 2022.

If we apply these survey scores to our model, (see figure 3 with full list of top175 cities) we find the Top 30 positions lead by cities from Norway, Denmark, USA, Australia, Switzerland, as well as Berlin, Vienna, and Amsterdam. Extraordinary Profitability with good wages and reasonable taxes push US, Swiss Cities into those top positions, while cities with excellent scores in Magnetism (like in London, Vienna, Berlin and Stockholm) compete from another angle. We can perceive a balanced summary of results with no surprises on which cities come out on top (based on the SmartCityExpo attendees' opinions). Given the vast number of answers and its small margin of error, we can conclude that the model works, is easy to understand and correctly reflects the complex reality it describes.

City	Country	MAGNETISM	IDENTITY	DYNAMISM	STRATEGY	PROFITABILITY	PERFORMANCE	NetPurchase Power	ATTRACTIVENESS
Bergen	Norway	38	60	28	69	7	8	16	1
Sydney	Australia	5	43	3	34	22	39	22	2
Stavanger	Norway	40	73	28	49	9	16	18	3
Oslo	Norway	16	32	27	44	21	9	35	4
Aarhus	Denmark	14	37	26	37	24	6	43	5
Kansas City	United States	81	107	55	32	3	23	8	6
Washington, D.C.	United States	24	46	46	26	17	13	29	7
Gothenburg	Sweden	9	28	31	27	28	15	42	8
Melbourne	Australia	27	63	5	61	16	63	13	9
Houston	United States	83	108	59	33	5	35	7	10
Copenhagen	Denmark	2	26	20	6	46	3	70	11
Phoenix	United States	84	145	54	2	6	21	9	12
Abu Dhabi	United Arab Em	111	148	50	127	1	101	1	13
Las Vegas	United States	65	68	62	45	10	30	14	14
Dallas	United States	88	118	61	35	4	17	10	15
Bern	Switzerland	25	33	22	76	25	44	24	16
Los Angeles	United States	29	55	58	16	23	27	27	17
Dubai	United Arab Em	105	152	35	101	2	100	2	18
Singapore	Singapore	43	122	17	8	15	21	25	19
Atlanta	United States	57	98	48	12	12	36	19	20
London	United Kingdom	3	2	66	20	53	26	58	21
San Francisco	United States	10	50	34	4	40	17	54	22
Canberra	Australia	55	67	6	91	14	60	11	23
Geneva	Switzerland	18	21	2	89	34	77	20	24
Adelaide	Australia	60	97	6	73	13	57	12	25
Chicago	United States	28	52	53	18	29	54	26	26
Zurich	Switzerland	17	58	14	28	37	38	39	27
Boston	United States	33	65	42	13	30	32	32	28
Toronto	Canada	19	71	8	31	39	44	37	29
Amsterdam	Netherlands	1	14	11	7	68	19	80	30
Miami	United States	62	95	52	17	20	39	21	31
Berlin	Germany	20	17	71	21	44	28	48	32
New York City	United States	6	18	49	9	60	28	64	33
Manchester	United Kingdom	26	45	70	10	45	46	41	34
Seattle	United States	63	87	45	38	27	7	47	35
Denver	United States	82	123	51	11	18	19	28	36
Baltimore	United States	90	112	60	59	11	30	17	37
Philadelphia	United States	71	64	56	63	26	47	23	38
Den Haag	Netherlands	42	89	12	58	36	14	52	39
Malmo	Sweden	44	84	31	41	35	12	53	40
Basel	Switzerland	31	37	16	84	49	62	38	41
Glasgow	United Kingdom	53	41	72	60	33	39	33	42
Tampere	Finland	39	104	23	14	42	5	62	43
Ottawa	Canada	49	76	10	79	38	52	34	44
Oulu	Finland	36	99	23	14	48	4	68	45
Rotterdam	Netherlands	21	61	21	28	59	11	73	46
Stockholm	Sweden	4	12	30	21	74	10	85	47
Montreal	Canada	69	82	9	88	32	52	30	48
Helsinki	Finland	12	81	19	3	66	2	88	49
Edinburgh	United Kingdom	15	22	69	5	69	67	63	50
Bristol	United Kingdom	64	49	75	57	47	55	40	51
Taipei	Taiwan	104	108	121	30	8	84	4	52
Cologne	Germany	35	26	83	40	58	65	51	53
Vienna	Austria	22	10	74	55	65	43	69	54
Frankfurt	Germany	61	42	63	75	51	24	57	55
Dublin	Ireland	8	48	1	46	77	92	50	56
Vancouver	Canada	79	112	4	82	43	33	44	57
Antwerp	Belgium	30	29	65	43	64	71	56	58

City	Country	MAGNETISM	IDENTITY	DYNAMISM	STRATEGY	PROFITABILITY	PERFORMANCE	NetPurchase Power	ATTRACTIVENESS
Stuttgart	Germany	58	19	82	77	56	67	46	**59**
Hamburg	Germany	59	54	81	48	57	49	55	**60**
Espoo	Finland	47	103	23	25	62	1	84	**61**
Luxembourg	Luxembourg	75	52	41	96	52	47	49	**62**
Belfast	United Kingdom	80	79	75	50	50	74	31	**63**
Nottingham	United Kingdom	89	80	75	78	41	49	36	**64**
Eindhoven	Netherlands	37	91	18	39	72	34	76	**65**
Munich	Germany	56	43	67	68	67	56	66	**66**
Birmingham	United Kingdom	54	50	80	42	73	49	75	**67**
Wellington	New Zealand	74	93	15	80	71	70	61	**68**
Valencia	Spain	23	16	43	71	82	71	81	**69**
Liverpool	United Kingdom	78	56	72	74	70	71	59	**70**
Zaragoza	Spain	50	19	44	97	80	75	72	**71**
Hong Kong	Hong Kong	101	125	105	36	31	81	15	**72**
Madrid	Spain	13	6	36	65	87	65	96	**73**
Brussels	Belgium	32	24	64	56	84	93	74	**74**
Dusseldorf	Germany	97	82	79	112	54	58	45	**75**
Barcelona	Spain	11	4	47	66	89	69	100	**76**
Paris	France	7	1	84	52	91	60	107	**77**
Seville	Spain	66	24	38	108	81	76	79	**78**
Honolulu	United States	96	145	57	64	61	39	60	**79**
Auckland	New Zealand	85	100	13	90	79	78	67	**80**
Linz	Austria	93	47	78	116	78	59	77	**81**
Málaga	Spain	48	35	40	84	86	81	89	**82**
Tokyo	Japan	77	33	110	23	83	24	97	**83**
Bilbao	Spain	41	15	37	93	88	80	91	**84**
Seoul	South Korea	34	40	99	1	90	90	90	**85**
Marseille	France	72	9	87	100	85	89	82	**86**
Osaka	Japan	98	74	112	72	75	63	71	**87**
Yokohama	Japan	99	115	114	23	76	37	78	**88**
Lyon	France	67	36	86	67	92	79	98	**89**
Nice	France	68	11	90	83	93	88	92	**90**
Bordeaux	France	51	5	87	86	95	85	99	**91**
Santander	Spain	52	39	38	81	97	85	109	**92**
Milan	Italy	45	8	101	47	99	94	108	**93**
Florence	Italy	46	7	102	54	105	102	104	**94**
Lille	France	95	68	87	86	94	85	94	**95**
Porto	Portugal	76	31	68	98	102	96	102	**96**
Kuwait City	Kuwait	137	167	97	146	19	135	3	**97**
Torino	Italy	91	12	104	104	98	108	86	**98**
Doha	Qatar	123	171	94	92	55	110	6	**99**
Manama	Bahrain	121	142	85	156	63	125	5	**100**
Tallinn	Estonia	92	92	93	51	101	91	112	**101**
Jerusalem	Israel	87	59	96	53	106	124	87	**102**
Lisbon	Portugal	70	29	33	109	108	98	114	**103**
Tel Aviv	Israel	94	114	92	19	103	105	93	**104**
Rome	Italy	73	3	103	99	109	113	105	**105**
Ljubljana	Slovenia	102	86	95	103	100	95	101	**106**
Nagoya	Japan	108	120	113	70	96	83	111	**107**
Prague	Czech Republic	86	22	91	95	113	99	120	**108**
Warsaw	Poland	113	71	115	132	107	103	110	**109**
Wroclaw	Poland	109	68	117	111	110	113	106	**110**
Riga	Latvia	106	66	107	124	112	97	118	**111**
Budapest	Hungary	112	75	116	117	114	128	103	**112**
Athens	Greece	107	57	118	128	116	123	113	**113**
Shanghai	China	100	77	129	61	120	105	141	**114**
Vilnius	Lithuania	103	90	98	94	123	104	148	**115**
Santiago	Chile	119	139	111	115	111	126	95	**116**
Sofia	Bulgaria	110	61	133	105	130	130	124	**117**
Bratislava	Slovakia	116	101	108	136	124	107	149	**118**

Figure 3 Full list of 2022 top 175 Attractive Cities. Source: Author

City	Country	MAGNETISM	IDENTITY	DYNAMISM	STRATEGY	PROFITABILITY	PERFORMANCE	NetPurchase Power	ATTRACTIVENESS
Beijing	China	114	96	126	107	133	127	144	**119**
Suzhou	China	122	102	147	118	118	116	123	**120**
Guangzhou	China	131	132	150	110	117	109	121	**121**
Chongqing	China	120	94	153	113	125	118	134	**122**
Zagreb	Croatia	118	106	130	122	132	133	125	**123**
Tianjin	China	125	105	145	121	127	120	134	**124**
Mexico City	Mexico	115	88	122	130	139	143	130	**125**
Kuala Lumpur	Malaysia	143	175	100	124	115	112	115	**126**
Bucharest	Romania	126	110	128	144	131	146	116	**127**
Chengdu	China	134	117	151	135	122	115	128	**128**
Shenyang	China	132	126	154	118	125	118	134	**129**
Wuhan	China	133	138	148	113	129	116	139	**130**
Guadalajara	Mexico	124	124	124	130	136	138	122	**131**
Shenzhen	China	139	154	143	106	121	110	133	**132**
Montevideo	Uruguay	117	135	106	120	149	134	161	**133**
Moscow	Russia	127	130	142	102	137	139	126	**134**
Buenos Aires	Argentina	130	132	120	139	134	122	150	**135**
Rio de Janeiro	Brazil	128	119	135	129	143	142	142	**136**
Belgrade	Serbia	129	115	131	141	147	139	145	**137**
Córdoba	Argentina	136	127	119	157	148	132	160	**138**
Sao Paulo	Brazil	138	136	134	145	144	137	146	**139**
Bangkok	Thailand	140	157	109	148	140	129	153	**140**
Riyadh	Saudi Arabia	168	174	149	151	104	131	65	**141**
St Petersburg	Russia	145	153	152	123	138	141	129	**142**
Minsk	Belarus	154	161	140	149	119	157	83	**143**
Monterrey	Mexico	144	159	124	137	141	145	138	**144**
Istanbul	Turkey	142	84	165	143	146	152	119	**145**
Cape Town	South Africa	135	121	144	134	153	150	154	**146**
Harbin	China	156	172	145	126	128	121	134	**147**
Brasilia	Brazil	151	156	136	154	142	143	140	**148**
San José	Costa Rica	150	162	127	159	150	156	132	**149**
Kiev	Ukraine	141	130	139	147	159	154	164	**150**
Bogota	Colombia	153	155	159	138	152	158	143	**151**
Quito	Ecuador	148	128	161	155	156	153	158	**152**
Jakarta	Indonesia	147	150	162	133	158	155	163	**153**
Panama City	Panama	152	151	138	165	155	162	131	**154**
Ankara	Turkey	164	141	166	164	135	148	117	**155**
Lima	Peru	149	128	157	162	160	163	151	**156**
Durban	South Africa	159	168	158	140	151	147	156	**157**
Hanoi	Vietnam	146	147	132	161	164	161	169	**158**
Johannesburg	South Africa	158	162	156	150	154	149	159	**159**
Tbilisi	Georgia	160	132	163	173	157	151	162	**160**
Medellín	Colombia	170	173	160	158	145	136	147	**161**
Ho Chi Minh City	Vietnam	157	170	123	153	163	160	170	**162**
Tunis	Tunisia	155	78	167	175	166	167	171	**163**
Asuncion	Paraguay	161	165	141	168	162	168	152	**164**
Santo Domingo	Dominican Repu	166	166	137	172	161	159	168	**165**
New Delhi	India	163	144	172	142	167	165	174	**166**
Mumbai	India	165	137	170	160	168	166	175	**167**
La Paz	Bolivia	162	149	164	166	171	171	167	**168**
Manila	Philippines	169	169	155	169	165	164	166	**169**
Cairo	Egypt	167	110	175	163	175	174	165	**170**
Bangalore	India	171	157	169	152	170	169	173	**171**
Casablanca	Morocco	172	143	173	167	173	172	157	**172**
Rabat	Morocco	173	139	174	171	174	175	155	**173**
Hyderabad	India	174	160	171	170	172	170	172	**174**
Accra	Ghana	175	164	168	174	169	173	127	**175**

6. City Attractiveness Findings

While interpreting the findings, we must bear in mind that most of the international studies and independent sources consulted reflect the information corresponding to 2021. Therefore, the impact of the war in Ukraine that began in February 2022 is not included. As a tip, we can observe in the LinkedIn-based talent flow study a strong movement from Ukraine abroad. We are therefore analyzing the evolution of the attractiveness of cities for talent during the year 2021. It is a year marked by post-COVID recovery attempts as quickly as possible. We observe 3 general patterns or trends from all cities:

Economy. The cities that are more resilient to the economic impact caused by the pandemic and those with a faster economic recovery advance positions strongly. We will study this effect in detail in chapter 6.5. It is worth advancing the strong gain in positions by US cities, passing over those direct competitors from CAN and AUS.

Innovation. In parallel to economic resilience, those cities with a solid strategic plan for innovation and leadership in the adoption of the latest technologies have gained relative positions compared to nearby cities or with a similar profile that have slowed down investment in innovation due to considerations of digital sovereignty, data location applicable laws, etc. These considerations, although very important, cannot block innovation, and satisfactory ways can always be found to guarantee GDPR and other applicable legislation without curtailing the adoption of new technologies, which is key to the city development and attraction of talent. New technologies, and especially advanced technologies in artificial intelligence, digital twin, predictive analytics, and others, are only possible with the parallel adoption of cloud computing strategies. This is the reason why FIN cities have overtaken SWE. UK gains positions while FR and GE drop. BEL also outperforms NED for this very reason.

With this combined effect, Impact COVID (GDP Impact & Recovery Estimated time) & Technology Adoption Acceleration, we observe:

WINNERS: NOR, USA, Asian Tigers, UAE (Coface 2022) (Economy & Technology Adoption Acceleration), BEL, FIN, DK, NED, UK, AT, (Due to Technology Investment)

LOSERS: FR, SWE due to slow Cloud technology adoption. CAN, AUS overtaken by USA. GE, SWI still laggards on SmartCities, but awakening. JPN due to economy. SouthEurope (SPA, ITA, POR) due to Economy downturn. LatAm and all Asia (except CHN which remains stable)

Non-capital cities. We see the rise of non-capital cities in most countries. These cities are proven more attractive than the capital cities of their countries. Examples are Bergen vs Oslo, Aarhus vs Copenhagen, Gothenburg vs Stockholm, Tampere vs Helsinki, Antwerp vs Brussels, Valencia vs Madrid. The explanation is obvious: these cities incorporate the general advantages or disadvantages of the country, while offering a better quality of life by more easily approaching the 15' city model due to their size. They also have a much lower cost of living as they are not the capital, especially in real-state. If, in addition, they are based in a country well connected by public transport, then the supposed advantages of living in the capital are reduced and, therefore, they surpass their capital cities in attractiveness.

