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# Imagineering: a model approach for futuristic design thinking in urbanism

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**Under the prevailing condition of uncertainty that postulates the impossibility of predicting the long-term future of the contemporary urban societies, spatial planning and design, seemingly, require new methodologies for an effective future perspective on the human settlements. Used to rely on forecasting as an extrapolation technique projecting no further than 15–20 years ahead in practice, the profession largely falls insufficient to suggest a forward-thinking approach, today. To transcend such settled 'short-termism' in urbanism, new futuristic methods enabling designers to come up with more articulated ideas on future forms and patterns (despite the restricting cognitive effects of complexity, and those of the actual context) are needed. In this regard, the paper revisits the idea of 'imagineering' to increase the foresight capacity of urban designers in the generation of futuristic urban scenarios in an effective manner. Based on some selected works conducted in METU Master of Urban Design Studio, Ankara, Turkey, the cognitive power of imagination and the methodical use of 'backcasting' are argued as the proper methodical framework to empower futurist design thinking in urbanism.**

## 1. Introduction

Considering the contemporary agenda of the urban theory which tends to come up with a series of frequently altered new conceptualisations for the age-old problem of liveable human environments, and the dominancy of the short-term, market-oriented pragmatism of the practice, one could argue that imagining new life forms of urban societies is the lost art in urbanism. In the face of hasty calls for urgent solutions to the grand socio-political issues emerged (i.e. recovery after urban warfare, social integration after massive migrations, global warming), design thinking in urbanism has been mostly limited to the search for 'smart' restorative interventions as partial solutions to the big problems. The given condition turns urban design into an operationally reactive and politically conservative field, mostly, in education and practice.

It is possible to argue that the above-mentioned condition is also influenced by the enduring critical perspective against the modernist utopian thinking based on central control and holistic order by total design approach (For the pioneering manifestations of that critical theory, see Jacobs (1961 [2000]), Alexander (1966), Rowe and Koetter (1978).) Still retaining its political relevance within increasing complexity of the contemporary urban societies, such a critical standpoint essentially conditioned the loss of the impetus for the so-called 'futuristic thinking' in urbanism.

As the leading concept of a particular modern artistic and political movement, 'futurism' originally was coined by the Italian avant-garde movement in the early 20th century (Poggi, 2009). Turning the conception of future into an ideological statement (along with the empowering fascism in Italy at that period of time), futurists hailed the notions such as speed, technology, motion and energy for the dynamic representation of the emerging industrial city and society (In the contemporary conception, the term widely implies the style or idea emphasising the optimistic and proactive approach to the future rather than the artistic movement itself.) (Goodman, 2008: pp. 55–57; Hunt, 2005: p. 158). It is not coincident that the notion of future as a renewed systemic idea (declared with the annexation of '-ism') was originated by visual arts of which the prominent intellectual production is the image. This is mainly due to the reason that thinking about future necessarily involves the act of imagination, illustrating any future condition by the enhanced cognition of visual thinking. As originally argued by Polak (1973), the creative capacity of the human mind in the formation of the images of the future has acted as the fundamental intellectual driving force of the Western civilisation in history. The basic supposition, here, is that effective descriptions of the future could guide social politics through a clear choice of alternative visions while initiating a rational optimism in the democratic society in the way of collective construction of positive transformations in future (pp. 1–23).



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Although some people would consider the asserted role of the 'image' overrated in the formation of normative political theory, one could easily acknowledge the cognitive power of visual thinking to convey the ideas, especially on the collective future with full of ambiguities (Bishop and Hines (2012) explain that point regarding the intrinsic capacity of human cognition. To them, human intelligence has been evolved with the inherited superiority of the visual cortex by which the images convey meaning more immediately and effectively in portraying the future (p. 239). This point was originally elaborated on a cognitive basis by Arnheim (1969) asserting that 'vision is the primary medium of thought' due its rich information content about the world (pp. 18, 232).). Pollastri *et al*. (2018) discuss the role of image and visualisation in provoking critical reflections on future urban strategies. Likewise, Toland and Kilbane (2018) dwell on the power of large physical models as communicative envisioning tools to explore future possibilities. Within such a broader context, the role of spatial design of which the major medium of communication and the fundamental source of (intellectual) production is the image itself – conveyed by various types of drawing such as plans, sections and perspectives (Laseu, 2001) – gets critical on a theoretical basis.

At that point, it would be useful to mention the 'futures studies' (or the so-called *futures research* and *futuristic*s) (Though there is a common tendency to use the terms, 'futures research' and 'futures study', interchangeably, Slaughter (1993) points out the underlying difference between those fields. Accordingly, while the former implies the search for future based on empirical and analytical methods through forecasting and planning, the latter is concerned with a kind of holistic synthesis embracing criticism and imagination (Slaughter, 1993: pp. 5–6).) as the scientific successor of the concept of 'futurism' in art. Emerged as a systematic research field aiming for strategic foresight of the far-future of modern (post)industrial societies in the 1960s, futures studies have developed a series of methodologies of knowledge-based projection of possible futures to be utilised for effective long-term policy development in public planning, foreign relations and corporate management (Since the emergence of the first research groups in futures studies from the mid-1960s, futuristic researches in many countries have made strategic foresight to assist decision-making processes in different fields (i.e. education, health, energy and water management) as well as the identification of potential dangers and risks to be realised in future. For the current state of the art in the field, see The World Futures Studies Federation (founded in 1973), WFSF (2018).) (Bell, 1996). While doing that, the research groups did not only use logical analysis, but also utilised imagination to make preferable distant future as comprehensive as possible (Cornish, 1977: pp. 78–92). Within the most productive years of the futures studies between the 1960 s and the 1980 s, there had been little intellectual interaction between the emerging field of urban design and that of futures studies. This could be mainly due to the ongoing disciplinary formation of urban design still lacking its methodologies in education and practice within that period (Hurtt, 1983: p. 54; Mumford, 2009). From the same (methodological) perspective, the observed recessiveness of urban design in contribution to the evolving discussions on the future of human societies directs from the enduring necessity to develop the methods responsive to the intrinsic nature of futuristic thinking. Such a problematic condition drives from the fact that radical design thinking based on speculative social fictions are considered 'irrelevant' within the very market condition in which the design fields are highly commercialised (Dunne and Raby, 2013: pp. 6–7). That implies the very condition of intellectual poverty within the contemporary urbanism where the idea of speculative design and design fiction are largely considered negative as in many design fields (Dunne and Raby, 2013: p. 88).

In his seminal book, de Jouvenel (1967) characterises any futuristic foresight with the act of *conjecture*, inference on future without complete information and sufficient evidence. For him, even remained fuzzy, the 'future data' generated by way of conjecturing provide the necessary basis for any decision making on the future state of the world (pp. 114, 141). Considering the necessary condition of working with imperfect information as the very inherent feature of the *designerly* way of thinking in practice (Cross, 1990: p. 130), one could recognise the relevance of conjecture in the field of spatial design, as well. Since the enduring conception of spatial planning and design is dominantly based on the idealised act of decision making only after proper survey and analysis – to acquire necessary information of the actual design context (Çalışkan, 2012), designing for the far-future without complete informational input on the future context requires a radical shift in the settled perception on design in urbanism.

The current paper, in this regard, suggests *imagineering*, visual generation of the unbounded ideas which would be, in turn, subject to systematic dismantling as the proper technique for the development of futuristic design thinking in urbanism. Reflecting on a graduate studio project conducted under the title of *'Envisioning the City: Design Explorations of the Future Urban Forms and Spaces'* in METU, Turkey, the authors address *backcasting* as a technique complementary to the method of imagineering in a wider operational framework. Within that framework, the applied capacity of designers in visual thinking is considered the key asset for the enhancement of an alternative (futuristic) track in urbanism. To that end, the authors revisit their studio experience as an experimental source for the construction of a conceptual model approach. The methodical model is believed to provide educators in urban planning and design with a guiding framework by



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which the idea of futurism could be successfully integrated into the educational programmes of urbanism.

