7 Diversifying intention

7.1 Between needs and possibilities

Pushing needs and pulling possibilities

Intentions are human concepts that balance needs and possibilities (section 7.1). Their attracting perspective on possibilities is limited in time and space (section 7.2). Their potential impact on different physical and social layers (section 7.3) depends on different expectations about the future context (section 7.4). A diversity of intentions may cause conflicts, but it also stimulates innovation, it diversifies the environment, and consequently, it provides freedom of intention for future generations. Spatial planning and design balance the diversity of intentions that require space. They connect a field of spatial problems (probable, but not desirable futures) with a field of aims (desirable, but not probable futures). This requires to make an inventory of desirable and probable futures as sets, in order to determine both subsets (see *Fig. 2* on page 17). They subsequently balance the field of aims against the possibilities in order to determine their possible function (section 7.5).

Outward intentions driven by needs

Failing conditions (see *Fig. 222* on page 242) raise vague needs, direct desires and more balanced intentions. Fluctuating desires may become a more durable intention if you have *thought* about them. Intentions thus are conceptualised desires, ready to be exchanged with other people. You may elaborate on them through plans, initiatives and projects. Realising a project, however, requires consensus; deviations cannot be tolerated anymore. The phase of intentions is the most innovative phase, if a diversity of intentions is tolerated. Production requires *equal* intentions, but innovation requires *different* intentions. Intentions are still receptive to other people’s intentions. Your intention may change through exchange with different intentions. By discussing them, other vague needs and former desires may receive priority. You may become aware of possibilities that you did not realise before. These possibilities, however, also may evoke desires and intentions that are not really answering your needs. Existing supplies seduce, causing you to neglect the more urgent needs that you may not even be aware of. Some dissatisfaction may remain.

Inward intentions driven by possibilities

Commercial initiatives primarily realise an average of other people's intentions, by balancing them against the possibilities of economic production. They fulfil a limited set of supposed needs in a specialised market, or they *create* a demand through marketing. The primary intention of the initiator is to earn money by postponing and enabling immediate intentions of a private person at a lower level of scale. Initiatives changing the environment, however, have to take into account more different needs, desires and intentions. They have to be diversified in regards to their time span, levels, layers, and perspectives, in order to make combinations that provide an added value. Their diversity is an opportunity for innovation and unusual combinations, if you manage to balance its field of problems against its field of aims and means. Design searches for the possibilities of different content, form, structure and function. The longer the time span, the more changing intentions have to be taken into account. Diversity of intentions require and enable spatial diversity and freedom of choice for future generations.

Targets and means

Discussing your intentions usually raises the question 'What is your problem?'. The supposition behind this question is, that from this problem you can formulate targets, and from these targets you can make an inventory of means required to reach these targets. It is appreciated if you name one problem and one target as the most productive strategy. It is the strategy of *production*, but it hampers *innovation*. Innovation balances *fields* of problems, aims and means. Production originates in probability thinking, suppositions about probable futures, as far as they are not desirable. Commercial estimation of needs is restricted to probable desires as they appear in queries. The average sells best. It overlooks possibilities beyond what is probable. Designing is possibility thinking. It includes these probabilities, but its core aim is to find *improbable* possibilities, *improbable* means. A designer who is limited by probability would produce predictions and more of the same. A combination of traditional solutions looks new, but it is eclecticism. Solving a well-known problem causes new problems in the environment of its solution. It is a profitable strategy, because as a successful problem solver, you immediately will be asked to solve the next problem, even if you have caused it yourself. Looking from some distance, by taking a larger scale into account, you are a problem producer. Any single problem is part of a *field* of current and future problems with mutual relations. But, a designer searching for possibilities *beyond* the probable futures, desires and aims, raises uncertainties. You may fail if you are not predictable. If you only want to earn money, be predictable.

Means directed study

Problems formulated in a set of currently probable, but not desirable futures produce probable aims and traditional means. Our current problems, however, are not traditional. They stem not from our daily experience, but from another time span, level of scale, physical or social layer and perspective on the future. The daily experience of a designer is different form the daily experience of the future user. Exploring possibilities within your own perspective is not enough. The design thus would not serve other perspectives. A designer has to be able to imagine different probabilities and desirabilities in different possible future contexts. You cannot *know* them, but as a designer you have to be *aware* of them and able to *imagine* more possibilities than solutions for the current problems. A design requires many detailed decisions that are not related to social problems and aims. A designer is used to thinking about many alternatives of content, form and structure for the same function, serving the same needs, desires, intentions and aims. This work is means-directed, instead of aim-directed. Aims themselves have to be designed or chosen. At a larger time span, targets *are* means, they are means for an efficient production.

Ways to study possibilities

There are at least four kinds of design study (see *Fig. 50* on page 93).[a] If the object and its context are known, then you study existing designs (´design *research´*). If the object is known, but it is appearing in different contexts, then you study types (´typological *research´*). Both kinds of study are *re-search*. If the context (with its problems, aims and eventually even a programme of requirements or brief) is known, but the object still does not exist, then its study is what designers usually do ('design *study'*). But, what if both object and context are unknown and consequently variable and indeterminate? From an empirical point of view, a study with a variable object and a variable context is absurd. It cannot be productive. Without context, it cannot solve any problem, without object it cannot serve any objective. Still, the many useless experiments with electricity in the 18th century, which were conducted without even knowing what electricity was, were extremely productive in a longer time span. So, there also may be crucial possibility studies to be performed by design beyond the current problems and aims ('*study* by design'), but the time span to become productive may be long, and perhaps it will never serve any other aim than satisfying curiosity.

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[a] Jong;Voordt(2002)*Ways to study urban, architectural and technical design*(Delft)DUP Science

7.2 Time span and level of scale

Time span of intentions

The capacity to imagine a sequence of many subsequent actions (of which only the first is directly executable, while only the last rewards) distinguishes humans from animals.[a] This human capacity, however, is utilised differently by different people. A 'consumers' lifestyle requires direct reward, e.g. by living in the centre of the city with its concentration of facilities; 'familists' take time to raise children e.g. by living in suburbs, before they become consumers, and 'careerists' accept that you have to invest many years before you arrive where you want to be.[b] But, everyone may have intentions for the coming hour, tomorrow, the next weekend or for the next summer holiday. These personal outward intentions are relevant for design, but apart from these intentions, there are inward and outward intentions that are represented by institutions, companies and their employees. A national government has many inward intentions relevant for spatial design. Its outward intentions, represented by a ministry of foreign affairs and its diplomatic service, may be less relevant. A company, however, has outward intentions, based on its suppliers and consumers in the market, and inward intentions, such as its production and employees, both relevant for design. Their time span is diverse. Buildings are intended to be used for 10 to 100 years. Companies intend to survive as long as possible, but they mainly do not make plans for periods longer than a year, except for their capital goods, such as buildings. Government institutions may cover a longer time span through its laws, and urban and regional plans.

