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Win-Win-Win-Win-Win-Win:
Synergy Tools for Metadesigners

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The failure of eco-design

Our 'Design Synergy in the Twenty-first Century' project was based upon the somewhat negative assumption that 'Eco-design', and 'Design for Sustainability' have so far failed. Few environmentally aware designers find a way to follow their conscience whilst thriving economically at the professional level. Most see little option but to apply their skills in support of market forces. Unfortunately, these forces are manipulated to proliferate more and more products within a rapidly expanding market. Unwittingly, designers have therefore helped to create a society driven by over-consumption and waste. Since the 1950s we have tried to create a 'sustainable' world by 'reforming the environment' (Fuller, 1969), reducing the scale of enterprise (Schumacher, 1973), or creating biodegradable, longer lasting products. However, although we now understand far more about the damage we are doing to the eco-system (e.g. 'Ecological Footprint, Wackernagel & Rees, 1996) this knowledge has failed to wean ourselves away from specialist design practices, and to establish a common environmental discourse across the industry. Perhaps the most promising work in the 'design for sustainability' movement has already been edging towards metadesign by embracing a more enterprising, adaptive, 'zero-waste' society (Murray, 2002). Society can now be conceived as a 'cradle-to-cradle' system (McDonough, 2002), that offers more and more opportunities for sustainable enterprise (Hawken, Lovins and Lovins, 1999). Despite the heroic efforts by the pioneers of 'eco-design', design for sustainability' etc., global carbon emissions continue to rise, and bio-diversity levels are falling at an alarming rate. This is because neither 'eco-design', nor 'design for sustainability' have been powerful enough to tame an economic system designed for limitless growth.

From 'design' to 'metadesign'

In looking for a more effective alternative to our current approaches we asked ourselves whether some form of 'metadesign' practice might be useful. What might we mean by 'metadesign'? We began by adopting Ascott's (1994) idea that 'design as planning' could be replaced with 'design as a seeding process'. In consultation with metadesign expert Dr. Lisa Giaccardi, of Boulder University we envisaged a unified, consensual, systemic practice that would act as a 'systems integrator' (Galloway & Rabinowitz, 1983). As such, its tasks would be too onerous for individual 'metadesigners'. Indeed, we suspected that we would need to find new ways to build the right kind of multi-disciplinary teams. This multi-layered mode of design would be sufficiently adaptive to function as a living system. As Maturana (1997), put it, it would actively 'language' its own ethical identity. In wondering how to evaluate the effectiveness of such a complex system we asked whether it could be evaluated by using 'synergy' as a performance indicator. Society would certainly benefit from new levels of synergy that might emerge from within, between, and across many social, political, ideological, economic and biological boundaries. Here, Buckminster Fuller's grand, if somewhat mysterious idea of a 'synergy of synergies' (Fuller, 1975) was helpful. I would define it as a totally comprehensive equilibrium that emerges from manifold

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diversities and mutual adaptabilities. In order to evolve a suitable understanding of 'metadesign' itself, we built our group out of individuals representing fourteen different disciplines.

Can 'metadesign' save the world?
Importantly, the implied focal point in our study was the future role of the designer. We believe that designers can, and should play a greater role in transforming society. Recently, the way designers think has become increasingly interesting to scholars, business managers and other professionals. This is because it is often seen to be more radical, creative and holistic than the way that specialist bureaucrats, lawyers, or managers tend to think. One of our team, Professor Naomi Gornick has been charting the convergence between design thinking and management thinking. (Gornick, 2006) Another of our experts from design research, Professor Martin Woolley, showed how synergies already exist within good practice, but that we need to develop better methodologies to enhance them. This suggests that, although, as designers, we have the potential to work at a higher level of organisation, we are not yet trained to do so. One reason for this is that our education system still insists on creating specialists. Professors Naomi Gornick and Karen Blincoe explored the implications of metadesign for design education and corporate practice, concluding that there would be significant advantages in locating it right at the centre of the curriculum. This has enormous implications. What if metadesign teams were to run governments, farms, and banks? This is a highly ambitious, entrepreneurial and, perhaps, even subversive idea. Nevertheless, it is worthy of consideration. Whilst we would not want to erode existing traditions of professional practice, society needs to change very rapidly if we are to avoid the impending environmental calamity that is looming.

Future research issues
However, where 'metadesign' is potentially vast in scale, the range of our project was limited by its brevity and modest scale. We could not, for example, address paramount issues such as food production and transport policy. Today, more than half the world's population live in cities. Although poor urban communities spend an average of 30 percent more on food than their rural counterparts, they consume fewer calories. This is not just because of low incomes and high fuel prices. In many of these areas between 10 and 30 percent of food produce is lost or spoiled on long journeys, and poor infrastructure. Without a 'metadesign' vision, our energy-dependent systems of intensive farming and long-distance transportation will begin to fail us. We need a new discourse that is able to explain how things work in a more holistic and relational way. This, in turn, would be needed in order to promote a more consensual, de-centralised system of governance. Whatever system of metadesign we adopt will therefore need to make individuals more creatively responsible and ecologically attuned. But, even if we could find one, how would we evaluate the efficacy of such a complex and interdependent system? One way to do this, we concluded, would be to look for processes that fulfil the 'law of increasing returns' (e.g. Romer, 1987), and to measure their synergy levels as well as we can.

