“Future health: perspectives from outside Europe”

ár̂gola arquitectos

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2. PERSPECTIVES FROM OUTSIDE EUROPE

3. TRENDS AND TENDENCIES

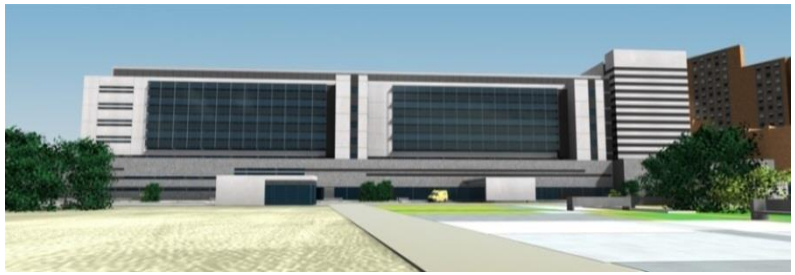
4. NEW MANAGEMENT MODELS

5. THREATS AND PARADIGMS

1. PRESENTATION

1. PRESENTATION

Who is árgola arquitectos?



EXTENSIVE EXPERIENCE IN:

- New hospitals: 29 in the last 10 years
- Refurbishments and extensions: 23
- Hospital master plans: 7 in Spain
- Over 1.500.000 m2 built in Spain
- Involved in over 3.000.000 m2 of health care facilities
- Architectural competitions in Spain: 86 and 15 abroad
- Consultancies for foreign companies: 5
- PPP projects in different countries: 8
- Building Information Modeling (BIM) Argola Arquitectos has been a pioneer in the use of this powerful software since 2006.
- **THE FOREMOST SPANISH FIRM IN HOSPITAL ARCHITECTURE.** (Construcción Alimarket, 2008-2009)

Experts in Public-Private Partnership (PPP)

NAME	CLIENT	DATE	BEDS	AREA (m²)
NEW HOSPITAL III VITARTE. PERÚ	Ortiz International Investment	2012	330	31.951
TORREJÓN HOSPITAL	Comunidad de Madrid. Torrejón Salud. S.A.	2011	252	59.627
HOSPITAL DE FARO. ALGARVE. PORTUGAL	Ferrovial Agroman S.A, Obrecol S.A, Novopca S.A	2010	498	119.230
HOSPITAL DE TODOS OS SANTOS. PORTUGAL	Ferrovial Agroman S.A, Obrecol S.A, Novopca S.A	2008	789	150.706
EL TAJO HOSPITAL. ARANJUEZ. MADRID	Comunidad de Madrid. Hospital del Tajo S.A.	2007	129	45.054
ENNISKILLEN HOSPITAL	FCC Construcción S.A y Anshen+Allen	2007	312	70.000
CÓRDOBA HOSPITAL	Eductrade S.A.	2011	250	34.398
KOCAELI INTEGRATED HEALTH CAMPUS. TURKEY	GAMA/TÜRKERLER JV (Tender process initiated for the Ministry of Health of the Republic of Turkey)	2014	1.180	230.000
IZMIR-BAYRAKLI INTEGRATED HEALTH CAMPUS. TURKEY	GAMA/TÜRKERLER JV (Tender process initiated for the Ministry of Health of the Republic of Turkey)	2014	2.060	404.000
EL SALVADOR HOSPITAL AND NATIONAL INSTITUTE OF GERIATRICS. SANTIAGO DE CHILE	**ASSIGNIA INFRAESTRUCTURAS, S.A./CONSTRUCTORA Y EDIFICADORA GIA + A, S.A. DE C.V**	2014	641	104.000
NEW HOSPITAL IN TOLEDO. SPAIN	**UTE "HOSPITAL UNIVERSITARIO DE TOLEDO**	2015	790	228.823

2. PERSPECTIVES FROM OUTSIDE EUROPE

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PROVISIONAL

PROBLEMS OF THE PROJECT

- Historic listed buildings under a high protection grade
- Hospital layout in pavilions, with many additions and in poor condition
- A substitution process is proposed on the same plot
- Existence of a referential blueprint agreed with SSMO, carried out by IDOM

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PROVISIONAL

PROVISIONAL

PROBLEMS OF THE PROJECT:

- The available land is very scarce, Which coupled with a limitation to four stories implies a very dense building approach

- The existence and preservation of the Historic Garden and the historic preservation of two of the pavilions further emphasizes the size of the property

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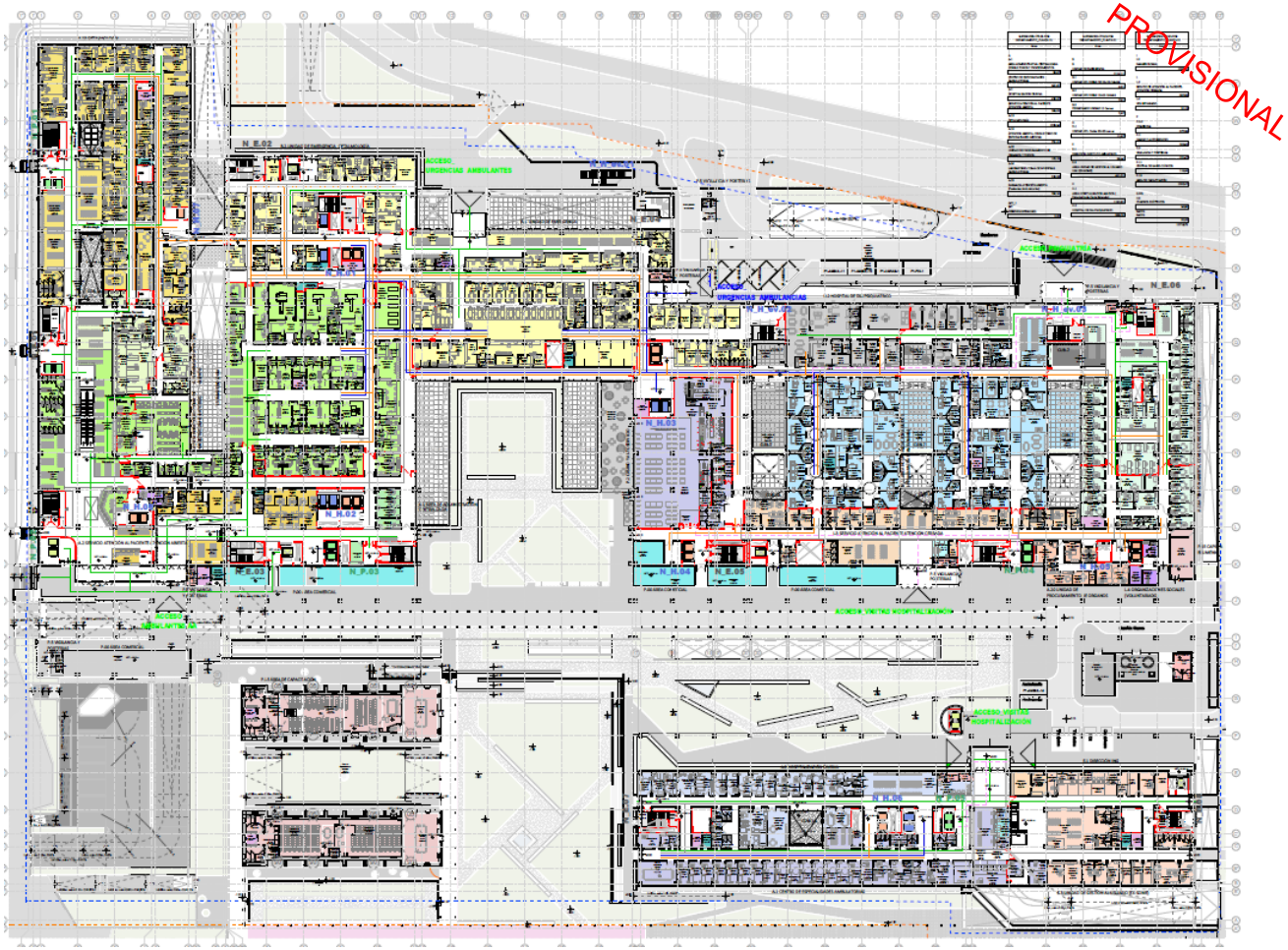