The relevance of time span

The relevance of time span for spatial design and environmental diversity may be clarified best by an extreme example. The Turkish municipality of Adapazarı (340 000 inhabitants in 2000) was hit by an earthquake of a 7.8 magnitude on the Richter scale, causing 17 000 casualties in 1999. The majority of its population lived in a plain surrounded by mountains. A serious earthquake causes liquifaction of its soil, and consequently the collapse of buildings. The population has since increased rapidly through natural growth and overflow from Istanbul. This increase has been wisely located in a new town on safer soil (see *Fig. 223*). In 2005, I made two scenarios for Adapazarı 2030. In the worst case, the population would increase to 2 million people, who would build new buildings in the plain (see *Fig. 224*). If there would be a similar earthquake in 2030, then the number of casualties could be as high as 120 000 people. In the best case (see *Fig. 225*), the municipality would manage to prevent additional construction in the plain. The municipality would locate more new towns at safe places in a ring around the plain connected by fast public transportation for 2.4 million inhabitants. It would relocate 200 000 inhabitants into these safe places, and keep the old Adapazarı centre with 100 000 inhabitants in reinforced buildings. People spend less time in recreational and industrial areas in more safe, low rise buildings. The municipality would, thus, transform the emptied districts of the old city into industrial and recreational areas. Proposed projects are evaluated based on this scenario. But the question is, whether this can be realised in 30 years. The recurrence time of similar earthquakes in this area was calculated at 30 years. Perhaps some places in the plain are safer to be built-up than others, depending on the thickness of the liquifying clay layer, and consequently the application of safe foundations. This would allow an intermediate scenario. This would, however, require more research, and research takes precious time.

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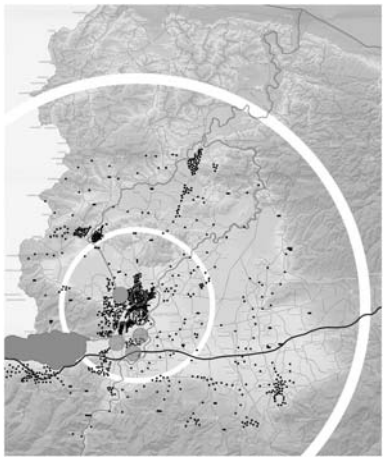
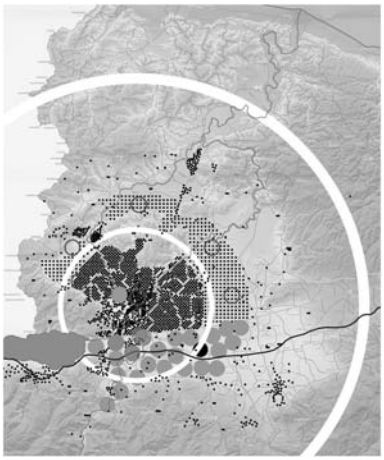
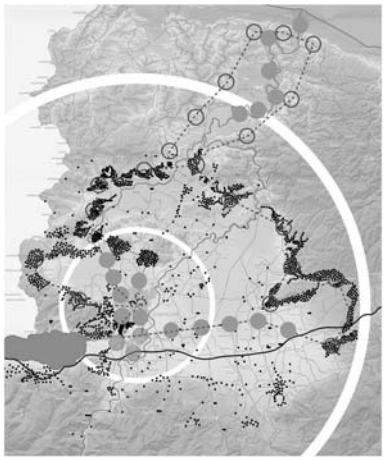
[a] Harrison;Weiner;Tanner;Barnicot(1964) *Human Biology* (Oxford) The Clarendon Press

[b] These life styles are distinguished as 'role emphasis' by Michelson(1970) Man and his urban environment(Reading)Addison Wesley.





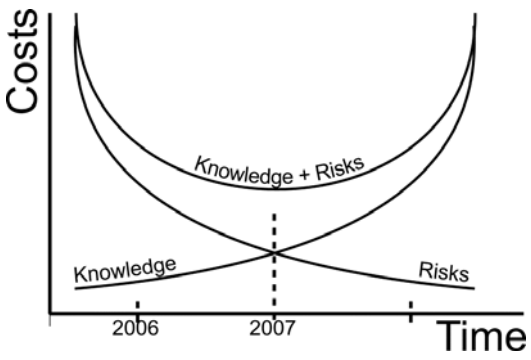


R={30,10km} r=1km(100 000inhabitants or jobs) r=100m(1000inhabitants)

Fig. 223 Adapazarı 2000 *Fig. 224 Adapazarı worst case* *Fig. 225 Adapazarı 2030*

Extreme scenarios to calculate risks

Scenarios are possible futures, not plans. They make you aware of what could happen, and which chain of effects this could have. Then, you can decide what you should *know* in order to make plans, which is useful to reduce ecological, technical, economic, cultural and political risks in different futures. Applied knowledge reduces risks (chances x effects). Risks (including loss of human life and happiness) and knowledge both have their costs. To increase your knowledge takes time, and the passing of time *increases* risk, but increasing knowledge may *reduce* risks. When do you have to stop collecting knowledge and start making plans, in order to reduce the risks? We should start making plans as soon as the costs of increasing knowledge are higher than the costs of decreasing risks (see *Fig. 226*).



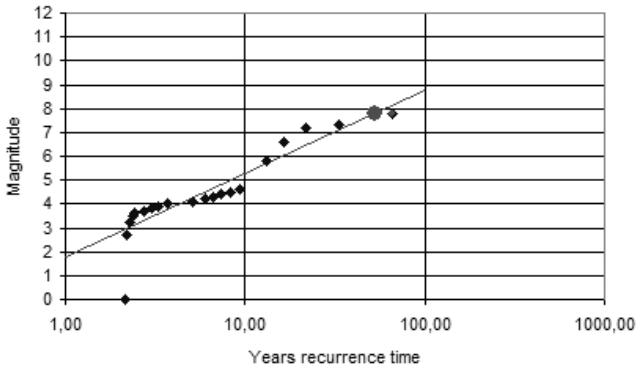


Fig. 226 The costs of increasing knowledge and reducing risks

Fig. 227 Ranking the earthquakes 100km around Adapazarı in the past 50 years

For example, you decide to study the soil of the plain in the region of Adapazarı. For which points in a radius of 10km (see *Fig. 224*) would you collect such knowledge? If you drill 1km deep holes every hectare, then you have to drill 31 416 holes. That will cost precious time. You can look for more rough and advanced means of inquiry to reduce the time you need, but how reliable are they then? What is the probability that you make a mistake and cause casualties? The calculation of the recurrence time of similar earthquakes in the region (see *Fig. 227*) indicated that an earthquake of magnitude 7 may occur every 30 years, but an earthquake of magnitude 7.8 (as occurred in 1999) may occur every 60 years. If this is the difference between the buildings collapsing or not, then you may have more time.