The economic dimension
One of our researchers is the 'eco-economist', Richard Douthwaite, who helped us to articulate a possible role for economics as a fundamental aspect of metadesign. Over the past thirty years, the rate of economic growth and the rate of discovery of oil reserves have followed almost identical upward curves. This has facilitated a waste-based society that has camouflaged its lack of synergy by doing everything at an accelerating pace. However, despite the optimism of some oil executives, this trend will falter, perhaps in the next few years. When this happens, the 'endless growth' model is likely to lose credibility, and society will ask itself to envision how we really want to live. My hope is that we will then see the rise of 'super-creative banking' systems, by which resources will be valued and orchestrated using ingenious new processes of sharing and exchange. In his nine preliminary recommendations, Richard showed how scarce resources could be rationed

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fairly, partly by encouraging local initiatives on a truly sustainable basis. This is something that an unregulated world economy is ill equipped to do. We would re-design the way that money is put into circulation, and we would stop using debt as an artificial way to increase productivity. Richard suggested that governments, rather than banks, might sponsor two types of currency, one for savings, one for trade. By prudently spending the exchange currency into circulation and taxing it back again, governments would be able to move us slowly toward zero inflation. Eventually, we would establish a genuine world currency (rather like what used to be called 'paper gold', or 'SDRs'). This would be distributed on the basis of population numbers, and global sustainability, rather than on economic power. It would be issued into circulation on a scale that would allow the reserve currencies to be returned to their countries of origin to clear international debt. (Douthwaite, 2006)

The architectural dimension

In seeking to explore a wide range of practical and theoretical issues, we made a brief case study of 'BedZed', a pioneering and acclaimed 'zero-carbon' housing project in the South East of England. This project was created by one of our researchers (the eco-architect, Bill Dunster). We discovered that Bill had already considered incorporating an economic dimension by considering a local currency system within early plans for his BedZed housing scheme (http://www.bedzed.org.uk/). His practical experience proved useful for our research, especially at the economic, entrepreneurial level. For example, Bill had found it important to demonstrate the financial and political viability of environmental improvement schemes. For example, by 'leaving the rich to be rich', whilst 'rewarding the poor', we might transform otherwise damaged environments into fertile and pleasant areas. This highly pragmatic aspect of metadesign emphasises its dynamic and creative nature. Bill advocated a mixture of building solutions, in order to achieve a rich mixture of styles and possibilities. Some entrepreneurs might want to build more, in return for using more carbon reducing technologies. This welcoming of difference and heterogeneity seemed to be an important feature of what we understand as 'metadesign'. For one thing, it is realistic. Where some people wish to devise conspicuous and innovative ways of 'eco-living', others might live in unremarkable houses, quietly transforming them into zero carbon zones.

Working with super-complex systems

Some of Bill Dunster's work entailed managing the efficiencies of energy conservation and generation. This aspect of his work dovetailed with the findings of two other of our researchers, a building scientist and a practising architect. Professor Philip Jones, a buildings scientist, uses laboratory methods to improve the conservation and management of energy in very large buildings around the world. His work is closely integrated with the designs of architects and planners, to ensure that synergies at one level can be maintained by synergies at another. A disadvantage of discrete, specialist design practice is that it offers incomplete solutions. Hence, the advantages of living in a low-energy house would easily be cancelled out by driving long distances to work, even in a 'low energy' car. Jan-Marc Petroschka, our expert in social housing is also an innovator in the design of live-work dwellings in London. Under his guidance we discussed the feasibility of 'scaling-up' the suburban BedZed agenda to become a fully interdependent urban 'living style'. This is because greater economies of scale can be achieved within cities, rather than in rural areas. Some of Jan-Marc's ideas on space-saving 'live-work' architecture are shown in his critically acclaimed housing project (Astra House, MacDonald Egan & Partners), recently completed in the Deptford area of London. Whilst neither the BedZed, nor Astra House projects have required significant technical innovation we were interested to know why pioneering initiatives like these often take a great deal of time to gain acceptance, or even to inspire imitations. We developed several mapping methods that facilitate close inquiry into such a question. In one example (figure 1), the early difficulties in gaining acceptance for a novel scheme can be grasped by monitoring the actions of four 'players' and the six relations that co-sustain them.