### 1.1 Imagining the city of future: intellectual roots of futuristic thinking in urbanism

The futuristic orientation of modern planning and design is rooted in the early 20th century when the negative consequences of rapid industrialisation along with the restraints of the traditional city towards future development were realised. With a strong recognition of the inherited limitations of the short-term design and planning solutions, 'urban utopias' (Fishman, 1977) represented a kind of reactionary approach to their time period with a prospective view on the future. Yet, the modern utopian perspective in urbanism does not stem from an intellectual *tabula-rasa*. It goes back in classical utopianism rooted in the ancient Greek philosophy. For instance, it is possible to trace some certain clues on the ideal human settlement in 'Republic' by Plato (428–348/BCE) (Segal, 2012: pp. 47–50). As the revival of the Greek philosophy, the Enlightenment movement represents the secular emancipation of human intellect not only to understand, but also to create the world. This is the resurgence period of future-oriented thinking, which was symbolised by 'Utopia', the iconic description of a fictional society written by Thomas More, an English statesman and social philosopher, in 1516 (Parker *et al.*, 2007: pp. 296–298). By his seminal book, along with a series of detailed depictions of the utopian settlement, Thomas More presented the model of an egalitarian society as the counter-statement of the present socio-political status quo of his time (Goodman, 2008: pp. 14–16). Following the same tradition, a similar (collectivist) outlook for the future was suggested in T. Campanella's 'The City of the Sun' (1602) and F. Bacon's 'New Atlantis' (1627) (Parker *et al.*, 2007: pp. 18, 45–47). By all the classical utopian texts, the fundamental idea of *progress* along with an optimistic belief of 'tomorrow to be better than today' (by way of improvements in arts, science and manufacture) was to be flourished (Cornish, 1977: pp. 54–56).

Two centuries later, such a powerful stance was transformed into the organisational models of communalistic society propagated by the utopian socialists such as R. Owen with 'New Lanark' (1825) and C. Fourier with 'Phalanstère' (1848) (Feuerstein, 2008: pp. 126–140; Segal, 2012: pp. 60–66). In the search for a better social life by new patterns of social collectivity in space, the social engineering projects of the utopian socialists against the early industrial capitalism can be considered the inspirational basis of utopianism in modern urban planning, which was originally manifested by Ebenezer Howard, the founder of the Garden Cities movement in the early 1900s (Barlas, 1992). In his classical text, 'To-Morrow: A Peaceful Path to Real Reform', Howard (1902 [2003]) manifested the need for a new settlement model for future urban societies, which would be in harmony with nature as opposed to the model of the central metropolis (Hall, 1988 [2002]: pp. 88–97).

More vivid architectural expressions of modern urban utopia, however, were to be suggested by F.L. Wright and Le Corbusier, the two protagonist visionaries of the 20th century. Based on the two fundamentally different approaches to the relationship between man and space, they conceptualised the future city in distinctive forms and images (Fishman, 1977). While Le Corbusier (1929 [1994]) envisioned the future modern city as the machine aesthetics of open architecture within a concentrated urban form motivated for the radical replacement of the traditional (Pinder, 2005: pp. 62–87), Wright (1935 [1996]) illustrated his utopian model in the form of a great diffusion of urban settlements through the countryside as the spatial (*anti-urban*) idealisation of an individualistic society (Frampton, 1980: p. 187). From a different ideological perspective (of collectivism), the modernist passion of future was championed by a group of Italian futurist architects with great admiration of speed, movement and technology in a strong belief in the industrial metropolis. By way of his grand designs of monumental skyscrapers with walkways cutting across the sky, A. Sant'elia (1914) was to influence the cinematic image of the futuristic city even towards the end of the century (McGarrigle, 2016).

When the bourgeois utopias of F.L. Wright and Corbusier had already turned into a kind of cliché, respectively, in the form of American suburbia and the social-housing estates of the welfare state in the post-war period, the first attacks to the capitalistic city and society came from the emerging avant-garde movements exploring an alternative mode of architecture through provocative texts and neo-futuristic images of the city (Alison *et al.*, 2007: pp. 34–151). Among them, the young architectural groups such as *Archigram* and *Superstudio* introduced 'paper-architecture' by imaginary design drawings in a peculiar practice through a new way of visioning the city (Sadler, 2005). In the same period in Paris, Y. Friedman conveyed a visionary perspective to architecture and urbanism with a strong faith in dynamism and flexibility to be achieved by the new structural technologies (Busbea, 2007). Such an aspiration for designing the future settlements in the form of megastructures is found in the Japanese counterpart of the futuristic movement prominently epitomised by K. Tange (Kultermann, 1970). From that time on, the future visions of cities are used to be associated with the images of megastructure (Banham, 1976). Then the ecological interpretation of the idea of megastructure as the future form of human settlements was suggested by P. Soleri from America with his experimental community to be accommodated in a compact hyper-structure called 'Arcosanti' (Soleri, 1996).



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Following the critical theory on the failure of the modernist architecture and planning which used to manifest themselves with big plans and total design images, the contemporary urban theory has long developed a sceptical view on the so-called 'utopian heroism' in urban design (Alexander *et al*., 1987; Jacobs, 1961 [2000]; Rowe and Koetter, 1978). Though the enduring critical approach in the contemporary urban design theory opposes to the utopian tradition of masterplanning (Campbell, 2018: p. 49) as the central vision of the future, it does not categorically oppose to the idea of futuristic urbanism as far as it is in the form of vest-pocket utopias embracing diversity and change. Yet, due to its critical distance to the idea of holistic future conveyed by *futuristics*, the critical urban theory could be argued as one of the factors discouraged the possible development of strong futurists perspectives to urbanism.

Another factor which might support the decline of the notion of future in urbanism (from the so-called modern period on) is the post-modern critique on the modernist school of planning based on the inclusive perspective to the future of society. The post-modern debate posing a critical position towards the idea of a holistic vision for future society takes its roots from the communicative theory introduced by Habermas (1984). That challenges the 'instrumental rationality' behind the modernist planning ideal relying on expert's capability of prediction and clear means-and-ends rationality (Healey, 1992; Sager, 1994). The current conception of planning as an inter-subjective field implies the notion of city foresight as a collective manifestation of the various stakeholders (Daffara, 2011). Accordingly, emerging discourse on communicative design and planning is postulated as a reaction against the so-called techno-rationalist approach (Friedmann, 1998) exhibited by most of the futurist urban visions. Moreover, the construction of the futurist imagery of the utopian projects based on the perfectly ordered and idealised model of space has been indicated as the aspiration of social engineering that bypasses pluralistic tendencies of the society (Bauman, 1991). The future vision based on the asserted capacity of perfect calculation and control in modern utopianism has been challenged with the emerging paradigm of *uncertainty and unpredictability* as an integral part of reflexive design and planning processes (Heydinger and Zentner, 1983; McDermott, 1993).

At that point, Ahlqvist and Rhisiart (2015) conceptualise futures studies in two categories: *utilitarian paradigm* based on expert knowledge, and *emancipatory paradigm* suggesting a communicative and participatory approach to planning. The latter view embracing inclusivity of multi-actor agency has been fervently debated in favour of pluralism in planning theory, as well (Forester, 1999; Healey, 1992). As argued by Kwami and Cosgrave (2018), static future visioning approaches are to be transformed into more procedural and inclusive ones to increase the capacity of society to participate in the collective imagination of the future. Moreover, Pollastri *et al*. (2018: p. 146) interprets the process of envisioning the urban futures as 'conversations among different actors' while emphasising the power of pluralism in the articulation of the future image. In this socio-political context, the critical inquiry of 'who develops the future vision?' gets more relevance than before.

In the very context of those 'big questions', the contemporary urban planning and management tend to respond to the above-mentioned critique by incorporating technology and the new forms of participation from a futuristic perspective (Mair, 2015; Tryfonas, 2015). Nevertheless, the field of urban design as *an integrative art of place-making* (Marshall, 2015) falls insufficient to suggest a strong futurist track within its practice. This argument is fundamentally supported by Maas *et al*. (2010) claiming that the production of visions has steadily decreased since the 1970s (p. iii). Though the authors have conducted a very productive futures research on architecture and urbanism within the programme titled 'The Why Factory' since 2016, they are yet to come up with a generic and generative methodology for the so-called futurist urban design. As another systemic search for futuristic urbanism, the foresight project of 'Future of Cities' (The project aims for regaining the broader perspective and long-term thinking in spatial planning for the next 50 years (GO-Science, 2016a, 2016b: p. 14).) that was coordinated by the Government Office for Science in the UK provided an actual basis for the development of futurist urban design practice which could also respond to the enduring call for pluralism in planning. Providing a series of alternative design images on the future urban form aiming for opening up a collaborative debate, eventually, the foresight project by 'Water and Cities Action Group' (2015), can be considered one of the good, but rare examples within this genre.

Yet, looking at the contemporary practice, it would be difficult to claim the presence of a substantive body of design research on the possible forms and patterns of the future cities. For instance, looking at the entries to the urban design competition organised by 'Urban Future Organisation' in 2014, it is hard to recognise any architectural and spatial typology that fundamentally differ from the conventional corporate typologies of today (Designboom, 2014; Hosmer, 2014). This point is also valid for the conceptual design images released in a recent issue of the journal, National Geographic, under the thematic discussion on the 'cities of the future' (National Geographic, 2019).

