af » Adaptable Futures

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Nightingale Associates
Sustainability Conference

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af

cgl

blueprint

iMCRC
VISION INSIGHT IMPACT
Innovative Manufacturing and Construction Research Centre

EPSRC
Engineering and Physical Sciences Research Council

STANHOPE

Buro Happold

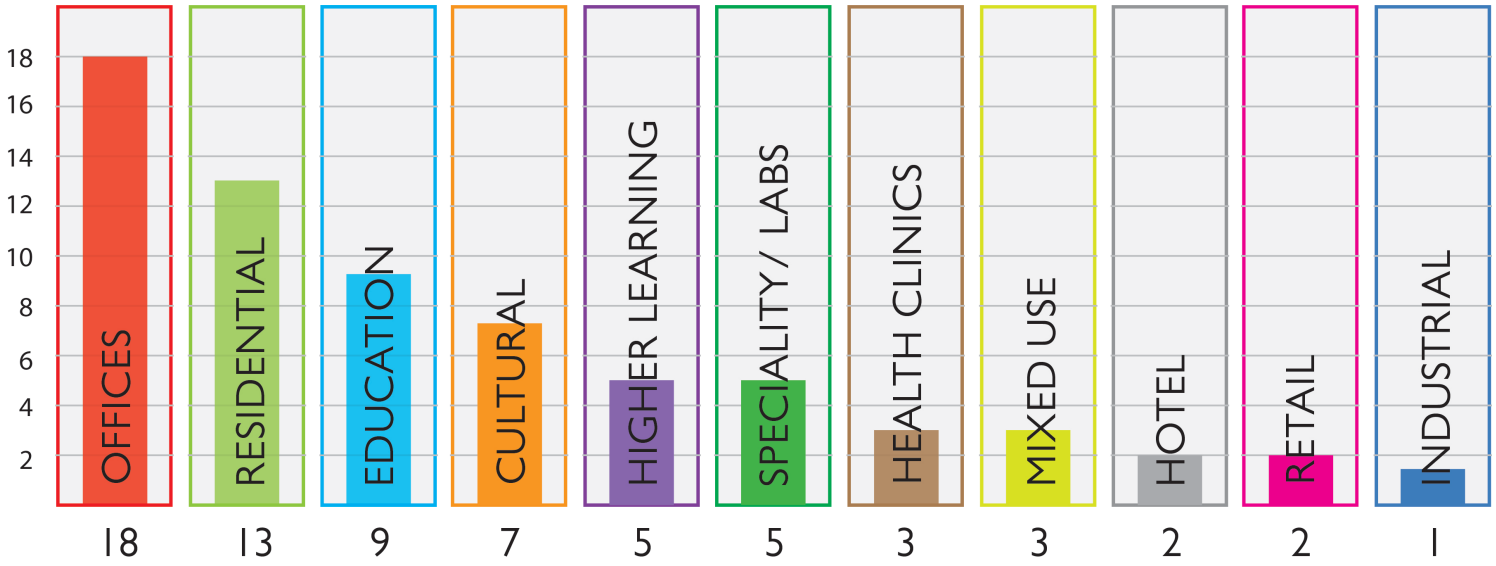
LandSecurities

gsk GlaxoSmithKline

SEGRO
SLOUGH ESTATES GROUP

3D REID

68 BUILDINGS

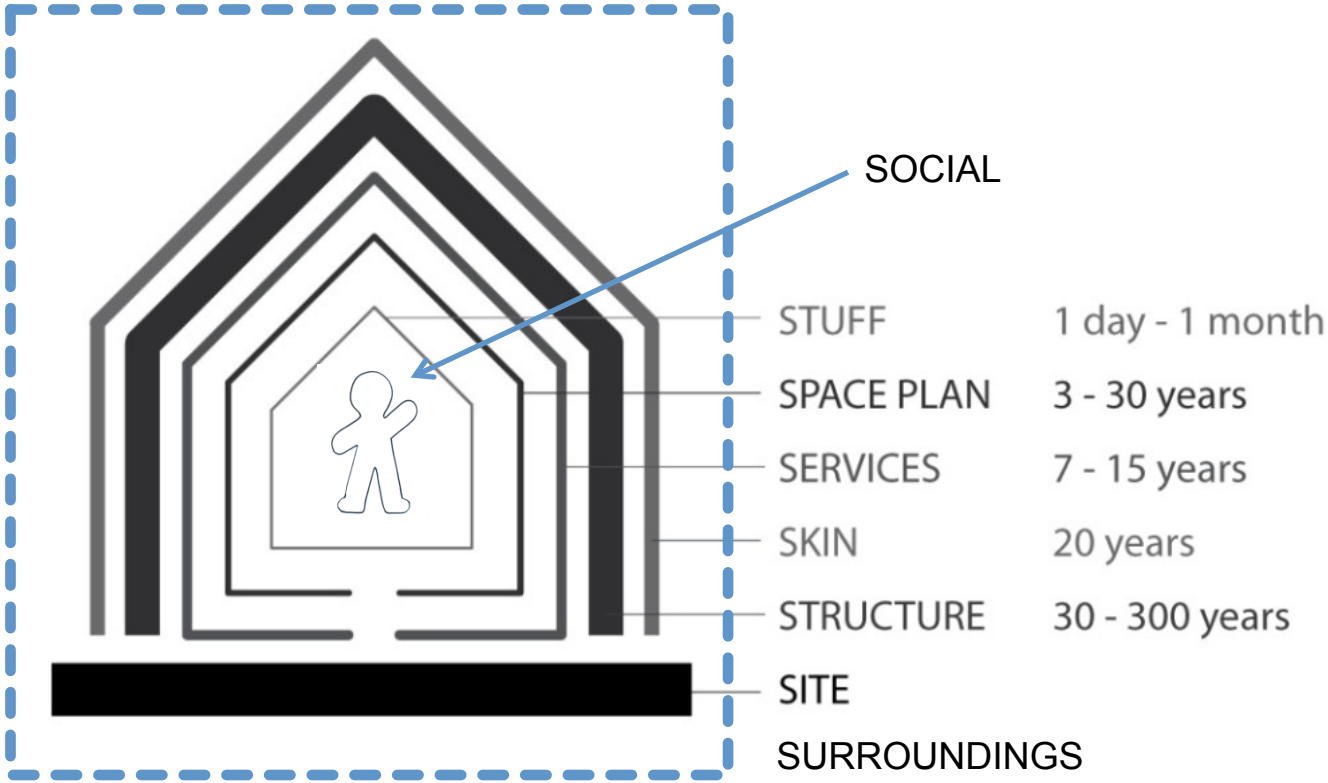


Discipline	Number of interviewees
Architecture	40
Client/occupier	2
Engineering	5
Environmental management	1
Facilities/estates management	3
Planning	5
Property development	12
Project management	10
Quantity surveying	1
Urban design	2
Valuation	5
Total	**86**

