LEARNING JOURNEYS AND INFRASTRUCTURE SERVICES: A GAME CHANGER FOR EFFECTIVENESS

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Who Should Read This White Paper?

This White Paper will be of interest to organisational leaders who want to design and operationalise change processes which increase the learning power, agility, collaboration, innovation and resilience of individuals, teams and wider stakeholder communities. It is relevant to regulators and all those concerned with improving 'joined' up, cross-sectorial thinking which improves social, economic and environmental well-being.

Key Messages from the White Paper

- Developing corporate learning power is a rigorous and measurable process which can be integrated with business strategy to catalyse transformation, improve performance and reduce the costs of failure.
- A learning infrastructure is both digital and social and is a critical component for organisational improvement and transformation. Human decision-makers are nodes in a digital network, converting data into meaningful information to improve business purpose.
- Learning journeys provide a metaphor for designing change strategies into business processes through collaboratively attending to 'purpose and identity', 'generating learning power', 'structuring knowledge' and 'producing value'.
- Developing people as resilient, self-directed, responsible agents of innovation and change requires a significant shift in 'mindset' – a different way of thinking, valuing and acting – which can only be achieved through transformative learning.

Abstract and Key Words

Organisations need to be able to learn and thus benefit from their experience. They need the capability to respond profitably to information about processes, people and the environment in order to improve performance in the digital world: in other words to develop their corporate learning power. Infrastructure services businesses have a great deal to gain from such learning because they work in partnership with many other organisations but in highly competitive industries. They design for end use but are often detached from their users. Unlocking the learning power of individuals, teams and leaders to adapt and change will increase the pace of business transformation and generate greater value for all stakeholders. It will transform tacit knowledge that is locked within individuals into corporate intelligence. The cost of not doing this is quantifiable through sub-optimal performance and business failure or conversely through the benefits of success. Knowledge is increasingly about 'flows' and 'networks' rather than 'stocks' so how individuals and teams use their learning power 'on the job' to generate actionable insights from data that inform decision-making is a

crucial new capability for the future. Data is increasingly complex, rapidly available and ubiquitous and requires continuous and collaborative interpretation and response aligned to business purpose. The premium is on the ability to interpret and use it rather than to simply collect it. This represents a significant mind-set shift from seeing knowledge as static to understanding data as the 'raw material' through which knowledge is generated and re-generated in the service of business strategy. The learning journey is a metaphor which incorporates four measurable processes: forming identity and purpose (ii) generating learning power (iii) knowledge structuring and (iv) producing value. Learning power is the way in which we regulate the flow of information and energy over time and this can be developed at any age. Each of these forward looking processes has implications for operational practices as well as for the ways in which digital resources are designed and deployed. Learning infrastructures can be co-designed and integrated with business strategy to (i) increase corporate agility, responsiveness and innovation, (ii) to model and explore customer and stakeholder behaviour and thus improve service and (iii) to develop digital platforms which support self-directed learning and behaviour change at scale.

Key Words

Learning Journeys, customer journeys, value management, learning power, agility, engagement.

Connections to Other ICIF White Papers

- Resilience of infrastructure systems at scale
- The Value of Resilience: what infrastructure practitioners need to know about resilience
- Re-thinking Design Standards as Learning Frameworks
- People and Infrastructure Services: an opportunity for engagement
- Evidence for the Value of a Systems Approach to Infrastructure Planning, Delivery and Operation.

Where Can I Find Out More?

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Learning Journeys and Infrastructure Services: a game changer for effectiveness

The purpose of this White Paper is to explore how an organisation can operationalise a learning infrastructure so that individuals, teams and leaders can respond more effectively to rapid change, digitisation and the need for radically new ways of thinking and behaving which enable them to respond profitably to the complex challenge of inter-dependencies in today's world. A learning journey framework, integrated with business strategy, can make learning and change explicit, visible and measurable at all levels and this can extend to the organisation's wider stakeholder network. It will increase the pace of business transformation and generate wider value for all stakeholders by equipping individuals, teams and leaders to respond collaboratively to the flow of data and information in ways that account for the complexity and interdependencies of infrastructure services in today's world.

The first part of the paper explores why a new approach to learning matters and the need to develop a 'mental model' for understanding learning and change in the information age. It then looks at systems thinking and feedback loops of information in organisations as the raw material of learning opportunities, introducing the idea of learning power and its role in Learning journeys. Each process of the Learning journey is unpacked, followed by their combined relevance to the design of learning infrastructures for organisations, aligned to business strategy. Finally the paper identifies three different applications of Learning journeys to organisational improvement.

1   Why does it matter?

We are living off legacy infrastructure which is failing us economically, socially and environmentally. The cost of failure and waste, and the 'failure of hindsight', is quantifiable.

Reducing waste and failure – or the inability to learn from failure - will improve profitability and this can only be achieved through better learning. How individuals, teams and leaders understand their business purpose and the environment in which that purpose is achieved, how they collaborate in solving complex problems and adapt their behaviour in response to rapid feedback of data is essentially a learning problem.

Learning is a critical component of value management. It is estimated that £464 billion will be needed to refresh infrastructure in the UK over the next 10 years. This equates to approximately 2.3% of 2014 GDP for every year for the next 10 years. The National Infrastructure Plan 2013 stated 25% of the investment in the infrastructure pipeline is publicly funded, 15% public/private funding, and 60% purely privately funded. The implication of these numbers is that new business models and approaches will be necessary to ensure the future competitiveness of the UK. Essentially, we will have to deliver greater stakeholder outcomes with less consumption of finite resources more quickly. This is the essence of value, the relationship between inputs, outputs and outcomes over time encapsulated under Value Management. Consequently, the learning principles and application described in this paper are presented within a Value Management framework.