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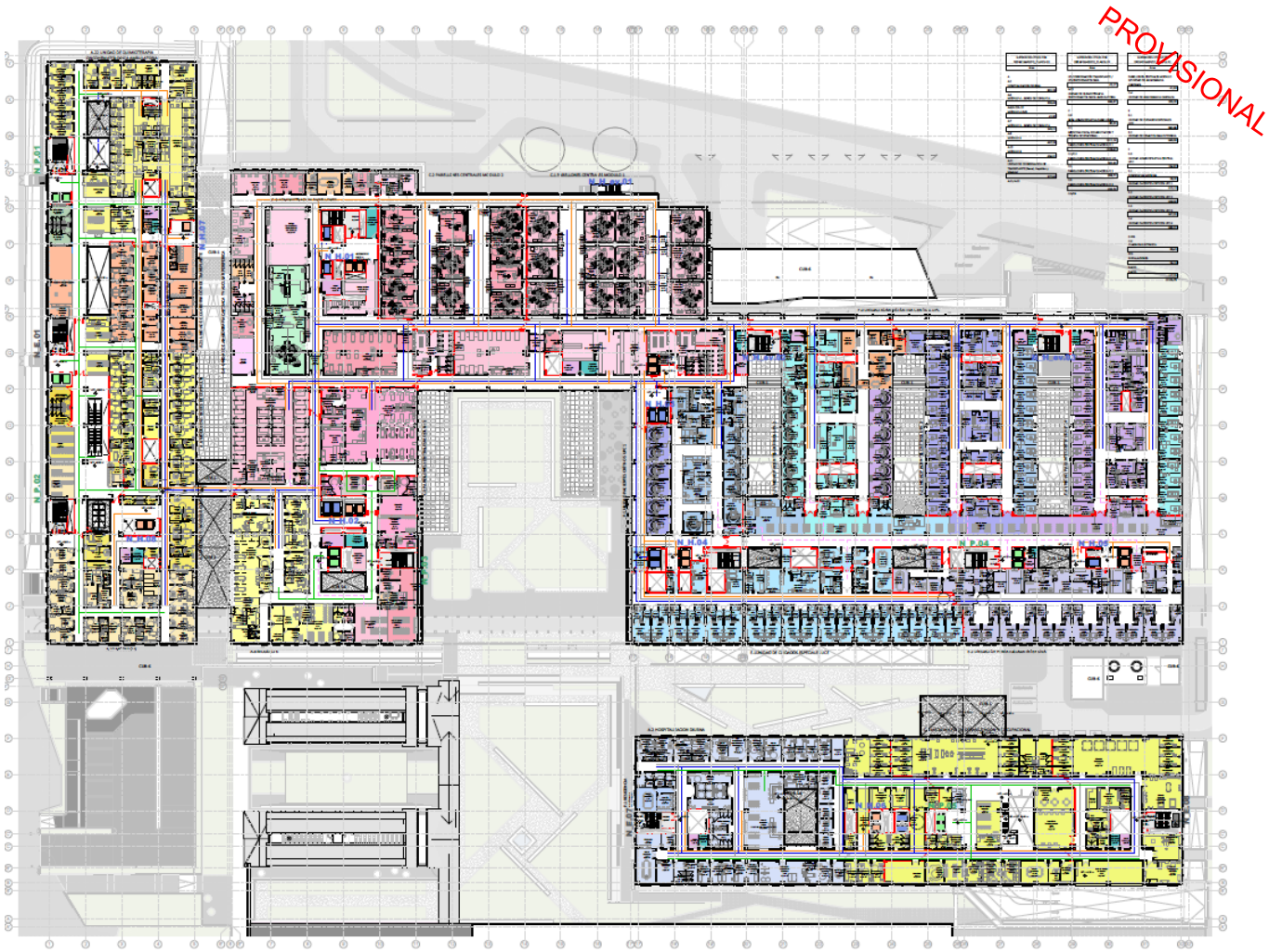

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Kocaeli

BUILDINGS		BEDS	BULDING AREA (m2)	PARKING AREA (m2)	TOTAL AREA
MAIN HOSPITAL		980	164.009	88.200	
GENERAL H.	*494*				
CARDIOVASCULAR SICKNES H.	*124*				
ONCOLOGYC H.	*116*				
WOMEN´S AND PEDIATRIC.	*246*				
REHABILITATION HOSPITAL		100	29.586	9.000	
FORENSIC HOSPITAL		100	24.902	9.000	
TOTAL HOSPITAL		**1.180**	**218.497**	**106.200**	**324.697**
TECHNICAL HOSPITAL			10.950		
SERVICES BUILDING			100.000		
TOTAL			**110.950**		
TOTAL HEALTH CAMPUS					**435.647**

2. PERSPECTIVES FROM OUTSIDE EUROPE

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Izmir

BUILDINGS		BEDS	BULDING AREA (m2)	PARKING AREA (m2)	TOTAL AREA
MAIN HOSPITAL		1.660	283.608	149.400	
GENERAL H.	*715*				
CARDIOVASCULAR SICKNES H.	*380*				
ONCOLOGYC H.	*141*				
WOMEN´S AND PEDIATRIC.	*424*				
REHABILITATION HOSPITAL		300	76.423	18.000	
FORENSIC HOSPITAL		100	20.346	3.000	
TOTAL HOSPITAL		**2.060**	**380.377**	**170.400**	**550.777**
TECHNICAL HOSPITAL			22.768		
SERVICES BUILDING			120.000		
TOTAL			**142.768**		
TOTAL HEALTH CAMPUS					**693.545**

2. PERSPECTIVES FROM OUTSIDE EUROPE

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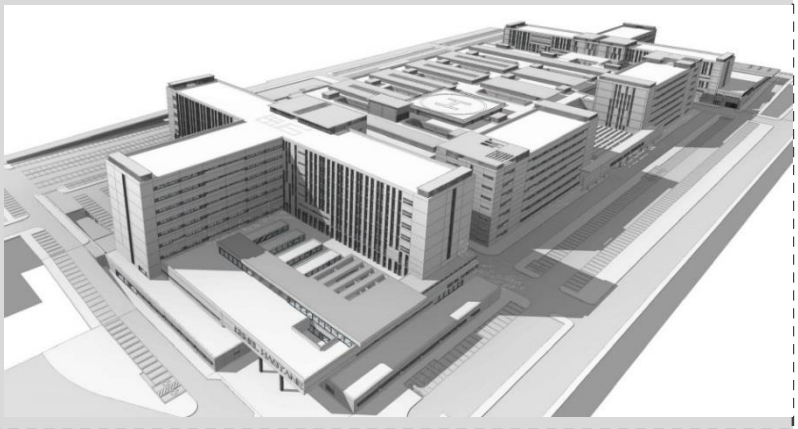

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2. PERSPECTIVES FROM OUTSIDE EUROPE

The size is uniform

HOSPITAL	BEDS	OPERATING THEATRE	M^2 TOTAL**	M^2 / BEDS	BEDS/ OPERATING THEATRE
FUENLABRADA	396	12	64.500,00	163	33
TACNA	192	5	31.334,28	163	38
EL SALVADOR*	641	26	121.586,50	190	25
KOCAELI	1180	61	229.447,00	194	19
IZMIR	2060	51	403.145,00	195	41
TORREJÓN	250	10	46.267,00	185	25

* Provisional data.
** Data without parking and without commercial.