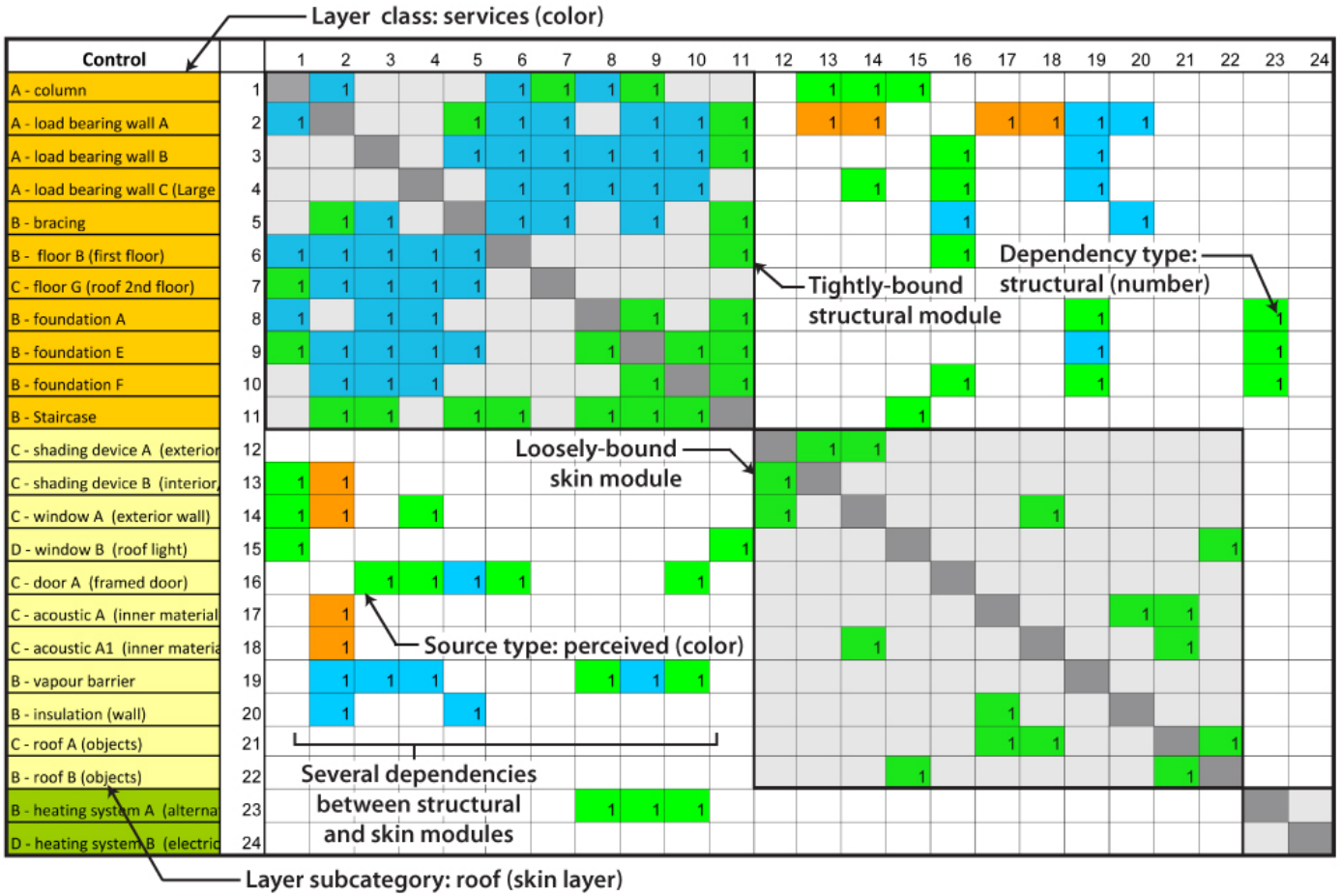

ADAPTABILITY IS ABOUT...
FUTURE-PROOFING
UNFINISHED SPACES
PROVIDING REDUNDANCY
LOOSENESS OF FIT
SIMPLE DESIGN SOLUTIONS
OVER-DESIGNING
GOOD DESIGN
SPECIFICITY

adaptability is...

expansion		expansion
outside (physical variables)	**stereotype** (black box)	**outside** (social variables)
Storage space	Movable walls	Procurement process
Materials	Open spans	Regulations
Window size	Taller floor height	Market condition
Fire strategy	Access points	Local appreciation
Construction Method	Service strategies	Ownership model
Building form	Hightech components	Designer skills



(Adapted from Brand, 1994)

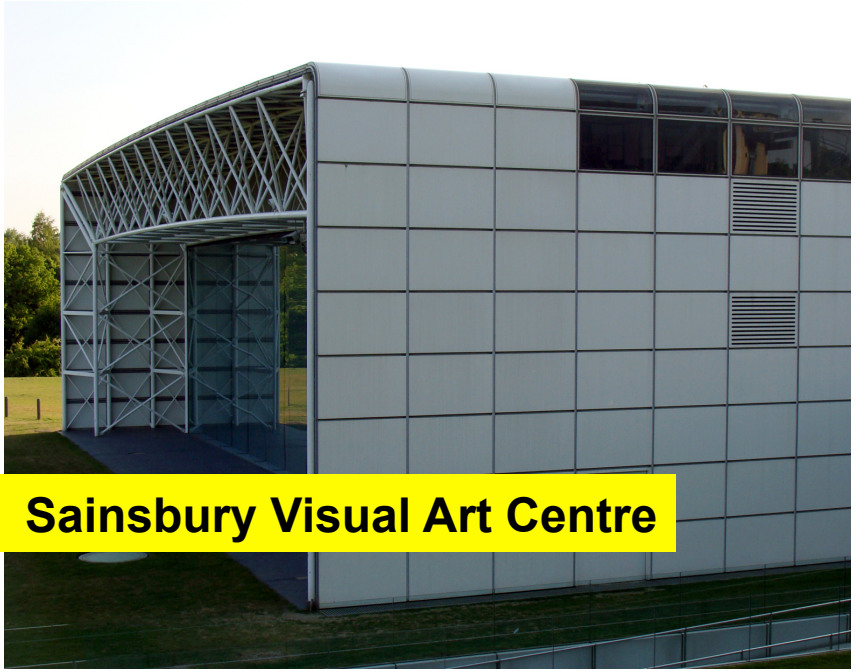

Layer class: services (color)
Control
A - column
A - load bearing wall A
A - load bearing wall B
A - load bearing wall C (Large
B - bracing
B - floor B (first floor)
C - floor G (roof 2nd floor)
B - foundation A
B - foundation E
B - foundation F
B - Staircase
C - shading device A (exterior
C - shading device B (interior
C - window A (exterior wall)
D - window B (roof light)
C - door A (framed door)
C - acoustic A (inner material
C - acoustic A1 (inner materia
B - vapour barrier
B - insulation (wall)
C - roof A (objects)
B - roof B (objects)
B - heating system A (alterna
D - heating system B (electric
Tightly-bound structural module
Dependency type: structural (number)
Loosely-bound skin module
Source type: perceived (color)
Several dependencies between structural and skin modules
Layer subcategory: roof (skin layer)

type of adaptability	type of change	building layers					
		Stuff	Space	Services	Skin	Structure	Site
adjustable	change of task	O					
versatile (flexible)	change of space	O	O				
refitable	change of performance		O	O	O		
convertible	change of function		O	O	O		
scalable	change of size		O	O	O	O	
movable	change of location					O	O