Within that context, a systematic reflection on futurist thinking in urbanism with a special reference to its intrinsic design cognition is yet to be realised in the literature. Then, in the following parts of the paper, the possibility to come up with



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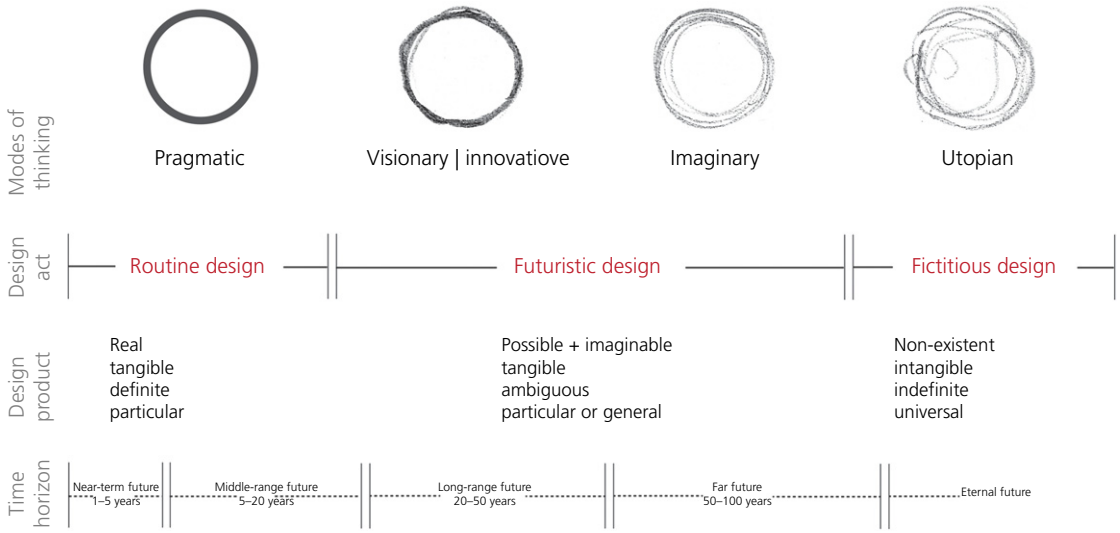



**Figure 1.** Modes of design thinking based on different future perspectives based on the time-horizon of the targeted future (source: after Savaşır (2008: p. 40))

a certain methodological perspective on futuristic thinking in urbanism is discussed.

### 1.2 'Imagineering' as a tool for futuristic design of the city

One could argue that considering the time-scale of the projected future, there is no single cognition model in futurist thinking. The longer the time span of any futuristic imagination, the harder to come up with a certain image of the future state of the art along with all the critical details it is supposed to reveal. To elaborate the point more, it is possible to conceptualise the act of design by the specific types of design outcome responding to the particular time-horizons (Figure 1).

In this framework, the pragmatic design acts to solve any real-time problem or to create an artefact to be utilised in the immediate future (within the very context of today) within a well-defined universe of existing prototypes is called 'routine design' (Gero, 1990: p. 34). The morphological constituents of any designed artefact or organisation within this genre are necessarily very definitive for a proper implementation or execution. Depending on the outcome itself (i.e. building, city), the period of routine design ranges from the immediate near-term (1–5 years) to the middle-range future (5–20 years). Then within the long-range future (20–50 years), 'innovative (visionary) design' operates to generate the ideas which radically alter the settled types (design elements) and typologies (relations). Providing new fashions and imageries altering the settled conceptions of today, 'imaginary design' suggests complete novelty in forms and patterns by introducing unprecedented design components for the envisioned far-future (50–100 years). Visionary and imaginary design acts, in this regard, could be considered 'futuristic' since the operational time-period corresponds to what we cannot predict, but envision. Within that context, utopian thinking could be characterised as the extremist version of the design, not only due to its open-ended time-frame in future projection, but also its scale of intention. Positioning the ideal forms of life projected for an unknown time period consciously (This would be because utopias do not have any concern for realisation of what ideally is imagined, but they are mainly motivated for provoking the public for the thought of the possibility of alternative futures that would radically alter the status quo of today (Fernando *et al.*, 2018).), each utopia, in essence, projects the total re-organisation of the society on every operational scale (from the individual to the humanity). The narrated future is composed of the imaginatively fictive characters, events and conditions without necessarily grounded on a rational basis as opposed to the other modes of futuristic thinking in design (Parker *et al.*, 2007: pp. 296–301). Nevertheless, utopias are deprived of the full representation of the desired future. This is, essentially, not only due to the limited cognitive capacity of the utopian thinkers in the articulation of such comprehensive social phenomenon but also due to the great level of uncertainty involved in the generation of future human societies. As seen in Figure 1, along the temporal trajectory of futuristic thinking, the representational mode (if not the capacity) of the human mind fundamentally transforms. The point is that when the time-horizon expands from the near-term future to



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the far-future, the image of the future statement loses its precision in mind. The future image involved in representation gets more ambiguous with decreasing precision and determinacy. Though the given condition does not necessarily imply the state of the incompetence of human intellect to conceive the future in a desired level of accuracy, it certainly entails a different mode of design thinking in the very context of futuristic cognition. Then the point is that the framework depicted above does not necessitate a progressive cognition in which one has to follow the previous stages to achieve another mode that performs in a longer time-span. That means each type of futuristic thinking represents a discrete mode of cognition responsive to a certain frame of time.

Following the recognition of the above-mentioned point as a critical factor within imaginative design solutions, the term, 'imagineering' was originally coined in the early 1940s in the US where the growing industry was in the search for new products through increasing mass consumption (Bykon, 2000). In its earliest record dated in 1942, the term was used by an American aluminium company indicating that *'imagineering is letting your imagination soar, and then engineering it down to earth'* (TJS Labs, 2016). As seen in its early description, the term implies a systematic coalescence of the processes of imagination and engineering design. Following its further use in different sectors of American industrial design (For other uses of the term in the past, see: Wikipedia Imagineering (2018).) The Walt Disney Company employed the concept during the establishment of an R&D centre on the design researches for the development of theme park industry in the early-1960s. Unlike any other settlement design process, what characterises the design of the Disney's theme parks as an act of imagineering was the use of movie techniques applied to the design processes (Gennaway, 2014 cited in Lynxwiler, 2016). Accordingly, as a result of a series of brainstorming sessions supported by various cinematic images of the intended spatial settings, the designers introduce innovative techniques to create unprecedented models realisable on the actual ground (The Imagineers, 1996: pp. 82–83). Therefore, considering its first systematic use in spatial design projects, it would not be wrong to claim that imagineering as a technique was originally institutionalised in urban architectural design.

As understood from the actual application of the concept, unlike any conventional design process, which is preceded by the analysis of the actual context and conveyed by the accessible design elements to come up with new solutions, imagineering is led by the visual narrative of the future. There is no contextual analysis because a new context is invented at the outset. The narrative as the suggested context is subject to be reflected on in design terms. Only after the image created, the design components are identified and the systemic relations between them are formulated. This is actually the phase called 'engineering'. Yet the point is that, since the second phase is conveyed by the deconstruction of the image into its system components to reveal its underlying architecture, the design process involved in imagineering could be called 'reverse engineering'. This implies a kind of post-rationalisation of imagination by the designer.

In this context, it is possible to position imagineering within the overall operational framework of creative thinking suggested by de Jong (2010) (Figure 2).

Accordingly, while *science* engages in the prediction of probable futures based on the existing knowledge of any given phenomena (within the scope of uncertainty), *planning* and *design* tend to formulate the means of possible futures which might be more plausible than the existing condition (de Jong, 2010: p. 26). These, of course, involve values and judgements as of the core issues in *politics*, the art of envisioning the desirable future of societies. In the outer fringe of the conceptual framework, there exists the field of *art* as the act of depicting the world of imagination. As seen in the figure, unlike science, design and politics, art does not have any cognitive boundary due to the unlimited capacity of imagination (as opposed to the limited capacity of information processing).

Within this framework, *imagineering* could be characterised as an interface between the domains of imaginable and possible futures of (visual) art and design, respectively. That implies the fact that the limits of the envisioned future by imagination are conditioned by the ability of the designer to define the system components by design. The more the critical details of the illustrated image provided, the higher the possibility by which the designer comes up with an elaborate 'design solution'.