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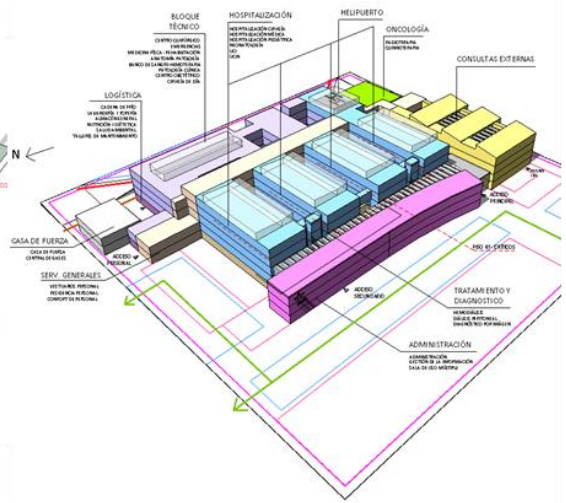
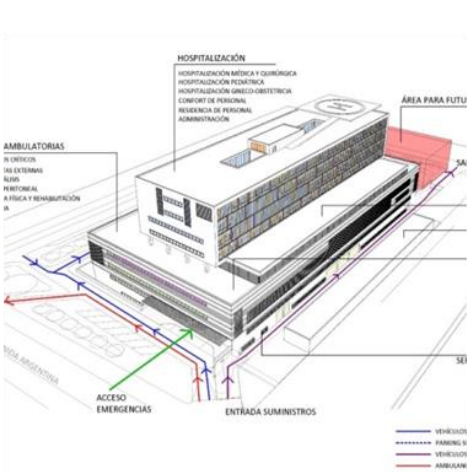
The incidence of the architectural typology on investment





INA	Piura	Chimbote
Lot area: 16,519 m^2 Area PA: 91,061.14 m^2	Lot area: 50,000 m ^{2} Area PA: 61,971.30 m ^{2}	Lot area: 16,068 m ^{2} Area PA: 44,752.31 m^2
Urban model Building in height	Double comb Horizontal building	Base and tower Linear building

INA PIURA CHIMBOTE TACNA

2. PERSPECTIVES FROM OUTSIDE EUROPE

The incidence of the architectural typology on investment

ARGOLA

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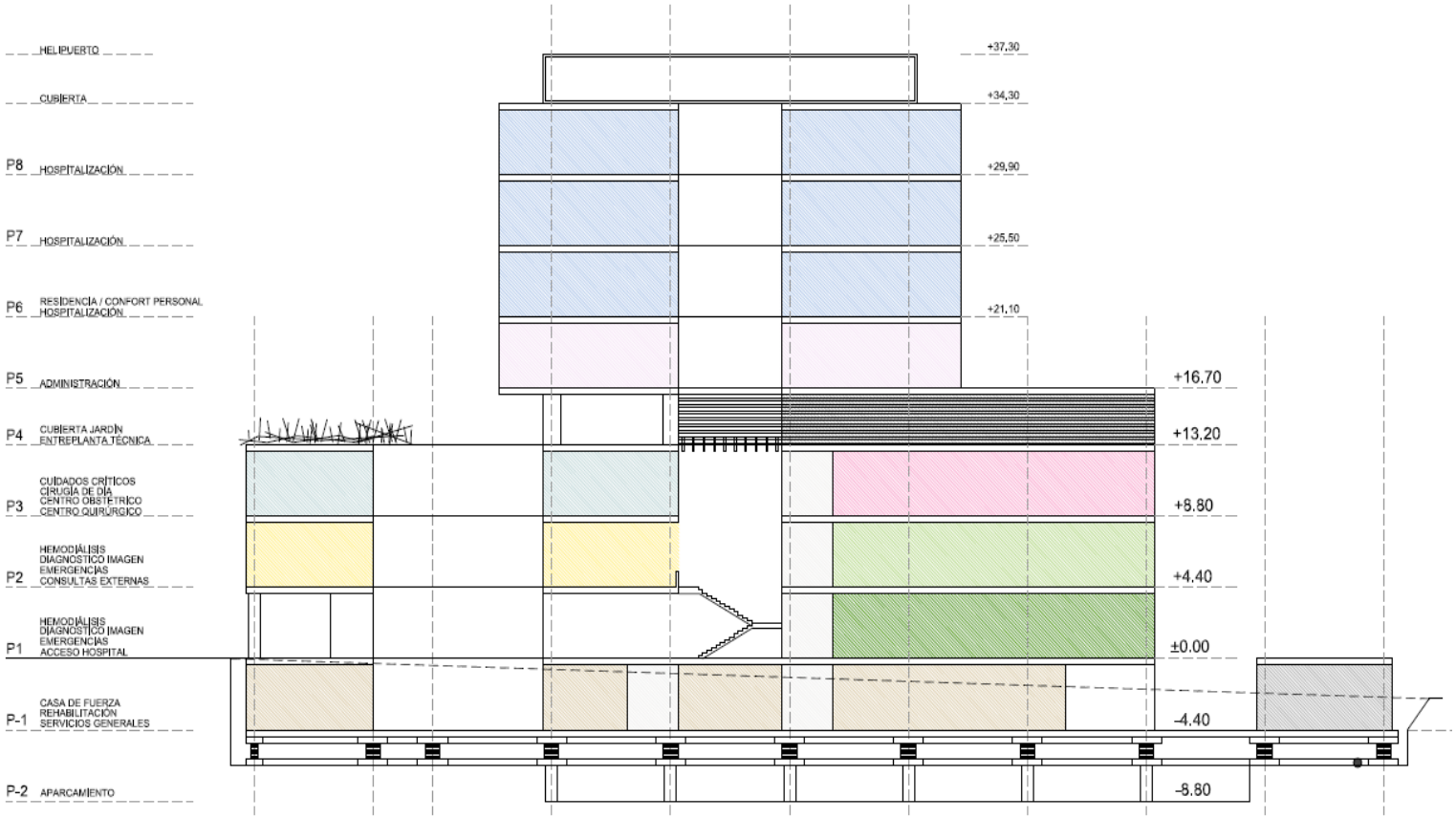

INA PIURA CHIMBOTE TACNA

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2. PERSPECTIVES FROM OUTSIDE EUROPE

The incidence of the architectural typology on investment

Draft project	Builded surface (*)	Cost without insulators	Insulator cost	Total cost	Direct cost in s / per m2
Highly complex hospital of the Ancash and Huaraz-ESSALUD health care network in the district of Chimbote, province of Santa.	43.870,00	S/. 151.182.597,64	S/. 5.180.790,35	S/. 156.363.387,99	3.564,24
Chimbote Increasing Complexity Polyclinic	7.454,16	S/. 23.139.803,55	S/. 3.370.431,20	S/. 26.510.234,75	3.556,43
Highly complex hospital of the Ancash and Huaraz-ESSALUD health care network in the district of Chimbote, province of Santa + Chimbote Increasing Complexity Polyclinic	51.324,16	S/. 174.322.401,19	S/. 8.551.221,55	S/. 182.873.622,74	3.563,11
Institute for children and adolescents sunder Social Securitas System in the district of Jesús María, Lima	67.318,32	S/. 258.742.002,94	S/. 8.905.207,55	S/. 267.647.210,49	3.975,85
Highly complexity of ESSALUD in Piura District Hospital	63.417,49	S/. 224.713.868,20	S/. 15.681.114,79	S/. 240.394.982,99	3.790,67

(*) Data without parking

The incidence of the architectural typology on investment

- The incidence of the typology is transcendental in the costs of the infrastructures.
- Optimal height: 6/7 floors
- The use of insulators is a cost that has a significant impact, with less occupancy less cost, but triggers vertical circulations
- Insulators and the location of parking under the building due to land scarcity forces the need for very large structural frames, 8 x 8 or even up to 8.4 x 8.4.

The Client

HOSPITAL	COUNTRY	YEAR	SYSTEM	CLIENT
FUENLABRADA HOSPITAL	ESPAÑA	1999	TRADITIONAL SYSTEM	ADMINISTRATION
TACNA HOSPITAL	PERÚ	2016	Project and Work	CONSTRUCTOR
HOSPITAL OF EL SALVADOR	CHILE	2014	Concession services (Gray Dressing-gown)	CONSTRUCTION + CONCESSIONARY MAINTENANCE
I KOCAELI AND IZMIR HEALTH CAMPUS	TURQUÍA	2014	Concession of Services and Diagnoses (Green Dressing-gown)	CONSTRUCTION + CONCESSIONARY MAINTENANCE + CONCESSIONARY SERVICES GREEN DRESSING-GOWN
TORREJÓN HOSPITAL	ESPAÑA	2009	Medical services concession	CONSTRUCTION + CONCESSIONARY MAINTENANCE + CONCESSIONARY SERVICES GREEN DRESSING-GOWN + PRESTADORA SANITARY SERVICES

In the 80s, the English started the concessions. The saying of the architects was:

"the prince has become Cinderella"

The evolution of the model supposes at the same time less implication and understanding by the client of the architectural quality, and a greater search of optimization and profitability of the design.