af» adjustable

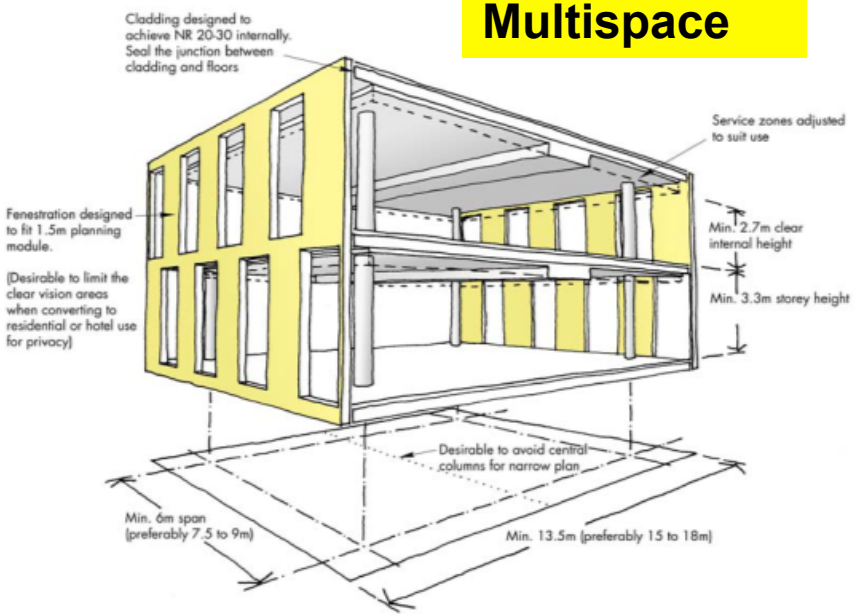
af» versatile

af» refittable



af» convertible

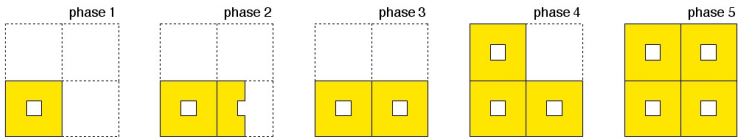
Multispace



Energy Park

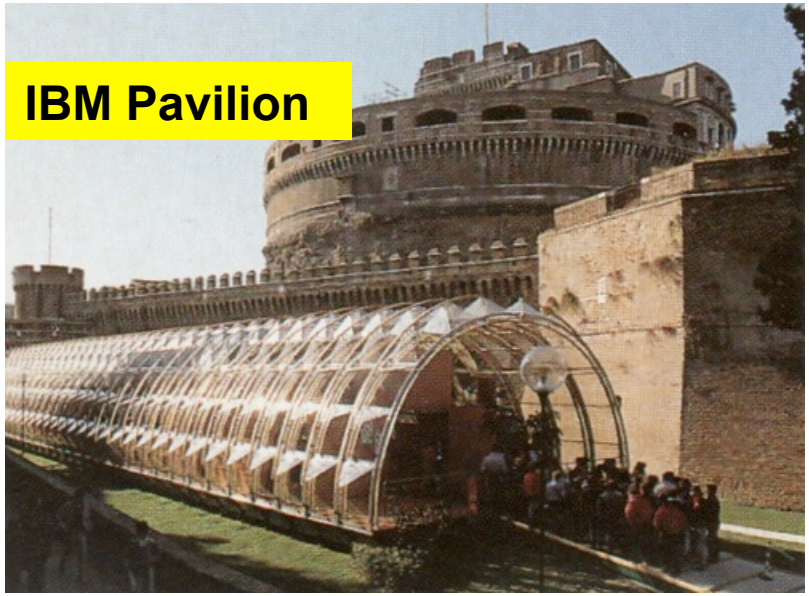
af» scaleable

Igus Factory



Sir Frank Gibb Building

af» moveable




ADAPTABILITY MEANS...
LESS DISRUPTION TO USERS
EASE OF CHANGE
LESS ENVIRONMENTAL IMPACT
EASE OF EXIT
CHANGES ARE LESS COSTLY
LONGER BUILDING LIFESPANS
FEWER VOIDS
?

af» sustainability

"In terms of construction, sustainability also implies flexible and adaptable buildings, constructed for a long life and able to respond to society's changing requirements"

(Richard Rogers, Architect)

"A sustainable building is not one that must last forever, but one that can easily adapt to change"

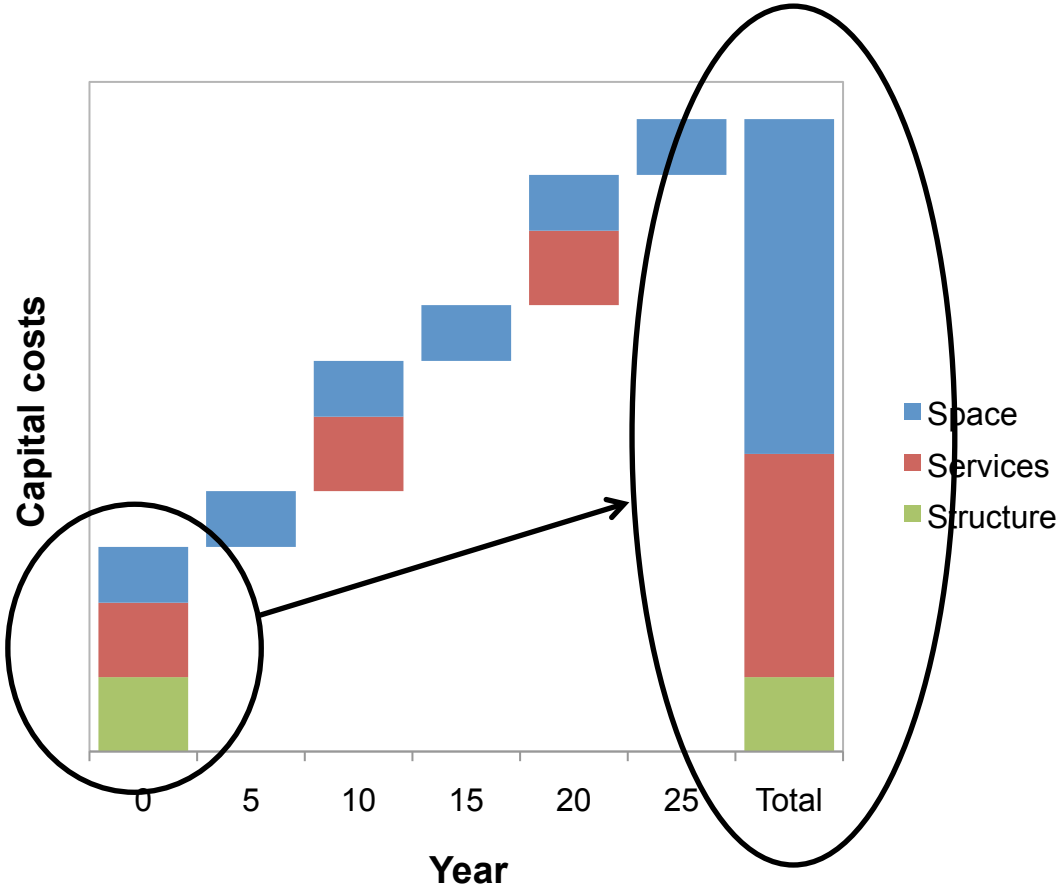
(Peter Graham, Academic)