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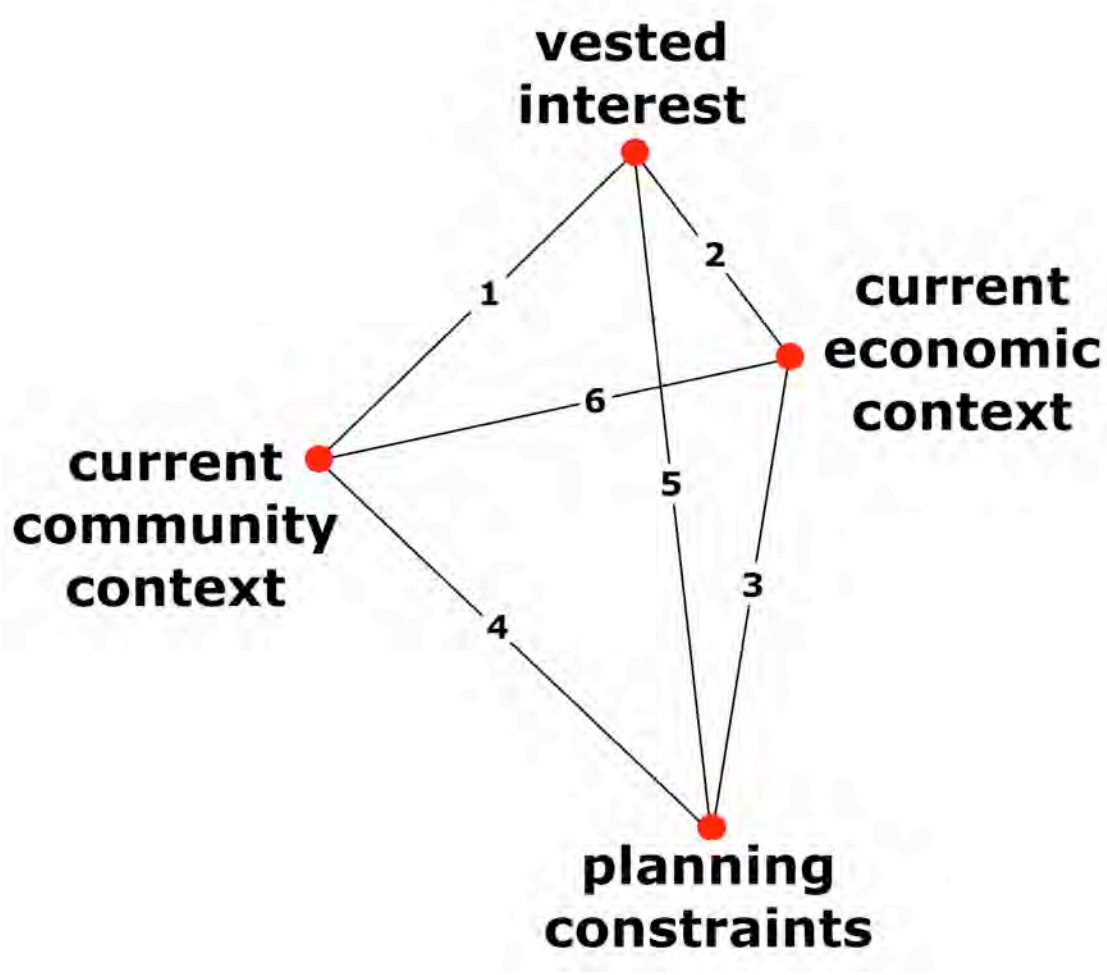

Figure 1 - Simplified (four-fold) model of the challenges in housing innovation

Whilst useful, this is inadequate way to represent the vast number of tiny, but significant factors that are, to a significant extent, reciprocally self-creating. In short, it may not contain enough information to be effective. Complexity must therefore be apprehended as a whole entity. In this case, for example, BedZed needed to gain the support of a cluster of interested parties, each of whom may have a different 'vested interest'. The support of a given individual is usually, also, influenced by the perceived views and likely actions of others within the cluster. Figure 2 shows all of the above 8 players (the dots on the diagram) linked together (by lines) in a minimum set of 28 links. If we are to represent all of the possible relations within the system, it would be wise to explore each link in turn, using a positively creative, opportunistic, and open-minded approach. This may mean that the 28 links can also be represented as 56 relational viewpoints. By using this map opportunistically and creatively it is possible to design points of critical intervention, and to devise new solutions to this kind of complex problem. We believe that this mapping system can enable complex 'vicious circles' to become transformable into more 'virtuous circles'. As such, it is a useful tool for metadesigners.

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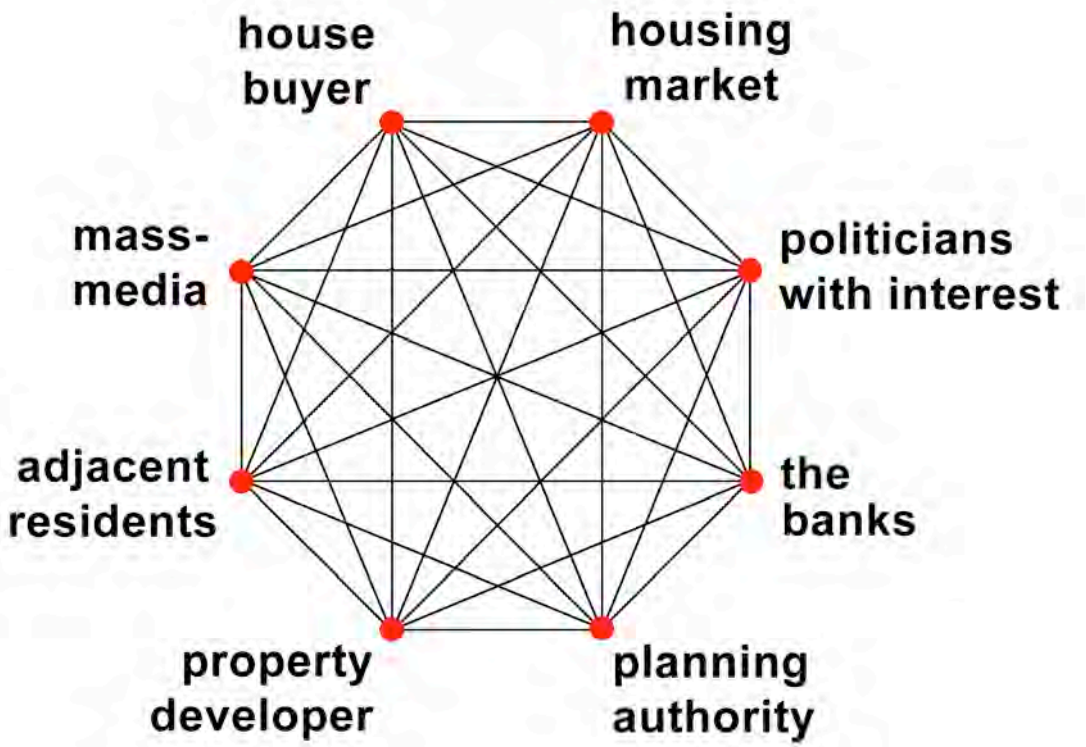