3. TRENDS AND TENDENCIES

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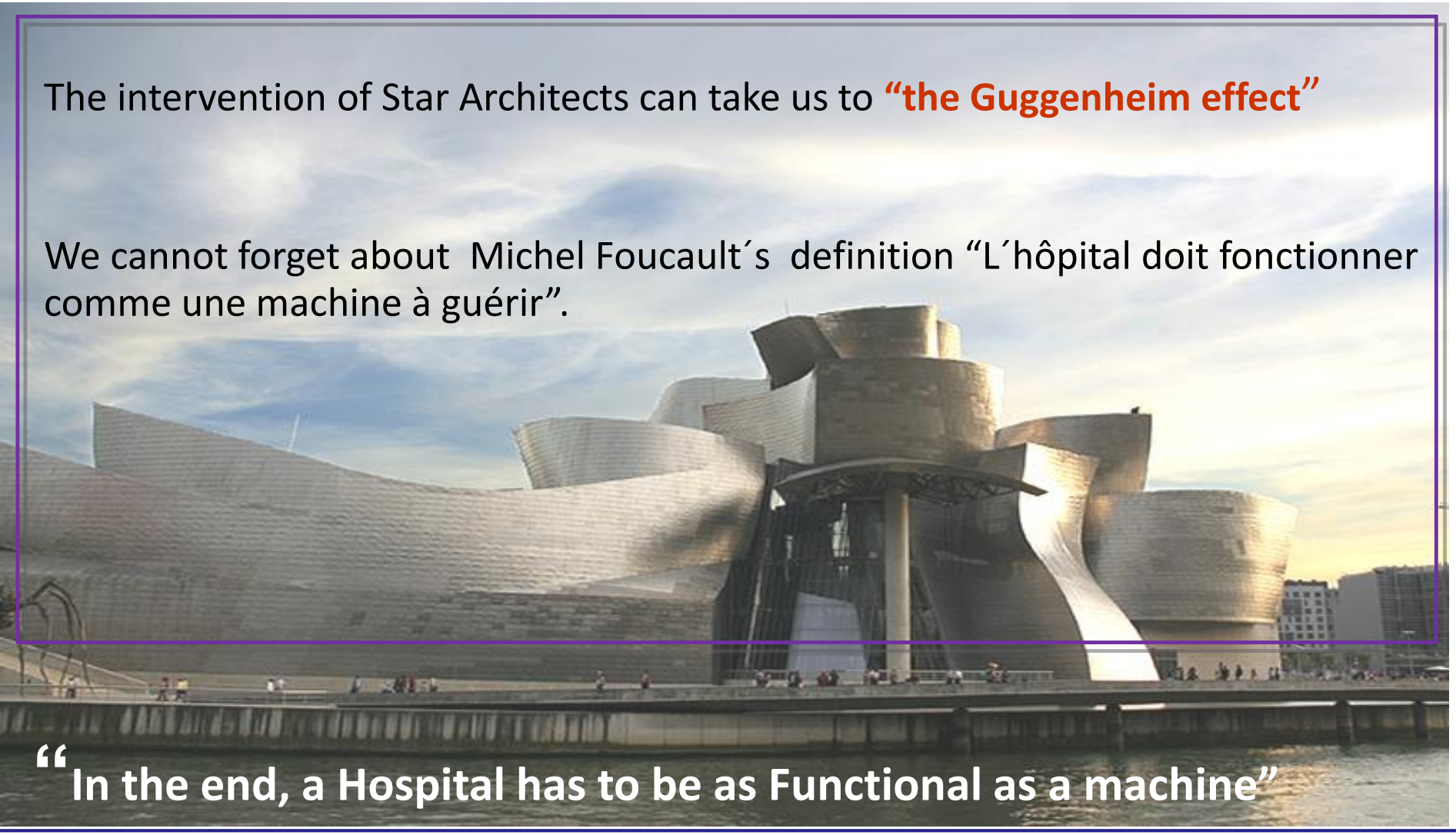


The intervention of Star Architects can take us to **“the Guggenheim effect”**

We cannot forget about Michel Foucault´s definition “L´hôpital doit fonctionner comme une machine à guérir”.

“In the end, a Hospital has to be as Functional as a machine”

The «wow» factor

It is very important

A hospital is one of the most important public investment

CITIZENS must be **AWED**

The Size Matters

Does size matter ?

HOSPITAL	POPULATION ASSISTED	Nº BEDS	% INDIVIDUAL	OPERATING THEATRE	CONSULTATIONS *	M2 TOTALES **	M^2 BEDS	PARKING LOT. ***	LOT/BEDS	M^2 PLOT	M^2 / PLOT/BEDS
TOLEDO	82.489	800	100%	25	327	279.865,53	350	3320	4,15	250.000	312
CÁCERES	230.000	476	80%	15	112	73.227,00	154	1124	2,4	145.839	306
MIERES	46.688	198	100%	7	45	34.177,00	173	510	2,6	15.200	77
MELILLA	65.488	245	100%	6	52	42.511,00	174	430	1,8	42.645	174
RONDA	11.200	186	80%	9	49	29.084,00	156	269	1,4	56.000	286
FUENLABRADA	215.000	396	40%	10	50	64.500,00	178	605	1,5	100.187	253
VIGO	600.000	1465	65%	33	155	173.691,00	118	3804	2,6	283.883	194
LUGO	97.685	869	42%	19	201	170.000,00	195	1429	1,6	166.000	191
SON DURETA	330.000	819	60%	26	230	217.647,00	266	2326	2,8	240.000	293
ASTURIAS	1.084.109	1065	40%	36	200	189.345,35	178	2212	2,1	364.867	343
BURGOS	178.574	744	41%	25	172	183.634,00	247	1580	2,1	264.405	355
MAJADAHONDA	540426	790	40%	22	251	172.000,00	218	3506	4,4	186.645	236
SAN SEBASTIAN	299.686	349	100%	13	165	84.290,00	242	1716	4,9	114.000	327
COSLADA	170000	239	100%	8	129	58.149,00	243	1025	4,3	80.000	335
EL TAJO	63.073	156	100%	10	58	32.979,00	211	527	3,4	149.695	960
VALLECAS	325000	325	100%	13	154	85.066,00	262	1700	5,2	445.623	1371
PARLA	150.000	247	100%	9	87	56.811,00	230	900	3,6	276.600	1120
VALDEMORO	101845	162	100%	4	52	45.183,00	279	733	4,5	69.978	432
ARGANDA	138.853	148	100%	7	76	54.003,00	304	687	4,6	41.672	281
TORREJÓN	134000	250	100%	10	36	46.267,00	185	586	2,83	62.396	250
VILLALBA	110.000	140	100%	9	59	47.600,00	340	680	4,8	55.000	392
MÓSTOLES	180000	260	100%	10	47	65.896,00	253	780	3	90.000	346

This chart shows the LARGE DIFFERENCES between HOSPITALS

The Size Matters

-But in this case **the smaller the better.**

-The most sustainable sq. meter is the one we don't build because it's not needed.

-We must analyse and think before we start to Design and benchmark.

-The functional programs and areas surface list should be revised several times during the design process and should be adapted to the new procedures.

The different buildings

A Hospital in our days, is a complex formed by several buildings. The relationship between them and their functions also help define the Model.

In our days, a hospital is formed by at least 6 buildings, buildings that have their own needs and requirements

THE HOTEL:

The nursing units needs of space and comfort contribute to the development of a hotel concept.