Other findings: Raise of 4 Asian tigers due to solid economy and fast postCOVID recovery. Same criteria applies to UAE Cities. Same data Correlations: None between Attractiveness vs Population, Strong vs GDP.

Same main segments. ADVANCED: Top100. (AUS, WE, CH, NED, NORDICS, UK, GE, US, CAN, JPN, 4 Asian tigers). Here we can split in two groups. 1-50 Attractive & Economy Resilient, and 50-100 Attractive mainly because of Magnetism, facing problems in Profitabilty. CHALLENGERS: 100-120. (ME, CEE). EMERGING: 120-165. (LatAm, CHN, RUS, SouthEast Asia, SouthAfrica). STARTERS: 165-175. (IND, Africa). It is very important to highlight the latest study carried out from the Worldwide Observatory for Attractive cities at UFV (Meneses, 2022) where exactly same 4-5 groups were obtained by just using raw data, unsupervised model without any human bias or subjective opinion or any criteria weight (as given by the explained experts survey). Looking at the list of the top 175 cities worldwide, let's explore those segments:

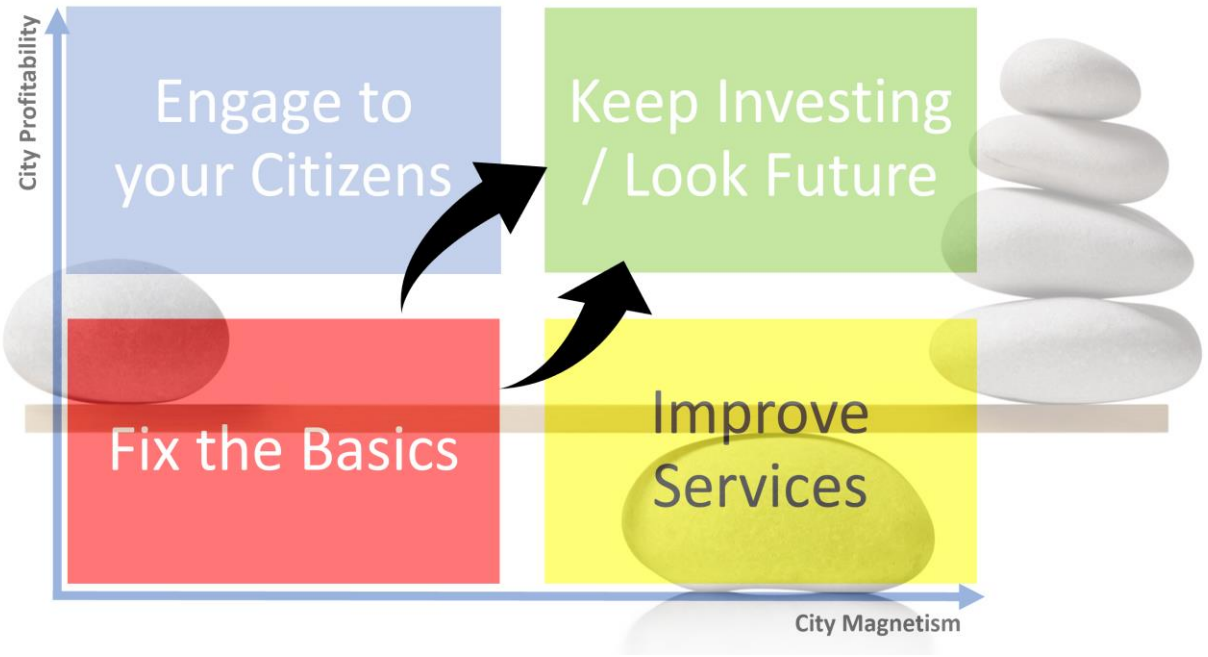
Advanced: From position 1 to 100, we find the most advanced, Western civilization cities. The first 50 cities in this advanced group correspond to those with the greatest economic resilience and post-COVID recovery capacity. The first 30 have gained positions mainly due to their financial muscle. The position of NOR is especially noteworthy with the 3 cities studied in the top 5 positions. This is due to an extraordinary positive balance between magnetism and profitability. A strong magnetism based on an excellent system of social protection, high standards in democracy and government, reputation, ethics and social values, equality and care for the environment is added a very powerful economy, supported by its energy independence and enormous production capacity of gas and oil. Norway is the main gas supplier to Europe. In addition, the extraordinary profit from energy production feeds its sovereign fund, one of the largest in the world, and what sustains its high social welfare. DK, SWI, USA, AUS, SIN, UAE accompany NOR in these top 30, all countries with low economic impact of COVID. From position 30 to 50 we have CAN, GER, SWE, NED, UK, FIN, all suffering the economic impact, but recovering quickly due to technology investment. Next, and from positions 50 to 80, we find BEL, AT, IRE, NZ, SPA, all of them with a significant economic impact from COVID but compensating with strong magnetism and the four Asian tigers (SIN, KOR, TAI, HK) climbing from Challenger's area. From positions 80 to 100 we find JPN, KOR with social and economic problems that have made them lose positions also from the point of view of magnetism. Seoul shows generational conflicts. Despite of the Olympics, JPN continues with its economic reform and with problems in social equality (HRW 2022). They are accompanied in this group by FR, ITA and POR with serious problems in terms of economic sustainability due to their high taxes, but they remain here due to high magnetism, but at risk of falling to the next group. Competition in this leading group is fierce. Climbing a few positions requires strong investments, solid, well-executed plans and dedicated teams with a generous budget and some international influence. Southern European cities may fall into the next, lower group if they don't accelerate smart investments. Their magnetism and quality of life are very high, but they won't be in that top group much longer without a strong component of innovation as well. We especially see Italy and Portugal on the brink.

Challengers: In this area, we group cities from positions 100 to 120 which are progressing rapidly, competing to join the leading group, following the example from Asian tigers. Here, we find the Middle East, led by Israel and Central/Eastern Europe. Any of these cities can join the top-tier group as soon as they gain prestige and consolidate the interesting advances they have made in recent years.

Emerging: Positions 120-165. Here we find first China, then most of Latin America. And finally, Russia, Turkey, South Africa and SouthEast Asia. It is like a BRIC group, but without India, which needs strong urban transformation (they already have an ambitious 100 SmartCities plan), replaced by Southeast Asia's Thailand, Malaysia although with obvious different dimensions. The cities in this group have plans, recognize this global competition, and are making rapid progress.

Starters: Positions 165-175. Among the Starters are Indians and Africans, These cities are beginning to plan their strategies for the global competition for talent although they continue to be burdened by unresolved, basic social and economic issues.

Attractiveness: Balancing City Magnetism & City Profitability



6.1 City Attractiveness by GeoCluster.

AREA	n	MAGNETISM	PROFITABILITY	AVERAGE
Africa	7	161	163	164
Asia-Pacific	18	93	86	88
CE Europe	19	119	125	123
China Extended	13	124	108	116
India Extended	4	168	169	170
LatinAmerica	19	143	147	146
Middle East	11	129	83	104
North America	22	58	25	29
Western Europe	62	43	64	58
	175			

Figure 4. Average positions. Attractive Cities by Geographic Area. Source:Author

Figure 4 shows the average position attained by each geographic area. In 2020 analysis, we found a face-to-face competition between North America and Western Europe, both with the same average position (38). With the economic impact of pandemic, we can notice in the 2021 and 2022 analysis that NorthAmerican cities have moved up in the ranking, while European have suffered more the pandemic effects. Western Europe enjoys more Magnetism, history, culture, and human values, but it pays a high price in taxes to maintain its welfare policy programs causing its Profitability to worsen. North America does the opposite: it makes up for a lack of history and cultural and human flavor with strong economic and competitiveness traits where they rank high in—and win at— everything, offering high profitability, high wages, moderate taxes and a reasonable cost of living. Better economic management of pandemic crisis has made this impact, improving US/Canada cities attractiveness. All other areas remain unchanged.

6.2 City Attractiveness. Honors Board.

Using the weights provided by the SmartCity Expo survey, we have assembled the following honors board. See figure 5.

Honors Board. Magnetism IDENTITY

HISTORY/CULTURE

1	Rome
2	Athens
3	Jerusalem
4	Paris
5	London
6	Milan
7	Shanghai
8	Vienna
9	Hanoi
10	Tunis

GOV-BASICS

1	Zurich
2	Aarhus
3	Copenhagen
4	Bern
5	Geneva
6	Basel
7	Stockholm
8	Helsinki
9	Gothenburg
10	Espoo

REPUTATION

1	Montreal
2	Toronto
3	Ottawa
4	Vancouver
5	Melbourne
6	Canberra
7	Adelaide
8	Sydney
9	Bergen
10	Oslo

SPACE/DENSITY

1	Riga
2	Oslo
3	Las Vegas
4	Ottawa
5	Gothenburg
6	Linz
7	Oulu
8	Stockholm
9	Tampere
10	Bordeaux

CLIMATE

1	Washington, D.C.
2	Florence
3	Nice
4	Rome
5	Montevideo
6	Jerusalem
7	San Francisco
8	Lisbon
9	Marseille
10	Quito

GeoRISK

1	Doha
2	Riyadh
3	Cairo
4	Tallinn
5	Espoo
6	Helsinki
7	Oulu
8	Tampere
9	Geneva
10	Basel

GeoECONOMICS

1	Prague
2	Shanghai
3	Vienna
4	Linz
5	Wroclaw
6	Warsaw
7	Geneva
8	Basel
9	Bern
10	Zurich

GASTRONOMY

1	Antwerp
2	Bilbao
3	Geneva
4	Paris
5	Amsterdam
6	San Francisco
7	Lyon
8	Basel
9	Bordeaux
10	Zurich

BRANDING

1	New York City
2	London
3	Paris
4	Chicago
5	Los Angeles
6	Boston
7	Barcelona
8	San Francisco
9	Miami
10	Tokyo

Honors Board. Magnetism

Magnetism DYNAMISM

COMPETITIVENESS

1	San Francisco
2	Copenhagen
3	Singapore
4	Boston
5	Geneva
6	Zurich
7	Stockholm
8	Gothenburg
9	Malmo
10	Helsinki

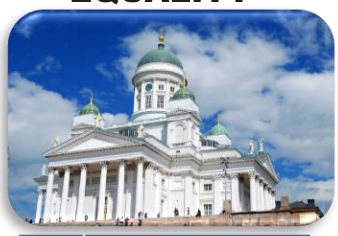
EXPAT EXPERIENCE

1	Málaga
2	Bilbao
3	Santander
4	Seville
5	Valencia
6	Zaragoza
7	Madrid
8	Lisbon
9	Porto
10	Sydney

ETHICS WELL-BEING

1	Copenhagen
2	Aarhus
3	Helsinki
4	Tampere
5	Espoo
6	Oulu
7	Oslo
8	Bergen
9	Stavanger
10	Auckland

EQUALITY



1	Helsinki
2	Tampere
3	Espoo
4	Oulu
5	Stockholm
6	Gothenburg
7	Malmo
8	Oslo
9	Bergen
10	Stavanger

Magnetism STRATEGY

HUMAN CAPITAL

1	Jakarta
2	Los Angeles
3	New York City
4	Boston
5	London
6	Washington, D.C.
7	Chicago
8	Moscow
9	San Francisco
10	Paris

SMARTCITY

1	Helsinki
2	Amsterdam
3	Copenhagen
4	Seoul
5	Edinburgh
6	Singapore
7	Manchester
8	Dublin
9	Antwerp
10	Tel Aviv

INNOVATION

1	Phoenix
2	San Francisco
3	Denver
4	New York City
5	Atlanta
6	Kansas City
7	Boston
8	Miami
9	Houston
10	Seattle

Honors Board. Profitability. Performance

DIGITAL GOV.

1	Tallinn
2	Copenhagen
3	Aarhus
4	San Francisco
5	Boston
6	New York City
7	Washington, D.C.
8	Chicago
9	Seattle
10	Los Angeles

EDUCATION. LIFELONG TRAINING

1	San Francisco
2	Boston
3	New York City
4	Washington, D.C.
5	Chicago
6	Seattle
7	Los Angeles
8	Baltimore
9	Philadelphia
10	Dallas

EMPLOYABILITY

1	Dallas
2	Seattle
3	Phoenix
4	Cologne
5	Berlin
6	Munich
7	Hamburg
8	Denver
9	Atlanta
10	Singapore

CONNECTED CITY

1	Singapore
2	Dublin
3	Luxembourg
4	Geneva
5	Bern
6	Zurich
7	Basel
8	Bucharest
9	Bergen
10	Antwerp

HLC / SOCIAL SVS

1	Bergen
2	Stavanger
3	Oslo
4	Vienna
5	Linz
6	Paris
7	Lyon
8	Bordeaux
9	Lille
10	Marseille

ENV.SUSTAINABILITY

1	Copenhagen
2	Helsinki
3	Espoo
4	Stockholm
5	Malmo
6	Gothenburg
7	Bergen
8	Oslo
9	London
10	Paris

CULTURE/TOURISM

1	Singapore
2	London
3	Tallinn
4	Bangkok
5	Hong Kong
6	Prague
7	Paris
8	New York City
9	Copenhagen
10	Vilnius

URBAN MOBILITY

1	Kansas City
2	Espoo
3	Oulu
4	Abu Dhabi
5	Stavanger
6	Bilbao
7	Kuwait City
8	Gothenburg
9	Tampere
10	Helsinki

URBAN PLANNING

1	New York City
2	London
3	Chicago
4	Kiev
5	Vancouver
6	Moscow
7	Taipei
8	Toronto
9	Washington, D.C.
10	Ottawa

SAFETY

1	Copenhagen
2	Toronto
3	Vancouver
4	Ottawa
5	Montreal
6	Aarhus
7	Singapore
8	Sydney
9	Tokyo
10	Luxembourg

Honors Board. Profitability. Net Purchase Power

MONTHLY WAGE (AVG)

1	Zurich
2	Geneva
3	Bern
4	Basel
5	Oslo
6	Bergen
7	Stavanger
8	Dubai
9	Abu Dhabi
10	Copenhagen

INCOME AFTER DIR TAXES

1	Dubai
2	Abu Dhabi
3	Zurich
4	Geneva
5	Bern
6	Basel
7	Oslo
8	Bergen
9	Stavanger
10	Kuwait City

NET REAL INCOME

1	Dubai
2	Abu Dhabi
3	Zurich
4	Geneva
5	Bern
6	Basel
7	Kuwait City
8	Oslo
9	Bergen
10	Stavanger

COST OF LIFE

1	Hyderabad
2	Bogota
3	Bangalore
4	New Delhi
5	Mumbai
6	Minsk
7	Medellín
8	Ankara
9	Cairo
10	Tunis

Honors Board. ATTRACTIVENESS

IDENTITY

1	Paris
2	London
3	Rome
4	Barcelona
5	Bordeaux
6	Madrid
7	Florence
8	Milan
9	Marseille
10	Vienna

DYNAMISM

1	Dublin
2	Geneva
3	Sydney
4	Vancouver
5	Melbourne
6	Canberra
7	Adelaide
8	Toronto
9	Montreal
10	Ottawa

STRATEGY

1	Seoul
2	Phoenix
3	Helsinki
4	San Francisco
5	Edinburgh
6	Copenhagen
7	Amsterdam
8	Singapore
9	New York City
10	Manchester