A spatial imagination of time

The example of Adapazarı shows the importance of time spans. A different time span may change your intention. But, it also shows how changes and possible futures are expressed as *differences* with between images such as *Fig. 223* and *Fig. 224* or *Fig. 223* and *Fig. 225*. You can imagine them separately, but an awareness of change requires their difference. You can imagine space without time, but you cannot imagine time without a spatial frame (e.g. the municipality), and a grain (e.g. its inhabitants) where it works out. If your intentions are time dependent, then they are also space dependent. The intentions for Adapazarı between the worst and the best case scenario tacitly supposed alternatives at a regional scale, with serious effects occurring at a personal scale, which may determine if you live or die, depending on where you are. But, any intention may imply impacts at different levels of scale. If you want to build a sustainable house, then your intention may imply an impact on your family, your neighbours and a world-wide contribution in reducing CO_2-production. If you initiate a larger project, then you may hit still other intentions at different levels of scale. Some of them may support your initiative, others will not. How can you take them into account?

Space and time

During the past ten years, I chaired approximately 400 PhD ceremonies at the University of Technology in Delft (TUDelft). In 2004 and 2005, I asked 60 randomly distributed PhD candidates to draw the area in space and time covered by their thesis. *Fig. 228* shows what they told me. The area between meters and micrometers, and between seconds and days was apparently studied most. I seldom chaired the ceremonies of my own Faculty of Architecture, but the concentration of grey between 1m and 100km, and between months and decades, illustrated in the top right corner right in *Fig. 228*, may identify their contribution. This finding may indicate the relatively isolated position in technology of Architecture and Urban design. At the end of 2005, the scheme became too small in the bottom left corner by the increasing number of nano-technological studies. The top left corner (nanoseconds at the scale of the Earth) and bottom right corner (millennia at the scale of nanometers) remained empty. There may be some proportionality in our knowledge of the relationship between space and time.

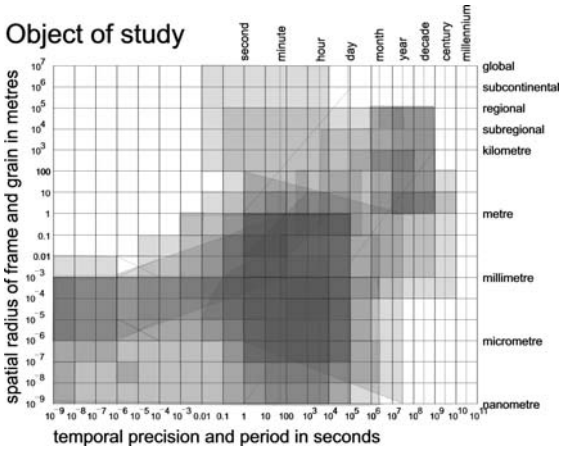


Fig. 228 60 PhD studies TUDelft 2004-2005

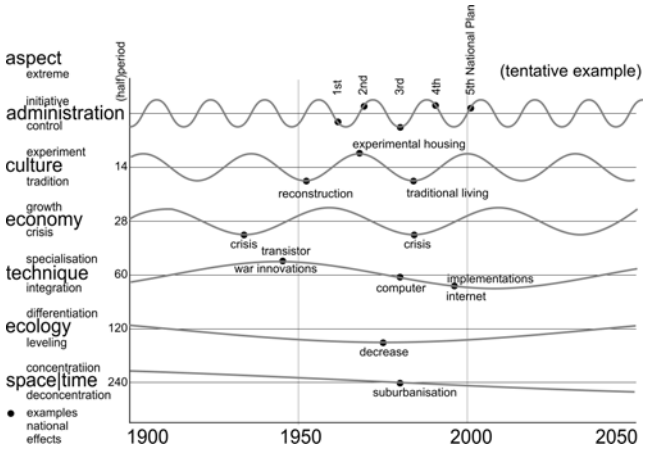


Fig. 229 Different wavelengths per layer

Periodicity in social layers

Fig. 229 shows different periodicities in different physical and social layers. Do not take it too seriously, because if it would depict reality, then the future would be predictable. It is only meant to show the possibility of different wavelengths in different layers. In the political layer, the sinus between initiative and control is depicted with a periodicity of 7 years. It supposes a regular change of administration from an increase of public services into a period of privatisation. In the Netherlands, 5 national plans in 40 years changed from more design into more control, and the reverse. In the cultural layer I suppose a change every 15 years by teenagers protesting against their parents. The fifties in the last century were the years of reconstruction (back to tradition) after the Second World War, but the protest generation of the late sixties caused all kinds of experimental housing, while I remember the eighties and nineties as more traditional. The economic cycle of 50 years is known as the Kondratieff cycle, but the current crisis came earlier than within 50 years. The Schumpeter-Freeman-Perez periods may be more realistic: 1771 > industrial revolution, 1829 > steam and railways, 1875 > steel and electricity, 1908 > petrol and car, and 1971 > information period. *Fig. 230* interprets these cycles as waves with decreasing wavelengths that build upon the previous results.

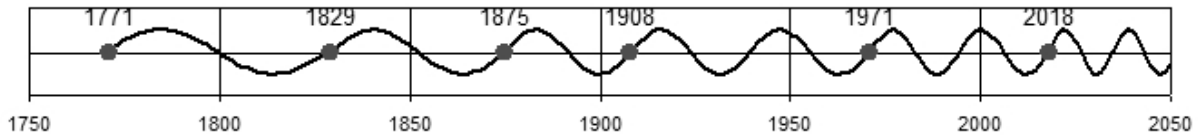


Fig. 230 A free interpretation of the Schumpeter-Freeman-Perez cycle

Periodicity in physical layers

But, both suppose technological shockwaves after rather randomly chosen innovations, in order to fit the economic figures. The technological cycle in and of itself may be an independent layer with an even longer cycle. Its ‘spring’ is the emergence of fundamental inventions, and its ‘autumn’ follows with less inventive practical implementations and combinations. The technology of converting energy, material and information may be crucial. The Dutch expansion in the 17th century was based on peat and wind, the English economy in the 18th and 19th century on coal, and the 20th century the US economy on petrol. The next is surely going to be based on the sun. It was closely related to the chemical conversions of matter (steel, plastics). Breakthroughs in the conversion of information (mathematics, the art of printing, the microscope and telescope, radar, the transistor) were often the result of war. The ecological cycle in *Fig. 229* is more based on what I hope, while the spatial cycle is what I fear. But, the most important conclusion from these graphs is, that the wavelengths can differ per layer. In each layer expectations and intentions may have a different time span.

