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Spinning in helices: design and the question of value

Philip ELY[a], Louis GENESTE[*b]

[a] Curtin University, School of Design and the Built Environment; [b] Curtin University, School of Management

Whilst those who practice, research or teach in design are cognisant of the agency of the discipline and its effectiveness for situational change, potential commissioners or clients of design are still to be persuaded of its worth. A number of recent attempts to measure the effectiveness of design have helpfully reignited an interest in design's value to commercial and societal interests, yet such models for evaluation are not unified to a point where different types of organisations – ranging from the commercially competitive to the socially motivated – can apply them to understand the value of particular design interventions. This paper develops a framework for analysis of the knowledge value of design to an organisation or society, building on the theoretical model of the quintuple helix and 'modalities of knowledge' respectively and then applies this analytical frame to ten design (research and practice) projects conducted over a twenty-four-month period. The paper concludes with recommendations on how such a framework – the Design Value Helix - may be developed for future analysis of design value for research, business and societal use.

Keywords*: Design, knowledge value, Design Value Helix, innovation, frameworks*

[*] Corresponding author: **Philip Ely** | e-mail: **philip.ely@curtin.edu.au**

Introduction

The motivation for the development of this line of inquiry began at an industry event – Design Thinking & Innovation – hosted by Michael Page (recruitment) with industry panellists from BankWest (finance), BHP (mining) and Skills of the Modern Age (training) in Perth, Western Australia. Attended by approximately ninety industry design professionals from traditional design agencies, in-house service, user experience (UX) and customer experience (CX) teams and design academics, the event explored the saliency of design thinking and other paradigms in the local design industry. The most significant question emergent from the event focussed on this area of 'measurement' – understanding the impact and value of design, on the back of the (then recently) published *The Business Value of Design* (McKinsey, 2018a) and the McKinsey Design Value Index. 'How' – wondered the audience – 'do we measure the impact of our work given that design comes in many forms and is used for multiple purposes?'

The *McKinsey Design Value Index,* drawn from an analysis of 300 publicly listed companies over a five-year period, measured financial performance and interviewed and surveyed business and design leaders. The index is derived from two million pieces of data and more than 100,000 design 'actions' (McKinsey, 2018a: 2). This work received an Honorable Mention in the 2019 Design Management Institute's Design Value Awards building as it did on the work of the DMI's own *Design Value Index*. More recently in 2019, digital product design company InVision published its own report on design's "astronomical impact" (Gonzalez, S, Goodman, R and Walter. A, 2019, p.2) following its interviews of over 2,200 designers. This report identified five levels of design maturity within organisations, ranging from Level 1 – "design is what happens on screens" – to Level 5 – "design is a business strategy" (ibid, p.15). The InVision report used statistical methods across a wide range of interviews with organisations of differing scales (not-for-profits, start-ups, large corporates) across 24 industry sectors and 77 countries.

An attempt to reconcile the differing approaches from the DMI, McKinsey and InVision methods into a unified model for evaluating design's value and impact may prove to be problematic. McKinsey's survey instrument, for example, includes questions around the work of design teams (e.g. Q. 19 "How effective is your design team at [f]ostering innovation?") (McKinsey, 2018b)– assuming that the company under analysis does actually have a recognised 'design team'. Whilst those particular questions are preceded by questions on the quantitative measures of design performance or promotion prospects of designers and the degree of support from C-level leadership, this particular survey is clearly focussed on larger corporate organisations. Whilst the InVision analysis of design maturity is open to a broader cohort, the research team recognised that the survey participants were selected from the InVision contact database of potential or current customers who "may have biased responses or may not have a complete understanding of design practices in their company" (Gonzalez et al, 2019, p.6). Given that InVision is a digital product design tool, the types of design interventions or actions reported are likely to be skewed towards design projects in the digital domain, ignoring the obvious broader application of design in other physical (products, tools, environments) or non-physical (strategies, processes, systems or ecologies) form(s).

The crucial link between design and economics

All of the approaches mentioned above focus attention on the value that design brings to business, but this neglects the wider social, technological, cultural and environmental impact that design has on the human-shaped world. To develop an understanding of the impact and value of design it is important to extend our thinking beyond the methodological and towards the historical and theoretical, for we find useful ideas there that may help us frame our inquiries into the value of design. In *Design and the Creation of Value*, John Heskett (2017) drew our attention to the 'problem of reliance on the quantitative' recognising that the tacit knowledge applied in design "can neither be explained in terms of rational decision-making, nor be summarized easily in quantitative terms" (Heskett, 2017, p.145). The neoclassical economic interest in design purely from a quantitative perspective clearly presents problems for designers who can see their value manifest in many aspects of life but this does not, as Heskett later states, "absolve designers from extending the boundaries of rational analysis and quantitative explanations that can communicate understanding of their practice" (ibid).