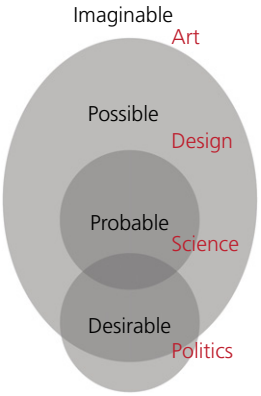



**Figure 2.** Basic domains of future and the major fields of creative thinking operationalised within the different domains, accordingly (source: after de Jong (2010: pp. 23–44))



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To Nijs (2015), due to its self-organisational capacity by inspiring the agents in collective production processes, imagineering represents a responsive technique for design in the context of complexity (pp. 15–19). From a planning perspective, Ratcliffe and Krawczyk (2011) address imagineering as a method of 'prospective thought scenarios' for the efficiency of urban planning towards a better comprehension of the urban complexity. Then, they methodologically suggest 'imagining ahead and planning backwards' to ensure futuristic foresight in planning practice (Ratcliffe and Krawczyk, 2011: p. 643).

Within the overall genre of 'speculative design', Dunne and Raby (2013) discuss the other methods that might be considered within the same genre of imagineering. Among them, *extrapolation* as the simulation of the extreme end of the current tendencies, and *ideas as stories* based on the narrative of the fictional transformation of culture, politics and ethics are classified as 'fictional worlds'. Then, there are 'thought experiments' such as *reductio ad absurdum* – logical argumentation aiming for absurd or ridiculous outcomes to falsify the given scenarios, *counterfactual* – creating a fictional present by alternating the history and *what-ifs* – structured brainstorming to specify what can go wrong in a given scenario, which all support imaginary design thinking in different respects (Dunne and Raby, 2013: pp. 69–88). Among them, 'what-ifs' is the closest technique to imagineering if it is represented by visual media.

Reflecting on the design industry within the rapidly urbanised developing contexts, Koolhaas *et al*. (2000) has, originally, recognised the emancipatory (cognitive) power of emerging visualisation techniques in design. He argues that by way of the increasing image-making capacity of the digital media (i.e. unlimited possibilities of collaging), designers have emancipated from the settled hesitation of long intellectual preparations in design (p. 320). This, essentially, does not only fasten the production process but expands the scope of imagination of the spatial designers (Balamir, 2013).

To discuss that point with regard to the idea of imagineering on a concrete basis, in the following part of the paper, the authors will present their experience of a design process, and reflect on it to come up with a robust methodological framework for futuristic thinking in urbanism.

### 1.3 Towards a 'futurist urbanism': a design exploration on future urban forms and spaces

In the current section of the paper, the intrinsic processes of two urban design projects will be presented to demonstrate the use of imagineering in urbanism. The projects were carried out within METU Master of Urban Design Studio in the 2015–2016 academic year. Under the main theme, *'Envisioning the City': Design Explorations of the Future Urban Forms and Spaces*', the studio aimed to come up with a series of ideas on the possible forms of the new urban life in far-future (The graduate studio was instructed by Baykan Günay, Adnan Barlas, Müge Akkar Ercan, Olgu Çalışkan, Cansu Canaran and Duygu Cihanger Ribeiro. See: METU MUD (2020).). Following experimental works depicting the fictional spatial complexes along with the discussions on the major aspects of human–environment (i.e. mobility, property, production and collectivity) in a utopian context, the students, in the second term, were asked to develop imaginary design scenarios for the new city-region of Ankara in 2055.

Within that framework, though the students were equipped with the basic theoretical knowledge and representational techniques of the city of future during the first semester of the program, the major challenge of the studio, apparently, turned into the utilisation of that operational background for envisioning the future in a given context. Despite the relative success of the studio in experimental imagination of utopian settlement forms in the previous term, the studio, in the second phase of the program, came to a deadlock in the generation of futuristic ideas for the given region. It was clearly observed that the students who started designing on the base-maps of the city could not come up with futuristic proposals on its future formation, easily. Though this is a very basic way to convey any 'routine' urban design project on an informational framework of the map, in the case of futuristic thinking, that settled way of design reasoning did not work efficiently (Figure 3).

Reflecting on the cognition of the designer at that phase, one could argue that the problem directed from the limitation of the existing context with whole exogenous variables hard to be transformed within short-periods of time. Whenever designers tend to generate new ideas, they were inevitably manipulating the very components of the region. Yet, for a futurist perspective, by definition, the designer had to operate with new typologies in the constitution of the future urban form. From that moment on, the studio instructors decided to introduce another method to open up the creative process of (imaginary) design thinking. As a response to the emergent problem, the students were asked to ignore all the settled variables of the context and to generate a series of generic, conceptual images not necessarily giving any reference to the city itself. Being freed from the cognitive burden of the actual context, however, would not mean a complete ignorance of the city on which the imaginary design proposals were to be developed. Rather, the students were to set a certain distance with the settled variables of the given (social and spatial) context while *conjecturing* for the far-future in an implicitly critical manner (Figure 4).

The collages composed just for the sake of providing an intended image of the projected future, in fact, conveyed a certain set of morphological ideas on the future settlement form. That means the image suggested without explicit



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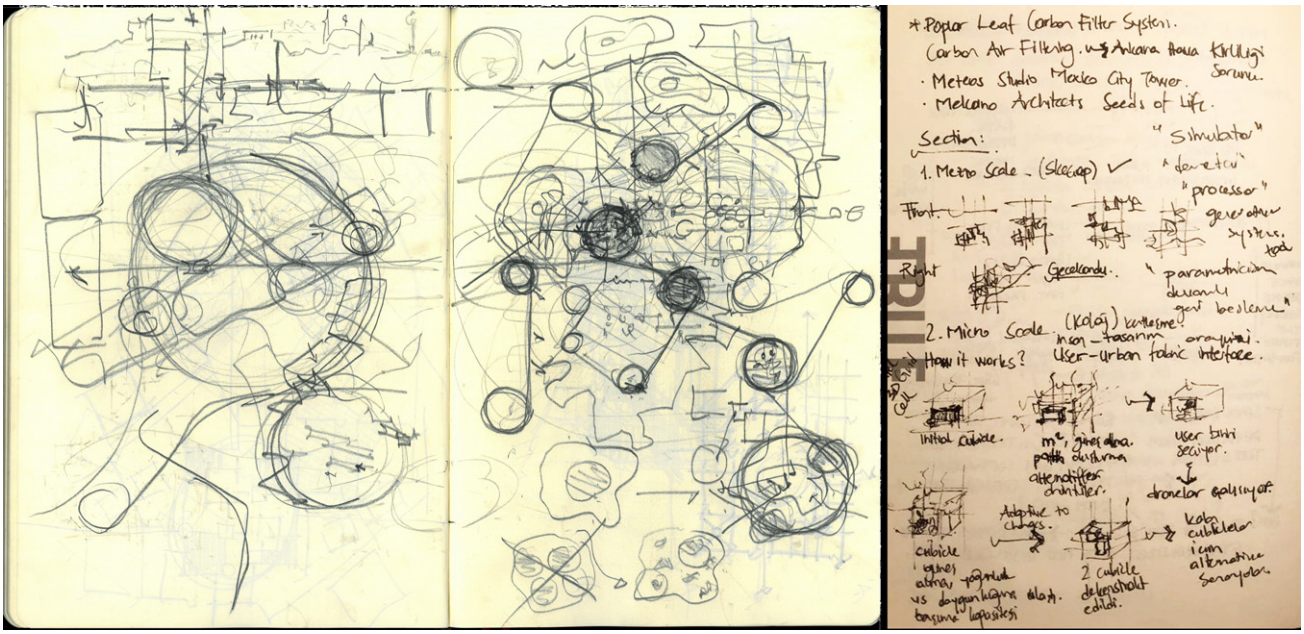



**Figure 3.** Design sketches of the students exposing the cognitive bottleneck in the formulation of futuristic design solution for the city-region of Ankara (source: O. Çalışkan's personal archive (2016))

consideration of the design components and the system structure were to be decoded after the initial imagination of the future scenario by a series of 'what if' questions. The implicit codes of the image were to be revealed by self-reflection on the illustration itself. That would provide a basis for the systemic (re)construction of the image in the form of a design scheme.

Accordingly, while the first image initiated the idea of multi-layered morphology of the city and rapid-mobility on super-compact and globally extended linear agglomeration (Figure 4a), the second image stimulated the idea of augmented verticality challenging the conventional forms of settlement on the terrestrial ground, and that of 'virtual grid' controlling the complex growth pattern in a generative manner (Figure 4b).

Once the morphological definitions of the envisioned urban form were made, the authors felt much easier for the generation of the design solutions in a futuristic manner. Accordingly, with the seed idea of 'scale' induced by the initial image itself, the first project titled *The Hypercity* could come up with more concrete design solutions on the possible structuration of the settlement system at various levels of scale (Figure 5).

On the contrary, in the project titled *The Geomorphicity*, we see a very similar performance of the designer to be able to generate rich 'morphological knowledge' of the future settlement vision which was derived from the anchoring ideas provided by the initial image (Figure 6).