7.3 Social and physical layers

Interests

Spatially relevant projects require spatial, ecological, technical, economic, cultural, managerial and political support, contributions and resources. The reverse, realisation, will generate positive and negative impacts in these layers. They are divided into specialised sectors, with different time spans and levels of scale. As a designer, you must be aware of the sectors involved, and be able to imagine their possibilities, expectations and intentions. Representatives from these sectors will ask you to balance their interests through design. But, they will evaluate your design against the background of the opportunities and risks for their own interests. As a designer, you have to convince them about the right balance. The selection and sequence of your arguments determine whether it will be convincing or not. The accidental audience determines the most appropriate selection and sequence. If the audience is mainly interested in profits and costs, then you may give priority to the economic arguments. If your audience is mainly interested in the reaction of their voters, then you may give priority to political arguments. But an audience may be composed of different sectors.

The sequence of argumentation

Stressing possibilities, expectations, or intentions requires different sequences, and different language games. As a designer, you may be inclined to stress the possibilities of your design. But, do they also extend the possibilities of your accidental audience? Could local or regional politicians sell your arguments to their backing? Do managers share your optimism in the time and space available? Does the audience share the tacit suppositions of your own subculture of designers? Is it mainly tradition-directed, or is it open to experiments? Are they convinced enough about the profits to accept economic risks? Are there independent technical experts present to share your optimism about the practicability of your design? Could you promise enough possibilities for environmental concerns? Could you please the neighbours of your object with the way you occupy their space? And so on. May be you have to change your language into a game full of metaphors about the possibilities in the direction of the expectations of your audience. Seduce them by realistic prognoses by officials in their field. Warn them of the trends by which they will be behind the times after the realisation of their project. But, the safest way is to study their own previous plans beforehand, to get acquainted with their intentions, and to follow every detail of their brief. Then, you can gradually change your tone into the expectations about the future context, and the possibilities of your design beyond the brief. Let me describe these interests with some irony and exaggeration to remain short in a field I am not very experienced.

Political arguments

Politicians simply determine what we can do together, and what you have to do on your own. Our political representation moves to the left and to the right in a cycle of, say, 7 years. It transports local tasks into municipal, regional, national or international levels of scale, and the reverse. Going right requires removal of public services, going left requires more governmental initiative and consequently higher taxes. The time span covering the realisation of your design and its use, determines the future political context of its existence. Politicians speak the language of desirability, which is a little limited by possibility. They are used to uncertainties, but they are less impressed by probabilities. Civil servants are used to changing the representation of their intentions at the municipal, regional or national level. It is not their fault if they have changed their mind in the next meeting. You serve them best through multi-functional design, or through arguments with something for everyone.

Managerial arguments

Management can be considered short term politics, and at a lower level of scale. It determines what can be contracted out, and what can be done in house. In this case, however, going left requires less managerial initiative, going right the more so. It is a nice example of the scale paradox. The prestige of managers depends upon their capacity to

change things within the period of their assignment. The direction is less important. The typical three year manager thus is inclined to make a U-turn compared to the direction of the previous manager, in order to stress what has gone wrong. After six years s(he) then has returned to the situation where the previous manager started, again causing the well-known problems from six years ago. But that phase of the sinus is forgotten by the actual crew. It gives way to the next manager and U-turn. So, if you do not meet the appropriate management for your project, then wait until the next U-turn. The most convincing argument for managers is either no argument, unless it is speed.

Cultural arguments

Cultural arguments range from traditional to experimental, but the most convincing argument is one that causes an increase in recognition, and a little bit of surprise. In this language game, metaphors and references to ancient designs are very useful, even if none of them are recognisable in your design. Culture is the set of shared suppositions in communication. Professionals in this field do not want to show their lack of understanding tacit suppositions. They will mainly object against a lack of references.

Economic arguments

There are two economic arguments: costs and profits. The costs are more predictable than the profits, because of the shorter time span of their appearance. Consequently, your arguments about the profits are less convincing, because speculating about the profits is the main territory of economists. Reducing the costs is the lesser part of their education. So, make your design more expensive than necessary, and let them delete the details you made for that purpose, in order to reduce the costs until they reach the quality you desire.

Technical arguments

Technicians do not like arguments, they primarily want to solve problems. So, give them interesting problems. They solve problems by combining or separating elements of construction. Separation is often more expensive. If that is the case, then separate elements in your design, and let them propose combinations. They then reduce the costs that the economic partners want to reduce. If separations are cheaper, then defend your combinations, and accept your defeat with a smile.

Ecological arguments

Schools of ecology are as diverse as nature itself. Consequently, diversity should be their message, but it is not. Their advise is very homogeneously to save energy, because it saves money and that is what everybody wants. The increase of CO_2 is a great thread for biodiversity indeed, but if saving energy would be the solution, then you should forbid the sun to shine, because it is wasting so much energy. The energy problem cannot be a durable problem, but the remaining CO_2 problem cannot be solved easily through spatial design. Remember, the original task of ecologists concerned biodiversity and human health. They will be grateful. Finally, they will advise diversity, and that is precisely what you can offer them through design.

Spatial arguments

Your colleagues in spatial planning and design may be even more diverse than ecologists. They will object from different levels of scale and time spans in different ways. Show them the picture of the scale paradox of *Fig. 7* on page 21 in order to explain that their adverse advice fits at your level of scale.

Divide and rule

This ironic summary may be perceived as advice on how to manipulate advisors, but it is a counterweight against the implicit uncertainty of their specialised professions. The sequence of their contribution may either successively trim down your plan, or enrich it through the procedure of having to resolve a diversity of conflicting advice simultaneously. Space has the precious faculty to house contradictions.

7.4 Future contexts

Creating a common future

The time span that covers the realisation of your design and its use determines the future context of its existence. The impacts of your design are estimated based on current experience, but they may be different in the future. The expectations of specialists about the future context are different. Exposing them to each other may result in a greater flexibility of their intentions. You may balance their contribution, if you ask them to make their expectations more explicit *before* they have expressed their intentions. If you manage to agree about one probable future, then the estimation of the different effects of your plan are put into perspective. If there are more probable futures, then your design should be *robust* enough to survive them all. Coordinating expectations about the future context avoids premature rejection of your design.