Heskett's interest was in the value of design shaped national policies and corporate strategies (Dilnot, 2016) and he drew on New Growth theory – in particular the work of Schumpeter (1934) and Romer (1992) – to develop his own *value creation theory* which placed the knowledge of users (ergo design) as an important 'factor of production'. It is worth examining these ideas more closely, for they help us position design in a wider economic

context. Schumpeter's ideas on capitalist markets may be summarised by the sum 'Technological Development + Competition = Economic Growth', but his most popular idea is that new technological revolutions would replace old ones every fifty or so years in a process of what he called 'creative destruction' (Schumpeter, 1934). Romer added to Schumpeter's concept by emphasising the role of knowledge in the generation of capacity and capability for innovation strategies (Romer in Heskett, 2017, p.106). Heskett goes one step further by suggesting that it is the knowledge of users, coupled with technologies (hardware or software) which generates capabilities for innovation strategies and that this knowledge leads not only to product innovations but also process innovations (affecting production quality) and transaction innovations (manifested in transaction efficiencies) (Heskett, 2017, p.151). Importantly, in both New Growth theory and Heskett's value creation theory, imperfect competition leads to the destruction of existing products and the dynamic creation of new demand, new markets and – of course – new users. Design is to be found both in the context of production (economic value, technological opportunity, social institutions) and context of use (utility, systems, product and meaning). For Heskett, designers must function in the conceptual space between designing to improve the capability of users of a product, understanding and shaping end-user beliefs and symbolisms, and understanding the systemic nature of use (e.g. electrical, cultural, broadcasting in the case of media) (Heskett, 2017, p.147).

What is helpful about Heskett's analyses of New Growth theory and design is that design is clearly identified as a form of knowledge which fuels growing economies. Indeed, his subsequent design policy work in the UK, Hong Kong and China makes this link between design, knowledge and innovation most explicit as he advised national and regional governments on the economic benefits of design-led innovation. However, the downside of an analysis of the value of design in an economic context is that it suits neoliberal capitalist societies - and specifically the interests of businesses (capitalists) - but is not applicable to instances where the role of design is not purely for economic purposes. For this, we must extend our thinking away from the techno-economic imperative and towards a more ecological point-of-view of design-led innovation and innovation ecosystems.

Innovation ecosystems

From a Schumpeterian perspective, in a developing or developed industrial society, innovation (and innovation policy) fuels economic growth. As Romer (1996) suggested, increasing returns and long-term growth are not simply reliant on physical capital but on knowledge capital too. This idea is reinforced in Romer's analysis that economic growth relies on technological change; technological change "arises in large part because of intentional actions taken by people who respond to market incentives" (Romer, 1990, p.S72). Further:

> *…Instructions for working with raw materials are inherently different from other economic goods. Once the cost of creating a new set of instructions has been incurred, the instructions can be used over and over again at no additional cost. Developing new and better instructions is equivalent to incurring a fixed cost. This property is taken to be a defining characteristic of technology. (Romer, 1990. P.S72)*

The 'how-to' of technological change – Romer's 'instructions' – are precisely what innovation entails: the creation of a distinct framework for action in which systems, processes and things coalesce around a unity of productive (most often) consumption. It is the knowledge of things, people, processes, materials and markets which bring about new innovations.

Romer's ideas have been developed further by Gibbons et al (1994) who have explored more contemporary changes in knowledge production which fuel this engine of social and technological change. They refer to two forms of knowledge production: Mode 1 and Mode 2. Mode 1 is knowledge production (of ideas, methods, values and norms) which has "grown up to control the diffusion of the Newtonian model to more and more fields of enquiry and ensure its compliance with what is considered *sound scientific practice"* [our emphasis] (Gibbons et al, 1994, p.2). Mode 1 knowledge may be seen as identical to our ideas of what we generally perceive to be 'science' - a knowledge of cognitive and social norms which determine how science is to be practiced. For Gibbons et al, if Mode 1 knowledge is conducted by an academic community of scientists who 'govern' the legitimacy of that knowledge, Mode 2 forms of knowledge are "more socially accountable and reflexive" (ibid: p.3) and are transdisciplinary in nature. Further, Mode 2 forms of knowledge are produced in the context of application,

creating a sense of 'supply' (academia) and 'demand' (industry) – although not exclusively, for Gibbons et al suggest that Mode 2 forms of knowledge have gone "beyond the market" (ibid) and can also be seen as 'socially distributed knowledge'.

Kari Kuuti is one of the earliest scholars to recognise that design – and design research – exhibits attributes of Mode 2 knowledge insofar as design knowledge has operated in the context of its application, is transdisciplinary in nature and "is distributed to stakeholders in the process of production itself" (Kuuti, 2007, p.3). Bærenholdt et al (2010) have argued that Mode-2 design research "acknowledges that research, design and society are heavily integrated, since research contributes to assembling society and society is a constant field of testing and experimenting in research and design" (2010, p.4). Design has certainly resisted moves by design science scholars to hold it to account in a Mode 1 state in which legitimate knowledge claims in design can only be made through scientific methods (a similar move resisted by the social sciences in the so-called 'Science Wars' during which time two opposing camps of empiricism and social relativism publicly endangered the science 'warriors' and the 'science bashers' in a display of intellectual prejudice and self-indulgence) (cf. Ross, 1996).