PROFITABILITY

1	Abu Dhabi
2	Dubai
3	Kansas City
4	Dallas
5	Houston
6	Phoenix
7	Bergen
8	Taipei
9	Stavanger
10	Las Vegas

MAGNETISM

1	Amsterdam
2	Copenhagen
3	London
4	Stockholm
5	Sydney
6	New York City
7	Paris
8	Dublin
9	Gothenburg
10	San Francisco

ATTRACTIVENESS

1	Bergen
2	Sydney
3	Stavanger
4	Oslo
5	Aarhus
6	Kansas City
7	Washington, D.C.
8	Gothenburg
9	Melbourne
10	Houston
11	Bergen
12	Sydney
13	Stavanger
14	Oslo
15	Aarhus

PERFORMANCE

1	Espoo
2	Helsinki
3	Copenhagen
4	Oulu
5	Tampere
6	Aarhus
7	Seattle
8	Bergen
9	Oslo
10	Stockholm

NET PURCHASE POWER

1	Abu Dhabi
2	Dubai
3	Kuwait City
4	Taipei
5	Manama
6	Doha
7	Houston
8	Kansas City
9	Phoenix
10	Dallas

Figure 5. Honors Board. Source:Author

6.3 City Attractiveness vs Population vs GDP.

We study the possible correlation of City Attractiveness with city population (Metropolitan Area). In figure 6, we can see the 175 studied cities, distributed horizontally according to their size, and vertically according to their score in the model. There are megacities in high and low positions, as well as medium-sized cities. In Magnetism, we rated high-density as positive, as an enabler of personal communication and development of activity. It's also well studied that despite the possible dispersion in small towns brought by the new communication and Internet technologies, citizens continue to prefer living in medium and large cities over living in isolated small towns. We should not confuse small cities close in commuting time to other large cities: they must be associated to that main city. For humans, they are psychologically the same city, same metropolis. From the observation and the correlation coefficient R^2 = 0.0754 we conclude that there is NO correlation between City Attractiveness and city size. Furthermore, we see that largest cities are strongly attractive due to Magnetism, although they are usually more expensive, and therefore with less Profitability, but that the second/third ranked cities in each country are more affordable, maintaining very good performance standards and high Profitability, although they are less Magnetic, so both things are offset in both city sizes. As explained, midsized cities are winning the competition due to their better quality of life. Perhaps we could say that we find megacities with more problems and handicaps to be leaders in Attractiveness, but they provide a bonus when it comes to Magnetism which is important to value.

In figure 7, we can compare City Attractiveness with GDP/Capita. Here R^2 = 0.7497, indicating a strong correlation (and growing vs last years) between these two magnitudes. No surprises: larger budgets with which to invest improves city branding, the external image, events, cultural activities, competitiveness and obviously the city services and Net purchasing power, because of higher wages. The opposite is also true: as we studied, low budgets lead to poorer city development, urbanism, quality of live and services and lower wages, so all main items are severely impacted. Again, we cannot conclude that City Attractiveness is a just a matter of rich cities. That's not true, as we can see in vertical (same GDP) all the 18 studied U.S. cities ranging from Kansas City (6) to Honolulu (79) positions, but obviously city wealth and capacity to invest strongly contributes to City Attractiveness.

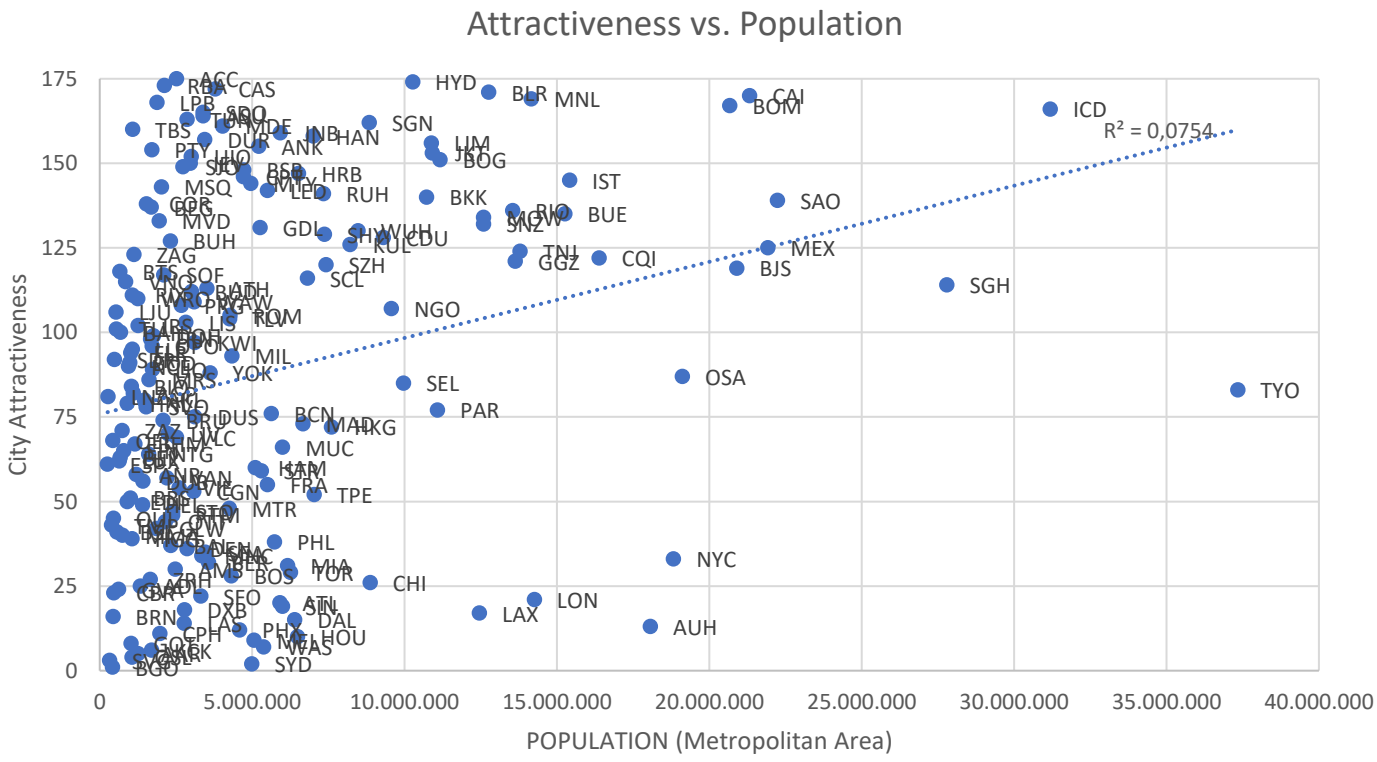


Figure 6. City Attractiveness vs Population (Metropolitan Area). Source: Author

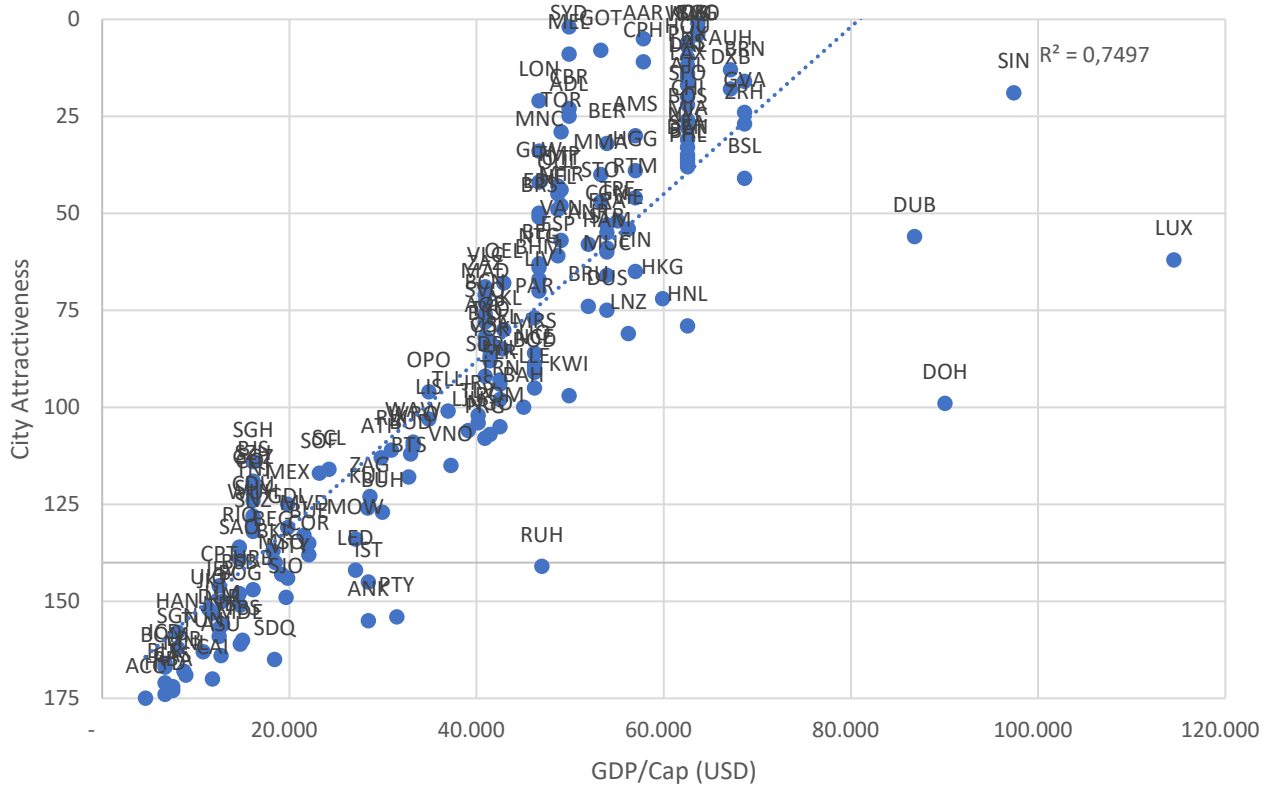


Figure 7. City Attractiveness vs GDP/Cap (USD). Source: Author

6.4 Attractive Cities vs SmartCities.

We are going to study the impact of investments in SmartCities on making the city more Attractive. We found that for many cities, investments in their SmartCity plan are the main axis of their strategy to improve their Attractiveness. These investments directly improve performance in city services, and therefore their City Profitability. In addition, they improve their investment in the future, their strategy, also their image of modernity and their reputation, and therefore, their Magnetism. For many cities, it is an important question of prestige (Asian Tigers and Chinese cities). However, we see many cities that pay little attention to a consolidated SmartCities plan, (even if they offer very good services) because they do not consider that they should improve their external image because they think they simply do not need it, since they are already very attractive from economy point of view… We place the Swiss, and some German, US cities here. Let's study figure 8.

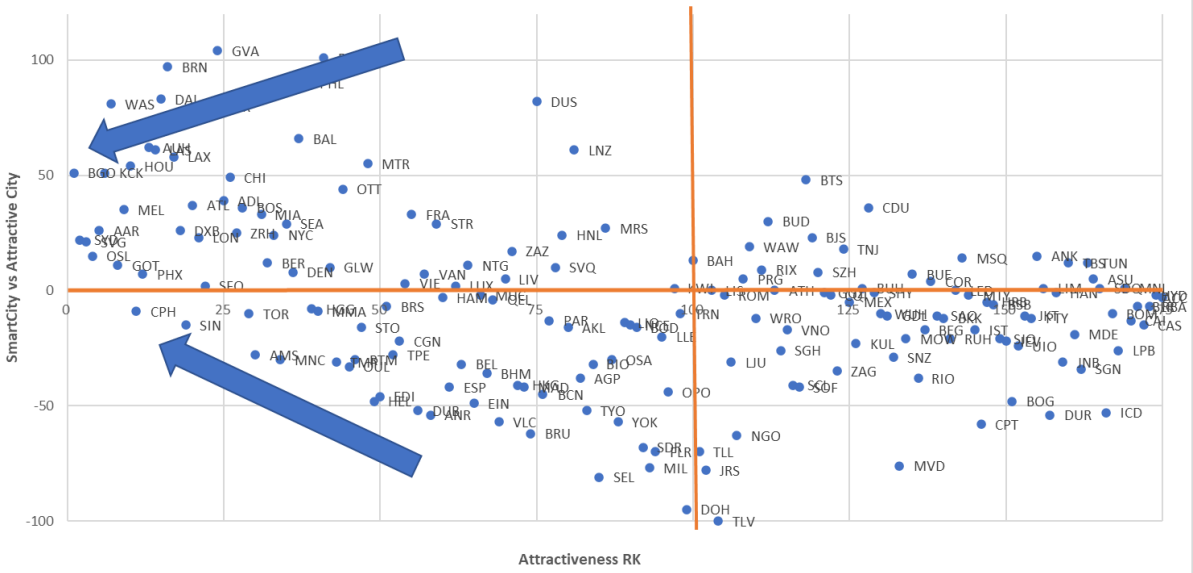


Figure 8. City Attractiveness Ranking vs Gap (SmartCity vs AttractiveCity). Source: Author

The horizontal line at zero: Over that line, cities more Attractive than Smart; under that line, those Smarter than Attractive.

On the vertical axis, the orange line marks rank 100, or the midpoint in Attractiveness, so to the left are the cities classified as Advanced; to the right the Challenging, then Emerging, then Starters.

To the left, above the top arrow we find the Swiss cities, much more attractive than smart, with short smart city plans, but they don't need them either! However, they are reacting and realizing that they need to invest in technology to maintain that leadership. Just below that arrow and to the right we find many US and German cities, with very good attractiveness, but that should improve their SmartCity plan. We then reach the orange line that marks many South Europe cities, on the border with the challenging cities. On this same left side, at the bottom, we find the leading cities in SmartCity, those investing heavily to improve positions in Attractiveness (Copenhagen, Amsterdam, Helsinki, Barcelona, Singapore...) Here is where the main battle for Attractiveness is fought nowadays, with large investments in Sustainability, citizen services, etc.

From the vertical orange line to the right, we see that most cities are at under the horizontal line: they are the Challengers, investing heavily in SmartCity plans to get promoted to the advanced group (Tel-Aviv, Doha, and many from Eastern Europe like Tallinn...) If we advance to the right, then we enter the Emerging group first and the Starters at the right end. We see that they all obtain better positions in SmartCity than in Attractiveness (most under the horizontal line), which indicates that they all use investments in SmartCity to improve their services for citizens, their image of modernity and their Attractiveness in general.

Therefore, as a general guideline, the SmartCities' Plan fulfills its mission of improving citizen services (Profitability), while helping in strategy, reputation, branding (Magnetism) and becoming the most powerful tool to improve in Attractiveness. Little can be done about fixed issues like geolocation. Some cities with poor geo conditions and large investment capacity (Doha, Singapore, Dubai,..) are exploring the creating of a virtual city in the metaverse (a MetaCity), to capture virtual talent? We will cover this later. Investments in changing or improving Identity are slow and always in the medium-long term. It is difficult to quickly improve economic conditions and net purchasing power. Therefore, the obvious lever, with more short-term results (even in a four-year legislature) is to invest heavily in a solid SmartCities plan. The cities that fail in this, have either fallen asleep in the leadership glory, (and are now waking up, like the Swiss, some US, German) or are losing positions and do not take advantage of excellent Magnetism to improve positions (Southern Europe). On the other hand, cities with handicaps in Magnetism, either due to a lack of history (U.S.), weather conditions (Nordics) or long distances (AUS) compensate with good SmartCity & Services plans that improve their attractiveness to leadership positions.