af» sustainability

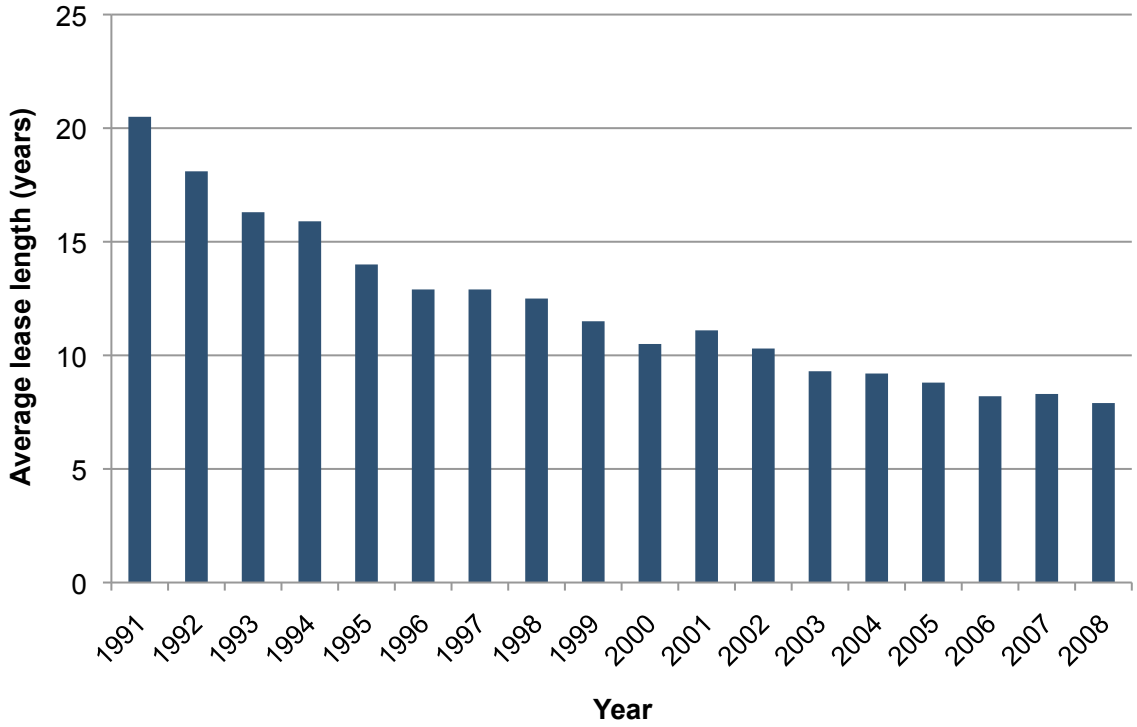
af» economic

"All other things being equal, a building that is more adaptable will be utilized more efficiently, and stay in service longer, because it can respond to changes at a lower cost"

(Russell and Moffatt, *Assessing Buildings for Adaptability*)



(Adapted from Duffy, 1990)

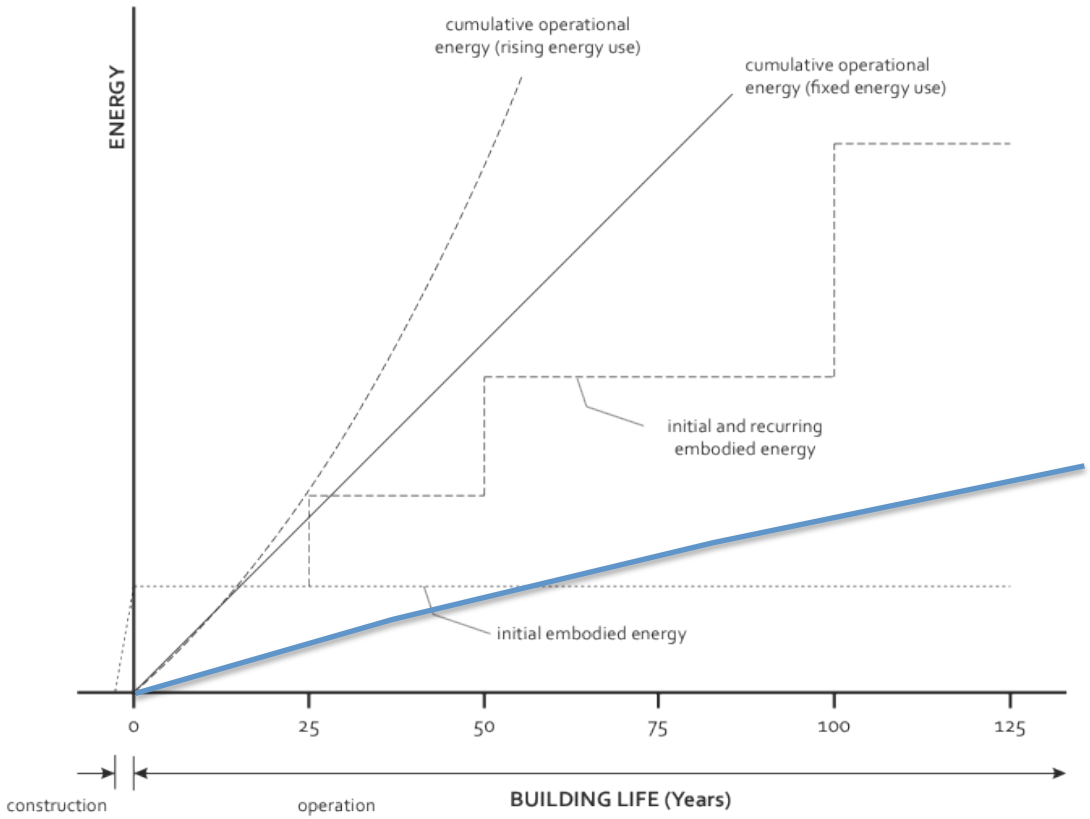


Average lease lengths in the UK (compiled from BPF and IPD, 2001, p.7 and 2009, p.4)

af» environmental

“The single most important factor in reducing the impact of embodied energy is to design long life, durable and adaptable buildings”

(Geoff Milne, Academic)



(Adapted from Yohanis and Norton, 2002)

af» environmental

Technology Strategy Board
Driving Innovation

Design for future climate

Opportunities for adaptation in the built environment

af» social

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”

(World Commission on Environment & Development)