Figure 2. The 28 possible relationships in an 8-player system

Working with super-complex systems

The relational mapping method we used in fig. 2 was inspired by some original research by another of our researchers, (Dr. Vadim Kvitash). Vadim holds many patents on a comprehensive system for evaluating something that is akin to the 'equilibrium', or 'balance' of whole systems within a medical context. His system of 'Relonics' (Kvitash, 1983 & 2002) offers a powerful, systemic language of complex, interdependent relations. In one application he finds a use for the otherwise discarded data taken from laboratory analysis of the blood samples. Arguably, in orthodox medicine, if the experts only look for 'abnormal' levels of particular chemicals associated with a given illness most of this data is ignored. In Vadim's system, we are also interested in the total set of relations between each individual factor, and each other factor. As the number of factors increases the resulting number of relations rises exponentially. This means that when we use a reduced set of isolated indicators to make a judgement, we are overlooking some of the information. Mathematically, the number of factors in a given set determines, with 100% accuracy, the finite number of relations implied. At this level of logic, we can therefore know exactly how many relations are possible. How we interpret them is another matter, but Dr. Kvitash can forecast, with 95% accuracy, whether a patient will live or die within three years of a heart operation. Where more discrete, analytical methods tend to look for single, identifiable parameters, his system plots relations against a non-statistically derived set of self-balancing norms (he calls 'relons'). We have evaluated his system using urban planning situations, rather than medical data, concluding that it is likely to be just as useful.

Dealing with intangibles in a complex system

In our project we also addressed the issue of complexity by considering the emergent nature of real urban spaces, and its potential for facilitating creative evolution and change.

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Where Vadim's work sought a high level of predictability, other researchers (Professor Milan Jaros, a theoretical physicist, and Hannah Jones, an artist and design theorist) both explored the more volatile and marginal features of our spatio-temporal environment. Each, in their different ways, acknowledged the need for a new, non-Kantian, non-Cartesian understanding of space and time. Milan, for example, explored the way that individual self-identity is, to an important extent, enabled by the 'spatio-temporal instabilities, or warps' between the virtual and the material worlds. In other words, the citizen finds or, 'creates' herself at the boundaries between what he calls 'an assemblage of the self, place and interactions (narratives) binding them dynamically together'. Although the responsible designer cannot dare to 'design' in any deterministic or predictive sense, at this level, metadesign teams might nevertheless be wise to reflect upon the complex socio-political insights that Professor Jaros's work has generated. If we were to ignore this level of understanding we may find that we may impair our ability to facilitate and/or to cultivate a creatively adaptive society.

Future research issues

Hannah Jones looks at the potential for sustainable urban planning by seeing the spaces between buildings as possible sites of unintended potential. By describing these unconsidered zones as 'awkward spaces', she acknowledges the inescapable ambivalence between that which is planned and that which inevitably follows as a by-product of the logic of form and flow. At a time when the public rhetoric of 'iconic buildings' is used to totalise an ethics of grace and power, Hannah prefers to celebrate the maladroit, the uncanny, the chaotic, and the dissipative. In working to establish a comprehensive language of urban incompleteness, she opens up unforeseen possibilities for the metadesigner. One of the aims of her project is the prospect of transforming 'vicious circles' into 'virtuous circles'. (See figure 3)

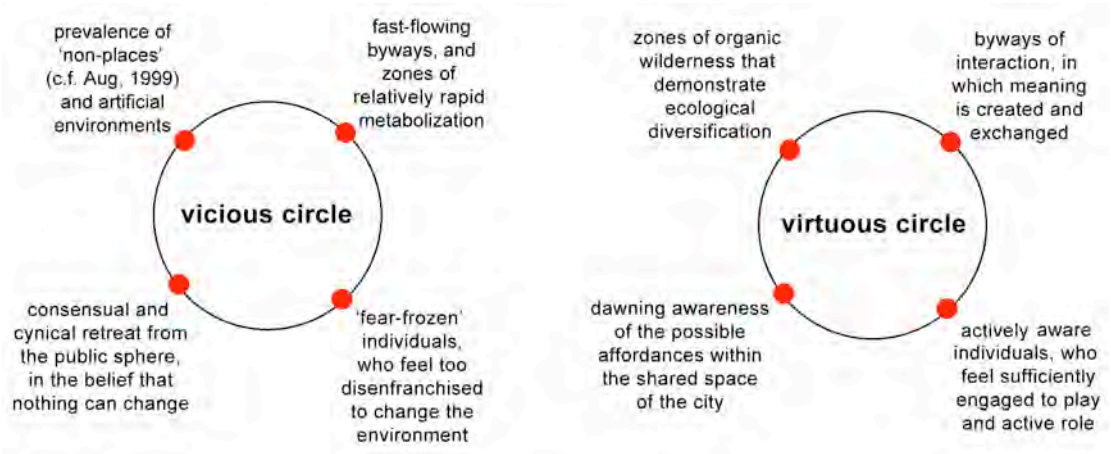

Figure 3. Transforming a 'vicious circle' into a 'virtuous circle'