Finally, at figure 9 Attractive Cities vs SmartCities by GDP, we can see that investing in SmartCities is quite independent from GDP, so all cities can invest resources on creating and executing a compelling SmartCity Plan. This will improve Attractiveness, and if investment is done rationally, progress can be very significant with a moderate cost (we have seen great progress in Latam Cities with very reasonable budgets, but wise investments). On the other hand, Attractiveness is more directly dependent on GDP, so everything that could contribute to improving it counts and is welcome (including the improvement in talent and investors' investment because of an increase in awareness due to a brilliant SmartCity plan). So, we are circling around same concept. As a conclusion, all areas are intertwined, and a balanced plan will touch the most-effective levers.

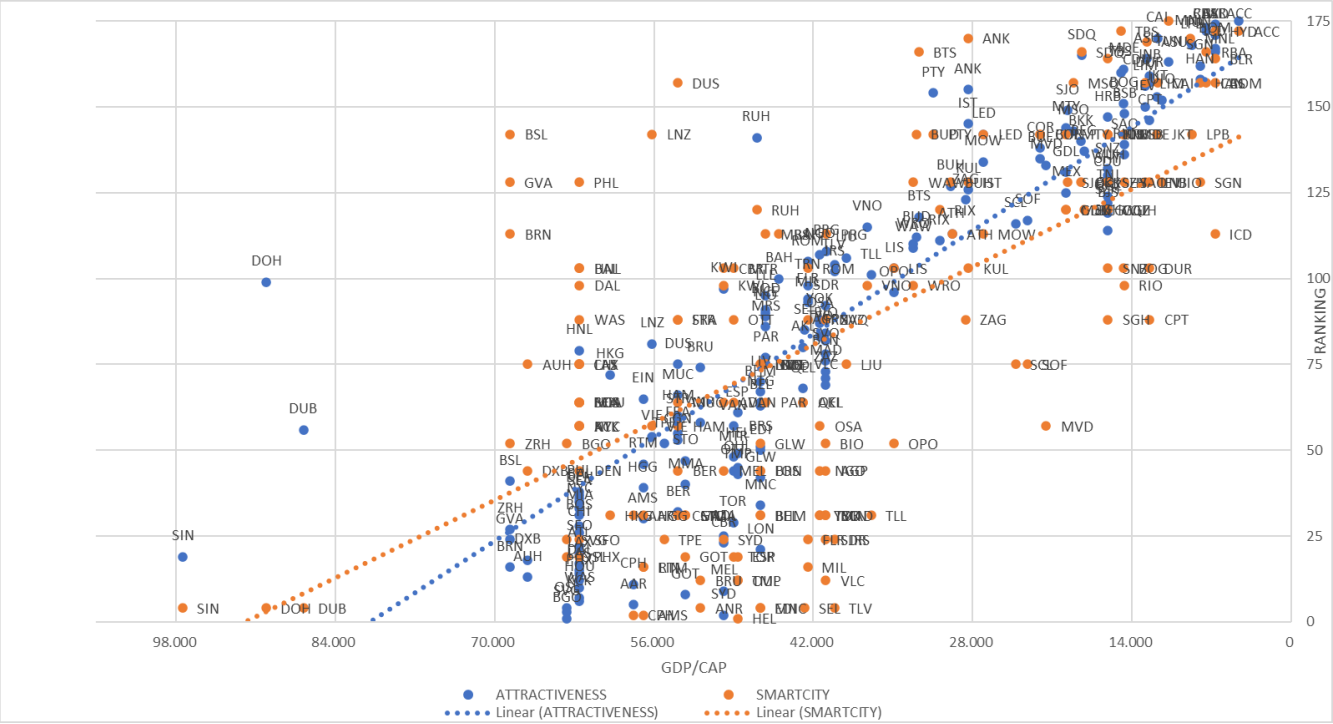


Figure 9. Attractive Cities vs SmartCities by GDP. Source: Author

6.5 Attractive Cities. Comparing 2022 vs 2021-2020 Results.

Impact of COVID vs Technology adoption acceleration

To study the economic impact of the pandemic, we have added to our ranking a comparison of the evolution of cities GDP and the expected post-pandemic recovery time (OECD, 2021) . It's clear that the city which recovers the fastest, is enjoying a significant advantage in competitiveness to retain and attract talent (Attractiveness). We can very easily identify the winners and associate them with the economies that are recovering the fastest (before end of Q3 2021). These are the US, UAE, 4 Asian Tigers, Nordics, Chinese cities. See Figure 10.

City	Country	RK22	RK21	RK20	21vs22	22vs21	TREND	INCR GDP (Q42019-Q4202	Recovery Expect
Abu Dhabi	United Arab Emir	13	103	108	5	90	95	N/A	N/A
Dubai	United Arab Emir	18	101	105	4	83	87	N/A	N/A
Las Vegas	United States	14	48	82	34	34	68	4,8	Q2 2021
Singapore	Singapore	19	66	80	14	47	61	N/A	N/A
San Francisco	United States	22	41	75	34	19	53	4,8	Q2 2021
Taipei	Taiwan	52	109	104	-5	57	52	N/A	N/A
Washington, D.C.	United States	7	14	58	44	7	51	4,8	Q2 2021
Seattle	United States	35	68	76	8	33	41	4,8	Q2 2021
Boston	United States	28	59	62	3	31	34	4,8	Q2 2021
Philadelphia	United States	38	62	71	9	24	33	4,8	Q2 2021
Los Angeles	United States	17	39	44	5	22	27	4,8	Q2 2021
Baltimore	United States	37	49	64	15	12	27	4,8	Q2 2021
Houston	United States	10	33	37	4	23	27	4,8	Q2 2021
Bergen	Norway	1	46	27	-19	45	26	3,1	Q3 2021
Aarhus	Denmark	5	23	31	8	18	26	1,4	Q4 2021
Miami	United States	31	34	56	22	3	25	4,8	Q2 2021
Manama	Bahrain	100	104	125	21	4	25	N/A	N/A
Tampere	Finland	43	53	67	14	10	24	1,4	Q3 2021
Dallas	United States	15	11	38	27	-4	23	4,8	Q2 2021
Hong Kong	Hong Kong	72	93	95	2	21	23	N/A	N/A
Guangzhou	China	121	136	144	8	15	23	11,9	Q2 2020
Atlanta	United States	20	19	39	20	-1	19	4,8	Q2 2021
Antwerp	Belgium	58	74	77	3	16	19	-0,5	Q4 2022
Stavanger	Norway	3	43	22	-21	40	19	3,1	Q3 2021
Den Haag	Netherlands	39	9	57	48	-30	18	-0,1	Q2 2022
Oulu	Finland	45	58	63	5	13	18	1,4	Q3 2021
Kuwait City	Kuwait	97	105	113	8	8	16	N/A	N/A
Brussels	Belgium	74	79	87	8	5	13	-0,5	Q4 2022
Doha	Qatar	99	98	112	14	-1	13	N/A	N/A
Shenzhen	China	132	139	145	6	7	13	11,9	Q2 2020

Figure 10 with TOP30 Growing Cities detailed comparison 2022 vs 2021/2020 results

Most studied 18 US Cities have significantly escalated positions. It's notorious their excellent Profitability. The way US managed the pandemic, minimizing the economic impact over social damage, and the changes on state and local investments and new environmental position with new President Biden have boosted US Cities in comparison with all other western competitive metropolises. The excellent appeal of American technological companies has been further accelerated by the cities adoption of technology to mitigate the effects of the pandemic (teleworking, processes analysis, market reassessment, digital transformation, reskilling in technologies and new developments to help with the green transition). The IRA Plan is also very supportive.

Although they plan to recover later, Finnish, Belgian and UK cities are gaining positions due to massive technology adoption. This improvement (also appreciated in Austria, Netherlands) corresponds not only to a greater adoption of technologies in SmartCities (especially in social and environmental sustainability), but also to the comparison with other cities heavily hit by the pandemic and with setbacks in investments. Basically, they kept investing while other were stagnated.

On the other way, cities have experienced significant decreases in Attractiveness in countries like Argentina, Brazil, India, due to the tremendous impact of the pandemic. Others such as France, Sweden, Switzerland due to a stagnation of investments in innovation, especially in Cloud technologies, so important to quickly respond with service continuity, innovation, cybersecurity and needed agility to readapt processes to new normalcy. Other countries such as Canada and Australia have been overtaken by USA. GER and SWI have not finished to waking up and investing heavily in urban digital transformation and they lack as well of Cloud adoption. SPA has been the European country with the greatest economic impact and the longest expected recovery time, due to its strong dependence on the services sector (hospitality, tourism, etc.), very damaged and a very slow recovery plan execution.

City	Country	RK22	RK21	RK20	21vs22	22vs21	TREND	INCR GDP (Q42019-Q42021)	Recovery Expected
Bergen	Norway	1	46	27	-19	45	26	3,1	Q3 2021
Sydney	Australia	2	6	8	2	4	6	3,2	Q1 2022
Stavanger	Norway	3	43	22	-21	40	19	3,1	Q3 2021
Oslo	Norway	4	27	11	-16	23	7	3,1	Q3 2021
Aarhus	Denmark	5	23	31	8	18	26	1,4	Q4 2021
Kansas City	United States	6	3	13	10	-3	7	4,8	Q2 2021
Washington, D.C.	United States	7	14	58	44	7	51	4,8	Q2 2021
Gothenburg	Sweden	8	47	10	-37	39	2	2,8	Q4 2021
Melbourne	Australia	9	7	1	-6	-2	-8	3,2	Q1 2022
Houston	United States	10	33	37	4	23	27	4,8	Q2 2021
Copenhagen	Denmark	11	8	19	11	-3	8	1,4	Q4 2021
Phoenix	United States	12	17	15	-2	5	3	4,8	Q2 2021
Abu Dhabi	United Arab Emir	13	103	108	5	90	95	N/A	N/A
Las Vegas	United States	14	48	82	34	34	68	4,8	Q2 2021
Dallas	United States	15	11	38	27	-4	23	4,8	Q2 2021
Bern	Switzerland	16	10	4	-6	-6	-12	0,7	Q1 2022
Los Angeles	United States	17	39	44	5	22	27	4,8	Q2 2021
Dubai	United Arab Emir	18	101	105	4	83	87	N/A	N/A
Singapore	Singapore	19	66	80	14	47	61	N/A	N/A
Atlanta	United States	20	19	39	20	-1	19	4,8	Q2 2021
London	United Kingdom	21	4	28	24	-17	7	-0,2	Q2 2022
San Francisco	United States	22	41	75	34	19	53	4,8	Q2 2021
Canberra	Australia	23	61	12	-49	38	-11	3,2	Q1 2022
Geneva	Switzerland	24	26	16	-10	2	-8	0,7	Q1 2022
Adelaide	Australia	25	21	2	-19	-4	-23	3,2	Q1 2022
Chicago	United States	26	22	36	14	-4	10	4,8	Q2 2021
Zurich	Switzerland	27	1	3	2	-26	-24	0,7	Q1 2022
Boston	United States	28	59	62	3	31	34	4,8	Q2 2021
Toronto	Canada	29	16	20	4	-13	-9	1,6	Q2 2022
Amsterdam	Netherlands	30	2	21	19	-28	-9	-0,1	Q2 2022
Miami	United States	31	34	56	22	3	25	4,8	Q2 2021
Berlin	Germany	32	5	6	1	-27	-26	0,6	Q4 2021
New York City	United States	33	20	42	22	-13	9	4,8	Q2 2021
Manchester	United Kingdom	34	18	26	8	-16	-8	-0,2	Q2 2022
Seattle	United States	35	68	76	8	33	41	4,8	Q2 2021
Denver	United States	36	37	25	-12	1	-11	4,8	Q2 2021
Baltimore	United States	37	49	64	15	12	27	4,8	Q2 2021
Philadelphia	United States	38	62	71	9	24	33	4,8	Q2 2021
Den Haag	Netherlands	39	9	57	48	-30	18	-0,1	Q2 2022
Malmo	Sweden	40	40	17	-23	0	-23	2,8	Q4 2021
Basel	Switzerland	41	15	9	-6	-26	-32	0,7	Q1 2022
Glasgow	United Kingdom	42	30	48	18	-12	6	-0,2	Q2 2022
Tampere	Finland	43	53	67	14	10	24	1,4	Q3 2021
Ottawa	Canada	44	44	24	-20	0	-20	1,6	Q2 2022
Oulu	Finland	45	58	63	5	13	18	1,4	Q3 2021
Rotterdam	Netherlands	46	13	18	5	-33	-28	-0,1	Q2 2022
Stockholm	Sweden	47	28	5	-23	-19	-42	2,8	Q4 2021
Montreal	Canada	48	36	7	-29	-12	-41	1,6	Q2 2022
Helsinki	Finland	49	32	52	20	-17	3	1,4	Q3 2021
Edinburgh	United Kingdom	50	31	34	3	-19	-16	-0,2	Q2 2022
Bristol	United Kingdom	51	56	54	-2	5	3	-0,2	Q2 2022
Taipei	Taiwan	52	109	104	-5	57	52	N/A	N/A
Cologne	Germany	53	35	29	-6	-18	-24	0,6	Q4 2021
Vienna	Austria	54	12	14	2	-42	-40	-1,3	Q3 2022
Frankfurt	Germany	55	51	35	-16	-4	-20	0,6	Q4 2021
Dublin	Ireland	56	63	65	2	7	9	5,2	Q2 2021
Vancouver	Canada	57	65	50	-15	8	-7	1,6	Q2 2022
Antwerp	Belgium	58	74	77	3	16	19	-0,5	Q4 2022