Whilst design researchers have come to understand Mode 1 and Mode 2 forms of knowledge, Elias Carayannis and David Campbell have built on these concepts still further through their studies of knowledge, innovation and the environment. They have developed an expansion of Mode 1 and Mode 2, considering the more complex ways that knowledge is created through multi-layered, multi-modal, multi-nodal and multi-lateral system(s) in which diverse worldviews shape what we consider to be specialised knowledge. Calling this form of knowledge creation "Mode 3", Carayannis and Campbell argue that a Mode 3 system of knowledge creation is "the nexus or hub of the emerging 21st century Innovation Ecosystem" (Carayannis & Campbell, 2009, p.202), in which new knowledge and innovations are borne out of co-evolution, co-specialisation, co-operation and – occasionally - 'co-opetition' (ibid, p221) - an awkward compound version of cooperative 'competition'.

Over the last ten years, Carayannis and Campbell have developed their thinking around Mode 3 forms of knowledge in two important ways. Firstly, recognising the changing landscape of innovation, sustainable development and economic growth in a complex, inter-connected world, they argue that it is "crucial to accept and to foster a pluralism of different knowledge and innovation modes (paradigms)…enabling a mutual cross-learning of different *knowledges*"(Carayannis & Campbell, 2019, p.20). The competitiveness and superiority of a knowledge system is "highly determined by its adaptive capacity to combine and integrate different knowledge and innovation modes…" (ibid, p.21) applying these principles of co-evolution, co-specialisation, co-operation and competition. In other words, the innovative capabilities of nations, societies and knowledge systems (disciplines) – and perhaps organisations - relies on the capacity to think and act plurally; to consider that ones' own knowledge system may not be the only one capable of confronting complex innovation problems. One only has to look at the different ways people are looking to solve the COVID-19 pandemic to see this in action. This is a viewpoint that may well be shared with that of Arturo Escobar, whose recent *Designs for the Pluriverse* argues for a pluriversal design practice that brings perspectives from both the Global North and the (often overlooked) Global South to confront the world of transition that we face (Escobar, 2018, pp2-4). Although seen largely as an anthropologist, Escobar has an intellectual interest in urban planning, design, self-organization and – like Carayannis and Campbell - systems thinking and knowledge systems. All three authors recognise the emerging importance of pluralist perspectives in contemporary knowledge systems.

The second significant conceptualisation of Mode 3 knowledge is in relation to what is described as the 'Quintuple Helix' (Carayannis and Campbell, 2019). The origins of this conceptual layer to forms of knowledge (or knowledge creation practice) lie in the 'Triple Helix' model of university-industry-government relations (Etzkowitz and Leydesdorff, 2000). In their original article, Etzkowitz and Leydesdorff presented a simplified model (*Figure 1* below).

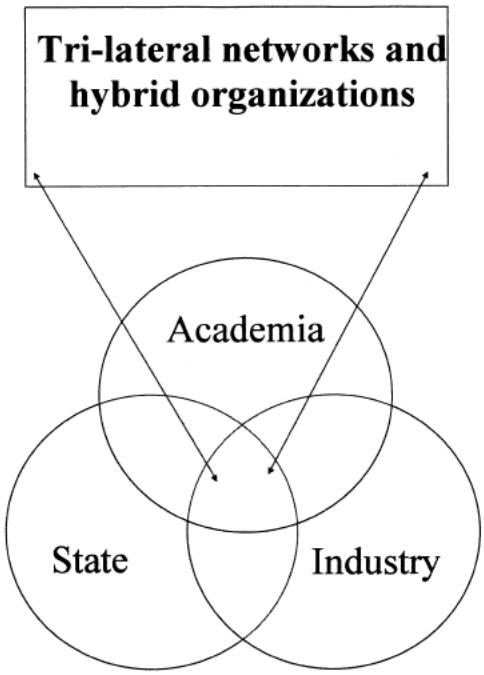

Figure 1: The Triple Helix Model of University-Industry-Government Relations taken from Etzkowitz & Leydesdorff (2000), p.111

Recognising the different states of flux and reorganisation, the authors revise this static model for relationships between the three by showing an unstable Triple Helix (*Figure 2).*

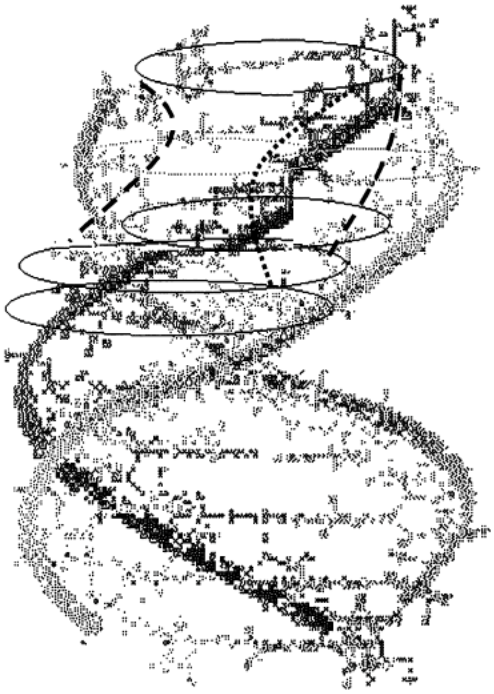

Figure 2: Conceptualisation of "communications and expectations at the network level [guiding] the reconstruction of institutional arrangements from Etzkowitz & Leydesdorff (2000), p.112