THE OUTPATIENT BUILDING:

Actually these facilities must necessarily be able to expand over time.

The different buildings

PLATEAU TECHNIQUE:

Houses all the special-care facilities such as Emergencies, Radiology, Surgical suites, Recovery.

ADMINISTRATION OFFICES:

These areas have different requirements than all the others within a Health Care environment.

POWER PLANT:

This building has very specific requirements. It should be designed so as to serve the energy needs of the entire Hospital.

THE PARKING LOT:

Nowadays, it is inconceivable to understand a Hospital complex without its own parking lot.

New trends… Working with evidence for design. EDAC researches on evidence based design.

Architectural Design based on scientific evidence provides advantages in relation to patient care and medical professionals and, staff satisfaction and performance.

This "scientific evidence" in the design of new Hospital infrastructures has demonstrated that a good functional and operational plan has to take into account the following factors:

TABLE 1: SUMMARY OF THE RELATIONSHIPS BETWEEN DESIGN FACTORS AND HEALTHCARE OUTCOMES

Healthcare Outcomes / Design Strategies or Environmental Interventions	Single-bed rooms	Access to daylight	Appropriate lighting	Views of nature	Family zone in patient rooms	Carpeting	Noise-reducing finishes	Ceiling lifts	Nursing floor layout	Decentralized supplies	Acuity-adaptable rooms
Reduced hospital-acquired infections	**										
Reduced medical errors	*		*				*				*
Reduced patient falls	*		*		*	*			*		*
Reduced pain		*	*	**			*				
Improved patient sleep	**	*	*				*				
Reduced patient stress	*	*	*	**	*		**				
Reduced depression		**	**	*	*						
Reduced length of stay		*	*	*							*
Improved patient privacy and confidentiality	**				*		*				
Improved communication with patients & family members	**				*		*				
Improved social support	*				*	*					
Increased patient satisfaction	**	*	*	*	*	*	*				
Decreased staff injuries								**			*
Decreased staff stress	*	*	*	*			*				
Increased staff effectiveness	*		*				*		*	*	*
Increased staff satisfaction	*	*	*	*			*				

* Indicates that a relationship between the specific design factor and healthcare outcome was indicated, directly or indirectly, by empirical studies reviewed in this report.

** Indicates that there is especially strong evidence (converging findings from multiple rigorous studies) indicating that a design intervention improves a healthcare outcome.

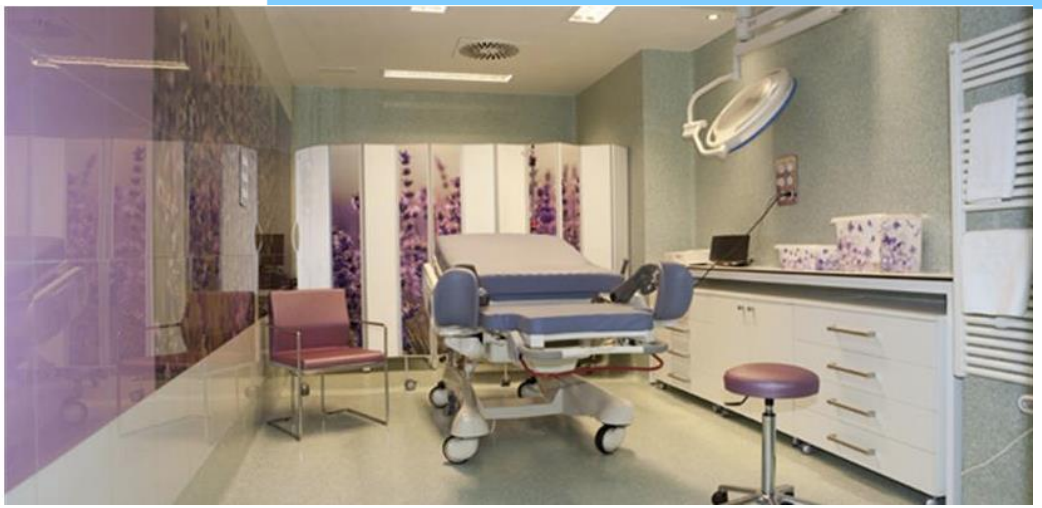
3. TRENDS AND TENDENCIES

Other Evidences

Obstetric Center : evidence-based unit design

Unit Labour Delivery Recovery (LDR)

- ✓ **A traditional Obstetrical model is based on the patient being moved between areas dedicated to the individual processes**
- ✓ **The design model combining labour, delivery and recovery in one room.**
- ✓ **The family could stay with the pregnant woman**



Benefits:

- ✓ Decrease infection
- ✓ Optimized the equipment
- ✓ Boost the affective bond between parents and child reduce the gender and infant violence through psychological development.
- ✓ WHO recommends this model "patient focused care".
- ✓ Increase the patient satisfaction.

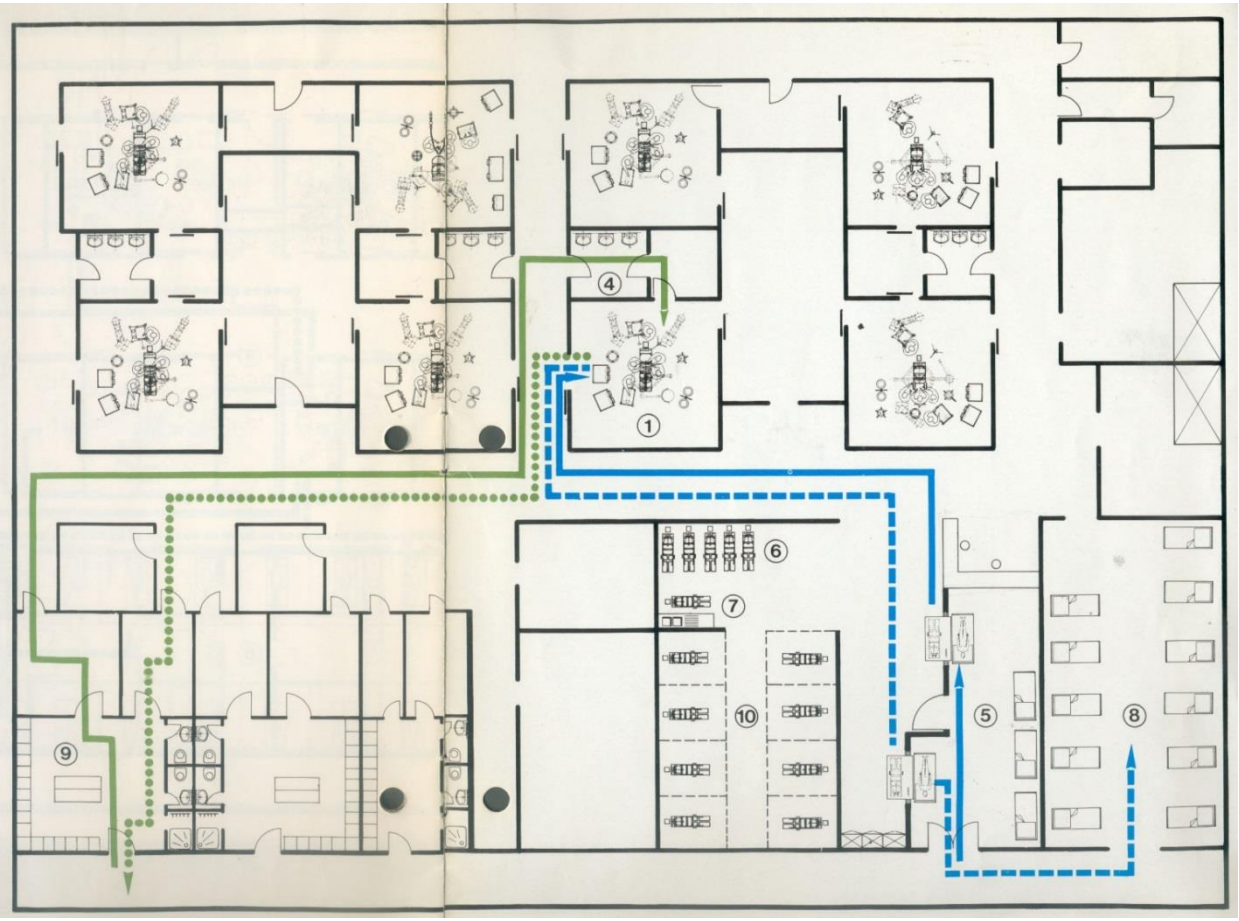
Other Evidences

Regarding children hospitalization seems to rule the technique known as **"kangaroo technique"**, consisting of providing continued parental presence to the child (except when clinically contraindicated).