Going beyond symbiosis

In seeking to integrate the best aspects of all of these belief systems, the idea of a 'win-win' situation is useful because it is so familiar. A 'win-win' situation is usually conceived of as two players in a symbiotic relationship. However, a metadesign team might multiply this idea by seeking to 'seed' new environments in which there are many more 'winners' than 'losers'. Although he language of 'winning' and 'losing' has some dubious implications, in the short term it is useful. Implicitly, Adam Smith's original idea that self-interest yields shared benefits for all (Smith, 1776) is very appealing because it makes a 'win-win' (i.e. at least doubly attractive) offer. Unfortunately, evolved into a contagious ethics of consumption in which individual self-gratification is rewarded because we believe it will

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energise the economy, and, ultimately, reward everyone. By contrast, the logic of 'sustainability' appears to offer a 'lose-win' scenario in which citizens must curb their desires in deference to future generations of consumers. Here, we may be attracted to an eco-mimetic model in which, say, when several tasks are undertaken in parallel there is a possibility that one may help the other without disadvantaging itself. It is customary to identify individual gains and losses as 'categories of advantage' as follows:

1) **Mutually damaging**
   (— / —)
   (Disadvantaging each another in pursuing exclusive advantage)

2) **Parasitic**
   (— / +)
   (High dependency on the fitness of one, rather than on both partners)

3) **Symbiotic**
   (+ / +)
   (Mutually supportive collaboration)

4) **Super-symbiotic**
   >(+ / +)
   (Symbiosis that also enhances context, or that acts 'for' additional beneficiaries who share the same eco-system yet may be unknown or beyond comprehension)

Unfortunately, faced with this kind of choice, humans frequently disregard the negative consequences of their immediate actions by seeing them as a choice between a single, strong, immediate, personal gain, versus a small (i.e. when shared collectively), unspecific, long-term loss (Hardin, 1972).

Figure 4 - The 'win-win' scenario mapped as a single relationship

The idea of two individuals who share a mutually beneficial relationship is familiar (see figure 4), but what happens when we bring in additional players to introduce new synergies into an existing symbiotic relationship? Here, we face the problem of how to manage increasingly complex systems. Nevertheless, it can be shown that the possible advantage increases significantly, even for a relatively small increase in the number of symbiotic players.

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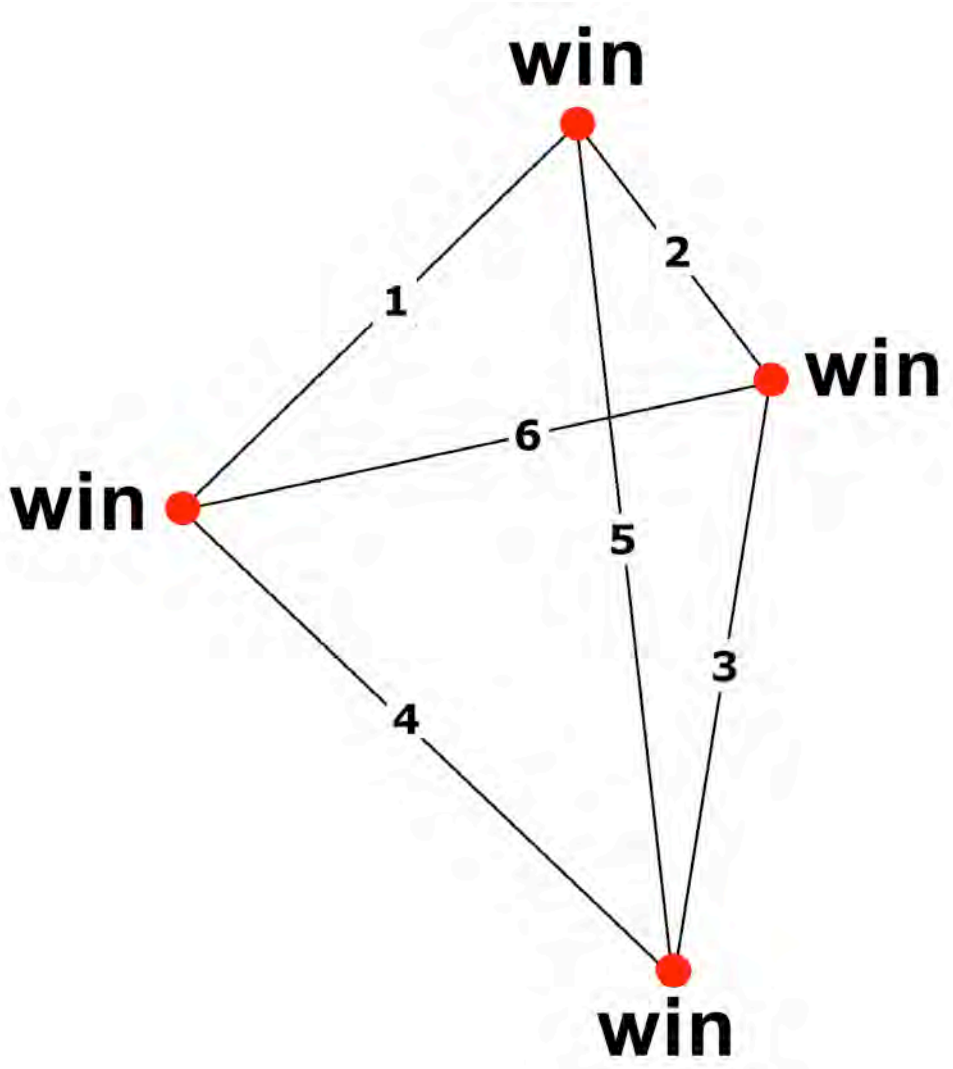