As seen above, with the clarity of the image generated beforehand, the author of the project was enabled to elaborate on the systemic design articulation with the necessary morphological details. In the context of the project, the critical detail which turns the image into the design scheme is the constitutional system (the so-called 'virtual grid') generating the form-complex along with the multiple living units coordinated by the so-called soft infrastructure itself. By this way, as in the previous case, the *system structure* is specified explicitly by way of decoding the *components* embedded within the initial image of the envisioned scenario (Figure 5).

From that point on, unlike the previous example, the current project represents the formation process, from the complex end-form to the constitutional modular element *backwards*. Then, not only the final form of the design is articulated but also its transitionary generative stages are characterised. By this way, a concrete basis for the critical assessment of different phases in specific consideration of their realisation (with regards to the future technologies and materiality) could be provided. This enabled a rich discussion on the proposed model by focusing on the specific design aspects (i.e. collectivity, privacy, flexibility or accumulation) and the corresponding strategies (i.e. superimposition, levelling, modulation or propagation) for each phase involved (Figure 7).



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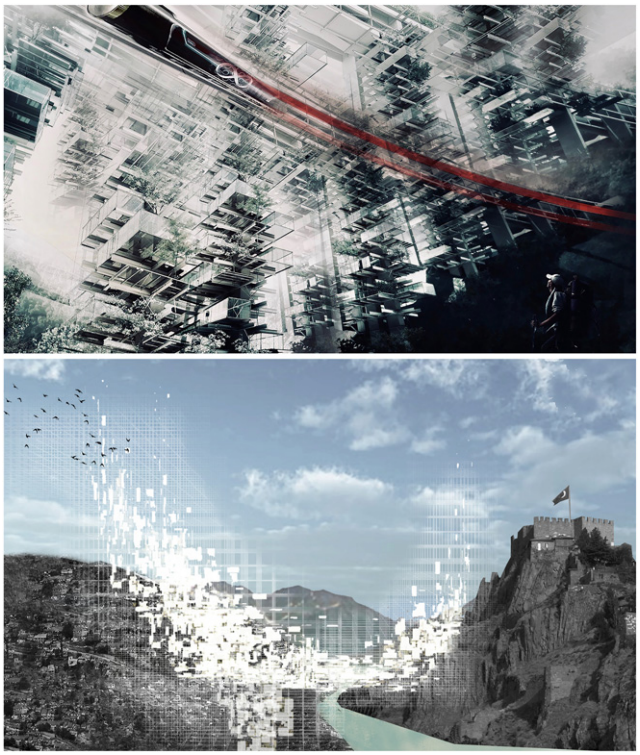


**Figure 4(a,b).** Collage works as conceptual images of the envisioned scenarios built by the two authors at the very beginning of the second iteration in the design process (source: O. Tümtürk personal archive, 2016 after OXO Architects (2010) and I. Yavuz's personal archive, 2016)

That critical point on the design process, therefore, lets us open another supplementary discussion on futuristic thinking in urbanism to be suggested in the following section of the paper.

### 1.4 Backcasting: a model proposal for futurist thinking in urbanism

The original design process depicted above makes us reconsider one of the methods of futures studies, which was developed from the late 1980s. As a way to provide new insight about the possibility of desirable futures by the visionary images of a long-term future, *backcasting* aims to encourage effective discussions on sustainability goals in long time-horizons (Bibri, 2018: p. 1). Involving creative imagination to tackle the inherited complexity in planning, backcasting suggests a particular approach for futuristic researches operated through the innovative combination of design, policymaking and art. Then the possibility of incorporating visual imagination and structural (social or spatial) organisation within the same working process makes backcasting very relevant for equipping urbanism with a responsive methodology for design-based futures researches.

Backcasting was originally developed as a methodological alternative to forecasting, an analytical tool for energy planning based on trend extrapolation and of energy consumption in the 1970s (Bibri, 2018: p. 10). Forecasting, on the one hand, is the process of predicting the plausible futures and solutions which are expected more likely than any others with regard to the existing condition of societies and organisations. It is based on monitoring and analysing the current trend, which would, in turn, be utilised to make future projections in terms of the observed trends and tendencies. That means if the planning context is predictable and controllable, then forecasting may be a proper method for the foresight of the future (Bibri, 2018: 9, 11). In a general sense, forecasting is used for both qualitative explorations of future possibilities and quantitative predictions of the future (Ike and Voogd, 2004). *Qualitative forecasting*, which is performed within the condition of deficient or absent historical data, mainly relies on professional judgements and value systems. As one of the most-known qualitative forecasting methods, 'Delphi method' is used to reveal expert knowledge through participatory processes to project personal attitudes on a defined problem field (Sackman, 1974). Scenarios illustrating the key branching points of the future have certain hypothetical characters (Kahn and Weiner, 1967), and therefore used in urban planning to explore alternative futures under the very condition of uncertainty (Khakee, 1991). Instead, *quantitative forecasting* uses empirical data to predict the future. In that sense, quantitative forecasters make their projections based on the conditional input of ongoing trends, the announced plans and enduring cycles to achieve a certain level of precision in future predictions. By using various econometric models, regression analyses and mathematical algorithms, they tend to extrapolate the present into the future. Within the sensitivity of the analysis, forecasting studies are motivated to inform decision-making processes in the way of finding adjustments of the problematic trends by way of a series of adaptations in the future (Bishop and Hines, 2012: p. 206; Dreborg, 1996).

Backcasting, on the other hand, is defined as first generating a desirable future vision or normative scenario and then looking back from that future to the present to develop relevant strategies leading towards that desirable future (Quist and Vergragt, 2006: p. 1028). Then the most fundamental difference between the two methodologies is that *a desirable future is the starting point in the definition of strategies in backcasting while in a forecasting process, the present trends and situations are key factors in predicting a likely state of future practices* (Bibri, 2018: p. 12). Unlike forecasting which is based on the extrapolation of the present into the future, backcasting involves an inverse process. In his comprehensive review, Quist (2007) shows that despite their procedural differences, all the backcasting approaches prioritise the construction of normative scenarios as the envisioned future within the process



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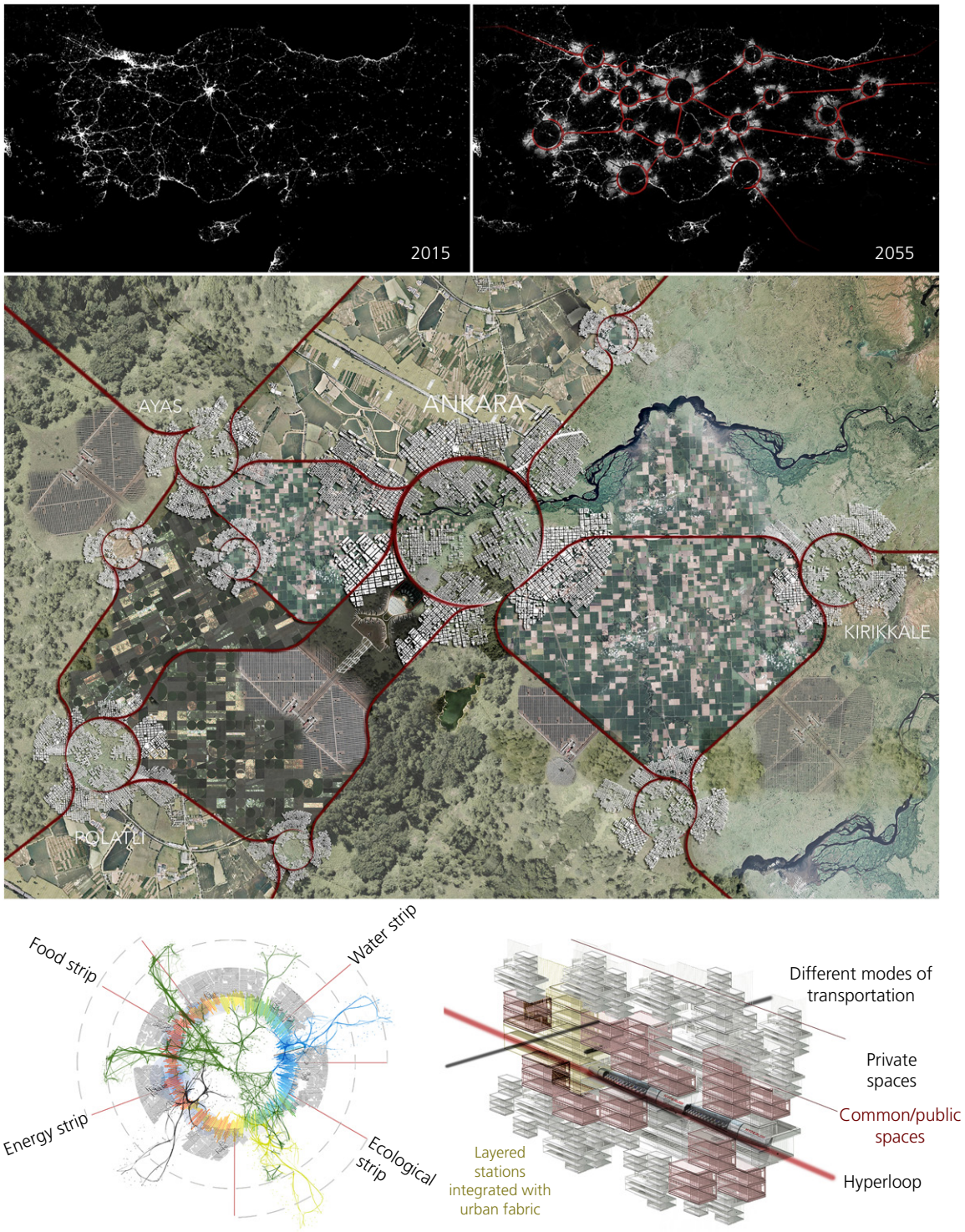