Extreme scenarios

Politicians did not foresee the emergence of nationalist parties. Architects, fashion and car designers did not foresee the emergence of a retro taste. Economists did not foresee an economic crisis. Technicians did not foresee a shortage of rare earth elements. Ecologists did not foresee the appearance of rare species in urban areas. Spatial designers did not foresee the disappearance of shops and the return of work at home by the internet. Their expectations are narrowed by their most recent specialised experiences. Extreme scenarios about *possible* futures may be useful to widen their expectations, their power of imagination and to make their intentions more flexible. But, they are time consuming. Asselt[a] detected 200 scenarios made in the Netherlands in 10 years between 1995-2005. They ranged from world scale to municipal scale, covered short and long time spans, and concerned one or more sectors.

Fig. 231 CPB 2004 scenarios 2040[b]

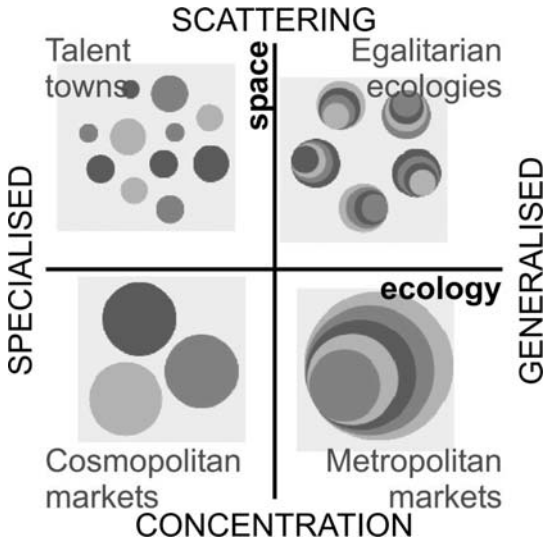


Fig. 232 CPB 2010 scenarios 2040[c]

In 2004 and 2010, the authoritative national 'Central Planning Bureau' (CPB) made four different national scenarios each time, both with a time span to 2040 (see *Fig. 231* and *Fig. 232*)[d]. In 2004, four scenarios were extreme on two axes: the size of the market and political

[a] Asselt;Plas;Wilde(2005) *De Toekomst begint vandaag. Inventarisatie Toekomstverkenningen.* (Maastricht) Faculteit der Cultuurwetenschappen, Universiteit Maastricht

[b] Mooij;Tang(2003)*Four futures of Europe*(The Hague)CPB
Huizinga;Smid(2004)*Vier gezichten op Nederland*(The Hague)CPB

[c] Weel;Horst;Gelauff(2010)*the Netherlands of 2040*(The Hague)CPB

[d] http://www.nl2040.nl/publicatie-deell-oudescenarios.htm

orientation. In 2010, the axes were extreme on the spatial distribution and 'ecological' task division. The first stressed the national level, the second the urban scale. There are, however, more levels of scale, time dimensions and relevant axes. For example, technology has changed the world more than any other dimension.

Technological extremes

The invention of a usable steam engine (1782), a usable petrol engine (1885) and the transistor (1947) have widened the possibilities of economy, culture, management and politics substantially. Making use of these possibilities has increased their freedom of choice. It has diversified possible futures. It is a serious omission that none of Asselt's 200 scenarios or the CPB scenarios do have a technological axis. But, how to imagine technological extremes at different scales and time spans? The economic axis may range from international expansion into national or local shrinking. It may stimulate a cultural trend into either experimentation or tradition and history. The political axis may range from public to private, resulting in a more active or a more passive management. The 'ecological' axis may range from specialised into generalised. The spatial axis may range from concentration into dispersion. But, how to formulate the extremes of technology, which are a substantial driving force behind all of them? I pondered this question for a long time. The extremes of technology have a relationship with the conversion of materials, energy or information, but these factors do not result in consistent extreme scenarios. Moreover, could you give such factors a different meaning at different levels of scale? How to find an axis of extremes that may differ at different levels of scale? I found a more abstract solution for the technological extremes: separation and connection, division and combination of functions. It results in different technologies at different levels of scale.

Extremes of division and combination

At a world-wide scale (R = 10 000km), anything is 'combined', but the continents (R = 3 000km) may divide their tasks and become specialised by different products of agriculture and industry. This specialisation will determine if there is an intercontinental exchange of shipping products over the oceans. This exchange results in very different technological scenarios. Subcontinents (R = 1 000km) may or may not become specialised, e.g. dividing or not dividing tasks of production or distribution, which again results in very different scenarios, based on different technological possibilities of exchange. States, regions, conurbations, towns and districts of towns may divide their other tasks based on still other technological developments. Traffic systems R = 30m may tend to divide or combine different kinds of slow and fast traffic, building technology R = 1m may tend into division or combination of stress- and pressure-resisting components. And so on, to the scale of chemical division and combination of atoms at the nano-scale. In fact, it is an axis similar to the 'ecological' axis at the urban scale of *Fig. 232*. But ecology does not divide 'tasks', it only shows or doesn't show diversity at any scale level.

More axes and levels of scale

Any axis that is added to imagine different possible future contexts for your project doubles the number of scenarios that need to be elaborated. The two axes of *Fig. 231* and *Fig. 232* produced 4 scenarios. Combining them into 4 axes containing extremes of policy, economy, 'ecology' and space would produce 16 scenarios. But, again adding extremes of technology and culture would produce 64 different scenarios. If furthermore you would take their possibilities at any level of scale mentioned in *Fig. 233* into account, then you would require 5 444 517 870 735 020 000 000 000 000 000 000 000 000 scenarios. This may be a little bit too much to make your guests aware of a possible future context where the impacts of your design may be different from what they currently assume. But, there is another way to obtain one or more rough perspectives, relevant for your project. Ask every participant what (s)he expects, seen from her or his own position, and take their combined view as your common future, in order to balance their intentions , and put them in perspective. The next section elaborates on a method to do so in a quarter of an hour.

7.5 Balancing intentions[a]

An inventory of possible impacts

The realisation of a spatial object affects external interests positively or negatively. To balance conflicting interests, you can make a rough inventory of intended and possible impacts, even before you start studying or designing the object itself. The programme or brief of your design is nothing else than a summary of the expected positive impacts (see *Fig. 47* on page 91). A summary of impacts suggests which potential partners you should invite for participation or negotiation. You may intend or expect social impacts (governmental, managerial, cultural and economic) and physical impacts (spatial, ecological and technical) at different levels of scale.