Carayannis and Campbell have subsequently revised this model, initially proposing the 'Quadruple Helix' which added a fourth helix, the "public", or more fully described as "media-based, culture-based and values-based public' (Carayannis & Campbell, 2010, p.51). This fourth helix extends the Triple Helix by considering how (public) culture and values shape innovation, and use the example of how "visions in the arts perhaps trigger, in the long run, the development of a new technology or the launch of a next technology cycle" (ibid). Widespread use of - for example – digital media technologies which have now become ubiquitous to everyday life, leads to the public shaping (and to the acceptance or rejection of) new digital practices and digital technologies. The social production of knowledge reveals the "accountability and reflexivity" (ibid) of Mode 2 forms of knowledge; here we see the interplay between the concept of Mode 2 and the Quadruple Helix.

The more recent 'Quintuple Helix' model acknowledges the pluralism of transdisciplinary and polyvocal knowledge creation whilst also adding the fifth helix of both our natural environment and of our social environments (our social ecologies). Here, knowledge is sensitive to the forces of society, democracy, economy *and* the natural environment (Carayannis & Campbell, 2019, p.46). This model is best explained by the authors' conceptualisation below:

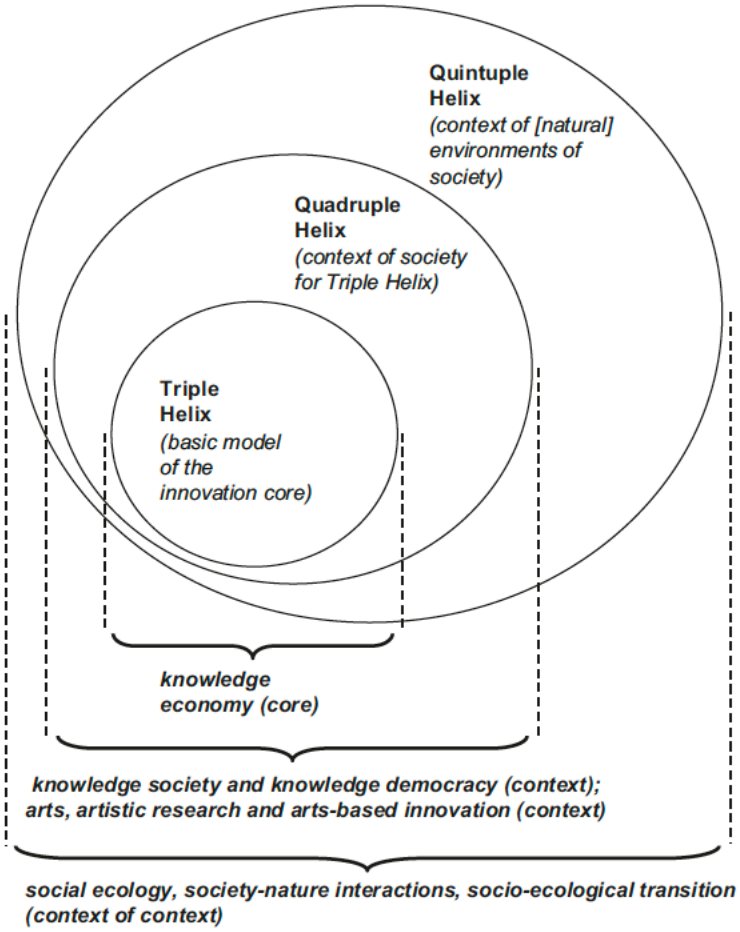

Figure 3: Carayannis and Campbell's conceptualization of the Quadruple and Quintuple Helix (2019, p.46)

If we are to reconcile the 'types' of knowledge (Mode 1 to Mode 3) and the helices that describe the innovation ecosystem in which they appear into a single model, we might present the following diagram *(Figure 4)*:

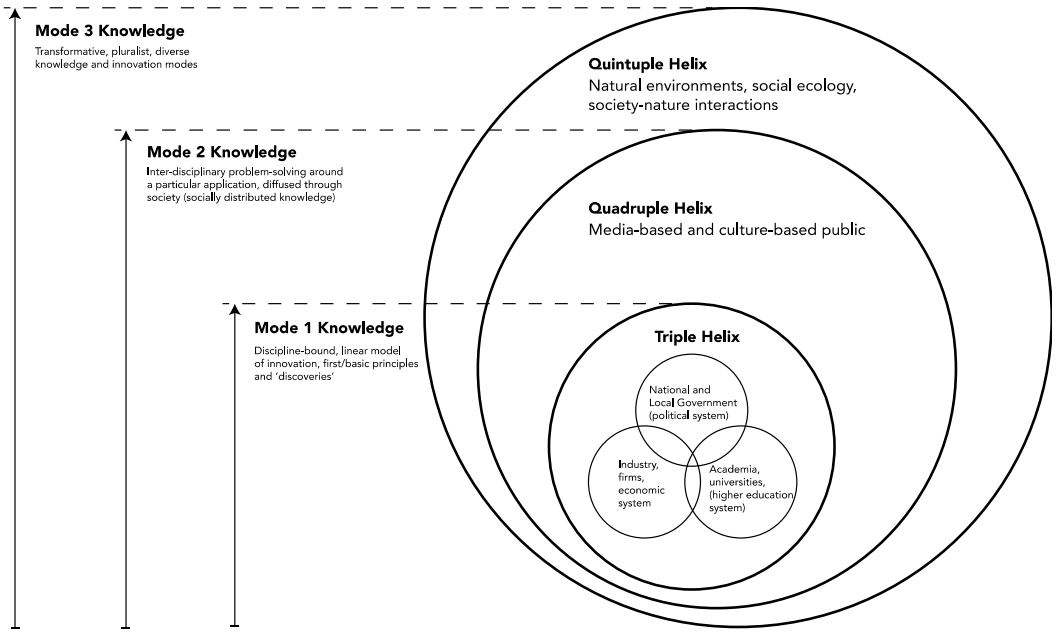

Figure 4: Modes of knowledge operating in the respective Helix. Note, each Mode or Helix progressively builds on (and includes) its' ancestor. (Source: Ely based on Carayannis & Campbell, 2019).

Carayannis and Campbell suggest that arts, artistic research and arts-based innovation provides an essential source of creativity to advance innovation and that "different disciplines of the arts" (Carayannis & Campbell, 2019, p.44) extend sciences, social sciences and humanities through their transdisciplinarity in the process of Mode 2 knowledge creation. Design is perhaps one of those disciplines that is able to extend the co-creation capabilities of all of the sciences; it certainly appears to exhibit the attributes of Mode 2 knowledge capability (Kuuti, 2007; Bærenholdt, 2010; Gregory, 2009, p.251)

Design in the innovation ecosystem

One of the limitations of Carayannis and Campbell's thinking is perhaps the view that arts and arts-based innovation operates as a Mode 2 form of knowledge. Given that recent post-colonial and transition design movements in particular (Irwin et al, 2015; Tlostanova, 2017; Van Selm & Mulder, 2019; Akama & Yee, 2019) have now widened designer's theoretical concerns and practical engagements with communities and societies beyond the hegemonic, technocentric ones of the Global North (cf. Fry, 2019), the transformational and culturally open-minded design discipline is opening itself to other worldviews – epistemologies, ontologies and practices from domains beyond those of the Western world. This embrace of plurality and attention to transformations would appear to locate some - although not obviously all - forms of design or design actions in the domain of Mode 3 knowledge. Design's collective work with indigenous communities demonstrates the way that design knowledge works in tandem with first-nation people's knowledge to co-design more sustainable, human *and* fauna- and flora-centred worlds (Akama et al. 2016; Akama 2017; Akama et al, 2019). Not everything that designers do is at the behest of the business imperative – a mere Mode 1 form of knowledge production.

Design then, appears to find its place in knowledge production *throughout* the Triple, Quadruple and Quintuple helix and in many modes – 1, 2 or 3. The question is where, when and how? What does Mode 1 design knowledge compared to Mode 2 or Mode 3 look like? Can we recognise design in the innovation system and where should we locate our design 'actions'? Perhaps, how might we 'measure' or see it in each helix and in various modes? In the following section, we explore how Carayannis & Campbell's model may be adapted to explain what we describe as the *Design Value Helix.*

Locating design in the Design Value Helix

The synoptic view shown above of knowledge and the helices in which it operates has emerged from a literature playing close attention to innovation and entrepreneurship ecosystems and the actors – firms, research institutions, policy makers, publics, communities and societies – who fuel these ecosystems. As individual designers, design researchers or design firms we can comfortably locate our work somewhere in these spinning helices of innovation, applying one type of knowledge or another. As professional designers we would probably find ourselves located in mainly the triple helix, fuelling firm-to-firm, academia-to-firm, firm-to-government or firm-to-academia interaction. Such firms, of course, take many forms (including not-for-profits and charitable sectors) but work here tends to be contractual and transactional with business imperatives at the forefront. Even work in the public (government) sector fuels business innovation (e.g. the design of a regional business development service) although much of it is centred on the provision of public services (e.g. health, education, leisure services) which, again, require the raising of contracts, the setting of specific business goals and the design of products, services and human-computer processes. Whilst knowledge of users (Kuutti, 2009) may provide organisations with much-needed insights for the effective development of new innovations, in the triple helix – and at Mode 1 – business and technical priorities are privileged over customers or publics. In Mode 1, a business or process leader (usually a client) will prioritise financial viability and technical feasibility over end-user desirability. That is *not* to say that such concerns are rejected altogether, simply that commercial or organisational realities limit the degree to which an organisation can truly engage in a programme of human-centred design that will satisfice the demands of its customers, end-users or stakeholders. Designers working in large organisations with marketing, operations and tech functions will have experienced the tensions inherent in these priorities! Measures of performance in this area will align with those we might expect to see in econometric evaluations: increase in sales, reductions in production cost, return-on-investment or similar.