**Figure 5.** Global extension of the envisioned settlement system on the scale of the country (above), the future formation of the so-called 'Hypercity' in the city-region (middle), and the functional and spatial organisation of the proposed settlement morphology (below) (source: O. Tümtürk personal archive, 2016)



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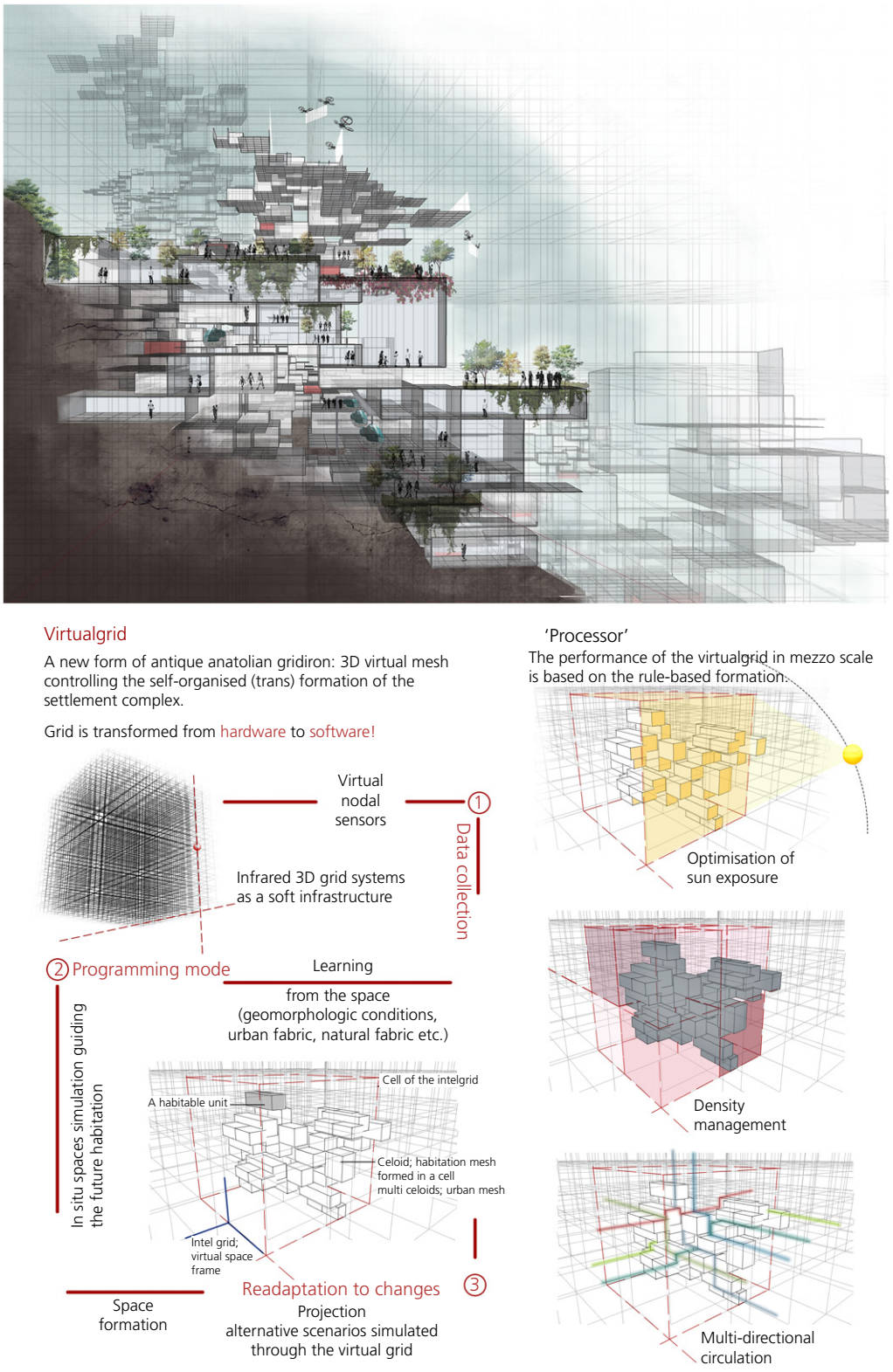



**Figure 6.** Growing artificial topography created by the spatial complex, *The Geomorphicity* (above), and the system structure along with its operation in control of the form-generation (below) (source: I. Yavuz's personal archive, 2016)



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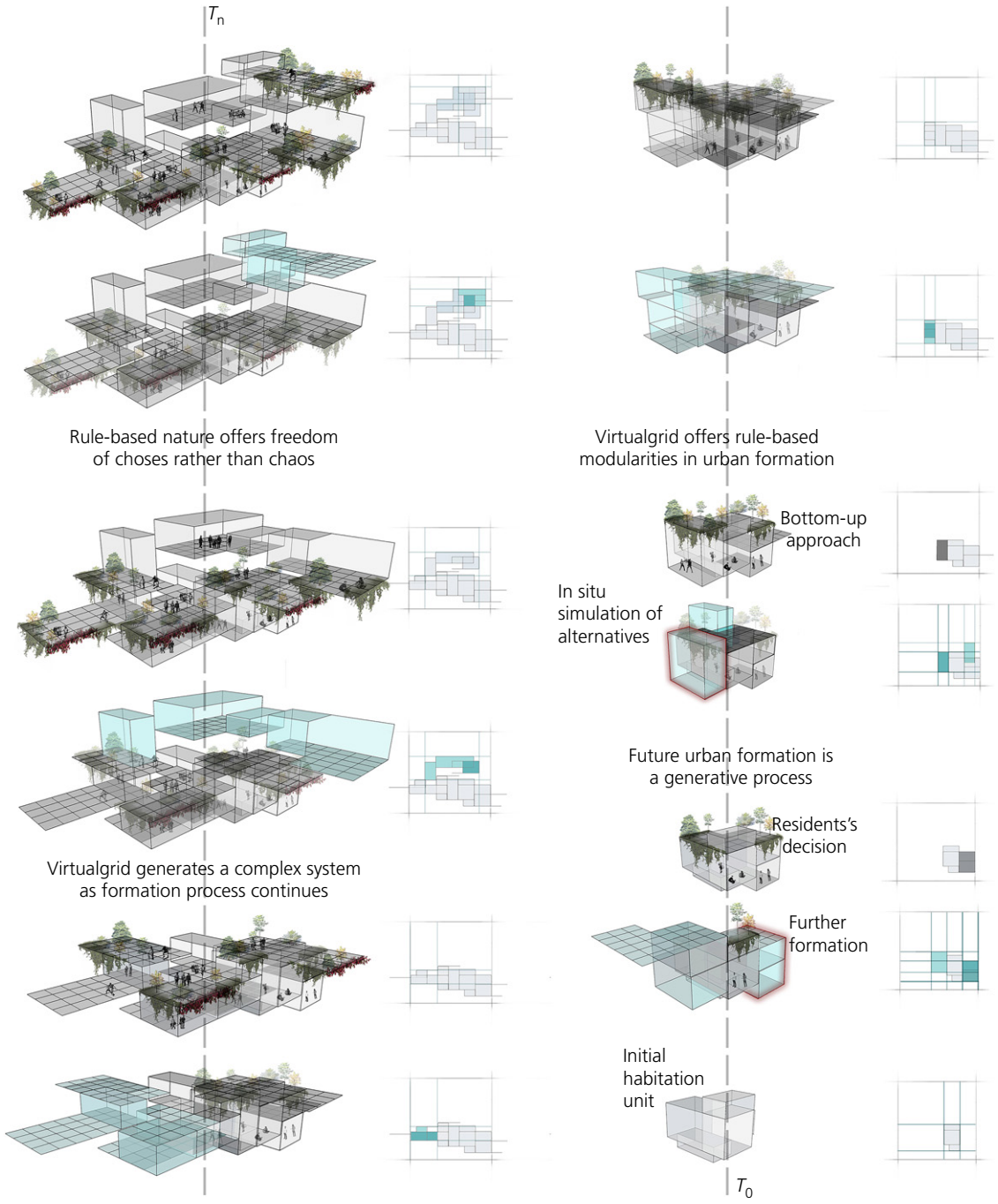



**Figure 7.** Modular growth of the settlement fabric simulated in progressive phases from the end to the first stage of the process (source: I. Yavuz's personal archive, 2016)

(pp. 24–28). Following the future images set as the desired future condition, the backcasting process is run through a series of extrapolations of the future back into the present. By this way, the feasibility of the pathway towards the desired future is tested (Quist, 2007: pp. 30–31).