Photo courtesy of Leicester Transport Heritage Trust

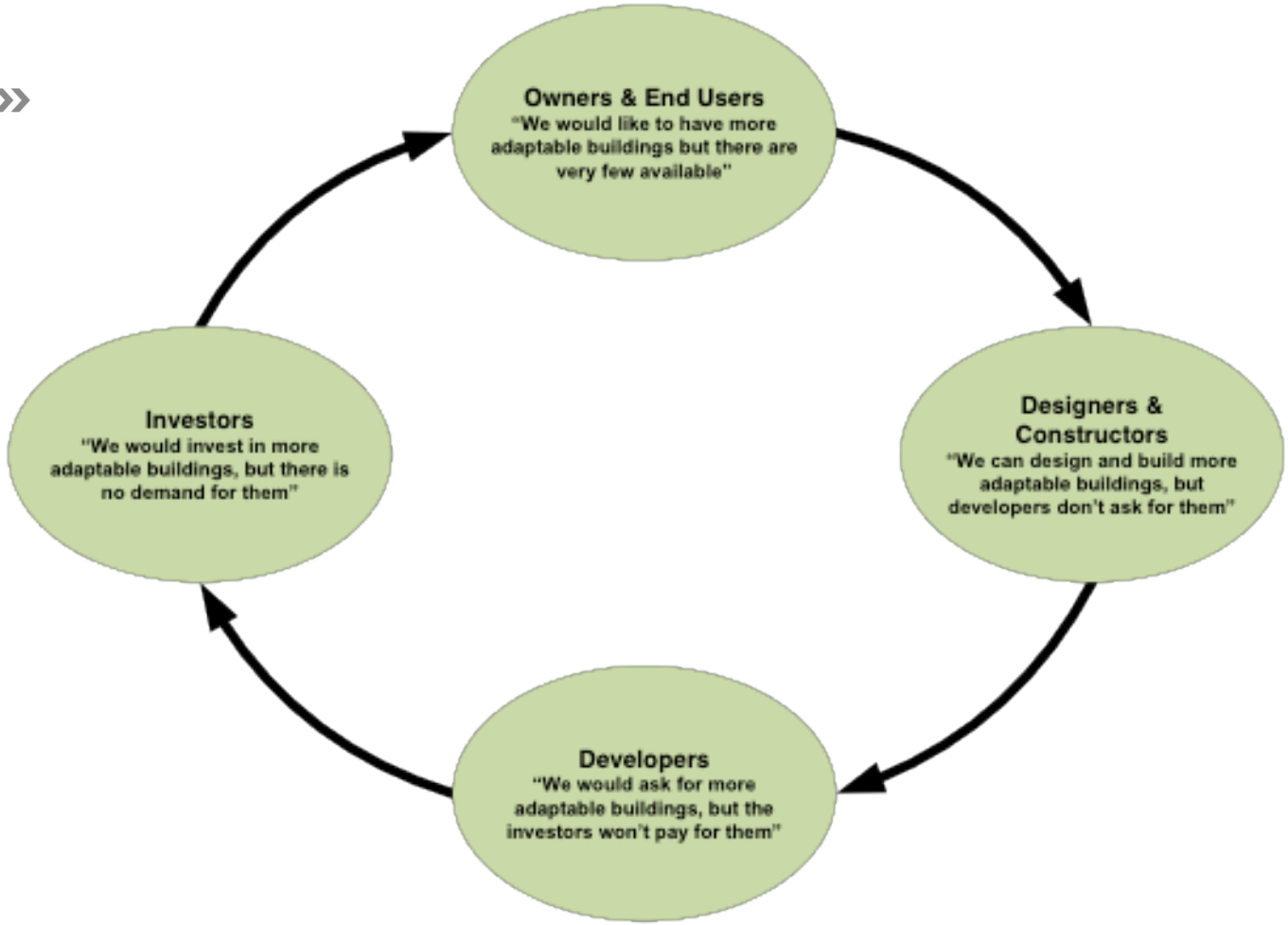
af» social


I'M IN FAVOUR OF ADAPTABILITY, BUT...
IT COSTS TOO MUCH
CLIENTS DON'T WANT IT
THE BENEFITS ARE TOO SMALL
THE FUTURE'S TOO UNCERTAIN
IT WILL COMPROMISE THE DESIGN
?
IT'S NOT MY DECISION
IT WON'T BENEFIT ME

af» costs

“I like buildings to last 500 years. I’d like them to change uses ten times. I’d like to be able to dismantle an office façade and put another kind of façade and respond to the climate and all of that. I guess the problem is that the more flexibility you create… the more cost there is”

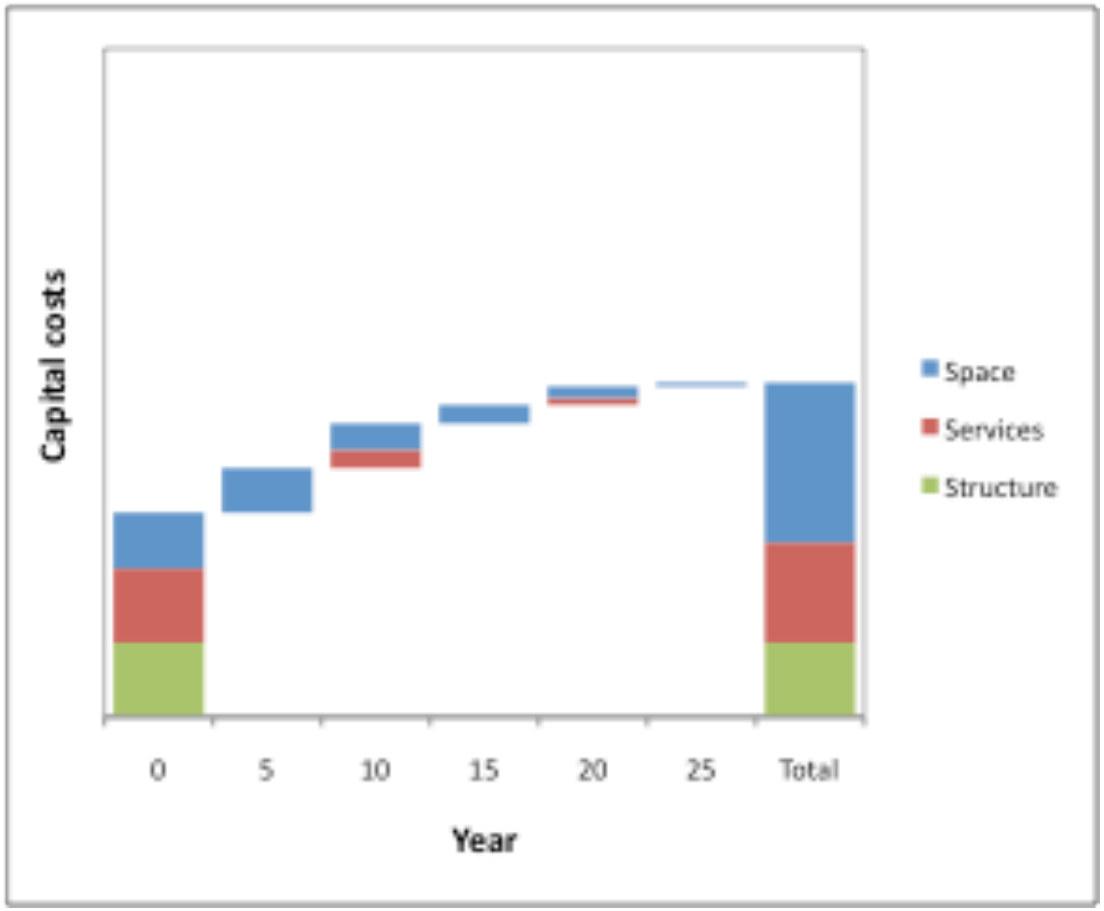
(Architect)


Owners & End Users
"We would like to have more adaptable buildings but there are very few available"
Designers & Constructors
"We can design and build more adaptable buildings, but developers don't ask for them"
Developers
"We would ask for more adaptable buildings, but the investors won't pay for them"
Investors
"We would invest in more adaptable buildings, but there is no demand for them"

af» costs

"Discounting has always been a source of controversy between economists and those from other disciplines interested in the environment. After all, if you discount at 5% over 100 years, then you are giving a future dollar a present equivalent of… roughly 2/3 of a cent. It is hard for a non-economist to reconcile this with taking the future at all seriously"

(Geoffrey Heal, *Discounting and Climate Change*)


Capital costs
Space
Services
Structure
0
5
10
15
20
25
Total
Year

benefits

"… you'd probably save a lot of money if you don't have to demolish and rebuild another building, but sadly, the person who pays initially is not the person who will get the benefit eventually"

(Architect)