Figure 5 - The 'win-win-win-win-win-win' scenario mapped as 6 paired relations

Let us take four players, rather than two, and represent them a tetrahedron (see figure 5). Buckminster Fuller noted the unique properties of the tetrahedron in 1975. They are implicit in Euler' Law (1752), which states that the number of vertices plus the number of faces in any polygon will always equal the number of edges plus two. (i.e. V + F = E + 2). This '2' is what Fuller called the 'constant relative abundance'. However, because this surplus becomes increasingly trivial as complexity increases, we may note an auspicious balance between the tetrahedron's simplicity (i.e. mnemonic convenience) compared with its relational richness (i.e. in its high ratio of edges to vertices). Thus, there are six times more peer relationships (i.e. edges) between four players (i.e. faces, or nodes) than there are between two players (see figure 5). Hence, by merely doubling the number of 'players' from two to four, we achieve a six-fold increase in the number of mutual relations that can be utilised. In short, the tetrahedron is special because it combines a graspable, non-hierarchical topology that offers possible symbiotic advantage to each of the four players. This can be presented to untrained users as a 'Win-Win-Win-Win-Win-Win' situation.

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Mapping Synergy

Although the concept of 'synergy' appears to be well understood in management, and elsewhere, its definition is surprisingly vague. This is partly because synergy itself is elusive and changeable. Indeed, all of the definitions we found were too generic to be useful. In seeking measurable outcomes, we therefore defined four fundamental 'orders' of synergy that would help us to map, and to manage the complexity of a practical system. This scheme regards Peter Corning's (1983) observation that some bioeconomic synergies include 'information-sharing' capabilities. I adopted this as our 'second order' synergy, the added 'data-storing synergy' (first order), 'knowledge-sharing synergy' (third order), and 'knowledge-sharing synergy' (fourth order). This tool makes it possible to 'metadesign' for complex conditions by mapping them as manageable task domains that can subsequently by re-integrated within the whole.