City	Country	RK22	RK21	RK20	21vs22	22vs21	TREND	INCR GDP (Q42019-Q42021)	Recovery Expected
Stuttgart	Germany	59	54	43	-11	-5	-16	0,6	Q4 2021
Hamburg	Germany	60	25	23	-2	-35	-37	0,6	Q4 2021
Espoo	Finland	61	42	41	-1	-19	-20	1,4	Q3 2021
Luxembourg	Luxembourg	62	57	32	-25	-5	-30	3,3	Q3 2021
Belfast	United Kingdom	63	45	69	24	-18	6	-0,2	Q2 2022
Nottingham	United Kingdom	64	64	70	6	0	6	-0,2	Q2 2022
Eindhoven	Netherlands	65	29	33	4	-36	-32	-0,1	Q2 2022
Munich	Germany	66	50	40	-10	-16	-26	0,6	Q4 2021
Birmingham	United Kingdom	67	38	59	21	-29	-8	-0,2	Q2 2022
Wellington	New Zealand	68	52	30	-22	-16	-38	2,7	Q4 2021
Valencia	Spain	69	73	46	-27	4	-23	-2,1	Q2 2023
Liverpool	United Kingdom	70	60	47	-13	-10	-23	-0,2	Q2 2022
Zaragoza	Spain	71	77	79	2	6	8	-2,1	Q2 2023
Hong Kong	Hong Kong	72	93	95	2	21	23	N/A	N/A
Madrid	Spain	73	75	73	-2	2	0	-2,1	Q2 2023
Brussels	Belgium	74	79	87	8	5	13	-0,5	Q4 2022
Dusseldorf	Germany	75	67	45	-22	-8	-30	0,6	Q4 2021
Barcelona	Spain	76	71	53	-18	-5	-23	-2,1	Q2 2023
Paris	France	77	70	60	-10	-7	-17	-0,9	Q3 2022
Seville	Spain	78	76	61	-15	-2	-17	-2,1	Q2 2023
Honolulu	United States	79	83	66	-17	4	-13	4,8	Q2 2021
Auckland	New Zealand	80	69	51	-18	-11	-29	2,7	Q4 2021
Linz	Austria	81	72	74	2	-9	-7	-1,3	Q3 2022
Málaga	Spain	82	80	72	-8	-2	-10	-2,1	Q2 2023
Tokyo	Japan	83	24	55	31	-59	-28	0,4	Q3 2021
Bilbao	Spain	84	89	90	1	5	6	-2,1	Q2 2023
Seoul	South Korea	85	84	49	-35	-1	-36	N/A	N/A
Marseille	France	86	81	81	0	-5	-5	-0,9	Q3 2022
Osaka	Japan	87	87	86	-1	0	-1	0,4	Q3 2021
Yokohama	Japan	88	55	78	23	-33	-10	0,4	Q3 2021
Lyon	France	89	78	68	-10	-11	-21	-0,9	Q3 2022
Nice	France	90	82	84	2	-8	-6	-0,9	Q3 2022
Bordeaux	France	91	86	85	-1	-5	-6	-0,9	Q3 2022
Santander	Spain	92	88	83	-5	-4	-9	-2,1	Q2 2023
Milan	Italy	93	90	91	1	-3	-2	-2	Q2 2022
Florence	Italy	94	92	96	4	-2	2	-2	Q2 2022
Lille	France	95	85	88	3	-10	-7	-0,9	Q3 2022
Porto	Portugal	96	99	98	-1	3	2	-1,9	Q3 2022
Kuwait City	Kuwait	97	105	113	8	8	16	N/A	N/A
Torino	Italy	98	100	99	-1	2	1	-2	Q2 2022
Doha	Qatar	99	98	112	14	-1	13	N/A	N/A
Manama	Bahrain	100	104	125	21	4	25	N/A	N/A
Tallinn	Estonia	101	106	100	-6	5	-1	1,7	Q4 2021
Jerusalem	Israel	102	96	93	-3	-6	-9	2,9	Q1 2022
Lisbon	Portugal	103	97	101	4	-6	-2	-1,9	Q3 2022
Tel Aviv	Israel	104	94	92	-2	-10	-12	2,9	Q1 2022
Rome	Italy	105	95	94	-1	-10	-11	-2	Q2 2022
Ljubljana	Slovenia	106	102	103	1	-4	-3	-2,1	Q3 2022
Nagoya	Japan	107	91	89	-2	-16	-18	0,4	Q3 2021
Prague	Czech Republic	108	107	97	-10	-1	-11	-0,9	Q2 2022
Warsaw	Poland	109	110	107	-3	1	-2	2,8	Q3 2021
Wroclaw	Poland	110	108	106	-2	-2	-4	2,8	Q3 2021
Riga	Latvia	111	118	116	-2	7	5	1,6	Q3 2021
Budapest	Hungary	112	114	111	-3	2	-1	-0,8	Q1 2022
Athens	Greece	113	111	110	-1	-2	-3	-2,2	Q2 2022
Shanghai	China	114	113	119	6	-1	5	11,9	Q2 2020
Vilnius	Lithuania	115	116	109	-7	1	-6	2,6	Q1 2021
Santiago	Chile	116	112	102	-10	-4	-14	3,3	Q3 2021

Figure 11. 2022 vs 2021 vs 2020 Comparison. GDP Increase. Expected Recovery time. Source: Author

City	Country	RK22	RK21	RK20	21vs22	22vs21	TREND	INCR GDP (Q42019-Q42021)	Recovery Expected
Sofia	Bulgaria	117	125	122	-3	8	5	0,6	N/A
Bratislava	Slovakia	118	115	114	-1	-3	-4	1,5	Q4 2021
Beijing	China	119	121	126	5	2	7	11,9	Q2 2020
Suzhou	China	120	128	131	3	8	11	11,9	Q2 2020
Guangzhou	China	121	136	144	8	15	23	11,9	Q2 2020
Chongqing	China	122	132	130	-2	10	8	11,9	Q2 2020
Zagreb	Croatia	123	119	117	-2	-4	-6	N/A	N/A
Tianjin	China	124	135	137	2	11	13	11,9	Q2 2020
Mexico City	Mexico	125	123	124	1	-2	-1	-1,9	Q3 2023
Kuala Lumpur	Malaysia	126	131	127	-4	5	1	N/A	N/A
Bucharest	Romania	127	129	121	-8	2	-6	2	N/A
Chengdu	China	128	137	138	1	9	10	11,9	Q2 2020
Shenyang	China	129	133	132	-1	4	3	11,9	Q2 2020
Wuhan	China	130	141	143	2	11	13	11,9	Q2 2020
Guadalajara	Mexico	131	134	133	-1	3	2	-1,9	Q3 2023
Shenzhen	China	132	139	145	6	7	13	11,9	Q2 2020
Montevideo	Uruguay	133	127	128	1	-6	-5	N/A	N/A
Moscow	Russia	134	120	120	0	-14	-14	2,7	Q2 2021
Buenos Aires	Argentina	135	117	115	-2	-18	-20	-3,1	Q2 2026
Rio de Janeiro	Brazil	136	138	135	-3	2	-1	-0,4	Q3 2022
Belgrade	Serbia	137	146	140	-6	9	3	N/A	N/A
Córdoba	Argentina	138	126	118	-8	-12	-20	-3,1	Q2 2026
Sao Paulo	Brazil	139	144	134	-10	5	-5	-0,4	Q3 2022
Bangkok	Thailand	140	148	149	1	8	9	N/A	N/A
Riyadh	Saudi Arabia	141	142	150	8	1	9	-0,4	Q1 2024
St Petersburg	Russia	142	130	129	-1	-12	-13	2,7	Q2 2021
Minsk	Belarus	143	124	142	18	-19	-1	N/A	N/A
Monterrey	Mexico	144	140	139	-1	-4	-5	-1,9	Q3 2023
Istanbul	Turkey	145	122	123	1	-23	-22	5	Q3 2020
Cape Town	South Africa	146	152	157	5	6	11	-2,6	Q4 2024
Harbin	China	147	151	154	3	4	7	11,9	Q2 2020
Brasilia	Brazil	148	150	141	-9	2	-7	-0,4	Q3 2022
San José	Costa Rica	149	147	148	1	-2	-1	-2,1	Q2 2023
Kiev	Ukraine	150	145	146	1	-5	-4	N/A	N/A
Bogota	Colombia	151	153	147	-6	2	-4	0,1	N/A
Quito	Ecuador	152	158	155	-3	6	3	N/A	N/A
Jakarta	Indonesia	153	160	164	4	7	11	2,8	Q4 2021
Panama City	Panama	154	149	153	4	-5	-1	N/A	N/A
Ankara	Turkey	155	143	136	-7	-12	-19	5	Q3 2020
Lima	Peru	156	154	159	5	-2	3	N/A	N/A
Durban	South Africa	157	155	160	5	-2	3	-2,6	Q4 2024
Hanoi	Vietnam	158	162	166	4	4	8	N/A	N/A
Johannesburg	South Africa	159	156	162	6	-3	3	-2,6	Q4 2024
Tbilisi	Georgia	160	157	152	-5	-3	-8	N/A	N/A
Medellín	Colombia	161	164	151	-13	3	-10	0,1	N/A
Ho Chi Minh City	Vietnam	162	166	171	5	4	9	N/A	N/A
Tunis	Tunisia	163	159	167	8	-4	4	-5,6	N/A
Asuncion	Paraguay	164	165	173	8	1	9	N/A	N/A
Santo Domingo	Dominican Repub	165	168	156	-12	3	-9	N/A	N/A
New Delhi	India	166	169	158	-11	3	-8	4,5	Q4 2021
Mumbai	India	167	172	161	-11	5	-6	4,5	Q4 2021
La Paz	Bolivia	168	167	170	3	-1	2	N/A	N/A
Manila	Philippines	169	161	163	2	-8	-6	N/A	N/A
Cairo	Egypt	170	170	172	2	0	2	N/A	N/A
Bangalore	India	171	173	165	-8	2	-6	4,5	Q4 2021
Casablanca	Morocco	172	163	169	6	-9	-3	N/A	N/A
Rabat	Morocco	173	171	174	3	-2	1	N/A	N/A
Hyderabad	India	174	174	168	-6	0	-6	4,5	Q4 2021
Accra	Ghana	175	175	175	0	0	0	N/A	N/A

6.6 Attractiveness vs Employability

The world is now, more than ever, being fueled by talent and human resources. With fast growing economies, and constant rivalry to be number one, cities are constantly racing to prosper both economically and socially.

However, with globalization, a great advantage rises for those who are talented (Parilla and Liu, 2019). A massive pool of opportunities from which to pick. Those wanting to develop their career in tech will probably try to work in Silicon Valley or Shanghai, while those interested in finance will aspire to grab a job in New York or London. (Haqqi, 2021)

As part of our model, we are interested in understanding to what extend the overall Attractiveness of a city impacts on its ability to attract talent. Although professional opportunities are a very strong attracter of human capital, we believe that a cities appeal is characterized by more than that.

Employability is extremely related to talent. Talent attraction is, together with profitability (high wages, low taxes) what makes US Cities topping our Attractiveness ranking. One of our points of interest arising from this study was to find out whether a city's attractiveness influences in any way the amount of talent the city attracts.

To analyze this, we have combined two sources with same weight. On one hand, The Global Talent Competitiveness Index, 2021 (Lanvin and Monteiro, 2021), where we take the Employability index, as a proxy to know the easiness to find skilled employees and talented educated citizens in a city. This is quantified by indicators about skills gaps and labor market mismatches and by the good provision of professionals by local education systems. On the other hand, we take LinkedIn Talent Insights report for each studied Metropolitan Area. This report gives us three main indicators to be equally weighted and combined. First, Hiring Demand (measuring the level of activity from recruiters in the area in the past 12 months), then % Jobs posted vs Total amount of professionals (measuring the jobs availability in the area), then Talent net flow (Professionals won or lost in the past 12 months vs total). These three indicators really offer a picture of employability situation in that area, based on the activity from demand and offer, and net talent win or loss. Only creative professionals have been studied (according to Pf. Florida's approach). Let's look at top25 at Figure 12.

City	Country	LinkedIN Talent Insights NOR	Employability GTCI NOR	Employability NOR
Dallas	United States	10,00	9,00	10,00
Seattle	United States	9,95	9,00	9,97
Phoenix	United States	7,82	9,00	8,83
Cologne	Germany	8,63	7,97	8,71
Berlin	Germany	8,56	7,97	8,68
Munich	Germany	8,30	7,97	8,54
Hamburg	Germany	8,26	7,97	8,52
Denver	United States	7,19	9,00	8,49
Atlanta	United States	7,17	9,00	8,48
Singapore	Singapore	6,09	10,00	8,44
Dusseldorf	Germany	7,58	7,97	8,15
Vancouver	Canada	6,29	8,64	7,82
Washington, D.C	United States	5,65	9,00	7,67
Baltimore	United States	5,65	9,00	7,67
Stuttgart	Germany	6,60	7,97	7,63
Frankfurt	Germany	6,54	7,97	7,59
Miami	United States	4,92	9,00	7,28
Kansas City	United States	4,89	9,00	7,26
Bern	Switzerland	4,52	9,34	7,24
Zurich	Switzerland	4,30	9,34	7,12
San Francisco	United States	4,61	9,00	7,11
Osaka	Japan	8,07	5,26	6,96
Tokyo	Japan	8,04	5,26	6,94
Yokohama	Japan	8,04	5,26	6,94
Boston	United States	4,25	9,00	6,92

Figure 12. City Employability. TOP 25 Source: Author

Employability is topped by US Cities, followed by most innovative cities in Germany, Japan, Switzerland and extraordinary technology investors like Singapore and Tel-Aviv. We have analyzed the City Attractiveness by more than 100 indicators, including emotional and rational components. But, how much pure Employability is related to City Attractiveness? We have concluded that investors/companies go where talent is, no longer the other way around. So, a city well prepared and equipped with talent will attract investors which will make the city to thrive. McKinsey (Cassim et al, 2020) positions workforce upskilling as one of four main recovery plans factors together with Green energy investment, Digitalization and new technologies and Resilience of supply chains and security of essential goods. They point to a 30% of potentially automatable tasks and a very waving demand patterns pushing to hundreds of millions of skilled workers to switch jobs. In this context, enjoying an over the average skilled population makes a city resilient to these fluctuations and competitive enough to leverage the new opportunities and growth potential.

But let's compare our Employability and Attractiveness results. In order to understand the relationship - between these two indexes. Final Correlation number R^2=0,5477, which is very high and means a strong association between the two concepts.

Improving Employability (by improving citizen skilling) seems to be a clear driver for all cities over the average line, moving top right. For those performing better in Employability that in Attractiveness, other concepts described in our Observatory like Magnetism or Cost of life should be considered the main levers to activate. (See figure 13)

But, let's remind that professional opportunities are not definite drivers when choosing a city, although they definitely help.