In this framework, backcasting stems from the incentive for the radical alternation of the given trends in long-lasting societal and environmental problems rather than responding to the near-future by partial and reactive solutions. Positioning itself in far-future, backcasting is a method applied *when the*



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*dominant trends are part of the problem and therefore there is a need for major change within the prevailing order* (Dreborg, 1996: p. 816). Then, the basic assumption is that very fundamental mechanisms of the society (i.e. private car ownership) could perform like the very source of the problems (i.e. auto-dependency in transportation). That means any future scenario based on the given condition would, inevitably, reproduce the same problem in different forms and patterns. For that reason, by means of the systemic exclusion of the basic variables of the mainstream trends (i.e. private car ownership), backcasting could provide radical alternatives of future scenarios (i.e. personal rapid transit), and highlight interesting polarities and limitations for progressive planning (Dreborg, 1996: pp. 819–822; Höjer and Mattsson, 1999: pp. 10–11; Miola, 2008: pp. 15–22)

Yet, instead of acting as its counterpart, backcasting involves some components of forecasting. With a series of 'what if' questions, backcasting applies causal models of forecasting in a partial manner (Dreborg, 1996: p. 824). That enables the researchers to make solid assessments on the alternative scenarios (The term, 'scenario' here implies '*a series of events that we imagine happening in the future*' (Cornish, 1977: p. 111).).

In this context, it is possible to characterise the main methods of futures studies based on their operational domains in time. In an overall view, while short-term plans represent a minor approximation to the long-term sustainability objectives, forecast studies invariably fall short to meet the long-term expectations due to taking the existing developmental factors for granted (Dreborg, 1996: p. 815) – the conceptual zone below the bar (Figure 8).

As seen in Figure 8, the main output of backcasting studies is not a single blueprint, but alternative images of the future in the form of scenarios and visions to inform strategic choices with a broader scope of policy-making processes (Quist, 2007: p. 19). As originally described by Robinson (1990), backcasting is essentially strategic and explicitly normative (based on aims rather than trends), and therefore design-oriented unlike other methods of futures studies that are either predictive or explorative (p. 823).

To Bishop and Hines (2012), quantitative techniques are suitable only for short-term projections. For the extrapolation of the data over 10–20 years (which is usually the time-horizon for the masterplans), the use of quantitative analysis gets risky with the lack of information on many variables in the long time-horizons (p. 199). Yet in backcasting, scenario analyses cover between 20 and 100 years into the future (As stated by Cornish (1977), we cannot do effective planning for the period 50 years ahead from today, since so many unknown factors may be involved along with various unpredictable events that

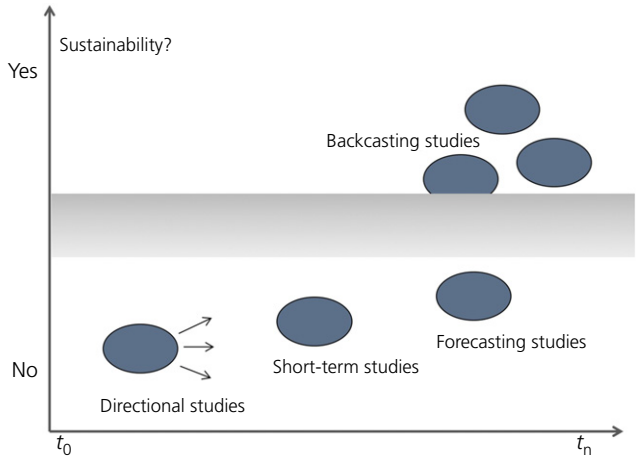



**Figure 8.** Applicability of the major future foresight methods by their operational time-horizon (source: after Steen and Akerman (1994: p. 138) cited in Dreborg (1996: p. 815))

may occur in the meanwhile (p. 98).) (Robinson, 1990: p. 820). This opens up the possibility of the operational use of qualitative techniques as the support system for the long-term futures studies. As a form of the qualitative description of the future state of human settlements, urban design, in this regard, can be considered a relevant field for backcasting to be utilised in urbanism.

The use of backcasting in spatial planning projects has tended to be discussed more frequently within the last decade. With the review of the long-term vision of 'Göteborg 2050', the utilisation of backcasting was originally addressed by Phdungsilp (2011) for city planning to achieve sustainability measures in the context of urban complexity (Nevertheless, by the review of the project, 'Göteborg 2050', the author does not provide a particular method for the utilisation of backcasting in spatial planning. Moreover, with its little insight on futuristic forms and dynamics, the urban design section of the vision, 'Urban Struktur Göteborg 2050' indicates the necessity for more theoretical and methodological researches on the issue. See: Goteborg2050 (2020).). Based on the same project, Bibri (2018) argued backcasting as a relevant method of scenario development for the 'smart sustainable city' in consideration of the normative, goal-oriented and problem-solving character of the method. From the same perspective, Eames *et al.* (2013) suggested backcasting to create a 'space of communication' in which imagined futures could be considered in multi-sectoral frameworks. Likewise, Dixon *et al.* (2018) discussed the use of backcasting to enhance participatory processes in planning through identifying possible urban futures and the conditions by way of active engagement of the stakeholders. Participatory backcasting approaches highlight the importance of inclusive



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foresight through bottom-up processes of policy making and planning (Eames and Egmose, 2011; Robinson *et al*., 2011).

More recently, 'Future of Cities' project (21 UK cities are involved in the programme of the city foresight' projects (GO-Science, 2016a, 2016b: pp. 51–52)) defined backcasting as a so-called 'assembling' technique with 'roadmapping' for city foresight. Accordingly, backcasting has been indicated as 'warm-up exercise to immerse in the distant future to explore possible barriers and enablers' (GO-Science, 2016a, 2016b: p. 44). From that perspective, the comprehensive programme has released a series of long-term city visions some of which involved backcasting as a particular method to inform the decision-making process (GO-Science, 2013, 2016a, 2016b: pp. 51–53). Whether they explicitly mention it as the selected method of 'city foresight' or not, the projects involving backcasting, apparently, conceive the systemic technique as an approach to envision future scenarios. Those scenarios, in turn, are aimed either to be linked with the current policies to address the key challenges and gaps to be tackled or to be utilised as a generative basis for setting key strategies (Dixon *et al*., 2018; UKWRIP, 2015).

Nevertheless, largely focusing on the procedural aspects, the emerging discussions on backcasting in planning gives little insight into the specific use of the methodology in envisioning the future forms and spaces by design. Looking closer at the actual applications of the method in planning, one could recognise the need for developing a robust methodical perspective for the effective involvement of backcasting in spatial design processes (For instance, within the city futures study for Newcastle, backcasting is misconceived as a kind of documentation of the historical events for a backwards-looking at the transformation of the city. See Tewdwr-Jones *et al*. (2015).).

## 1.5 A conceptual model for backcasting by imagineering

Reflecting on the actual design processes run by imagineering, in this context, it is possible to suggest a conceptual model of backcasting that would be utilised for the futuristic researches by urban design (Figure 9).