In Mode 2, design begins to operate in a meaningful space where wider publics (media and culture) are actively engaged in the development of new products, services and processes. Whether funded by philanthropists, charities, local or national governments or socially responsible commercial entities, these are projects located in the Quadruple Helix and grapple with the inter-agency and intra-community complexities of designing for the public good. Commonly cited examples include rural development projects in remote communities or more radical, political forms of design activism – for example Van Lier's showcase of 31 designers "fighting for a better world" as part of the *What Design Can Do* annual conference (Van Lier, 2018). Measures of performance here may still be quantitative in nature – for example in the number of individuals engaged in a public project – but they may be complemented by qualitative measures such as wellbeing or happiness captured through human narratives.

In the Quintuple Helix, the design stakes are much higher. Here, design projects (and designers) engage in projects which consider the wider ecology and society in which they live, draw upon different types of knowledge (practical, ethical, technical) from a diverse community of many worldviews, and synthesise and develop designs that manage to reconcile the needs of business, government, many publics and the environment - transforming them in the process. Such design actions and projects may be rare – but their rarity sets a gold standard in design effectiveness. Whilst there may be an increasing number of projects that set out to design the transformational change that the transition design movement calls for, the number that actually deliver on its promise may be tantalisingly elusive - but that should not be through want of trying! In the Quintuple Helix, measurement of performance may take a largely qualitative, narrative form, supplemented by a full gamut of quantitative measures that may still include end-user numbers, financial benefits and public media audience figures. Projects are likely to demonstrate widespread behaviour change, the harnessing of complex systems towards common Earth goals and – most importantly – sustainable designs likely to satisfy spiritualist, ecologist and materialist values and outcomes.

In the revised diagram below, we show the *Design Value Helix:*

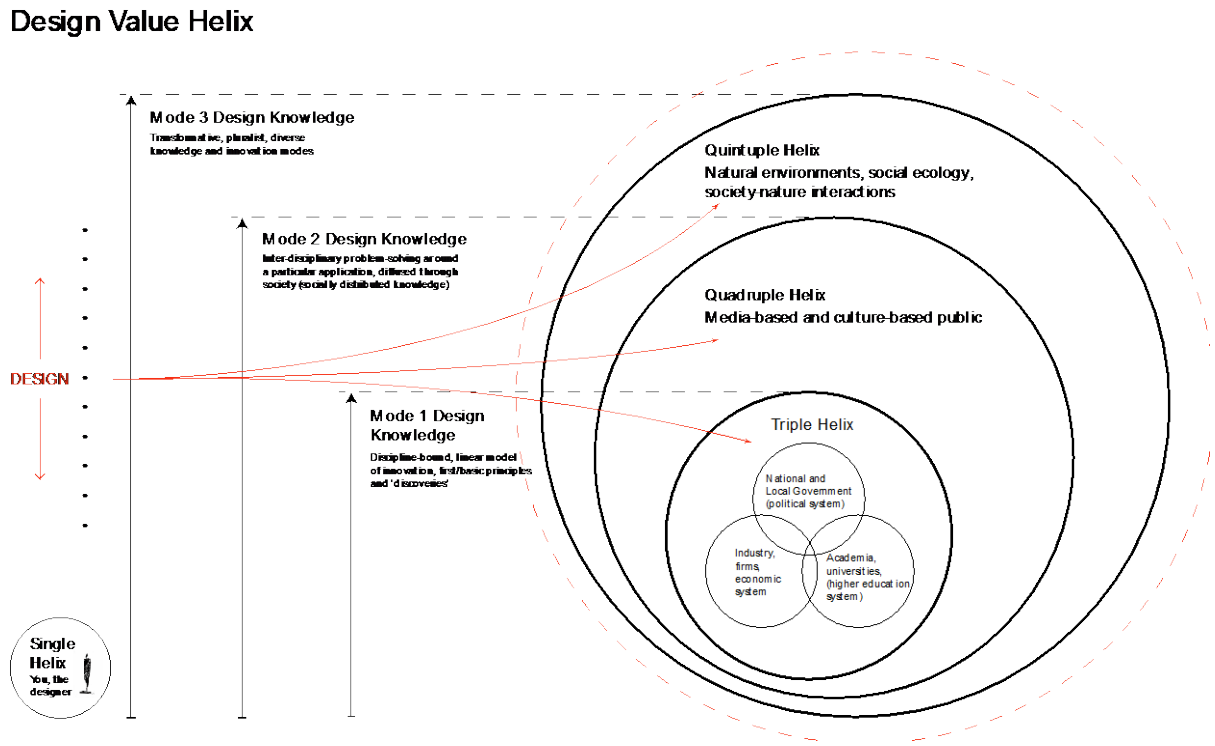

Figure 5: Design Value Helix model (Source: Ely)

In the *Design Value Helix*, design actions can be found in one of the three helices. The precursor to any action appearing in one of the helices is the single helix – a world in which the designer operates singularly and initially disconnected from the outside world. The single helix marks the early stage of projects where the designer is still formulating design approaches, still developing designs and working on design 'intent'. Whether projects are self-initiated or commissioned by clients, the single helix represents the period of early design development.