This technique has already been introduced in the most modern hospital functional planning, serving as well as a reason for refurbishing the old ones.

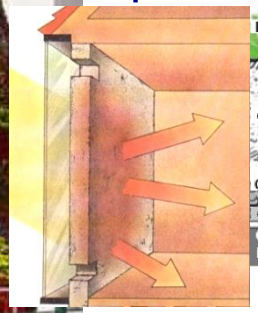
Other Evidences

SURGERY BLOCK IN CLUSTER



Sustainability and environment

SUSTANABILITY is not only designing a building with a green roof or trombe wall……**it's much more than this**……We must take some decisions about primary hospital's planification.



GREEN ROOF

TROMBE WALL

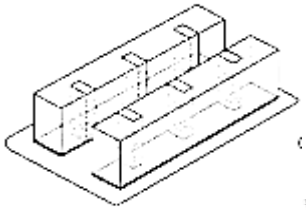
Search architecture that acts as a therapeutic element

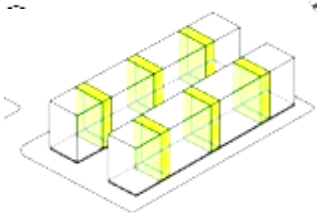
Architecture also as a cure: **humanization**

A fundamental objective that encompasses much of the decisions on projects, is the search of humanizing the Hospital, to make it a friendly place for both workers and patients. In this way the building exerts a genuine therapeutic function

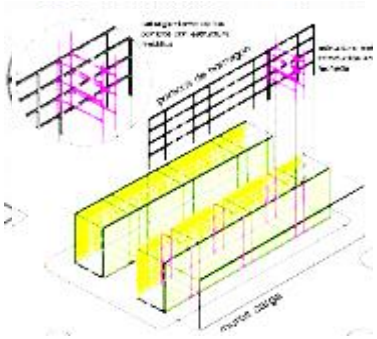
This objective is achieved with elements such as the entrance of **natural light**, presence and contact with nature, the **spatiality** and of course, the smooth operation of the Hospital

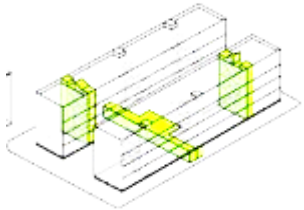
Flexibility



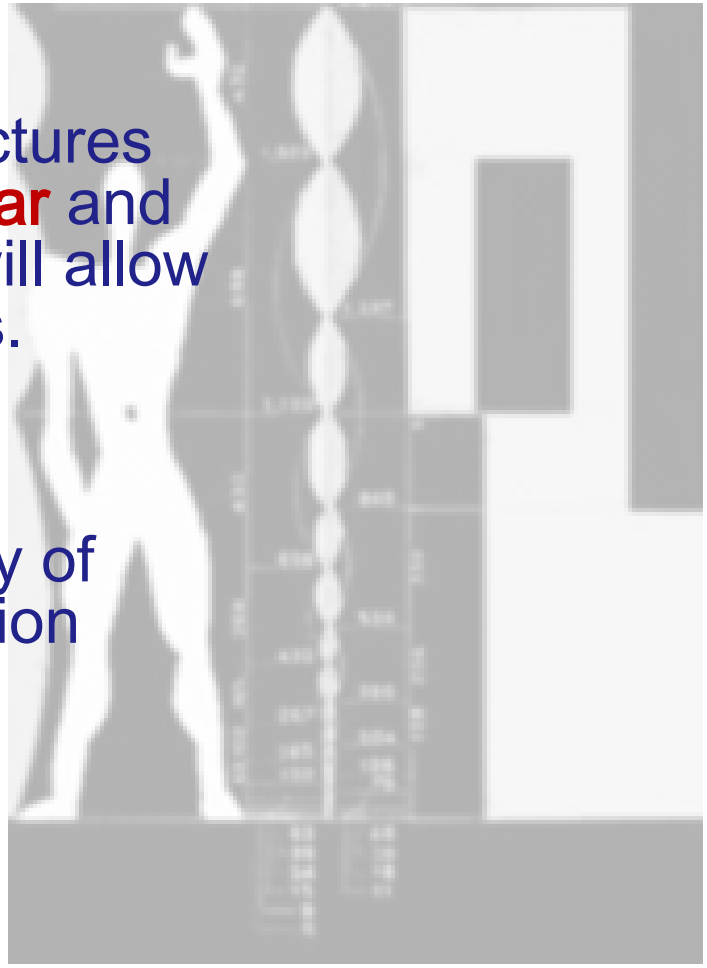


Using building structures that create very **clear** and **open** spaces that will allow future modifications.





Increasing tendency of space systematization and **modulation**



4. NEW MANAGEMENT MODELS

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The PPP Client

The client has changed. The Public Administration has been replaced by the construction companies.

Progressive tendency of including " private initiative"

OUTSOURCING is becoming more common everyday.

Increase in the Dispersion of organizations and/or entities with responsibility for planning or decision-making.

Tendency to hire consultants.

Proliferation of consulting companies of uneven quality.

" Many different actors in planning with different views"

Changes in PPP Model Involvement:

Private sector transfer	Classic Model I	Mixed Model II	Partial concession contract III	Concession contract IV
Promotion	NO	NO	YES	YES
Majority Shareholder	NO	NO	YES	YES
Building industry	YES	YES	YES	YES
Infrastructure management	YES	YES	YES	YES
Catering Service	NO	YES	YES	YES
Healthcare Service management	NO	NO	NO	YES
Example Autonomous community	Andalucía	Asturias	Madrid 1	Valencia Madrid 2

TENDENCIES

Changes in PPP Model Involvement:

Changes in management progressively shift to private management.

The client shifts from being Public Entities and Administrations, to being Public Companies and Enterprises, to being a Public-Private Partnership to finally become a Health Services Provider.

In the UK, where Public-Private Partnerships started to take place in the 80´s, it was said that the client shifted from “Prince to Cinderella” transferring the weight of the National Health Service (NHS) to maintenance and cleaning services companies (what we call “grey gowns”).

The next step, which is to privatize the Health Services Providers, has already taken place in Spain and seems unfeasible.

Changes in PPP Model Involvement:

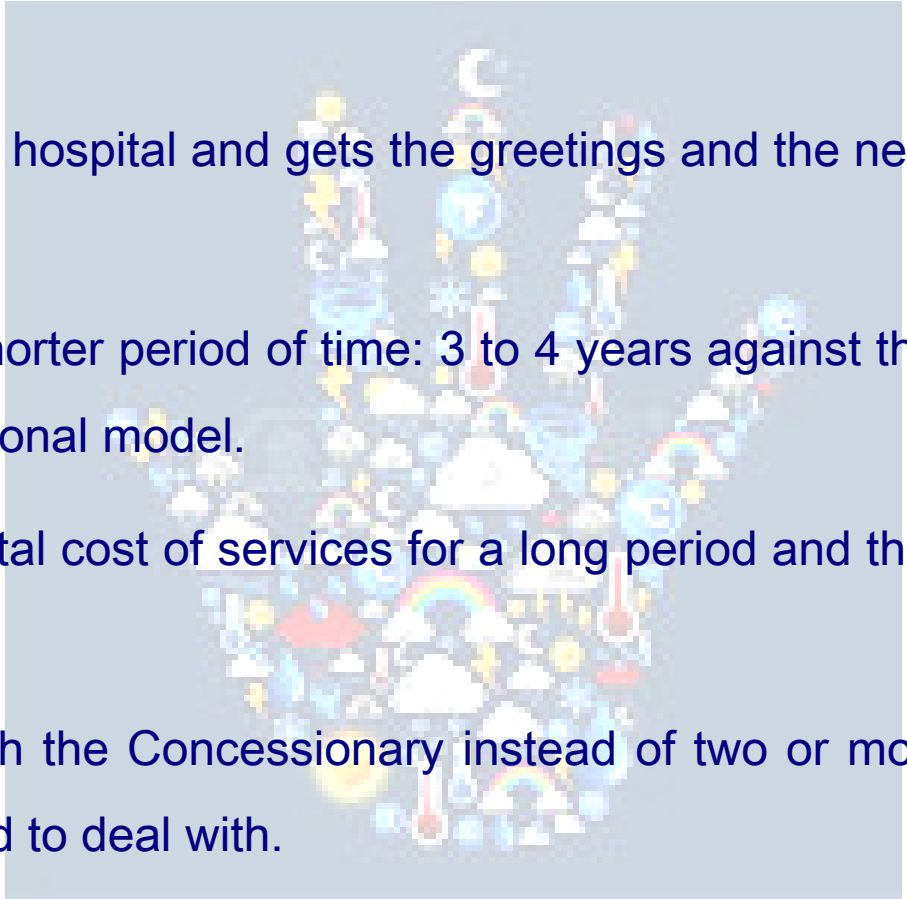
Changes in promotion and management systems reduce time.

It has been reduced from 10 years in the 90´s to 24 months nowadays (Project and Construction of Torrejón Hospital).

Too often the forecast completion periods are replaced by political election deadlines.

These shorter and strict deadlines will take their toll on the life span of the Hospital.

Advantages for Politicians



- It's obvious that one opens the hospital and gets the greetings and the next one to come has to pay for it.
- They can see the results in a shorter period of time: 3 to 4 years against the 6 to 8 years of the classic , Conventional model.
- The cost of construction, the total cost of services for a long period and the time schedule is fixed
- You only have one contract with the Concessionary instead of two or more, so you only have one to control and to deal with.

Advantages for the citizens

- The period in which they get access to the medical service is reduced considerably, and this for the citizen is crucial.
- The disadvantage is that we leave our children to pay for it. Some argue that that's an advantage for those who use the service, so every generation that uses it must pay the investment.

Is this a Business?

- Of course it is!! For the service Companies that increase their income and annual turnover for a long and fixed period of time with a fixed price.

- But mainly for Institutional funds, Investors and Banks because they get a fixed and insured Return On Investment over a long period of years.

BIM Advantages

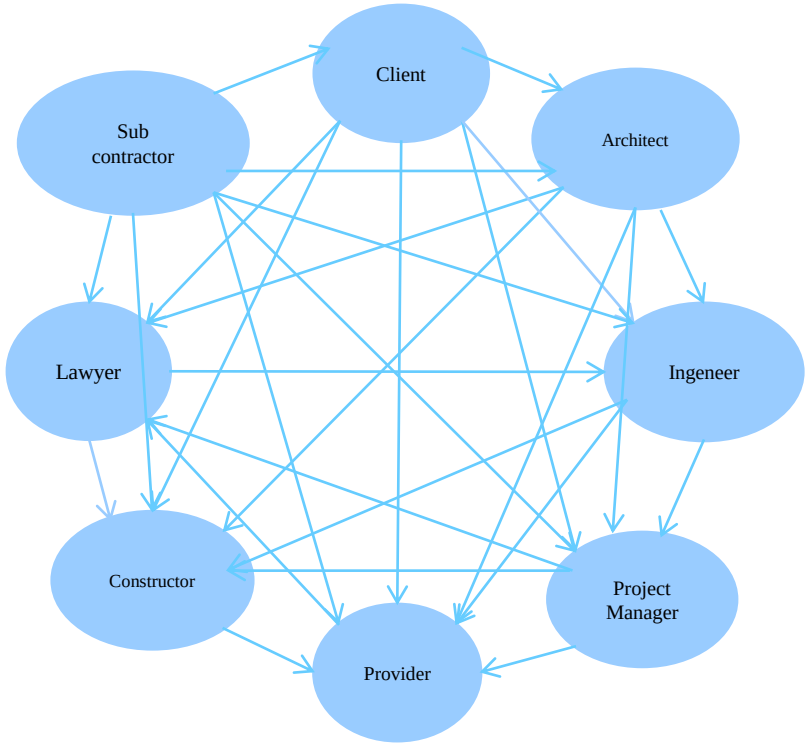
New generation of Systems and processes, known today as **Building Information Modelling** (BIM) involve a **Conceptual revolution** in the way we approach a project, and the way we design, develop build and manage the buildings during their lifetime process.

BIM involve different tools, processes and methodologies. Instead of designing a single drawing which would include a tag tool like CAD, BIM represents in a **three- dimensional model** a database which includes all the properties and parameters of every single element of the whole building.

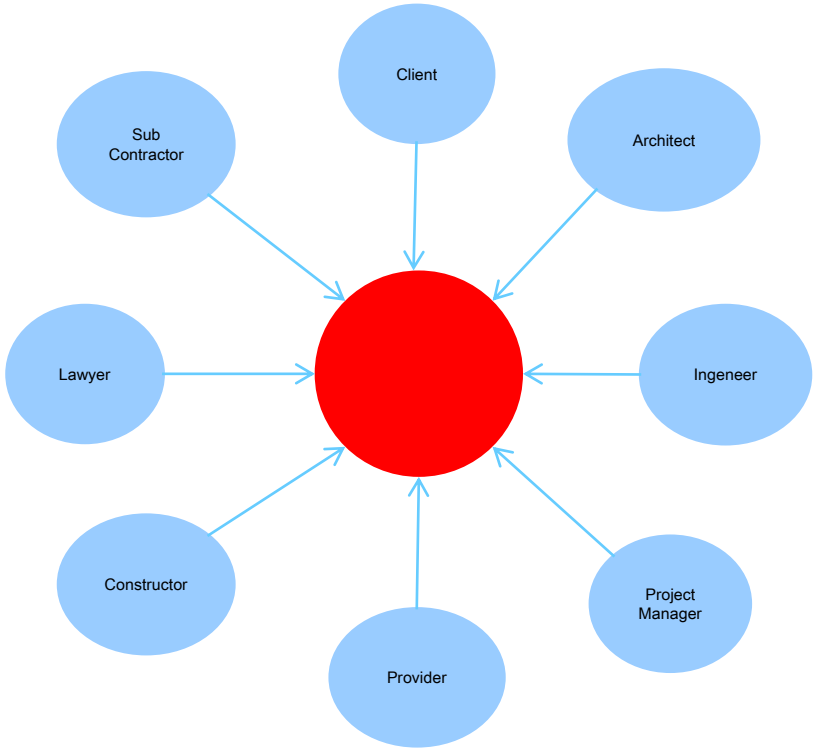
For the technicians in the construction sector, BIM represents a **completely new approach to the designing process**.