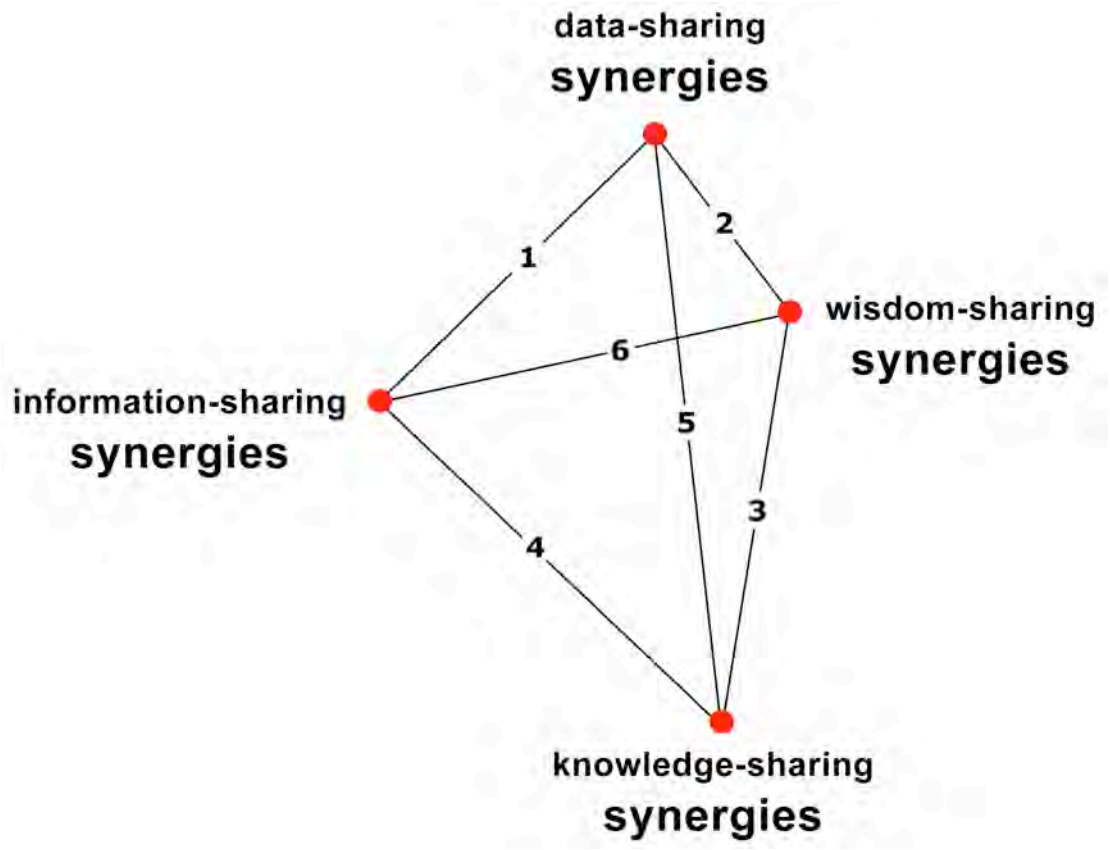

Figure 6 – Using our 4 Orders of Synergy to map a 'Synergy-of-Synergies'

Figure 6 shows a crude mapping of our four Orders of Synergy. It reflects four levels of complexity intended to encompass, and 'synergise' a wide range of other synergies. Where, for example, the 'data-sharing' level might include, say, smart metallurgical synergies, the 'information-sharing' level might facilitate sophisticated energy management systems. Where the 'knowledge sharing' level might be used to guide the cultivation of shared social benefits, the 'wisdom-sharing' level would probably include highly ephemeral and emergent phenomena, perhaps at the eudemonic, or spiritual level.

In seeking to ensure excellent communication at many cognitive levels we preceded some of our meetings with a dance workshop run by a choreographer. These proved to be extremely effective in reminding ourselves of the embodied nature of thinking, also in

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facilitating a rapid rapport between each, and every other researcher. Much of our theory behind our mission was underpinned by the multi-facetted research of another of our research team, Dr. Otto van Nieuwenhuijze. Otto's work includes some of the topological insights that informed communication issues, including co-authorship (Nieuwenhuijze & Wood, 2006). Some of the methods, or tools we used emerged partly as a response to difficulties of interpersonal relations that, for a short time, threatened our momentum when conducting practical workshops. Here, we used a corresponding, but different mapping system. Assigning each researcher to one of four levels reduced unhelpful conflict, thereby enabling her/him to play an optimum role. We created four levels of collaboration, each represented by a 'group' for holding the identity of one of the four roles.

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Complexity	Role / Group	Approach / Mode of Inquiry
HIGHER ⇧ ⇩ LOWER	❶ *NEW KNOWING*	intuitive / spontaneous / anticipatory
	❷ *ENVISIONING*	imaginative / critical / self-reflexive / tactical
	❸ *LANGUAGING*	discursive / interpretive / adaptive / facilitating
	❹ *PUSHING/DOING*	hands-on / decisive / resourceful / managerial

Figure 7 - The Four Groups and Their Roles

Where the 'New Knowing' group acted as a kind of unconscious mind for the whole team, the 'Languaging' group was able to create new meanings that would promote better communication. Where the 'Pushing & Doing' group focused on the delivery of specified outcomes, the 'Visioning' group's role was to anticipate possibilities, and to present options.

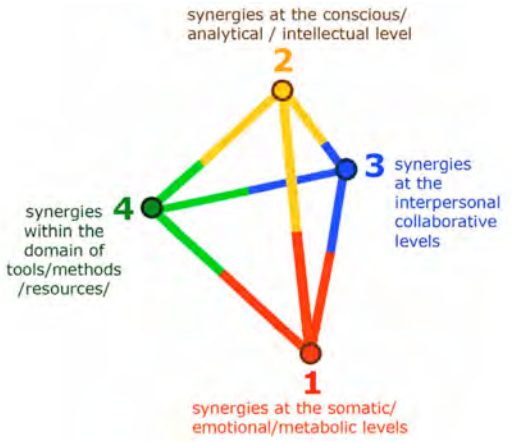

Fig. 8 – The Four Collaborative Roles

We developed this idea into a practical management tool that mooted co-creative roles for synergy management, (see figure 8) developed for sixteen individuals on four tables (see figure 9).

Fig. 9 - Layout of tables for the workshop

At each table there was one permanent member of the group. The other three were each assigned the task of liaising with another table. This ensured that the maximum number of interdependent conversations could take place with the minimum of confusion or conflict.

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On March 21st, 2006 we gave the system a final test in the presence of a stakeholder, Andrew Carmichael, of the Creative Lewisham Agency. Andrew asked how to overcome the common problem of planning inertia, in which the potential of a region is sometimes held back by the collective reluctance of property developers in following a first initiative. Sometimes, a single landmark building can stand alone for a number of years before attracting initiatives of a similar scale. Only when a certain critical mass of new ventures is reached is a region likely to behave as an attractor to the necessary level of community and business investment. One of our solutions included the suggestion of running a well-planned workshop for all of the interested parties in which the mutual benefits of second and subsequent phases is clearly presented, shared, and discussed in order to highlight all mutual gains, and to seek further advantages. A 'win-win-win-win' format is one way to crystallise this process. This was one of the practical outcomes of the 5-hour workshop that may be implemented by the CLA.