Different effects at different levels of scale

Building a sustainable house may cause positive effects for the individual and the global community, but it may spoil the view of your neighbours, and consequently decrease the value of their house. Establishing an industrial plant may provide employment for the region, but it may cause environmental problems in its neighbourhood and exhaust the resources of the Earth. If you upgrade a city centre serving R=3km, then the district centres serving R=1km may decline, giving new opportunities for neighbourhood shops serving R=300m. If you argue that upgrading the city centre provides new opportunities for neighbourhood shops, then, for the sake of convenience, you might overlook the consequence in between, the decline of the district centres. How many levels of scale do you have to check if you do not want to overlook effects at *any* level of scale? If you take *Fig. 7* on page 21 seriously, then the levels of scale must differ by approximately a linear factor of 3. It comes down to 22 levels of scale between the Earth and a grain of sand (see *Fig. 233*).

Fig. 233 Relevant levels of scale (expressed in R) to check possible impacts

The named radiuses R={10 000km, 3000km, 1000km, …1mm, <1mm} are not exact measures, but 'nominal values' as explained in *Fig. 17* on page 52. They may overlap.

The object and its context

Fig. 234 represents a building complex in its context. This *object* is represented in the (spatial) bottom layer as 'O', ranging to 'o'. The rest is *context*. 'O' is the frame (R=30m) of the building complex. Anything larger is context. Its grain 'o' (r=300mm) is the smallest component taken into account. Anything smaller (e.g. building materials) is also 'context'. Even if you do not know the impacts of the intended building complex and its components in this context exactly, you may have an idea whether there will be governmental, managerial, cultural, economic, ecological or spatial impacts at different levels of scale. You may only *locate* them in the layers and levels of scale where you expect *any* impact, even without specifying them. Positive impacts may become part of your programme (P in *Fig. 234*).

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[a] Parts of this section were published earlier in Jong(2007) *Context Analysis.* **IN** Bekkering;Hauptmann;Heijer;Klatte;Knaack;Manen**,** *The Architecture Annual 2005-2006. Delft University of Technology* (Rotterdam) 010 Publishers p92-97

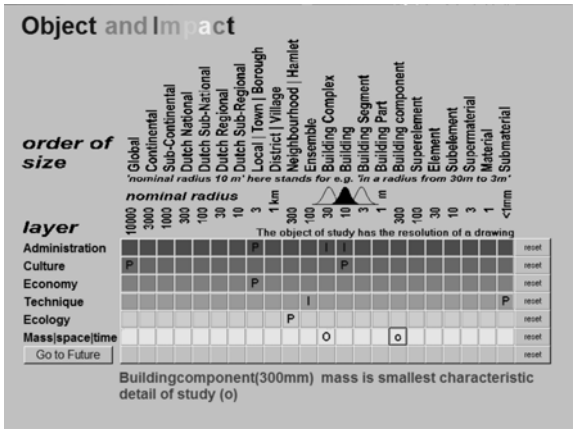

Fig. 234 Locating impacts (I) and positive impacts (P) as a programme of object O...o

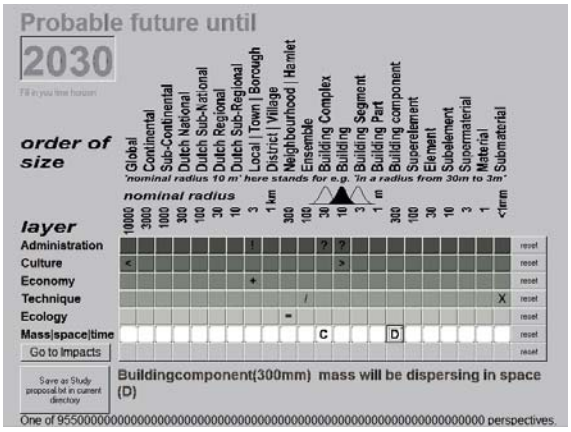

Fig. 235 Making expectations about the context of these impacts in 2030 explicit

You may invite representatives from the indicated positions to discuss your project. Ask these clients, partners, stakeholders and those having any other interest in your object whether they expect positive (P) or uncertain (I) impacts. This delivers a set of possible impacts in the context of your object.

Future context

But, the impacts will be different in different *future contexts*. For example, any impact will be different in a context of growing economy compared to a declining economy. Therefore, you may ask your guests their view on the future, based on their position, in the given time span. *Fig. 235* shows an example of which future they could expect in any position. At different levels of scale, the government or management may be active or passive, the culture may be innovative or traditional, the economy may be growing or declining, the technique may develop more divisions or more combinations, the ecology may be diversifying or equalising and objects (mass) in space may concentrate or de-concentrate. In fact, you make a scenario, based on views from the different positions involved. If you do not agree about one scenario, then you can make more scenarios.

Impacts depending on a probable future context

If the expectations about the probable future within which your object will have its impacts are clear, then you may specify these impacts in this context further. They may raise new intentions at the different positions, as they are coordinated by a common scenario. It is important to be explicit about these expectations, because people with other future contexts in mind will judge your initiative with other suppositions about the probable future. They can reject your study solely on that basis. If you have made your suppositions explicit beforehand, you can ask them to judge the qualities of your study or design again, but now within that perspective. It could raise an essential debate about the robustness of your study in different future contexts. So, it can be evaluated also against the background of different, but determined perspectives.

The FutureImpact computer program

To agree with stakeholders and specialists beforehand about a common vision on supposed futures, I developed a simple computer program called 'FutureImpact'[a]. 'FutureImpact' can be used by individuals or groups. The program delivers a more precise division of orders of size and layers, as shown in *Fig. 47* on page 91, through the use of separate buttons. They allow to chose two very rough extreme values per button to maintain an overview (see *Fig. 234*). In the second screen (*Fig. 235* left below) you will find a button that produces text in

[a] Downloadable from http://team.bk.tudelft.nl/Publications/FutureImpact.exe or http://team.bk.tudelft.nl/Publications/FutureImpact.zip

the map where you stored the program. It is a text to be elaborated into a report or study proposal. It contains all given the inputs at any level of scale and layer already systematically divided in chapters and paragraphs. Once you have located possible impacts, the future context of these impacts determines their possibility of realisation. For example, if you suppose desirable impacts in municipal administration (R = 3km, see *Fig. 234*), how then, could you estimate their value without any supposition about their future managerial context, in the period these impacts should be realised (e.g. until 2030 chosen in *Fig. 235*)? Is it an active management context with many initiatives, or is it a passive administrative context that just checks and controls the rules? In the last case, other initiatives should be part of your own project, in order to have the intended impacts realised. The same applies to the administrator of the building complex (R = 30m) and the users (R = 10m). And, these impacts can be opposite at these different levels of scale.