BIM Advantages

differences on the process regarding a traditional context and a sharing information context



Traditional

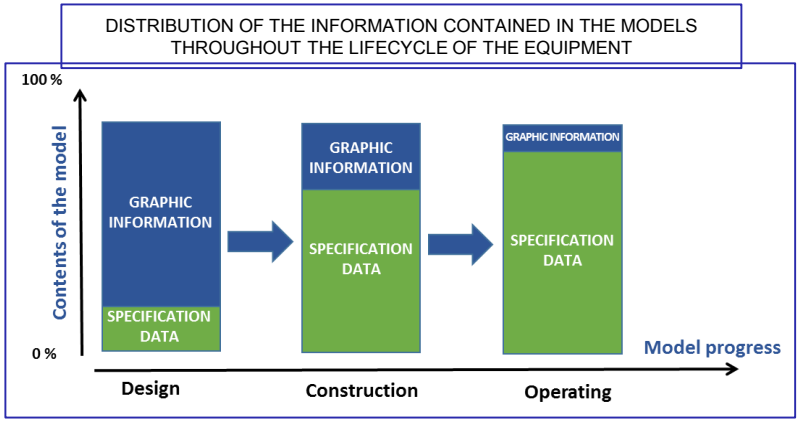


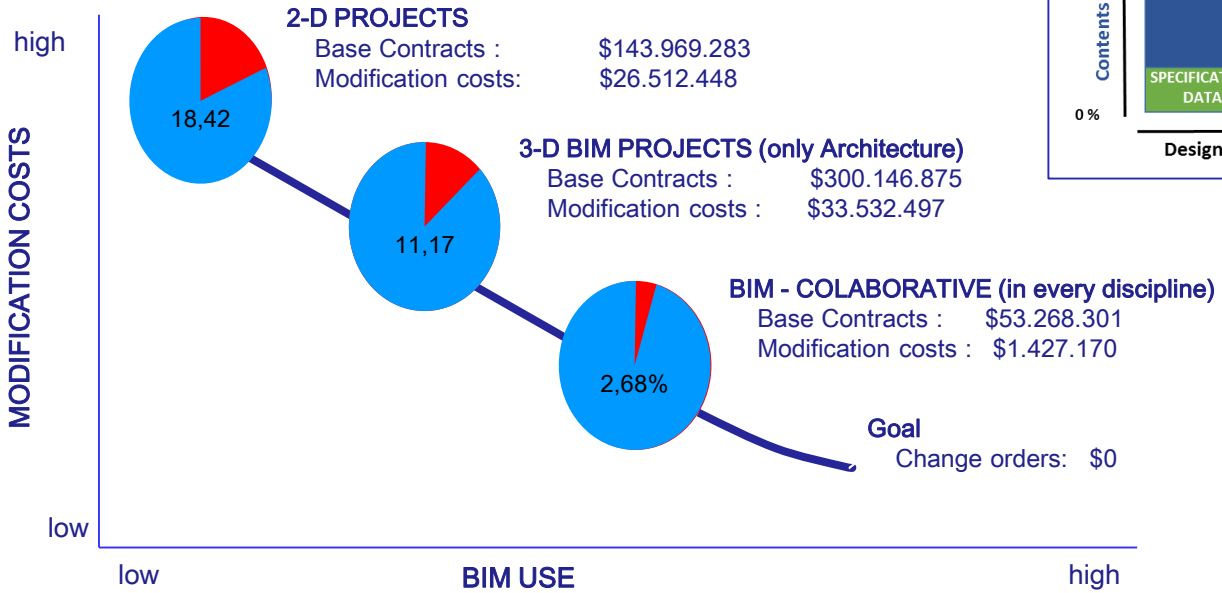
Sharing information context

BIM Advantages

BIM – proved benefits:

- 50% reduction in requested project information (RFI) → 10% project cost reductions.
- 18% reduction in construction documentation production.
- 2-3% improvement on the material execution budget.





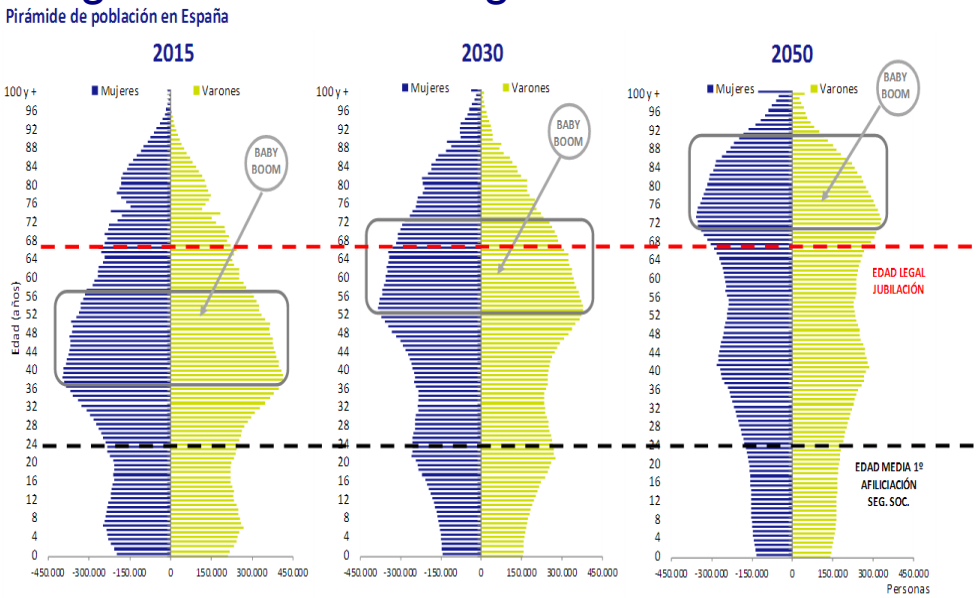
5. THREATS AND PARADIGMS

5. THREATS AND PARADIGMS

The Silver Tsunami

The Baby boomers of the sixties are reaching their retirement age.

- Health care resources will soon be invaded by these citizens in their need for Sanitary Services.
- On the other hand, more and more procedures are been solved through Day Hospitals.
- They can collapse the Health care System of all developed countries, are we ready for this avalanche?

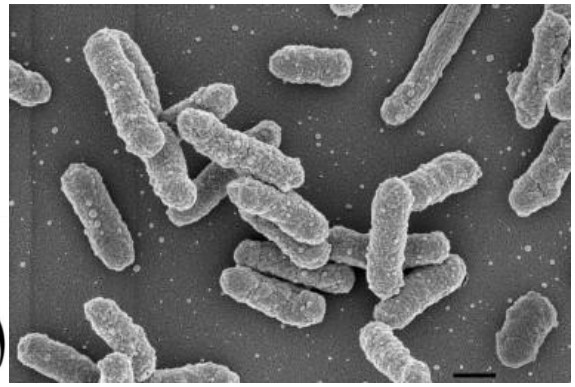


Fuente: Círculo de Empresarios sobre datos del INE (2016)

- We need to move fast, increase the Day Procedures and use the available technology so people can be treated and healed at home.

The Biochemical Threat

- We are seeming more and more illnesses produced by very virulent viruses and bacteria, which can provoke pandemics that can spread all over the world. Viruses and bacteria, like EBOLA….
- This can become a new way off war, think of ANTHRAX… and a very uncontrolled and dangerous one.
- We must think about the security of our Hospitals and be prepared to isolate wings or areas to comply with P4 biosecurity procedures.



The Hospital as a castle

- Frequently our Hospitals become the 21TH Century Castle.
- A place to feel secure more than a place to heal.
- The Hospital has to interact with the neighborhood not only to heal but to improve the health of the citizens and their lifestyle.

- Not only healing illness but preventing illness in health.
- Frequently people have to return to hospitals with little progress in their health problems due to the living conditions in the neighborhoods around the Hospital.

The Big Data

What is Big Data and how can it change the Health Care System

- Health care sector generated more data than any other sector in the world.
- Our powerful computers can process any amount of data and through internet we can share them with everyone
- Big Data will change medicine from mere symptoms description and clinical information into predictive and preventive medicine which is the way of the future.
- Through a cellular phone we can share and reach any data we need.
- And data grows as in a exponentially formula.
- Managing this data we can predict our future health.

The Big Data

But let us analyze our actual world:

- The biggest taxi company in the world has no taxis (*UBER*)
- The biggest apartment company in the world has no buildings (*AIRBNB*)
- The biggest telephone company in the world has no infrastructure (*SKYPE*)
- The biggest department store in the world has no shops (*AMAZON*)
- The bank that grows faster has no branches (*PAYPAL*)
- The biggest film provider has no cinemas (*NETFLIX*)
- The biggest software provider doesn´t program their applications (*GOOGLE AND APPLE*)

What do they all have in common? : "they all process huge amounts of data"

The Big Data

- What will the future bring us?
- That the biggest hospital health services provider that grows faster in the world is NOT a HOSPITAL?
- Will it be ONLY Internet?

Thank you very much for your attention