THANKS: We are grateful to Professor Tom Inns and Vicky Hale for initiating and managing the Design in the 21st century project, and to the EPSRC and AHRC for their support. Warm thanks are extended to Ann Schlachter and Hannah Jones, for organising the research events with an extraordinarily positive spirit. We are also indebted to our researchers:

Professor Karen Blincoe, Andrew Carmichael, Dr. Caroline Davey, Richard Douthwaite, Bill Dunster, Professor Naomi Gornick, Hannah Jones, Prof. Phil Jones, Prof. Milan Jaros, Dr. Vadim I. Kvitash, Dr. Otto van Nieuwenhuijze, Jan- Marc Petroshka, Professor Martin Woolley.

We are grateful to our expert visitors and supporters who made a significant contribution. These include:

Jonny Bradley, Jonathan Chapman, Dr. Ken Fairclough, Alistair Fuad-Luke, David Heldt, Will Jones, Duncan Kramer, Julia Lockheart, Anette Lundebye, Bim Malcolmson, Jae Mather, Denis O'Brien, Fabiane Perella, Dr. Garth Rennie, Paul Taylor, Alma Tischler-Wood, Mathilda Tham

FURTHER READING
(See our ds21 web-site: http://attainable-utopias.org/ds21)

- Ascott, R., (1994) in Giaccardi, Elisa "Metadesign as an Emergent Design Culture", Leonardo Journal, Volume 38, Number 4, August 2005, pp. 342-349
- Corning, P., (1983), "The Synergism Hypothesis", McGraw-Hill, UK [see also http://www.complexsystems.org/publications/pdf/synselforg.pdf]
- Douthwaite, R., (2006), "Economic Synergy", Journal of Landscape and Urban Planning, Landscape Ecology, Planning and Design ISSN: 0169 (at press)
- Dunster, W., (http://www.bedzed.org.uk/
- Fuller, R. B., (1975), "Synergetics: Explorations In The Geometry Of Thinking", in collaboration with E.J. Applewhite. Introduction and contribution by Arthur L. Loeb. Macmillan Publishing Company, Inc., New York.
- Galloway and Rabinowitz, (1983), quoted in Giaccardi, E. (2005). "Metadesign as An Emergent Design Culture", in Leonardo, Volume 38, Number 4, August 2005
- Giaccardi, E. (2005). "Metadesign as An Emergent Design Culture", in Leonardo, Volume 38, Number 4, August 2005
- Gornick, N., (2006), "Convergence: New Management Imperatives and their Effect on Design Activity", Design Management Review Spring 2006 Vol. 17 No. 2 (ISSN 1045-7194)
- Hawken, P., Lovins, A. B., & Lovins, L. H., (1999), "Natural Capitalism", Earthscan, 1999
- Jaros, M., (2006), "Towards re-definition of space-ness in the post-mechanical age:

Draft for subsequent publication as: Wood, J., (2007), "Win-Win-Win-Win-Win-Win: synergy tools for metadesigners", a chapter in "Designing for the 21st Century, Interdisciplinary Questions and Insights" book, (ed. Thomas Inns) Gower Publishing, ISBN: 978-0-566-08737-0, December 2007

Methodological notes", Journal of Landscape and Urban Planning, Landscape Ecology, Planning and Design ISSN: 0169 (at press)
- Jones, H., (2006), "Sustainable Future Cities: How can Re-evaluating the Potential of Awkward Spaces in the City lead to a Creative and Sustainable Urban Design of London?" Journal of Landscape and Urban Planning, Landscape Ecology, Planning and Design ISSN: 0169 (at press)
- Jones, P., (2006), "Modelling the Environment in Cities", Journal of Landscape and Urban Planning, Landscape Ecology, Planning and Design ISSN: 0169 (at press)
- Kvitash, V., (2004), "Balascopy System and Method with Improved Sensitivity", U.S. Patent No. 6,768,948
- Maturana, H. R. (1997) *Metadesign*, available at: http://www.hum.auc.dk/~rasand/Artikler/metadesign.htm
- McDonough, W., & Braungart, M., (2002), "Cradle to Cradle: remaking the way we make things, Rodale Books
- Murray, R., (2002), "Zero Waste", Greenpeace Environmental Trust
- Nieuwenhuijze, O., & Wood, J., (2006), "Synergy and Sympoiesis in the Writing of Joint Papers; anticipation with/in imagination" International Journal of Computing Anticipatory Systems, edited by Daniel M. Dubois, published by the Centre for Hyperincursive Anticipation in Ordered Systems, Liège, Belgium, Volume 10, pp. 87-102, August 2006, ISSN 1373-541 (at press)
- Romer, P., M., (1987), "Growth Based on Increasing Returns Due to Specialization," American Economic Review, American Economic Association, vol. 77(2), pages 56-62, May
- Wood, J., (2005) "The Tetrahedron Can Encourage Designers To Formalise More Responsible Strategies", for the "Journal of Art, Design & Communication", Volume 3 Issue 3, Editor, Linda Drew, UK, ISSN: 1474273X
- Wood, J., (2005), "(How) Can Designers Learn to Enhance Synergy within Complex Systems?", conference paper given at the 'DESIGNsystemEVOLUTION' conference in Bremen, Germany, March 2005
- Wood, J., (2006), "Synergy City", Journal of Landscape and Urban Planning, Landscape Ecology, Planning and Design ISSN: 0169 (at press)

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