Any 'function' supposes a level of scale

A good example of change of meaning through the scales is the concept of 'function', so often used in designing.[a] This change of meaning is already detectable linearly by a factor of 3 (around 10 in area), be it often unnoticed.

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a That function concept for the design is central, for example in Kroes(2006)The dual nature of technical artefacts(Studies in History and Philosophy of Science)0301 Vol 37 nr 1. In this, hardly any attention is paid to the scale on which people can speak of 'function'.

b With this 'nominal radius' R is meant here an element from a series of dimension *names* that each do not exactly represent the radius of the circumscribed circle, but a radius that lies between the previous R and following in that series. A small r then concerns the inscribed circle (resolution).

What is the function of a brick (nominal radius[a] R=10cm), a window (R=>30cm, a door (R=1m), a room (R=3m), a house (R=10m), a building complex (R=30m), an 'ensemble' (R=100m), a neighborhood (R=300m), a district (R=1km), a city (R=3km), a conurbation (R=10km), a metropolis (R=30km), a region (R=100km), a country (R=300km), a continent (R=1000km), yes, what is the function of the world?

Any 'intention' supposes functions and therefore a level of scale
The term 'function' is often understood 'teleologically' as purpose. I can, however, imagine unintended functions, but I cannot imagine an intention without intended functions. A design has more unintended effects than intended.
If intention *supposes* function, and function is scale-sensitive, then 'intention' is also scale-sensitive.

Politics is a good example of scale-sensitive intentions.
If you define 'politics' as looking for an answer to the question 'What should everyone do *for themselves* and what should we do *together*?', then scale-articulation is necessary to distinguish intentions. What do we do together at the level of a house, building complex, ensemble, neighborhood, district, city (municipality), regionally, nationally or internationally and what are we going to decentralize again?

Every political party assumes scale levels in its program where 'for themselves' and 'together' acquire a different meaning.

The meaning of 'function' changes from physics into humanities
Administrative, cultural, economic, technical, ecological and physical *functions* differ substantially in meaning. Moreover, at every level of scale any of these functions can get a different meaning and priority or dominance.

'Function' hides an inside-outside paradox
If you define 'function' as operation or working, then you should distinguish an inward and an outward function. A house has an inward function for its residents, but also an outward for the neighborhood, the city and so on.
A car is *constructed* and *used*. Its internal structure should fulfill the function of moving a mass, but it has also an external function for a family, a business, a city and so on. A ball is hollow to function light and elastic and convex for playing.

'Function' supposes structure
I can not imagine a function without an external *structure* (a set of connections and separations) within which it operates (eg a manager supposes an organization, an aeroplane supposes airports and free air). A function supposes, however, also an internal *structure* (its construction) through which the facility can operate at all. On its turn, 'structure' supposes a dispersion in space and time, a 'form(ation)'.
'Function' therefore also supposes 'form'.

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a With this 'nominal radius' R is meant here an element from a series of dimension *names* that each do not exactly represent the radius of the circumscribed circle, but a radius that lies between the previous R and following in that series. A small r then concerns the inscribed circle (resolution).

Combination of functions saves space, specialization saves time.
This may be a bold statement, but it is an actual dilemma in many designs. 'Function' supposes dispersion (form) and duration (formation) in space and time. In many contexts space and time are precious resources. The statement supposes some ('perpendicular'?) complementarity of functioning (***Fig. 48*** p53).

The mathematical function reduces 'function' to operations on numbers
This limited use of the concept 'function' is elaborated in chapter 6 p153

ANY DESIGN IS MULTIFUNCTIONAL
In order to design a non-existent object, you can start with the function ('functionalism'). That is a widely used methodical goal-oriented start. However, there is rarely *one* 'monofunctional' function or operation at issue.
There are for example always financial consequences and there are often more stakeholders with different intentions (built upon the different suppositions mentioned above) enabling to use different functions of the same facility.

In this way, each design is in principle multi-functional. A program of requirements is an enumeration of desired functions, but that is seldom complete if you take every scale, direction, context and structure into account. Some functions are so obvious that they are not in the program for a home. The designer also often finds function possibilities that no one has anticipated, such as a door in which you can also sit[a].

If the overview of all these functions in the target field is no longer guiding because of the multiplicity, a designer can also start in a resource-oriented way with available contexts, materials, possible forms or structures.
A sketch of shapes or structures can sometimes suddenly offer space to all requested functions in unexpected combinations and still add functions that fulfill unspoken wishes.[b] The program of stakeholders can therefore change.[c]

Content, form, structure, function and intention, as object layers of their own, suppose each other in a conditional sequence: no intention without a vague or concrete representation of some function, no function without structure in or by which it can function, no structure without a form (state of dispersion) in which it 'takes place' in space, and no form without material ('content') that can take this form.

This conditional sequence does not yet play a significant role in the order of the *design process*. A designer sketching forms is still free to alternate the focus arbitrarily to the content, structure, functions or intentions. This means that different skills are alternately adressed, and that can provide new perspectives and inspiration. The focus changes can follow each other quickly or slowly. That is why there are so many design methods.[d]

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a An example from the lectures of Aldo van Eyck in the 70s at the TUDelft about the huts of the Dogon people in Mali.
b Designers of a new large urban district (I will not name the location) stated that they had not studied the piles of municipal files with requirements and wishes, when they surprised the stakeholders with a design, that almost all requirements and wishes had been met.
c Jong;Voordt(2002)Ways to study and research urban, architectural and technical design(Delft)DUP p271.
  http://www.taekemdejong.nl/Publications/2002/29 PROGRAMMING OF BUILDINGS from Jong(2002)WaysToStudy(Delft).pdf
d 'Meta-hodos' is Greek for 'the way along'.

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The conditional sequence is, however, important for realization, and in that sense a designer can anticipate this in the design process in order to shift focus once again. At the end of the design process it is a checklist to check the designed object for its practical-conditional coherence ('evaluation' afterwards).

A similar conditional set of possibility conditions exists for the *context* in which the designer is placed with a not yet developed object at the beginning of a design process. There are physical, biological, technical, economic, cultural and administrative conditions that suppose each other in this order.

At least I can not imagine a management if there is no culture (authority, language, motivation) that carries it. I can not imagine a culture that can maintain itself without an economic base, no economy without the existing technology that makes it possible, and so on.

The estimation of such a context and the utilization of its possibilities requires again different specific skills from a designer, prior to those required for the determination of content, form, structure, function and intention in the design process itself.