Roughly typing the social future context

The computer program follows the distinctions from page 256. For administration and management, it distinguishes opposites of initiative ('!', as symbolised in *Fig. 235*) and checking and controlling '?'), applicable at any scale level. There are many other possibilities to type administration and management style, but this variable hits the core of management itself, in that it is relevant for design and applicable at any scale level. But what about culture? For example, what does culture mean at the level of building material (R = 1mm)? To include any scale level, the program distinguishes 'traditional' (<) opposed to 'innovative' or 'open to experiments' (>). For example, if your study will have impacts on households (R = 10m), and these households are mainly traditional, it will be difficult to confront them with an experimental design. However, if your client is an innovative housing corporation (R = 1000m?), you will get support from that side. That cultural context will influence your study and your presentation, and the way you will arrange your arguments. The economic context has been characterised minimally through growing (+) and declining (-). That can be different at different levels of scale. The economic context could be a declining neighbourhood within a prosperous municipality. A context like that will determine a project or an assignment to a considerable extent.

Roughly typing the physical future context

Which extremes could be found to characterise the technological context at any level of scale? According to the distinctions from page 256, the program allows to choose internal separation (/) and combination (X) of functions as relevant and essential technological context values. It is also an essential design choice at every level of scale: shall I separate or combine pressure and tension (R = 10cm), separating and supporting functions (R = 1m) within my construction, cook and eat in my kitchen (R = 3m), live and work in my neighbourhood (R = 300m)? If the probable trend is to combine living and working at a district level (R = 1km), then you still can separate it at the level of the neighbourhood (R = 300m) or the building complex (R = 30 m). That kind of expected context is important for any design decision.

In ecology the program allows to choose diversity or heterogeneity (|), as opposed to equality or homogeneity (=). Which kind of diversity it concerns could be elaborated later: diversity of plants, animals, or people, households with the same or different age, lifestyle or role-emphasis (e.g. familism versus careerism).

At the purely physical level of mass and space in time, accumulation, concentration (C) of masses versus sprawl, and de-concentration (D) are essential design context factors. What is called mass could be specified later, but concentration and de-concentration (state of dispersion) of legend units in a drawing are characteristics of form and composition at any level of scale. They can differ per level of scale (see *Fig. 236* and *Fig. 237*).

An existing or expected scale sequence like DCDC or its reverse CDCD (concentration accords) identifies some global characteristics of form. I will elaborate on the 'state of dispersion' more in detail, because it is relevant in other layers as well.

States of dispersion

Form as a primary object of design supposes a state of dispersion of an arbitrary legend unit, e.g. built-up area. Scale articulation is important to distinguish states of dispersion. That is not the same as density. Considering the same density, different states of dispersion are possible (*Fig. 91*) and that is again the case at every level of scale (*Fig. 95*). *Fig. 91* shows the use of the words concentration (C) and de-concentration (D) for *processes* into states of more or less accumulation, respectively. When applied to design strategies in different levels of scale, I would speak about 'concentration accords' (*Fig. 95*). In *Fig. 95* the *regional density* is equal in all cases: approx. 300inh./km^2. However, in case CC, the built-up area is concentrated at both levels ($C_{30km}C_{10km}$) in a high *conurbation density*: (approx. 6000inh./km^2). In the case CD, people are de-concentrated only within a radius of 10km ($C_{30km}D_{10km}$), into an average conurbation density of approx. 3000 inh./km^2. In the case $D_{30km}C_{10km}$, the inhabitants are concentrated in towns (concentrations of 3km radius within a radius of 10km), but de-concentrated over the region. Since 1966, this was called 'Bundled de-concentration' (RPD, 1966). The *urban density* remains approx. 3000 inh./km^2. In the case $D_{30km}D_{10km}$, they are dispersed at both levels.

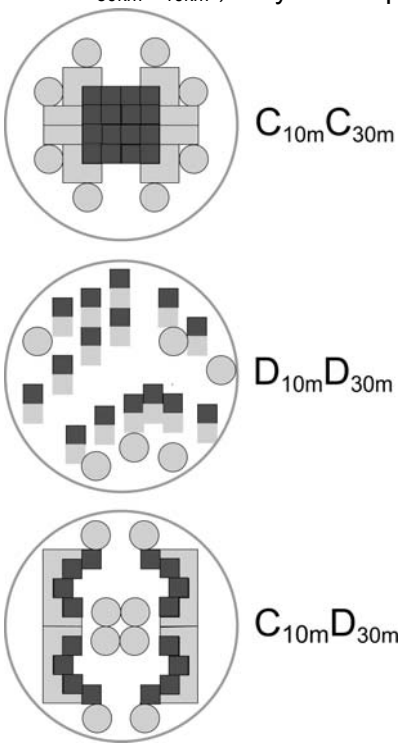

Fig. 236 States of dispersion R=30m

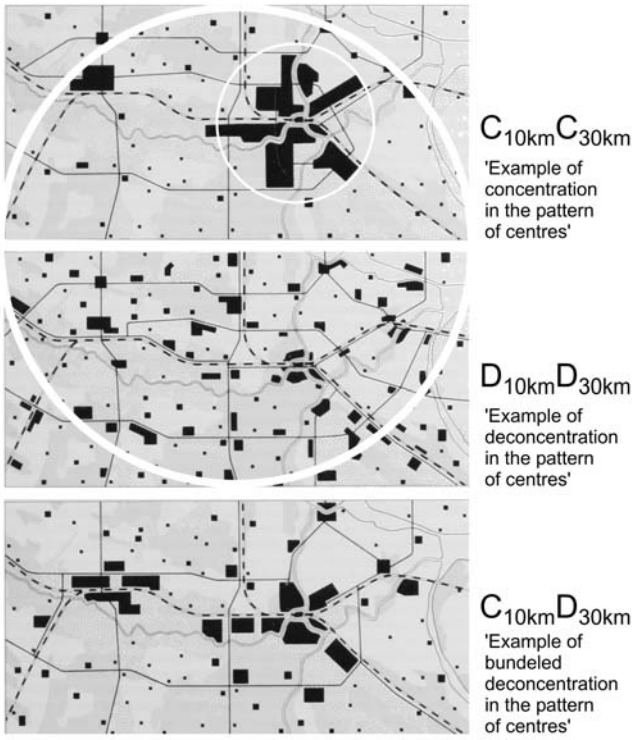

Fig. 237 Accumulation, Sprawl, Bundled De-concentration R=30km[a]

Desirable, probable and possible future contexts

There are three language games ('modes') concerning the future context that are relevant for urban, architectural and technical design, and their stakeholders and specialists (see *Fig. 1*). By not distinguishing these modes of future, a confusion of tongues between stakeholders aiming at *desirable* futures, and specialists predicting *probable* futures and designers exploring *possible* futures, results. Distinguishing them properly can deliver an outline of fields of problems and aims that should be taken into account.