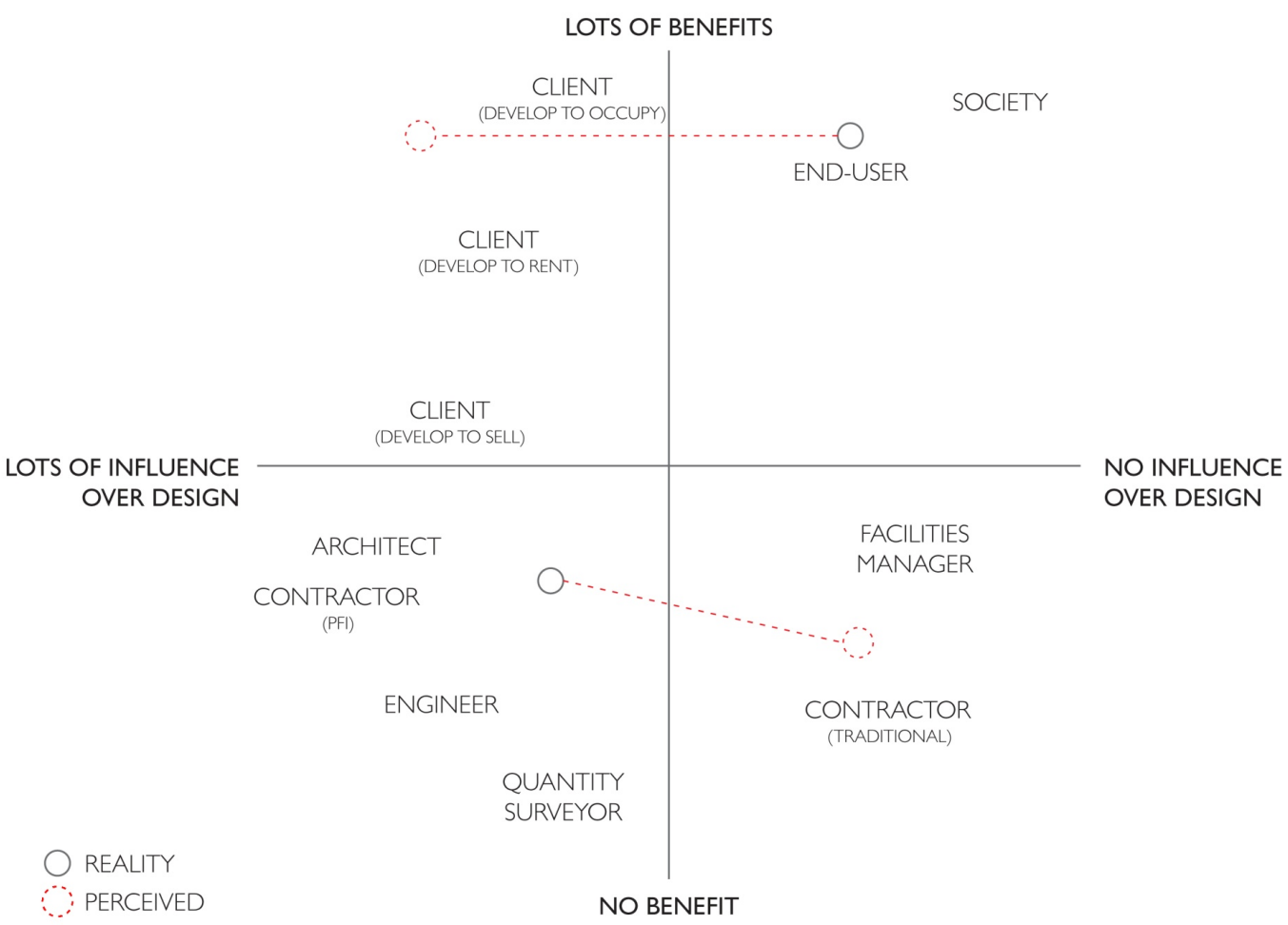
	Type of adaptability			
Type of developer	Generality	Flexibility	Elasticity	Total
Develop to occupy	68%	42%	85%	70%
Develop for rental	40%	42%	100%	56%
Develop for sale	22%	33%	75%	38%

(Adapted from Arge, 2005; p.124)

af» benefits

“Real estate is still a drop in the ocean for them. All they’re thinking of is, “How many drugs are we gonna produce from this facility or develop from this facility? Do the economics stack up”, to worry and spend the time and effort making them more adaptable”

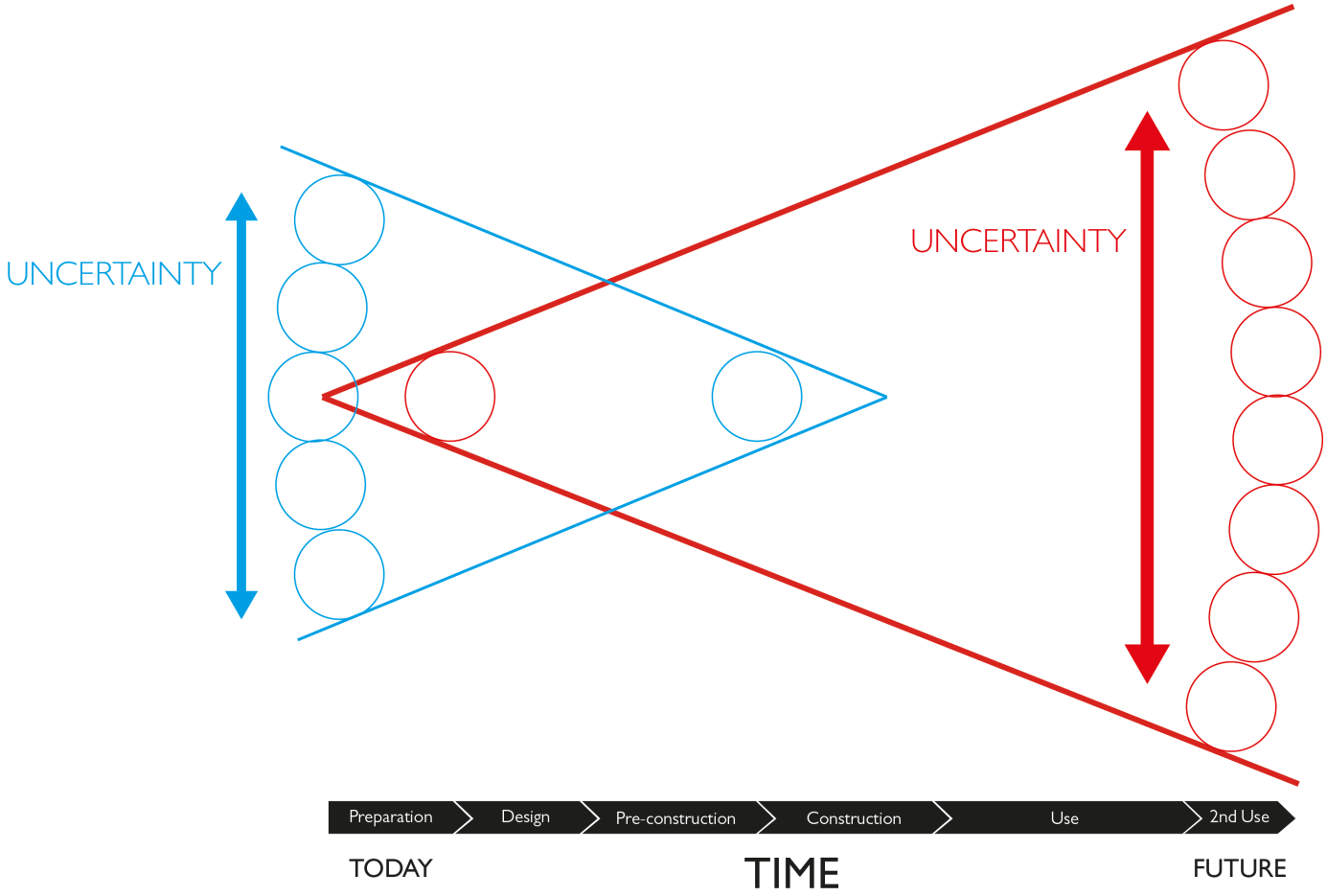
(Agent/advisor)