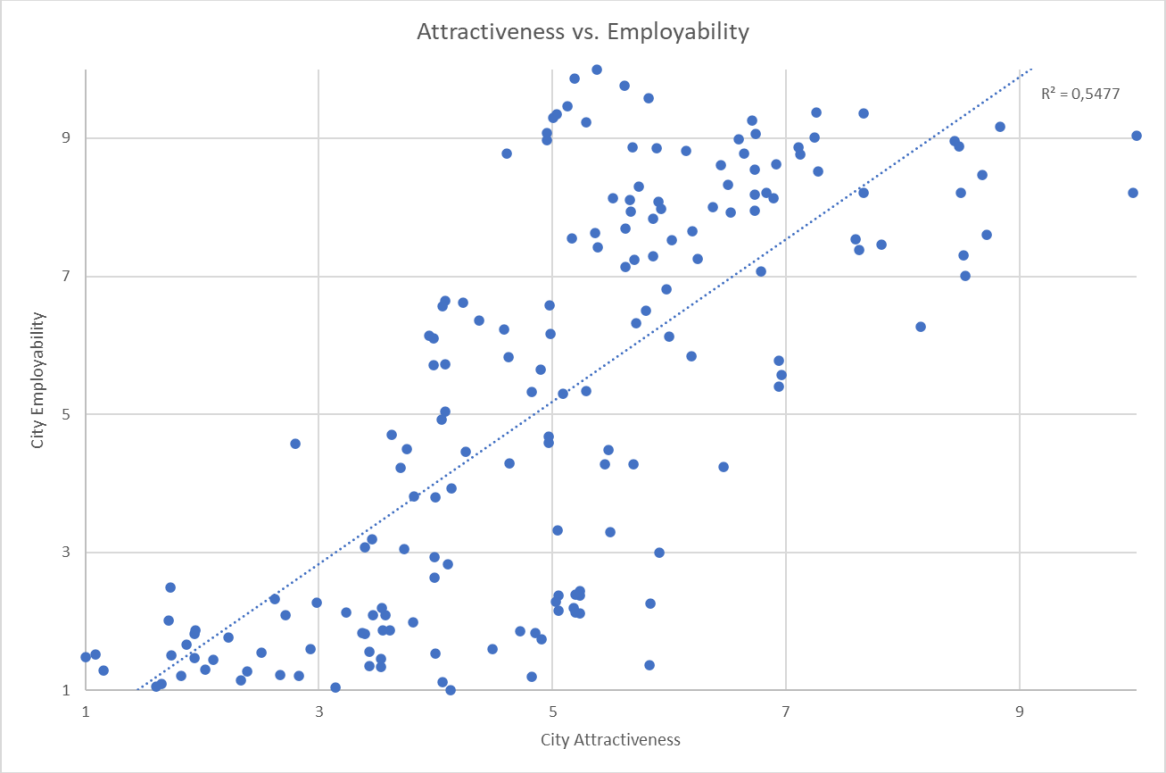


Figure 13. City Attractiveness vs Employability. Source: Author

7. Conclusions

7.1 Balancing City Magnetism and City Profitability

The key is to find a balance between transforming the essence of the city (its physical and virtual shape) while improving its benefits and services. The two aspects feed off of each other. A city's essence determines how the services provided should improve, while the new services have an impact on transforming the city's essence. The transition to an information- and knowledge-based economy represents both a revolution, due to its new acceleration and blistering speed, and a challenge as we try to balance the concept of an attractive and accessible city with social and environmental progress. (Van den Berg, Van de Meer, Oligaar, 2006)

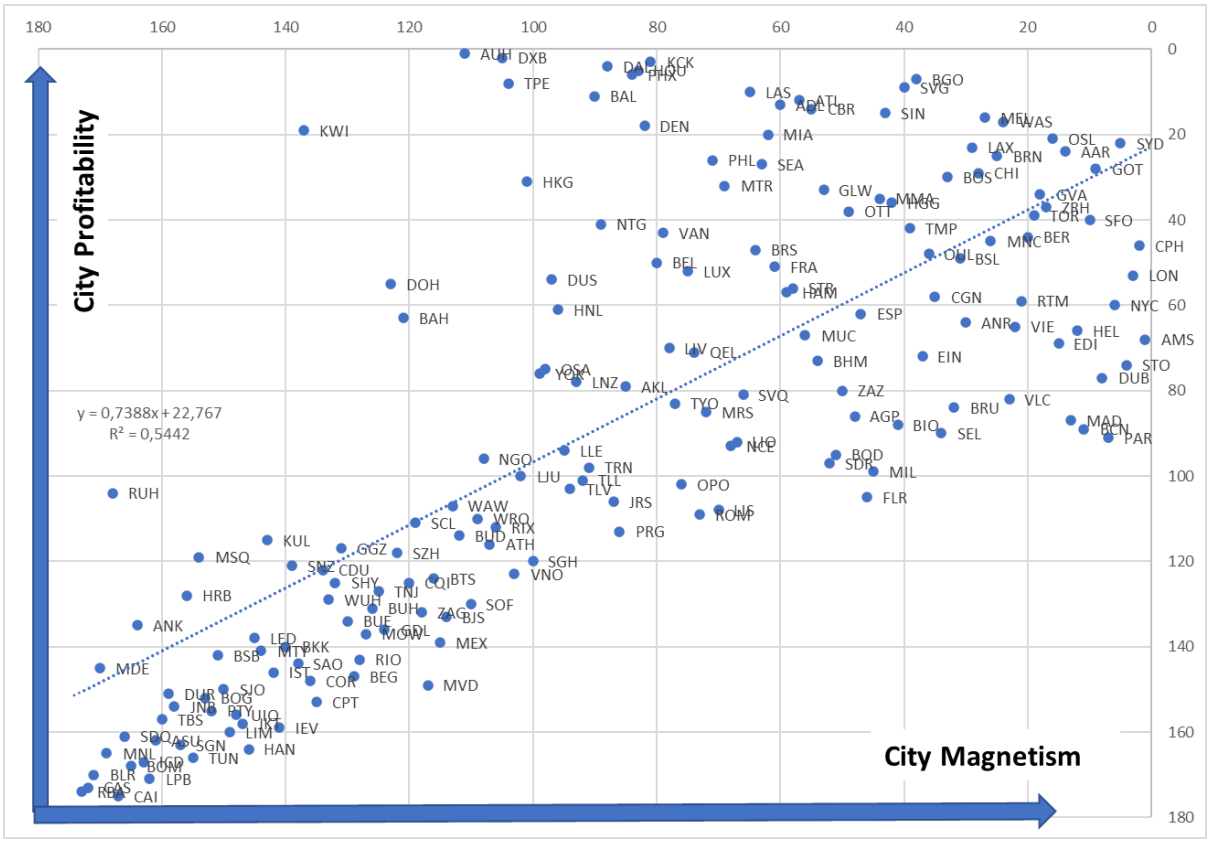


Figure 14. Balancing City Magnetism and City Profitability. Cities in UNLOCODE three letters nomination. Source: Author

The magic quadrant is in the upper right (see figure 14) where we find cities with high Magnetism and Profitability. These are mainly cities in the Advanced area of the ranking. These cities compete hard day after day to stay there, to gain positions step by step, making a huge investment. The message for them is clear: keep investing, keep progressing.

In the lower left quadrant, we see cities with low magnetism and low profitability. These are Emerging and Starter cities. Our message is again clear: 'fix the basics'. In the upper left quadrant, we find cities with low magnetism but high profitability. They are mainly some less-than-magnetic US and Japanese cities, as well as some very industrial, cold German cities, UAE, Hong-Kong and Kuwait. They have the opportunity to improve and evolve and move into the magic quadrant if they invest in achieving social sustainability, improving their dynamism, cultivating their identity, and designing an attractive future plan that is connected to their citizens. In the lower right quadrant, we find cities with high magnetism but low profitability. Those are cities with a great identity and rich human values, but talent also demands opportunities for compensation and professional success. Most come from Southern Europe, as magnetic as tax-hell. They must improve the provision of citizen services and the economic equation, or they run the risk of falling behind in overall attractiveness. This looks to be true of Italian and Portuguese cities with high Magnetism, but poor Profitability.

7.2 Cities of Future. New Normal City. The GETSS City.

The pandemic has changed the concepts of sustainability derived from the United Nations Sustainable Development Goals applicable to cities. In the West, we have gone from associating sustainability exclusively with the environment, to reconsider the other two other fundamental components: economic and social sustainability. The pandemic has accelerated the use of technology and has put it on value. It has also changed our habits regarding work, social behaviors, and consumption. Let us briefly study which areas have significantly changed the most. Let's explore the new normalcy.

The new GETSS City (Green, Experiential, Time, Social, Safe). 5 pillars, 16 motions.

We aspire to enjoy the best (life, family, work, environment), and we want it now (time is the only physical dimension that we don't control) and under the safest conditions. COVID has shown us death, how fragile our lives are, how important is to make proper use of time, enjoy the experience of living, our social inherent essence, importance of security and safety rules, and value of technology to enable all beforementioned.

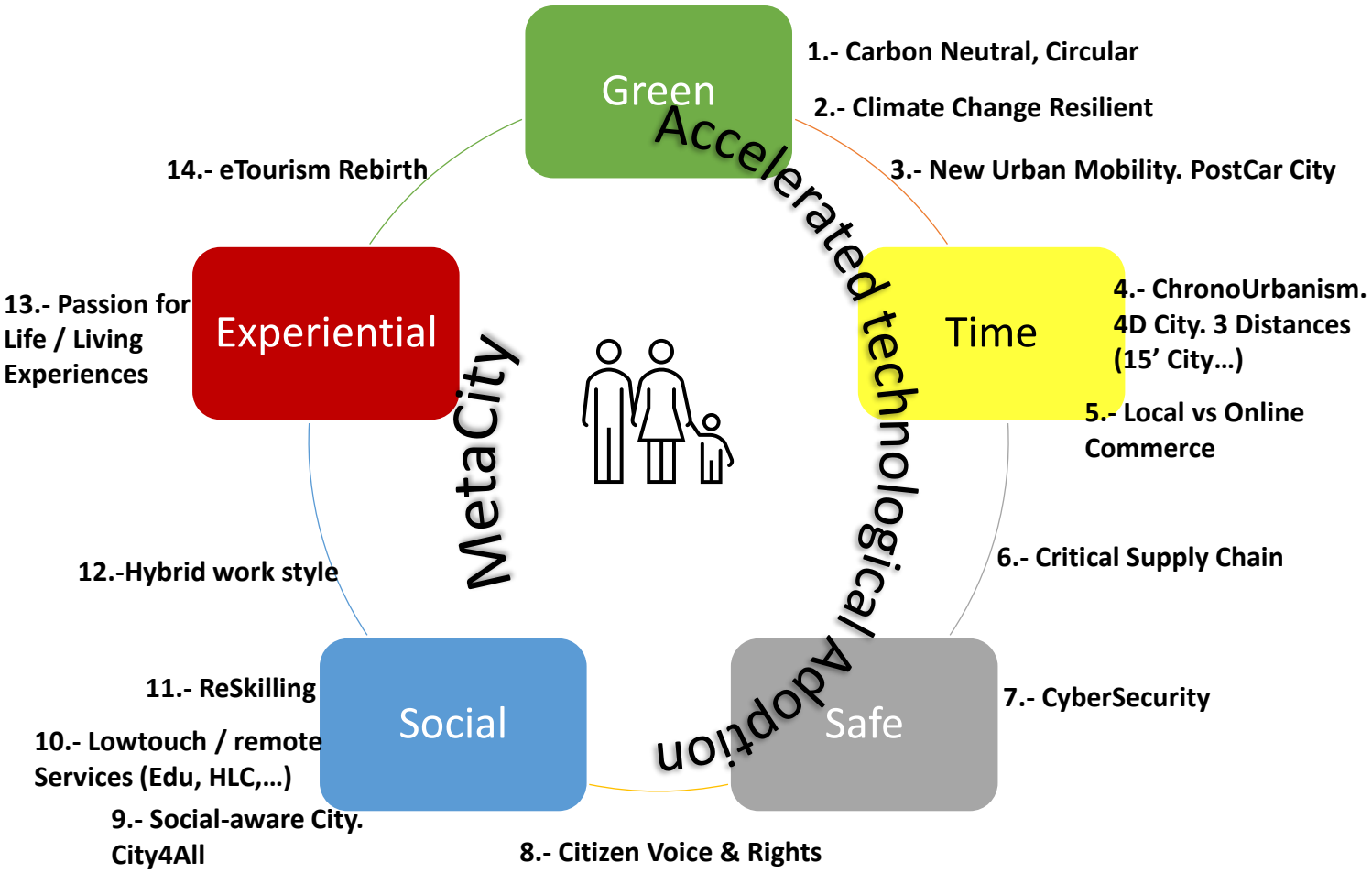


Figure 15. The new GETSS normalcy. Source: Author

Accelerated technological adoption

The pandemic has taught us the value of technology to allow us to continue our work and economic activity. In addition, it has been essential for the development of vaccines and the rapid communication of risks, minimizing the impact of the pandemic. Our cities have learned to telework using technology. They have been able to maintain good quality public service and to make the necessary decisions in a completely new and changing environment. After responding to the initial challenge, cities use technology to try to predict new service demands, prioritize investments based on the impact of the pandemic, and incentivize economic and social recovery.

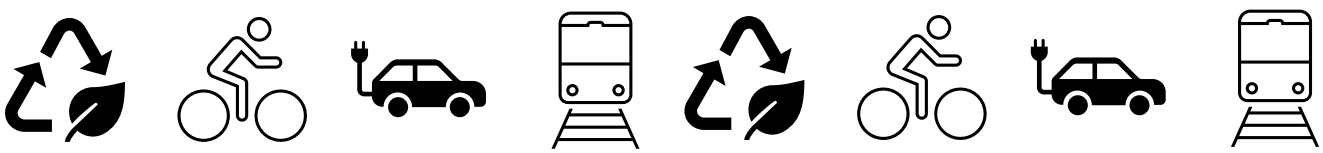
Simulation tools are added to the predictive models. In this sense, Digital Twin systems allow simulating the different alternatives to solve an urban challenge associated with physical elements, such as traffic, pollution, energy supplies, security, urban development, intelligent building management, among others. In this way, the use of artificial intelligence to develop a 3D virtual model of the city that allows us, in real time, to understand its situation and carry out future simulations on the possible measures to be implemented, represents an enormous advance in the improvement of the quality of urban life, since it allows testing the possible alternatives without having to disturb the neighbors with works and expensive physical movements in the city.

This acceleration of change caused by new technologies is also accelerated in itself (exponential technologies or turbo boost) (Diamandis & Kotler, 2020). I believe that we are at a time when many technological developments that have been perfected for years are going to reach a disruptive moment: virtual and augmented reality as the basis of the metaverse, 3D printing, digital twins, Blockchain, nanotechnologies, biotechnologies and neurotech, robotics, autonomous systems, 5G and 6G communications and a new phase of artificial intelligence will, in combination, bring new lifestyles and production systems that are extraordinarily efficient and respectful with the planet.

1.- Sustainable Green city. Carbon Neutral, Circular City.

Post-Covid cities face the challenge of sustainability with the aim of the European Green Deal and parallel initiatives across the world (like California's AB32 Global Warming Solutions Act, UK Climate Change Act, and others). Cities are the fundamental pillar to combat climate change. Every modern city sets itself the objectives of Carbon Neutral and Circular City. The economic recovery will be slower or faster, depending on the good analysis and prioritization in the use of recovery funds. But whatever its speed, it will be green. European cities are leading, once again, this global process. In this sense, the initiative 100 Carbon Neutral cities by 2030 of the European Union is framed (EU, 2022). Copenhagen leads urban initiatives with the goal of being Carbon Neutral by 2025. Furthermore, Copenhagen sets this goal not only for city operations, but also for emissions from all citizens, becoming the first world capital to pursue this status. Other European cities mark 2030 as the final destination of their Carbon neutral initiatives within the global European Green Deal framework for 2050.

The proper management of matter and, in general, waste, make up the basic pillars of circular cities. Reduce, Reuse, Recycle, Regenerate and Redesign are the 5 R's that mark the direction of development of a modern and sustainable city from the point of view of matter. Therefore, any city that intends to be minimally attractive for talent must prioritize the objectives of environmental sustainability (Carbon neutral and Circular economy).



2.- Climate Change Resilient.

It is clear that extreme weather events are becoming more frequent (droughts, downpours, extreme temperatures, cyclones, sudden changes in climate, etc.) and the increase in global temperature is already becoming more evident. To combat rising temperatures, cities are beginning to reorder their urban planning. The construction of climatic shelters allows an important reduction of the risk that affects people vulnerable to heat. The intelligent use of the phenomena of convection, radiation and heat conduction enables efficient temperature regulation in buildings and energy savings. The intelligent maintenance of buildings plays a fundamental role, firstly because they are responsible for 40% of a city's carbon emissions, secondly because glass towers cause an additional greenhouse effect and thirdly because the efficient management of these buildings can help generate more climatic islands. The use of traditional remedies such as blinds, balconies, use of white paint have always worked in this regard. Cities are investing in the construction of forest crowns that allow lowering the temperature of the city while facilitating leisure (running a marathon without leaving the parks). Another issue to take into account is the use of asphalt. Research is being carried out on new materials that reduce the heat that this type of floor radiates. Also, the use of the subsoil and underground spaces as shelter from inclement weather is also proving tremendously valuable. Another clear threat to cities is excess water. The water floods can sink buildings and so on. To combat its effect, the concept of the sponge city is created. A sponge city is one that allows water to be absorbed and managed, evacuating its excess and avoiding damage. In this sense, there are cities like Barcelona that have built huge underground spare tanks to mitigate the effect of heavy rains that devastated the city due to its steep slope towards the sea. Another fundamental element is to design green infrastructures that filter and drain the water to the subsoil. Much remains to be learned from the efficient management carried out by the Netherlands. On the contrary, those cities with a water deficit must learn to manage it. We are seeing how cities that traditionally have a surplus of water have suffered a summer of drought and even the impact of forest wildfires. Their water storage and distribution systems were unprepared for these dry spells due to poor storage and outdated distribution infrastructure with huge leakages. Additionally, the efficient use of water and its recycling are essential to achieve a self-sufficient city. Here the example to follow is Tel Aviv. And once again, the use of the latest technologies in digital twin simulation allows us to design cities that are resilient to climate change. Examples of this are the digital twin projects for water management in Porto and Goteborg or for efficient energy management in Helsinki.