On the left hand side in the diagram a design action (DESIGN) is seen to move temporally through Modes or helices, acknowledging that design actions or initiatives that start in one effective mode can end up in another. For example, a project to design a sustainable form of transport may begin as a funded commission by an industry partner or client, becoming popular in public consciousness and eventually change patterns of behaviour around urban travel. In this case, a project which engages the public and a community in its development and eventually influences (positively) a society would have applied Mode 1, 2 and 3 knowledge *and* shifted its influence from the Triple Helix towards the Quintuple Helix. Such an outcome can only be observed through time so the effect of design actions can permeate across all three modes.

The Design Value Helix in action

For the designer, design manager or design commissioner questions arise about how our proposed theoretical model might be applied to the practical measurement of the impact or value of design. Here, we apply this model to an evaluation of a number of projects emergent from design research in one university and show how the *Design Value Helix* can be used as an evaluative framework of design value. We evaluated ten projects (*Table 1*) in their current state (at time of writing), with each project having a slightly different disciplinary emphasis ranging from social design (working for the social good) to design thinking (applying an IDEO or Design Council model); communication design (graphic design) to broader design-led innovation (confronting design challenges through a variety of methods/frameworks).

Table 1: Summary of Ten Projects

No.	Project Name	Project Type	Description	Status
1.	ResourcesX	Social Design/Design Thinking	Two-day Executive education training using design thinking methods applied to three real-life not-for-profit design challenges	Completed
2.	Social Design in Action	Social Design	The co-design of integrated health, education and community services	Terminated
3.	GNSS Infographic	Communication Design	Design of an information visualisation for geospatial science research for public and government audience	Completed
4.	Officer Preparedness	Design Thinking/Design-Led Innovation	Initial half-day co-creation workshop for officer preparedness for domestic violence incidents	Ongoing
5.	Future of Energy	Design-Led Innovation	Large energy provider initiative for multi-agency collaboration.	Ongoing
6.	The State of Design	Communication Design/Design Leadership	Design advocacy project	Ongoing
7.	Research Branding	Communication Design	Two brand identities - research group and research programme	Completed
8.	Humanities	Design Thinking/Communication Design	Collaborative workshop and publication	Near Completion
9.	Mental Health Design	Social Design/Design Thinking	Student-led co-design of mental health services	Completed
10.	Energy Innovation	Design-Led Innovation/Design Thinking	Student-led co-design of improved innovation ecosystem between energy provider and start-ups	Completed

The first stage of evaluation was to locate each project within the helix/mode that best described the nature of the project and the mode of knowledge *(Figure 6)*, but given that project status and project intent varies, a further analysis is required *(Table 2).*

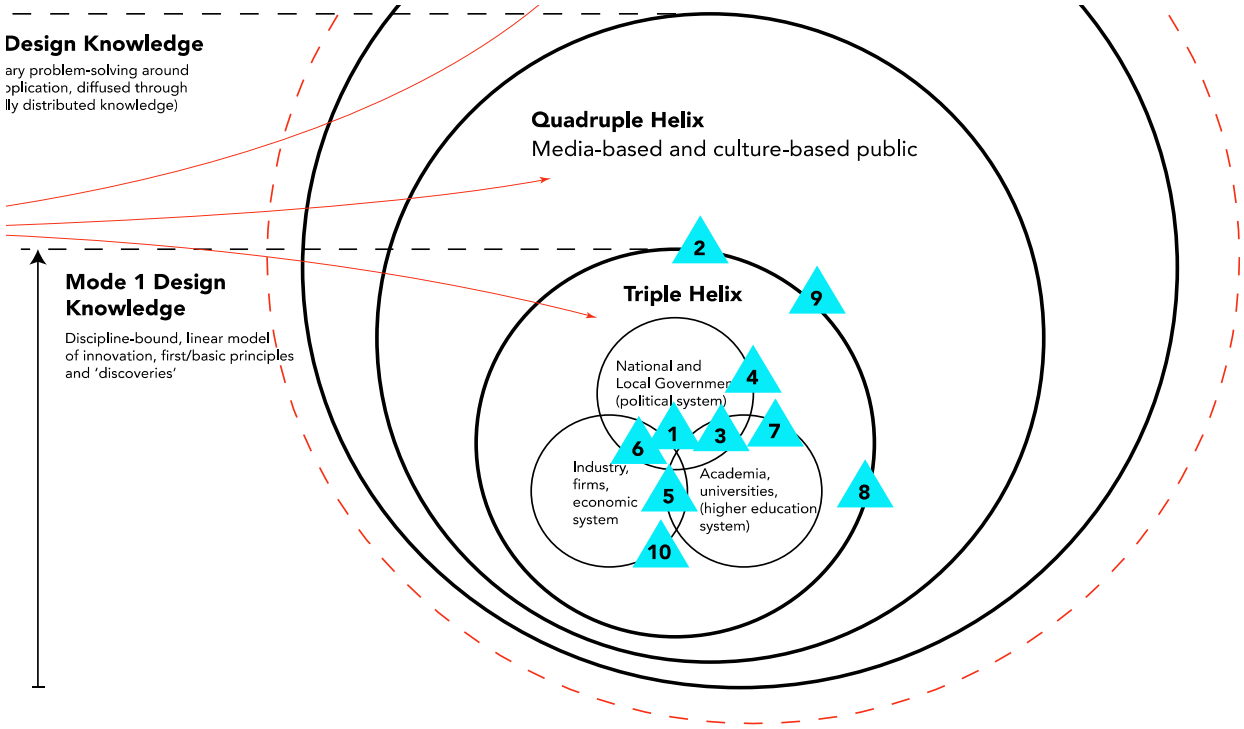

Figure 6: Mapping each project in the relevant helix/mode (Source: Ely)