LOTS OF BENEFITS
CLIENT
(DEVELOP TO OCCUPY)
SOCIETY
END-USER
CLIENT
(DEVELOP TO RENT)
CLIENT
(DEVELOP TO SELL)
LOTS OF INFLUENCE
OVER DESIGN
NO INFLUENCE
OVER DESIGN
ARCHITECT
CONTRACTOR
(PFI)
FACILITIES
MANAGER
ENGINEER
CONTRACTOR
(TRADITIONAL)
QUANTITY
SURVEYOR
REALITY
PERCEIVED
NO BENEFIT

benefits

“So we might be spending money on anticipating these changes which aren’t either realised at all or aren’t realised as they were intended”

(Architect)


UNCERTAINTY
UNCERTAINTY
Preparation
Design
Pre-construction
Construction
Use
2nd Use
TODAY
TIME
FUTURE

af» benefits

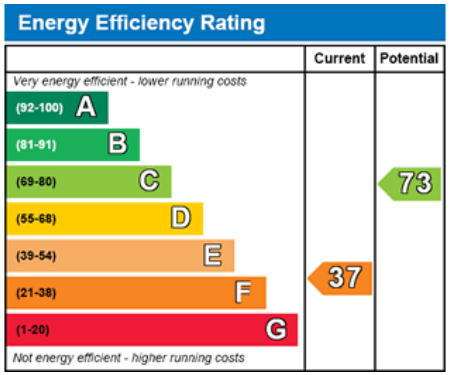
"Yes, I think from the client's side, from the brief side, what they're thinking through is the scenarios that they can envisage, so they're not thinking in two hundred years time, will this building be a tannery? They're thinking who's going to come along in the middle of 2014 looking for a building. I think that's at the heart of most of the briefs that we receive."

(Architect)


MORE BUILDINGS WOULD BE ADAPTABLE IF THERE WAS...
LEGISLATION/ REGULATION
AN INCREASE IN BUILDING VALUES/ RENTS
?
CHANGES IN PLANNING RULES
MORE CLARITY OVER COST/ BENEFITS
GREATER USE OF LIFECYLE COSTING TECHNIQUES
A CHANGE IN INDUSTRY MINDSETS
GREATER STANDARD-ISATION

“In all honesty, life cycle... whole life cycle costing really should come into it, but it doesn’t in reality. Development teams work to a budget and they don’t necessarily design with assisting management costs at a later stage... Property industries don’t work on a 40, 60 year basis. It might be that in five, 10, years time, that building, you’ve sweat the asset, you move it on. ”

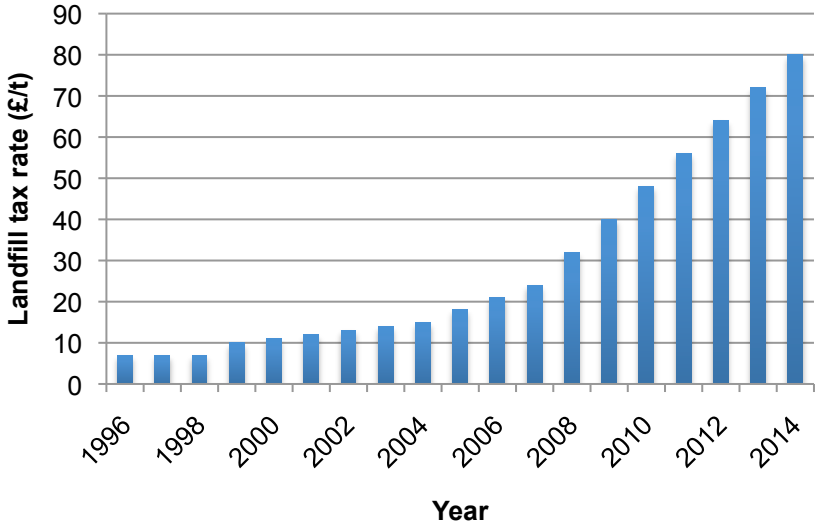
(Environmental manager)

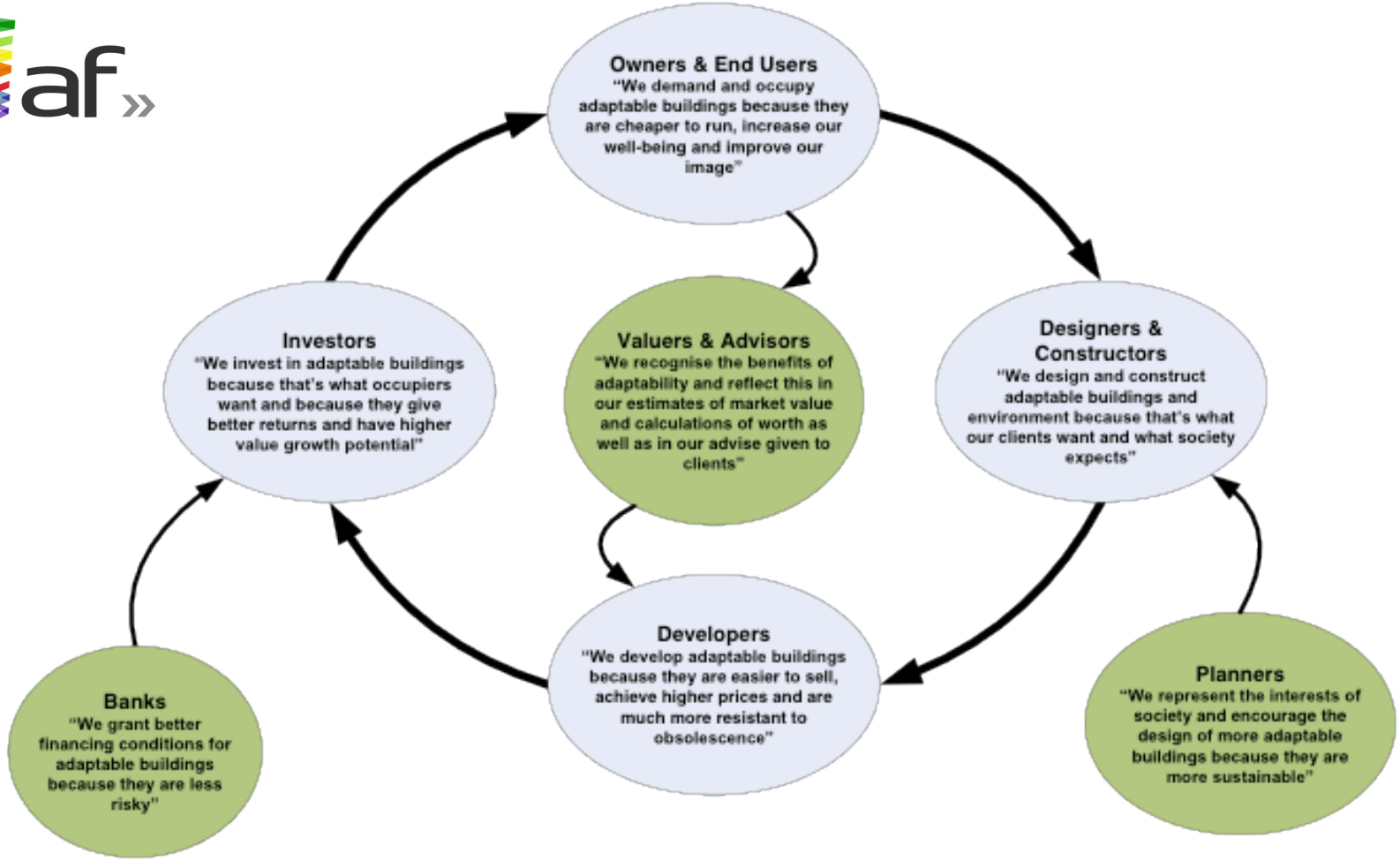

Energy Efficiency Rating
Current
Potential
Very energy efficient - lower running costs
(92-100) A
(81-91) B
(69-80) C
(55-68) D
(39-54) E
(21-38) F
(1-20) G
Not energy efficient - higher running costs
37
73