3. New Urban Mobility. PostCar City

Urban mobility is one of the most dynamic, fast changing, citizens appreciated-by concepts and the one that faces the greatest challenges. It must combine: an economic sustainable and emission-free service, with the psychological effect that pushes citizens to use individual means of transport (we are experiencing a back to heavy traffic), together with the appearance of new individual vehicles and flying machines. Also, new shared mobility services are offered. Clearly, Urban Mobility tends to consolidate a service model offered by more or less autonomous and shared electric vehicles. Cities re-evaluate their spaces to reduce areas for cars and win social spaces for citizens. In this rethinking, the construction of new lanes for individual electric vehicles such as bicycles or scooters prevails. I want to show my surprise at what I call the theory of *four*: if an alien visited our planet, it would conclude that we adore those four-wheeled machines called automobiles. We dedicate 40% of our urban space to them, 40% of the urban energy we use, for a use that barely reaches 4% of time. There is no other good that depreciates so quickly: when leaving the dealership our vehicle is worth 27% less, on average. It seems clear that the owned vehicle model is going to become obsolete due to the concept of mobility as a shared service. (Thompson, 2015) Large manufacturers face the challenge of offering mobility as a service and maintaining a huge fleet of vehicles that must respond quickly and flexibly to the demands of citizens. And all of it stored no one knows where, but ready at the user’s door when they demand it. A Renault’s manager pointed to this concept applied to the Paris metropolitan area: it is physically impossible to store more than 1 million cars around, ready to be used on the weekend, and hire a legion of operators who park them near users on Friday and pick them up after Sunday… but consumer demands always rules. Will see.

4. ChronoUrbanism. 4D City. 3 Distances (15' City…).

Postpandemic Cities are moving towards the postCar paradigm and the 4D Cities (adding time as main dimension). Distances are no longer measured in miles/km but in time to go. That way, we can observe Cities reallocating resources and lifestyles around these three main distances:

- 90' as Metropolitan Area
- 15' as Ideal City (village)
- 1' as District social areas

We observe the city with different approaches according to its function, its role in the global urban ecosystem, and its capacity to serve the citizen. In this sense, the efficiency of public transport determines the real size of the city. In this way, if we consider 90 minutes as the maximum commuting time that a citizen is able to invest to access his job (it is the average time in a city with one of worst traffic in the world: Los Angeles, USA), we conclude that all reachable area in less than 90 minutes by public transport should be associated with the same metropolis. This is the actual psychological size of a city. In this way, Madrid is assimilated to the Community of Madrid (Region) and more, Paris is associated with Île-de-France, we observe Big London occupying the entire England's southeastern quarter, we could assimilate the Benelux to the same single large Metropolis, etc. This concept of metropolis enables cities to become hubs of international influence in the global competition for talent. In a context of peace and economic stability, cities compete to retain and attract talented citizens. At the beginning of the fourth industrial revolution, cities interact and play this competition internationally, within their blocs / civilizations and above the countries in which they are located.

If we zoom in detail, we find the concept of the 15 minutes city (15CITY, 2021). This concept, developed by Professor Carlos Moreno for the city of Paris, aims at the generation of Villa-cities where citizens can find 95% of the things they need, including their work, at a distance of less than 15 minutes using public transport or micro electric vehicles. From the very well-connected grouping of villas you get the metropolis. In this way, the concept of suburb, ghetto, is avoided, and social inequalities are fought. Each villa must have minimum standards of quality of life and services.

Zooming in once again we focus on the concept of district, and within the district we talk about the 1 minute city (Peters, 2021). This concept, proposed by the city of Stockholm, tries to encourage the development of areas of social interaction within the districts at very short, walkable distances. It is about building social spaces for the elderly, children, parking and charging micro electric vehicles and other social functions all within our district. Also associated with this concept of proximity urban development we can find the concept of superblock. Initiated in Barcelona, a superblock is a grouping of blocks where traffic is only allowed on its perimeter. Inside, we develop elements of social coexistence such as boulevards, benches, tree-lined elements, etc., allowing only the superblock inhabitants domestic traffic and the provision of merchandise. These superblocks are already being tested in various cities such as Barcelona, Ghent, and there is an ambitious plan for Madrid and many more.

	Distance (t) / (km)	Mean	Benefit	Concept
Metro/Regio polis	90′ / 350km	Transportation	International Hub	Compete 4th Ind. Rev.
Villages	15′-20′/ 10km	EmicroV, Bike	Quality Life	95% all you need (job)
District	1′ / 1km	Walking	Social	Superblocks

5. Local versus Online Commerce

The enormous boom in online commerce during the pandemic has highlighted the fragility of the local retail and commerce system. All cities are considering the recovery of the thousands of neighborhood businesses that have disappeared. To compete with the online commerce monsters, they need not only to take advantage of technology to offer their products online, but also taking advantage of their proximity and the quality of local and fresh products. Likewise, cities must regulate the intense merchandise traffic and the abuse of packaging waste generated by large online commerce companies. There is also a preference for the local over the international standard product. In any case, the impact on business closure is tremendous. It is worth noting the effort of many cities to facilitate the work and operation of small local businesses. Initiatives such as providing free parking for buyers (Albuquerque, New Mexico), promoting the development of cooperative electronic commerce tools, or the most advanced ones, such as Barcelona, where City Council directly invests on adding innovation and intelligence to local businesses (smartstores) to make them more competitive (Beabloo, 2021). These initiatives demonstrate the big effort that cities are making to save the massive employment this sector generates. In parallel, cities are moving towards a Cashless model, that is, the elimination of conventional coins and bills to go to a totally based on electronic transactions model. This helps to combat tax fraud since all transactions are traceable and should generate the corresponding taxes, avoiding the black market.

In addition to this, the *Amazon* effect occurs. It has been proven that in those cities where one of these large warehouses is installed, the average salary drops (The Economist 2018). Regarding its environmental impact, an increase of 29% in the use of plastic packaging has been observed, as well as an 18% increase in its carbon footprint. (Amazon Sustainability Report, 2021). Returning to the time factor, it has been shown that it is impossible to deliver goods in the shortest possible time without promoting extremely low wages and impacting the environment.

6. The value of the critical supply chain

The pandemic has shown the extreme value that critical supplies, such as food or energy, bring to the community. Recent disruptions in the supply chain including those caused by the pandemic, the increase in the cost of energy and especially gas, inflation, shortages of semiconductors and chips, the war in Ukraine with its impact on agricultural supplies and others have put highlighting the critical value of supply operations in cities. (Cigala et al, 2022) Cities need to guarantee a series of public services and, therefore, the corresponding materials and services. At the same time, they enable general supply points for the entire population, guaranteeing that there is no shortage of any critical product such as food or energy products. The need for a resilient provisioning system has become highlighted. Subsequent cybersecurity attacks (ransomware) such as that impacted at the Continental Pipeline (US), which supplies half of fuel at US west coast, have reinforced this need to protect the fundamental supply chain.

7. Cybersecurity.

Cities responded immediately to the threat of the pandemic. They provided their employees with the necessary technologies to be able to telework and maintain active service continuum. In most cases, this sudden incorporation of new technologies did not drag an associated security project in parallel. The impact of ransomware attacks on local administration reaches 58% (Wray, 2022). It is an organized crime whose income is already comparable to drug trafficking. Therefore, we face a challenge of extreme importance, since criminals are trying to cause maximum damage and attack the environments with the most sensitive and vital information for the city operations. Accepting extortion and paying is not an option. Nor is it the paralysis of public service. Therefore, cities must organize a specialized response to manage this situation. If we add to this the difficulty of hiring highly qualified personnel, we find that the only solution is to rely on externally managed systems, main Cloud providers that guarantee the necessary data protection and security and advanced tools protecting the operations from end user device, tools to overall systems and data centers. Outages: CS, as well as back up systems and decentralized servers (Cloud) for redundancy, are necessary to protect the city from outages. Shadow IT: Non approved tools and software not managed by IT Department reach more than 60% of cloud services in large organizations, according to Capgemini. They pose a threat when not securely integrated within the wider city IT ecosystem. Identify, Respond, Recover, Protect/Detect and Sustain has proven to be the virtuous cycle to keep the city digital assets safe. (WEFORUM, 2022)

8.- Citizen Voice & Digital Rights

Compliance with the GDPR is neither optional. Cities and administrations must observe exemplar behavior in this regard. Citizens trust the city to manage their private and sensitive information. This trust relationship is the basis for the provision of quality public services adapted to the peculiarities of citizens and anticipating their needs. As advocated by (Deloitte 2021), the involvement of private sector regarding the management of data and citizens' identity will remain crucial not only to define standards collectively, but also to build a sophisticated, secure and user-friendly infrastructure that is economically viable. As a response to the growing concerns about citizen data collection and usage, the European Commission has published guidance on the development of new apps to "support the fight against coronavirus in relation to data protection. It's important to ensure that EU citizens can fully trust innovative digital solutions and can embrace them without fear". Nonetheless, most Local and Regional Governments still seem to be struggling with understanding the guidelines on storing and using PII data and look at their cloud provider(s) for guidance.

Additionally, and with special emphasis on the European Union, new digital rights are being developed, allowing citizens to be the unique and exclusive owners of their digital identity. The new decentralized identity environments allow citizens to decide which part of their identity could be transferred to each public or private entity at all times. Obviously, this management requires the use of the latest technologies. The current situation where certain providers of information and internet services obtain all the citizens personal information by all means must cease, with the citizen being the exclusive owner of what is done with their personal data. It is an added challenge to cybersecurity, and one more reason to invest on the needed technologies and processes to control it.

Three trends are observed on this citizen Digital Rights crusade:

- Data-driven technologies have intensified Digital Rights concerns. We have witnessed the rise of manifestos/ governance frameworks claiming to help cities in the greenfield of digital rights-based policymaking. For instance, the Cities' Coalition for Digital Rights (CC4DR) have developed a framework used by European cities such as Amsterdam and Helsinki.
- No citizen left behind. Demonstrate fairness, openness, consent, equality and transparency. Discuss potential inequalities caused by digitalization (aka. the digital divide).
- Participatory Democracy. Cities are expanding their Urban Data Platform with means to collect citizen feedback, opinions, and adapt the new applications to their needs and preferences.

9.- Social-aware City. City4All

After the tragedy of the pandemic and the subsequent economic impact of the recession, city managers need to know the citizens social situation. It is urgent to activate and analyze the historical data available on citizens in order to determine the different levels of economic and social vulnerability in which they find themselves, mapped by district. In this way, city managers can balance budgets and prioritize serving those who need it most. It is not easy to find a common definition of the term vulnerability. Each city can find different approaches to this situation and analyze it from different angles. Also, special importance must be given to the groups at greatest risk: the elderly, children, women at risk of gender-based violence, homeless people, immigrants, etc, as studied by EU Social Challenges in Cities (Mulvik et al, 2022) More general analytics can also be done to identify the level of poverty, happiness, vitality and mental health (which has been greatly impacted by the pandemic). This georeferenced social analysis is very useful for building the aforementioned 15' city, identifying the necessary services by distance. It should be noted that a city barely uses 9% of its data at daily operations. The remaining 91% is historical data that is not analyzed, and in many cases, it is not known how it can be accessed or integrated. Modern cross-platform database systems allow you to integrate all these different data sources or silos to get the information you need. At the same time, the advanced cooperative and confidential analytic systems allow guaranteeing anonymity and GDPR compliance to extract aggregated information, respecting the citizens sensitive data.

Initiatives like (SmartCities4All 2015) try to reinforce the attention needed to provide systems, tools and services that can be used, accessed and operated by all, making the city inclusive from the new technologies and services approach. Once again cities must be human-centered as explained.

10.- Lowtouch / remote Services (Edu, HLC,…)

The social distancing imposed by the pandemic has allowed the provision of public services to flourish remotely, by using the latest technologies. Once again, the technologies helped maintain an adequate level of public service during the pandemic. Many of these services have maintained a high level of use, as they have proven their effectiveness and are trusted by citizens. However, there are public services such as education and healthcare where direct human intervention remains essential. It is therefore necessary to find the right balance between face-to-face service and service that can be provided remotely, with its consequent advantages in efficiency and low cost. It is important to learn from the setback suffered by banking in Spain when an elderly person (78 years old) gathered more than 600,000 signatures to demand that banks offer direct contact services to citizens. This change.org campaign "I'm older, but not an idiot" managed to adapt certain banking services that were made available only online and for people with certain knowledge of computer applications and since then, bank employees must listen elderly who approach the bank at their own pace.

11. Need for additional training (ReSkilling)

The new technological tools and the need to treat public data with the exquisite care that compliance with the GDPR requires, forces us to improve technical training and administrative processes for civil servants. In parallel, governments need to recruit a significant number of new qualified technical and advanced security environments staff. This is a fundamental challenge due to the huge gap in salary that this type of professionals finds in comparison with private companies: an additional challenge for public administration managers. They need to add other incentives, such as vocation for public service, or job stability so that working for the public administration brings an incentive that makes it attractive and comparable to working for private companies. The demand for STEM (Science, Technology, Engineering Math’s) professionals is accelerating in all settings. Digitally skilled employees and citizens are crucial for EU competitiveness and an inclusive digital society. Cities play a key role in creating the right conditions for more and better jobs Therefore, cities must become large HR departments to manage citizens’ talents This is especially crucial at the start of the 4th industrial revolution

Talent no longer goes where the companies are, but companies, and therefore the prosperity that they bring, are moving closer to where the talent resides. However, 42% of European citizens (Digital Economy and Society Index (DESI) Report) (DESI, 2022) do not have basic digital skills and 37% of EU people in the labor force, farmers, bank employees, and factory workers alike, also lack sufficient digital skills, despite the increasing need for such skills in all jobs. Moreover, Covid has “escalated the need for the digitization of a wide range of government processes and citizen services (such as unemployment benefits), making digital skills a prerequisite for government employees” (IDC, 2021)

12. Hybrid Work Model

The new post-pandemic work model is hybrid, remote and distributed, impacting the traditional country-capital model with thousands of civil servants to a more decentralized concept. Possible teleworking for civil servants is estimated between 30-50%. The combination of remote, cooperative work, integrated into teams, will facilitate new models of development of the public duty. There has been a population movement from large cities center to the surrounding rural areas (all under same metropolitan areas). If we consider these areas inside the perimeter of 90' commuting time, we observe that the impact of repopulation of the rural environment is very relevant in small countries or at state level. Confinement has shown that technology enables this new way of working. It allows officials to improve their work/life balance. It requires new tools to verify work performance and the achievement of objectives. At the same time, it poses the challenge of providing civil servants with the computing and communications technologies necessary to carry out their work remotely. Workers are rethinking not only how and where they work, but why, reopening the traditional “social contract” between employers and employees and rising the teleworking paradox: Most workers prefer teleworking, but ask employers a more flexible workplaces where they can better meet physically their workmates and make a more focused work. Employees plan to go office more time than managers! Definitely, the adoption of advanced hybrid teamworking technologies and all-integrated work and personal life digital tools are a must for our cities.