The overall flow of the procedural model is based on a non-linear process run by several iterations until a satisficing result is achieved. In his framework, the design process starts with the initial conjecture that ends up with alternative visions in the form of a narrative (scenario). The initial step is mainly derived by the critical reflection on the exogenous variables of any given context, which do not tend to change within the middle-range future. Then, the alternative scenario radically altering some critical variables for the far-future is constructed. Unlike any planning scenario tending to formulate rational processes (based on the actors and actions), scenario building in imagineering is conditioned by the future image, simultaneously. Employing 'why not?' and 'what if' questions, the designers are asked to push the limits of imagination. Then a kind of post-rationalisation involves the disclosure of the implicit system components of the spatial form and pattern that were freely created within the initial image. Once the designer recognises the implicit morphology (compositional and structural logic of the form of the spatial image), then he/she can create systemic drawings illustrating how the form that was previously represented by mere image could be generated on a systemic basis. Due to the clearer comprehension of what initially imagined, then the time-wise formation of the spatial pattern can be constructed in sequential steps. Starting from the end-product to the possible early phases of the form-generation, the process goes backwards. This represents the core part of backcasting. Progressive backward simulation of

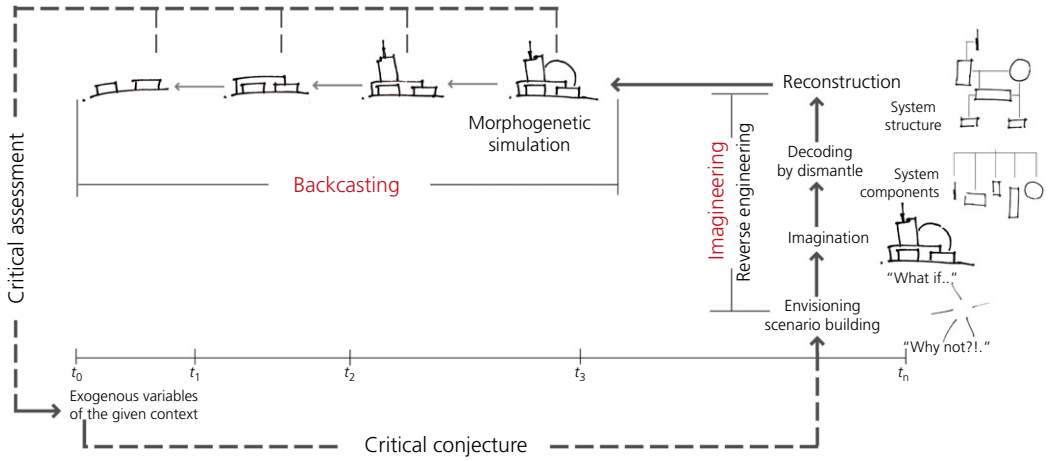



Figure 9. Conceptual model of backcasting by imagineering for the futuristic design studies in urbanism



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the form enables the designer to reflect on each stage, critically, and to assess the social and technological feasibility of the (trans)formation with regards to the contextual variables of the period.

By this way, the designer is not only emancipated from the very limitation of the real factors of the given context in future scenario building but also suggests a rational basis for a clear (visual) and systemic (layered) scrutinisation of the future vision.

As seen in the conceptual model process, analytical thinking is not excluded in backcasting studies. Once the characteristic features of the vision become clear, the constitutive factors of the scenario are analysed and tested against the desirable future (Höjer and Mattsson, 1999: p. 12). The future image as the knowledge-base for the critical reflection in decision making, in this sense, corresponds to prospective reasoning based on conjectures as originally discussed by de Jouvenel (1967). Generation of images as the parts of the future scenario is, in turn, subject to the external communication and negotiation with the third parties, as well. For better performance of backcasting, in this context, creativity and criticality, the two fundamental skills should be pursued by the designer: while creativity involves in breaking the trends by reframing the problems by visual imagination truly defines the methodology of backcasting, critical thinking implicates the ability to test the future alternatives on the solid basis of design morphologies.

## 2. Conclusion

The absence of a strong discussion within urban design and planning around the future of human societies under the prevailing condition of uncertainty along with various externalities such as the environmental crisis, socio-economic fluctuations and rapid changes in demographic patterns has already gained a common recognition in the current debates (Kwami and Cosgrave, 2018; Wilson, 2018). Ratcliffe and Krawczyk (2011) argue that the contemporary city planners and policy makers lack an effective future-oriented approach and visionary capacities due to the increasing difficulty to comprehend current complexity and the speed of change in urban societies (p. 644). In the same vein, Maas *et al*. (2010) assert that *the contemporary city design is full of obstacles* – that is, the so-called '*crippling bureaucracy*', '*risk assessment psychosis*', *economic crisis* and '*preservation mania*' – standing against imaginative thinking (pp. vii–viii). In this context, it would not be wrong to assert that the contemporary spatial planning and design profession, seemingly, lost its visionary capacity in comparison to its heyday at the beginning of the last century (Pinder, 2005).

Robins (1996) identifies the current intellectual condition in urban studies with the notion of 'imaginative collapse'. Accordingly, he asserts that '*we do not plan the ideal city, but come to terms with the* "*good enough*" *city*' (p.132). This is mainly due to the enduring bias against the idea of 'fiction' as opposed to the 'real' especially in the curricula of planning education. Largely focusing on the urgent urban problems, the mainstream urban planning and design education today is highly engaged in the short-termist perspective of the market. This basically prevents the possible advancement of a stronger futurist intellect in the academia of urban planning and design.

In this context, reflecting on their own experience in the experimental medium of the design studio, the authors argue that designing for an unknown social and technological context to be possibly realised in far-future is a hard task for the trained cognition of the designers. This is because they used to operate within the definitive condition of the already-known design variables of the near-term or mid-range future. To overcome such intrinsic drawback in futuristic design thinking, designers should employ substantially different methodologies than conventional design procedures. If there is no binding reference to the context (since the given context is, categorically, supposed to be transformed into an entirely different form in the far-future), then the context itself should be generated first. Such a paradoxical state represents the very nature of futuristic thinking in urbanism. At that point, the authors claim imagineering as an effective technique for the development of a futuristic urban design. This mainly is due to the reason that image-led foresight of the future, potentially, liberates the designer's cognition from the very limitation in the bounded rationality of the settled methodologies of planning, which are principally based on the initial analyses of the present. Within the conceptually constructed methodological framework based on backcasting, the proposed method derives from the image of the future to be constructed for successive critical reflections with regards to the current (social and technological) limitations and possibilities.

As discussed by Brück and Million (2018), there is a need for education curricula to be constantly updated with new knowledge and methodologies of futurology embracing both logic and speculation (p. 145). As a response to that actual need, the paper addresses backcasting as a futuristic method that would be utilised in urban design education internalising future thinking. Despite its widespread use in various fields (i.e. sustainable transport, infrastructure, water management and recycling systems) as a response to the high level of complexity involved (Dreborg, 1996: p. 814), backcasting could not find an operative basis in spatial planning and design. Being compatible with imagineering, the method of backcasting is believed to foster higher intellectual productivity in urbanism in the search for more inspiring alternative futures of the cities.



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Suggesting more experimental applications in education, it is believed that backcasting would extend its ground in planning practice. Taking advantage of the higher communicative capacity of visual thinking, the technique of backcasting within the method of imagineering would support the development of futuristic perspectives to collaborative planning more effectively. Enriching the future image in the minds of people participating in the planning processes, imagineering would be potentially considered operational in practice in the course of time.

In addition to backcasting by imagineering, scenario building would be adapted to the design and planning researches in education as another prominent method of futures studies. Based on the premise of 'intellectual indiscipline' that indicates envisioning the future by simulating divergent stories to stimulate various strategic choices instead of predicting a specific end-condition (Ike and Voogd, 2004), scenario building would respond to the need for more dynamic and procedural visioning approaches in the contemporary urban planning. The methods of speculative design discussed by Dunne and Raby (2013: pp. 69–88) could be also integrated into the educational programmes of architecture and planning to ensure new theoretical forms of urbanism. Then again, the early methods of creative thinking such as brainstorming and synectics (Koberg and Bagnall, 1972: pp. 68, 114–115) or roleplaying by 'thinking hats' suggested by de Bono (1985) in the name of 'lateral thinking' would be operational to boost the futuristic imagination of the planning and design students.

As argued by de Jong (2010), '*design extends science from what is probable alone, to include what is possible and imaginable*' in an ideal context (p. 30). This entails a certain kind of task in design education to free students from the constraining suppositions and biases directed from the very world of the probable. Especially, in the context of urban planning and design which are highly conditioned by the multiple factual variables including society, economics, politics and culture, such liberated perspective stands as a challenge in education. To be able to open up the creative mind of the students to the unexpected possibilities of the future, a closer link between art and design needs to be constructed. Such a strengthened connection is believed to support the imaginative capacity of the students in urban design education.

Finally, the remedy for the poor visionary capacity of the current profession should not be seen in converting the architectural practice from small to big works as claimed by some 'progressive' architects (Maas *et al*., 2010: p. 72). The authors, in this regard, argue that the solution does not lie in 'big architecture', but in creating an imaginative (and collaborative and participatory) perspective with its corresponding methodologies for designing the collective fabrics of our cities.

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