Subtracting probable and desirable futures

Probable futures we do not want are a field of problems (see *Fig. 238*). Problems are predicted or signalled through specialists' empirical studies.

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[a] VROM(1966) *Tweede Nota Ruimtelijke Ordening* (Den Haag) Staatsuitgeverij

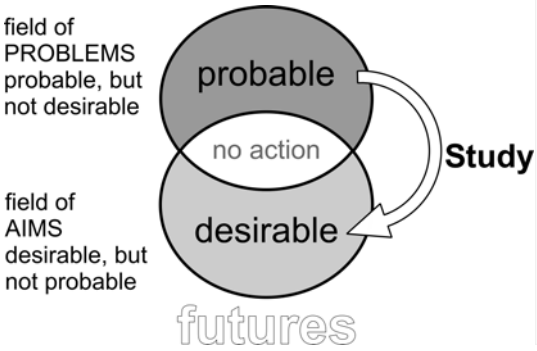

Fig. 238 Subtracting futures into fields of problems and aims

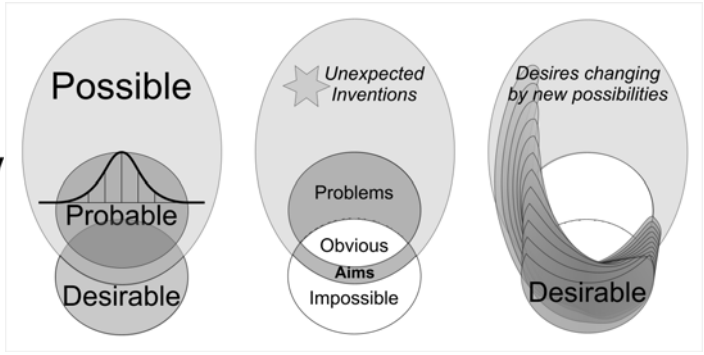

Fig. 239 Adding possible futures, changing desires into unexpected possibilities

Desirable futures that we do not expect to happen without action (like desirable but not probable futures) are a field of aims. Clients, stakeholders and their representatives (administrators, managers) deliver a field of aims. Sometimes it is a battlefield. Often not all of them are possible in one project. The designer guards and extends the possibilities through design.

Adding possibilities by design

Anything probable is per definition possible, because if something is not possible, it certainly is not probable. But not all possible is also probable (see *Fig. 239*). There are improbable possibilities. To find these improbable but possible futures (including and using the many probabilities of specialists as possibilities) is the task of the designer. S(he) is supposed to know many possibilities that stem from design and typological research (see *Fig. 50*). Sometimes s(he) adds possible futures no one in the team could imagine, let alone desire beforehand. Their desires and aims that were embodied in their program of requirements, were limited by their imagination. Desires can change as soon as new possibilities are imagined. That is why design can change a program of requirements.[a]

The context of invention

The designer has a personal context that is relevant to be selected for, or to propose, a specific design study. It contains her or his field of abilities (portfolio, own work) and field of design means (repertoire, studied references to the work of others). S(he) is supposed to have gathered many preceding examples (precedents), and to have studied them by design research and typology (see *Fig. 50*). They should explore the design possibilities by pulling them out of context, and processing them into a new context.[b] S(he) is supposed to be able to apply, process and extend them in a given context, which can be proven through their portfolio of work. Of course, s(he) is moulded and limited by education, colleagues and friends. But the available portfolio and repertoire can be included in a study proposal for possible futures in a more or less determined context.

Limitations of a design related study proposal

To make a study proposal, teachers and clients often ask a clear cut problem definition and clear cut aims, a hypothesis, an overview of methods to reach the aims that are tested by the hypothesis, a planning of time and means (data!) and a list of expected results. I suppose that my proposal to weaken the problem~ and aim definition into a broader *field* of problems and aims will meet objections: “Without a clear problem~ and aim definition, any scientific study becomes boundless!” That is an objection that typically stems from the

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[a] Weeber;Eldijk;Kan(2002) *Designing a City Hall* **IN** Jong;Voordt, *Ways to study and research urban, architectural and technical design* (Delft) Delft University Press

[b] Hertzberger(2002) Creating space of thought **IN** Jong;Voordt**,** Ways to research and study urban, architectural and technological design (Delft) Delft University Press

practice of empirical research, which focuses on truth or *probability*, and aims at *desirability* (see *Fig. 238*). However, a design related study focuses on *possibility* (see *Fig. 239*). In the field of urban, architectural and technical design or management, there are other general limitations that prevent a boundless study. To the weakened 'fields' of problems and aims, a scale, a repertoire and a portfolio can be added. These five limitations can be gathered from a proper context analysis when introducing the proposal. More than in empirical research (principally repeatable by others), in design study (principally not repeatable by others) the field of abilities and means of the person executing the study are relevant for the expected result. Once these fields are presented, you can choose two different directions of study: elaborating on these fields to improve them, or explore new fields of design means and abilities. Both are legitimate, but their results are inherently different, and should be mentioned at the beginning of the study proposal.

The content of a design related study proposal

The limitations of empirical research result in problem isolation that is not suitable for studies related to context sensitive urban, architectural and technical design or management cases. That kind of study can utilise other limitations to prevent a boundless study project: a determined scale (frame and grain), the field of design means (repertoire) and the field of abilities (portfolio) of the person executing the study. By adding these limitations the ceteris paribus isolated problem~ and aim statements can be broadened into the description of a *field* of many coherent problems and conflicting aims, to be recapitulated in a concept. To provide for these limitations, a design related study proposal should be preceded by a context analysis that contains many elements that are otherwise dispersed in the proposal. So, the proposal itself can be short. Such a context analysis is possible even if the object of study is still variable beforehand, like a design. For example, the contents of a study proposal then could be as follows.

1 CONTEXT ANALYSIS
1.1 Object of study: time span, frame and grain
1.2 Probable future context: field of problems
1.3 Desired impacts of study: field of aims
1.4 My references and repertoire: field of means
1.5 My portfolio and perspective: field of abilities

2 STUDY PROPOSAL
2.1 Location or other future context factors
2.2 Motivation or program of requirements
2.3 Intended results, contributions and planning

3 ACCOUNTS
3.1 Meeting criteria for a study proposal
3.2 References
3.3 Key words

The last button of the FutureImpact computer program produces a text with these chapters, asking many questions that require user input, in order to elaborate on solutions in greater detail. The sections 1.1 – 1.3 are already elaborated according to *Fig. 238*, through the automatic subtraction of the probable and desirable futures that were provided via user input. That text should be modified by the user thoroughly, it is nothing more than a checklist, with many suggestions for elaboration, according to the given input and the method proposed here.