Security in the handling of sensitive data in public administration and privacy must be taken into account when setting up this new work environment. As a consequence, the real need for the use of offices and their capacity is reconsidered. This implies an unexpected excess of public office spaces that can be used for other social functions. At the same time, teleworking lowers the costs associated with public service both in offices and infrastructure, public transport, time, while helping on the climate protection.

Additionally, cities must become large human resources departments to manage all the talent they encompass. Crucial in these moments, at the beginning of the fourth industrial revolution, the companies and therefore the prosperity that they bring, are moving closer to where the talent is. It is therefore vital to improve the employability and skills of our citizens. Policies that improve the general qualification of all citizens will raise their capacities and therefore improve the attractiveness of that city for investors. Due to the constant acceleration in the use of new technologies, citizens must adapt and retrain in those most in demand. Constant lifelong training offered by the city and by the employing entities is critical.

13.- Passion for Life / Living Experiences

After so much death and confinement, it seemed that we all needed to make up for lost time. Go back to enjoy social events, parties, leisure, try to recover the not enjoyed happiness time. The pandemic has also taught us that we live too fast without reflecting on the ephemerality of our existence. It has also taught us to enjoy the moment experience. And on the other hand, new technologies can help adapt the public and private services we enjoy to give us the best possible personalized experience. For this reason, most cities are rethinking their services for citizens, incorporating personalization techniques learned from the retail market and complemented with social marketing.

14.- eTourism Rebirth

We are also observing the tourism recover to pre-pandemic levels. But technology has advanced in parallel, and cities want to use it to achieve higher-quality, longer-stay tourism and higher spending per visitor. It is about using the latest technologies to show the attractiveness of our city, provide much faster and more efficient booking services, offer the best physical and digital (*phygital*) experience while visitors are in the city (by using AR/VR, virtual tours, personalized services, etc), manage the tourism ecosystem stakeholders to run special campaigns and promotions, analyze all the associated parameters with advanced Big Data systems. and finally create a loyalty community using social marketing techniques. A new eTourism for a new physical but digital immersive experience, which for many cities means a boost in the economy recovery.

MetaCity. The parallel virtual City

While the metaverse is still in its early stages, the continued development of innovations, user adoption, utilization in large corporations, technological advancement and integrations, as well as rising valuations of associated digital assets, are indicative of the continued growth of the metaverse and the likely trajectory toward its destiny as the next third-generation, immersive, three-dimensional Internet. (Web3)

This enormous opportunity for human development has its advantages and disadvantages, but it seems to be consolidating itself as an innovation for the future that we all will live with. The parallelism between the metaverse and the possible literary worlds suggests that the first is assimilated to a virtual city: the MetaCity. This concept represents a revolution in the way of operating and offering public services in the city, in the social relations of its citizens and in their leisure activities. Our city, therefore, incorporates a fifth virtual dimension. It is also a new challenge, a new opportunity to improve the attractiveness of our cities in their global competition to attract talent (in this case from its virtual dimension). Like all human developments, the ability to generate new business models and new services for citizens will be the determinants of the speed with which the metaverse is consolidated in our lives. Much remains to be done, as it is still in its infancy and there are many alternatives and a range of possibilities to explore. Some will be discarded as impossible or ruinous, others will finally consolidate the advantages and benefits of this new concept for the good of humanity. If we observe the parallel development of neurotechnology and remember once again the movie *Avatar* where the protagonist connected his hair with the mother tree uniting in a single community consciousness, could we dream as the American urban planner Jane (Jacobs, 1961) did about a beehive city, where we are all co-creators of it and we can all enjoy its benefits by connecting our minds to the MetaCity? We still have time to reflect on this.

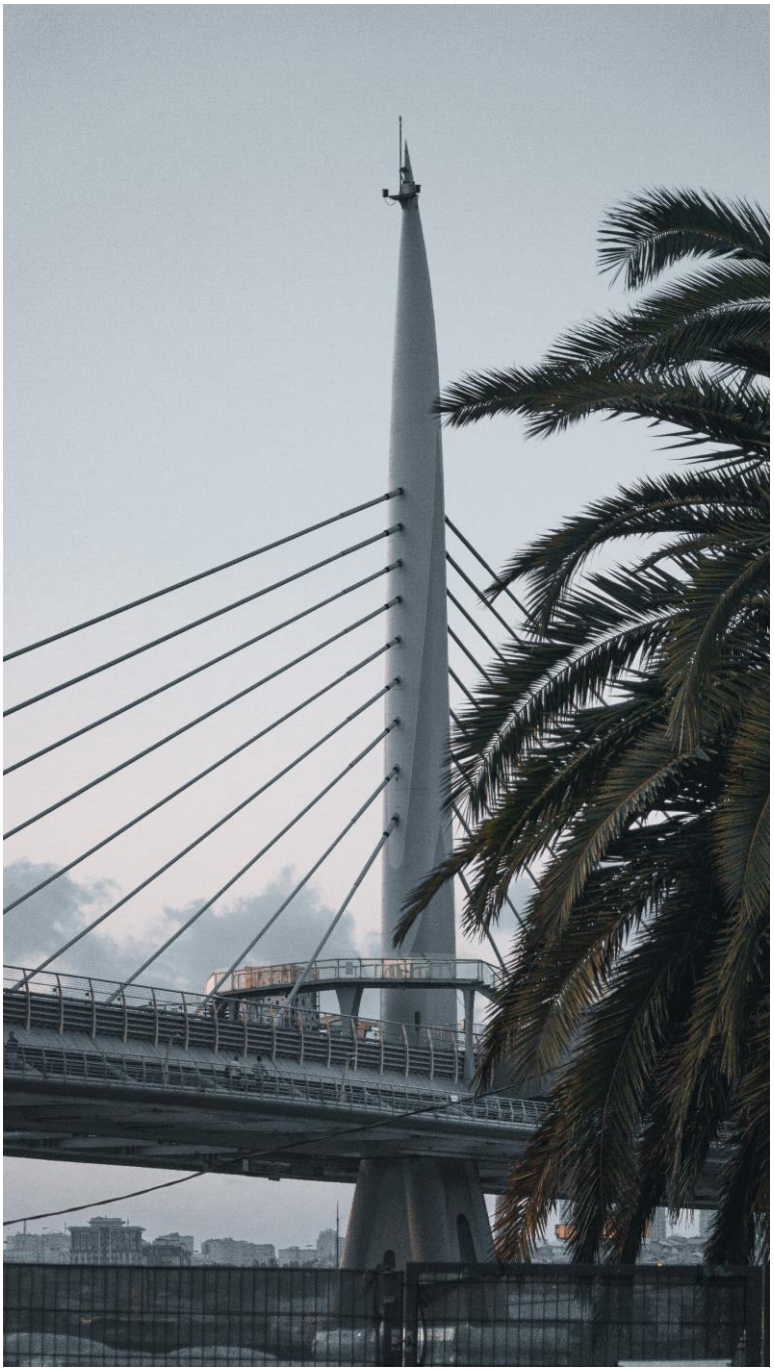
A Renaissance in Culture?

The value of spaces and activities dedicated to culture and social relations has been made clear. The pandemic has reached the very beginning of the fourth industrial revolution where robotization and artificial intelligence will replace all non-creative work. This fact emphasizes the value of purely human developments. Could we dream of a new renaissance as a global movement that appreciates creative proposals in all the arts and sciences?

7.3 Cities of Future. What might they look like?

Transforming City Magnetism may take 15 years or more. This slow but constant evolution should not discourage us from making the transformation. Before beginning the development of a strategy to transform the City Identity / Magnetism, we must recognize our existing advantages, assets, values, identity, heritage, and culture and use them to build upon, to lean on them to begin to thrive. We should think of our city as a house that we want to sell, or rather, that we want to rent to talented citizens. We have to include in that house the most appreciated elements so that talent can live, achieve maximum well-being and develop their full potential, and all this with a reasonable income or cost of living (citizenship contract). Magnetism is the house itself; Profitability is the services available in that house combined with its rent price. Let's pay attention to those lower-Magnetism secondary cities in countries that already have a widely recognized and strong capital city. They can transform themselves and stand out globally if the right political decisions are made and their citizens contribute. They don't compete with their capitals on Magnetism, but their lower cost of living make them more attractive.

The transformational plan must be the long-term, consensual result of an all-parties debate. A combination of the three fundamental axes is also a must: Urbanism, Humanism and Technology, with urbanism leading and the others supporting and complementing.

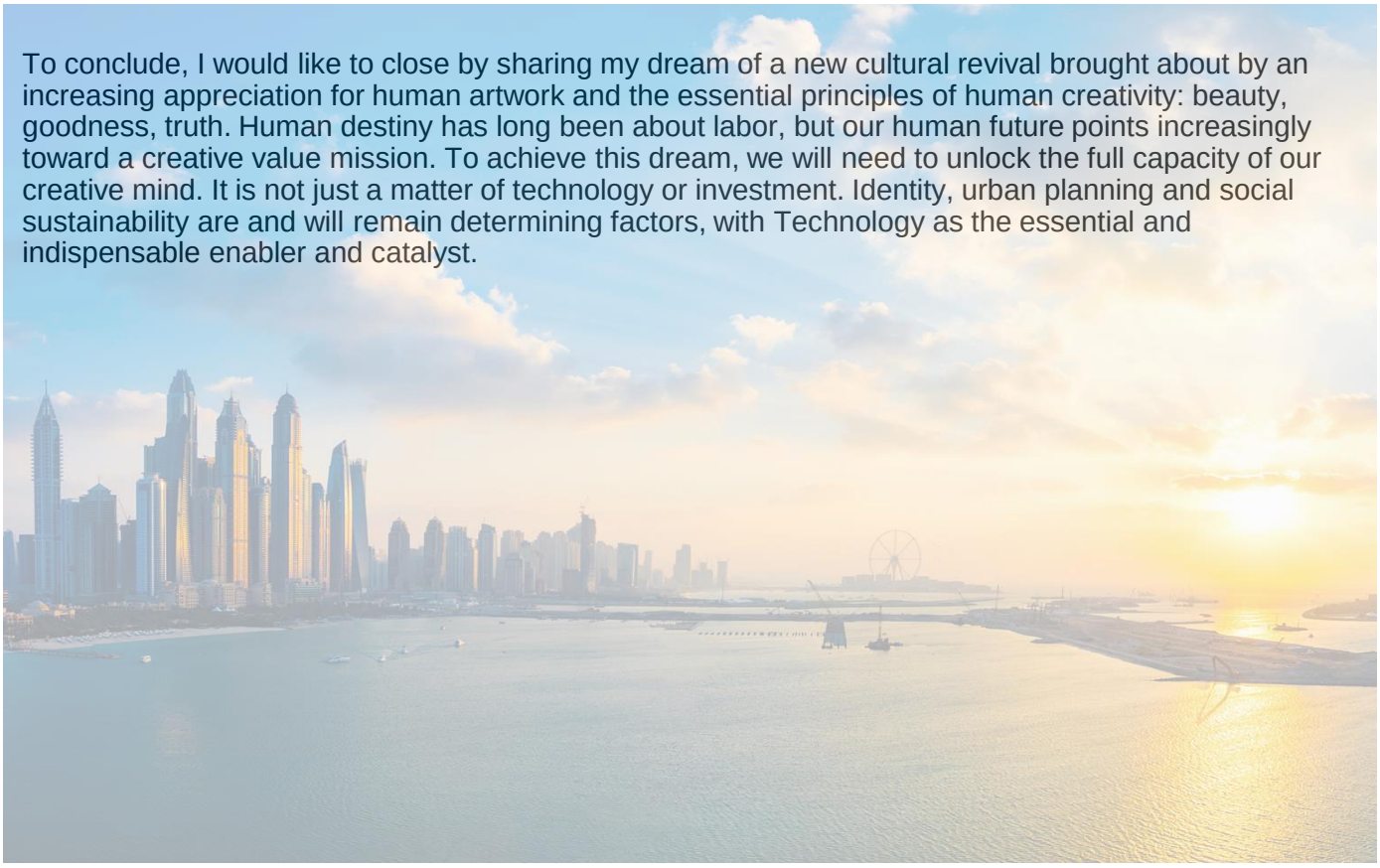


And finally, we have the technological side, from investment in innovation to the focus on human capital and the proposal of an ambitious SmartCities plan. The SmartCities Plan fulfills the mission of improving citizen services (Profitability), while also helping in strategy, reputation, and innovation (Magnetism) making it the most powerful tool we have to improve Attractiveness. As we have mentioned, little can be done about fixed issues like geolocation, and changes in Identity are slow and always mid- to long-term projects, and improving economic conditions and net purchasing power is difficult to do quickly. Therefore, the obvious lever, with the most short-term results (even in a 4-year legislature), is to invest heavily in a solid SmartCities plan. Cities that fail in this aspect have either fallen asleep in the glory of leadership (and are now waking up, like the Swiss) or are losing ground by not taking advantage of their excellent magnetism to climb in the ranking (like in Southern Europe). On the contrary, cities with handicaps in Magnetism—either due to lack of history (US), weather conditions (Nordics, Emirates) or long distances (AUS)—can compensate those shortcomings with SmartCities plans that improve their attractiveness, or event thinking about future MetaCities…

A New Model for SmartCommunities

- Human: **Citizen-centric** with welfare and quality of life as the major goal.
- Sense of **community** (ideally a beehive) with all citizens cooperating around a collective task or project, with a strong sense of unity, belonging and identity. Multiplicity as the new city social paradigm, where the total sum of ideas, opinions, and preferences set the city's evolution. We have demonstrated this concept with solidarity and volunteers at pandemic.
- **Self-everything**: sufficient in water, energy, matter, people-talent, funding, resiliency...
- **Zero-everything**: car fatalities (zero vision), pollution, carbon, violence, unrecycled waste, unmanaged water, non-renewable energies, crime, inequality, poverty.
- **Sustainability**: social, economic, and eventually environmentally: Carbon negative, Circular.
- City as a **social enabler**: relationships facilitator, inclusive, social diversity, livable, leisure-fostering and shared activities.
- **Citizens as co-creators**: permanent engagement, proud to contribute. City as an expression of collective experience. SmartArt as a combination of technology and creativity.
- Megalopolis broken: walking-distance suburbs/districts, making them next to one another. More spaces for humans, soft heights gradient, boulevards as an urbanism principle, walkable city, bike-friendly. 3 Distances **(90'-15'-1') City**
- **Smart-DataSphere**: AI-driven Digital Twin models monitoring the physical city (from sensor to IoT to Edge to Cloud Analytics to AI), simulating potential improvement alternatives, but always understanding living humans. A respectful and ethical technological city, conscious and persuasive city by tracking citizens' psychologies.
- **Agile, Dynamic and Versatile**: Always creating projects, experimenting, listening to citizens, applying feedback, adapting to new circumstances and needs, developing new solutions and starting over again and again. Creativity always as the leading motion.

  "Create opportunities, solve problems, innovate. All three are inseparable." Jane Jacobs
- Open, Respectful, Ethical, based on a **strong identity and values**.
- A city with **smart Recovery & Resiliency funds investments**, making a fast recovery the driver for new competitiveness and prosperity.



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