Table 2: Further analysis of project location

No.	Project Name	Status	Mode	Helix	Success Metrics (Initial)
1.	ResourcesX	Completed	1	Triple	Increase in innovative approaches; improved staff empathy
2.	Social Design in Action	Terminated	2	Quadruple	Improved life outcomes for children; in-work parents; improved health; and more
3.	GNSS Infographic	Completed	1	Triple	Peer and Government understanding of fundamental science
4.	Officer Preparedness	Ongoing	1->2	Triple, likely to extend to Quadruple	Decrease in officer harm; improved victim support; decreased perpetrator injury or death
5.	Future of Energy	Ongoing	1	Triple	Streamlined innovation process; increase in inter-agency collaboration
6.	The State of Design	Ongoing	1	Triple	Increased Government and business awareness of design capabilities within State.
7.	Research Branding	Completed	1	Triple	Broader awareness in academy of Design research
8.	Humanities	Near Completion	1->2	Triple->Quadruple	Broader awareness in academy of Humanities research; increased engagement with Humanities researchers; wider public awareness
9.	Mental Health Design	Completed	1->2	Triple->Quadruple	Key service stakeholders collaborating to support young adults (achieved); decrease in self-harm, suicides and other

					indicators (currently unmeasured)
10.	Energy Innovation	Completed	1	Triple	Industry partner provided with tools to increase start-up/corporate interaction

This second level of analysis reveals the diagnostic strength of the *Design Value Helix* model, for it requires the design team to return to the original project intent, evaluate performance based on this intent and understand what the ultimate project outcome is likely to be. The 'Success Metrics' here are defined by the initial brief, but projects may go beyond (or fail to deliver) to these quantitative or qualitative goals and success metrics may change. For example, Project 4 is still ongoing and an initial collaborative design sprint with law enforcement officers, lawyers and emergency services personnel is likely to continue to engage key stakeholders from multiple agencies. What began as a possible digital technology challenge that might have been 'solved' by the development of a mobile app has now become a design project looking at service interoperability, inter-agency working and – most importantly – has become more human-centred from the perspective not only of officers, but also victims and perpetrators of crime. For this reason, an initiative we first identified as fitting a mode 1 knowledge project falling under the triple helix innovation process is now classified as a mode 2 project following the quadruple helix process. In this example, the *Design Value Helix* model shows its potential as a tracking tool that follows the evolution of a project and its likelihood of achieving broader and more aspirational community goals.

Furthermore, an analysis of *how* projects have come to their current position in our helices – the mode of knowledge required to develop them – reveals that although some projects may be completed, their legacy continues. In Project 9, for example, a group of postgraduate students worked with a regional health funding body to identify possible service offerings or process improvements that would improve young adults' mental health. The students engaged not only with discreet stakeholders identified by the client funder but consulted with a wider public (albeit in one-to-one interviews) to understand multiple perspectives. Here, they drew on knowledge beyond the expert group and in the wider community (Mode 2). Whilst their insights and design ideas were presented to the client (and a service provider) in a typical Triple Helix environment (university-government-industry), the ideas presented are likely to be socialised into broader public consultation and future service provision (Quadruple Helix). The project may have 'finished' but their design legacy lives on. The question is - will this legacy ultimately demonstrate and achieve quintuple helix outcomes? Only time will tell and therein lies the need to review projects even after their completion and the *Design Value Helix* model provides a means of achieving this.

Conclusion and Further Research

In this brief demonstration of how the *Design Value Helix* model can be applied to the evaluation of design projects, actions or initiatives, it is clear that there is still further data collection required to provide a granular view of the performance of a project. Metrics such as audience reach (e.g Project 8), reduction in staff off-duty (Project 4) or project flow (Project 5) would be quantitative measures that would provide detail to the analyses above. However, it is clear that in design actions such as advocacy projects (Project 6) performance might be better explained in terms of improved Government or public understanding, which may only be understood qualitatively. The *Design Value Helix* enables designers and their clients, managers or stakeholders to ask two important questions in relation to impact and value: Firstly, *how* was the project developed (what knowledge was brought to bear on a given problem area and what knowledge was created)? And, secondly, how *far* did the impact of the project extend (what helix has the design outcome landed in)? The second of the two questions highlights the temporal challenge associated with all design-related projects. As we pointed out earlier, even after projects have been completed, their legacy continues, and the *Design Value Helix* model provides a mechanism with the potential to measure retrospectively the far-reaching effects and outcomes of design-led initiatives. Only time will tell if this potential will be realised!

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