Communities and Local Government

Relaxation of planning rules for change of use from commercial to residential

Consultation




Owners & End Users
"We demand and occupy adaptable buildings because they are cheaper to run, increase our well-being and improve our image"
Valuers & Advisors
"We recognise the benefits of adaptability and reflect this in our estimates of market value and calculations of worth as well as in our advise given to clients"
Designers & Constructors
"We design and construct adaptable buildings and environment because that's what our clients want and what society expects"
Planners
"We represent the interests of society and encourage the design of more adaptable buildings because they are more sustainable"
Developers
"We develop adaptable buildings because they are easier to sell, achieve higher prices and are much more resistant to obsolescence"
Banks
"We grant better financing conditions for adaptable buildings because they are less risky"
Investors
"We invest in adaptable buildings because that's what occupiers want and because they give better returns and have higher value growth potential"

af»

PERSPECTIVES
TIME, COMPONENTRY, FUNCTIONS, SPACE

CONTEXT
TIME

PROCESS
SOURCES, TIME

BLACKBOX
POLICIES, COMPONENTS

FRAMECYCLE
STRATEGIES, PRODUCTS, BENEFITS, TIME

LAYERS
COMPONENTRY, STAKEHOLDERES, TIME

BALANCE APPROACH
POLICIES, PRODUCTS

VIRTUOUS CYCLE
STAKEHOLDERS, PROCESS

UNCERTAINTY
TIME, RISK

CHANGING COST
COST, PROCESS, CHANGE

CRITICAL DECISIONS
TIME, ECONOMICS, SCENARIOS

PERMUTATIONS
TIME, ECONOMICS, SCENARIOS

LEASE LENGTHS
TIME, BENEFITS

LAYER COST
TIME, ECONOMICS, LAYERS

DECISION MAKING
STAKEHOLDERS, INFLUENCE

BENEFITS
STAKEHOLDERS, STRATEGIES

DSM
COMPONENTRY, SPACE, PRODUCT

SOURCES
RULES, STRATEGIES, PRODUCTS, MARKET

LINKING TABLE
STRATEGIES, TIME, LAYERS, STAKEHOLDERS

INFLUENCES
STAKEHOLDERS

SPECIFICITY
FUNCTION

BUILDING LIFE
PROCESS, STAKEHOLDERES

BENEFIT INFLUENCE
STAKEHOLDERS, BENEFITS

CASESTUDIES
PRECEDENTS, LENS

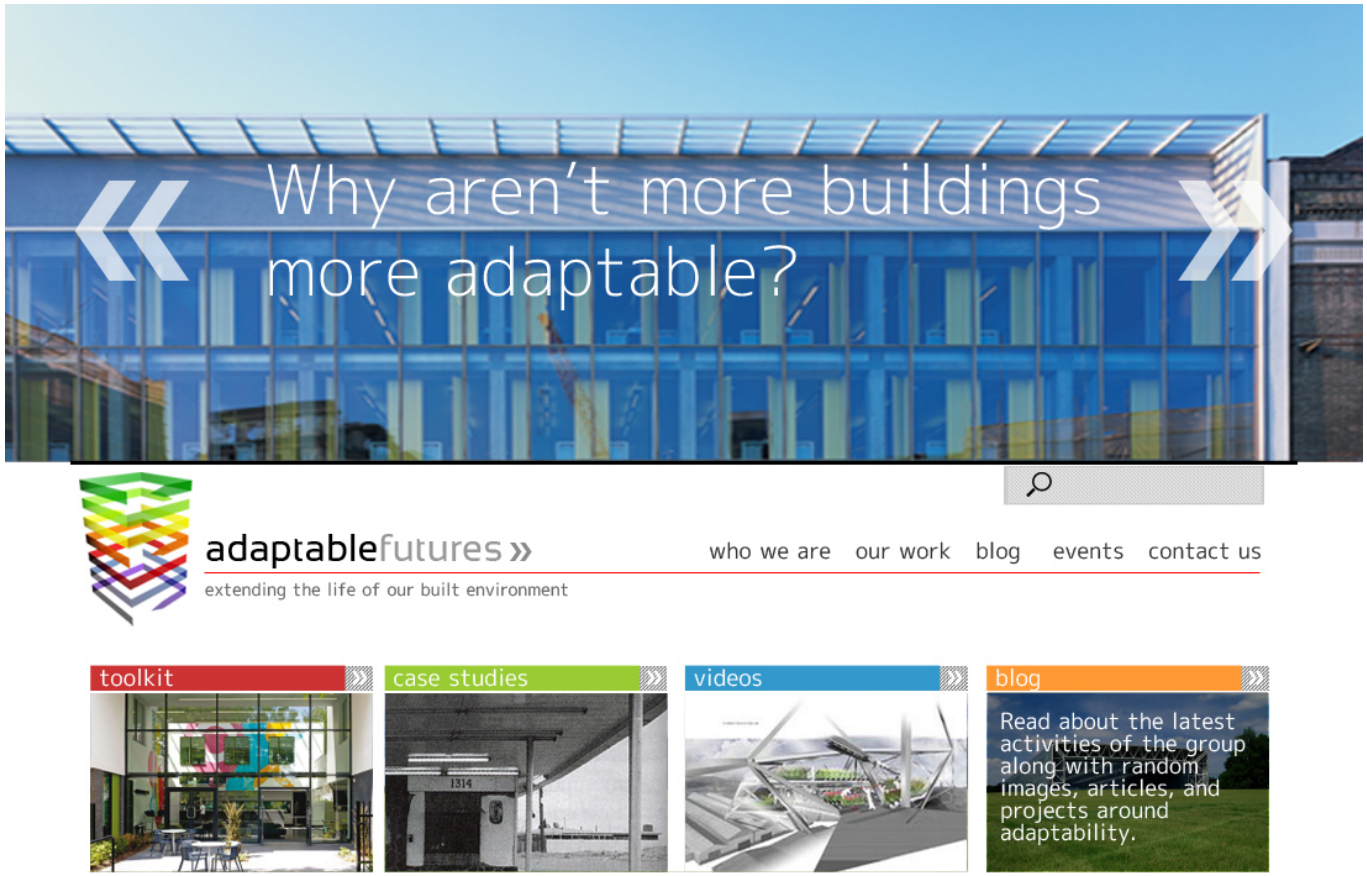
COST SOLUTION
RISK, ECONOMICS

RULEs
RULES
FUNCTION, COMPONENTRY, SPACE

STRATEGIES
SOULTIONS, GUIDELINES, SCENARIOS

STRATAMETERs
STRATEGY DEMANDS AND RELATIONSHIPS
STRATEGIES, COMPONENTRY, SPACE

CAPs
RELATIONSHIP BETWEEN PHYSICAL AND SPATIAL PARAMETERS
COMPONENTRY, SPACE



The *adaptable futures* research group at Loughborough University unpacks adaptability in detail looking at the complex web of dependencies that induce, hinder, and accommodate change. *Learn more about our work.*

af» further information

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