Business performance will be significantly improved when the learning culture enables all stakeholders to generate greater value:

- through collaborative knowledge generation to solve new problems
- more quickly through pro-active reflection on process using rapid feedback of data for responsive decision-making
- more sustainably, through establishing design principles to transfer, repeat and improve progress towards shared, measurable outcomes throughout the lifecycle of infrastructure
- through innovating across traditional 'silos' and boundaries, thinking and acting holistically

The 20C 'mindset' presupposed that complex problems were solved by simply spending more on them. Not only has this approach proved ineffective, it is no longer an option, particularly when it comes to infrastructure. What is required is a radical shift in 'mindset' – a different way of thinking, valuing and acting - which can only be achieved through effective learning. This White Paper discusses how this can be achieved.

2   The Changing Concept of Learning: mental models matter

Traditionally, learning is something we do in a formal context, where we acquire knowledge that may be useful to us in our (professional) lives. Applying knowledge can be like following a script: when it is logical, linear and focused on 'objective' data. It is 'top down', transmitted from experts to novices and tends to focus *either* on the parts *or* the whole rather than joining them up. Using this mental model we tend to think via a prescribed framework and neglect our own richer and grounded experience, as well as the potential of the unknown and the uncertain. It promotes an academic/vocational divide and de-values 'practical wisdom'. A mental model like this can help us learn efficiently and acquire knowledge that is readily shareable in a stable professional community where a particular end product is important, foreseeable and known in advance. However, such a model becomes an obstacle when a professional community needs to be agile, to adapt, change and innovate rapidly in response to uncertainty, risk and challenge – when the information needed to solve problems is not known in advance and when solutions have to be invented in response to particular local or global contexts and factors which are often unpredictable.

For example, think about how we have changed the way we use mobile devices since the introduction of the smart phone in 2007 or how spending habits have changed since the introduction of the credit card fifty years ago. There has been a huge amount of learning

involved in those changes but very little is through script-based knowledge transmission in a 'classroom' environment; rather, it happens mainly through dynamic processes of co-construction, collaboration and competition.

Today's technical, social and environmental challenges require us to solve complex problems in particular contexts, generating new knowledge and skills which respect and draw on, but move beyond and across existing funds of knowledge. Learning is not a 'one off event' but a process through which we navigate collaboratively towards an outcome which we can't know in advance, but recognise when we get there. We have to make sense of overwhelmingly complex data, guided flexibly by a locally determined, shared purpose and design principles, whilst remaining open both to the unknown and to difference. Seely-Brown (2015) describes this approach as 'knowing, making and playing' – in which making and playing are about permission to fail: rapid experimentation through prototyping whilst leveraging intuition and imagination. This design-based learning is how humans learn naturally and it gets us closer to the sort of critical work skills identified by the Institute for the Future that will be needed in the next ten years, as the landscape of work is reshaped by technology and globalisation (Davies et al 2011).

3   Systems Thinking and Learning Organisations

Systems thinking has made a very significant contribution to our understanding of how organisations learn because it provides a way of mapping the complex behaviour of organisations using the concepts of layers, processes and feedback loops (Blockley 2010). The roots of systems thinking lie in research into solving complex real-world problems set in social systems (Checkland, 1981). Many disciplines and strands of research dating back to the middle of the 20th century have contributed to the development of systems thinking.

Biologist von Bertalanffy's (1950) general system theory was enthusiastically applied in areas including engineering and economics. Forrester (1961) developed a way of modelling industrial systems based on physical flows, their respective accumulations and information-based decision-making which are determined through feedback mechanisms. Systems dynamic modelling is a way of understanding a system (or organisation) through the relationships between its multiple 'hard' and 'soft' processes and the interactions and feedback loops between them. Systems thinking has been substantively applied and developed in infrastructure industries, health, insurance, the military, government and more recently in education. The best known application of systems dynamics and systems thinking to how an organisation learns was made by Senge (1990) in 'The Fifth Discipline' in which he argued that organisations are the product of how the people in them think and inter-act with each other and with the technical and physical processes for which they are responsible. Systems thinking is an approach that enables a view of the whole as well as the parts – an holistic and trans-disciplinary perspective which is crucial for leadership although sometimes challenging to 'reductionist' mindsets. It links 'hard' and 'soft' systems including the psycho-social systems of individuals and teams. Developing such capability in systems thinking is a learning challenge for the 21C which only occurs when learning is integrated with business processes and strategies.

4   Feedback Loops as Learning Opportunities

The critical link between learning and systems dynamics is in the idea of feedback loops. Feedback loops emerge from the interactions between processes in a system. They are the *raw material of learning opportunities* because, essentially, in the context of infrastructures a feedback loop is a flow of information or energy that may be triggered by human or other intervention, that invites a response from a human being (or from a machine that a human

being has designed) and/or the natural environment. How organisations respond to feedback loops – especially negative ones – influences customer satisfaction and so the ability to learn adaptively and rapidly in context is a critical business capability.

Feedback loops may operate within the focus of attention of the people in the system or they may be out of focus. This depends on people's awareness of and capacity for understanding and developing their learning to learn capabilities - or learning power - their 'mental models' and the alignment between their personal purpose and shared purpose of the organisation.

It was feedback structures and their cause and effect dynamics that enabled Senge to identify twelve 'archetypes' or recurring, often negative patterns of organisational behaviour. His hypothesis was that the leaders in a learning organisation will 'see' these patterns and respond and adapt to them in order to reduce their impact and thus improve productivity and

> *Learning power can be measured then fostered, learned and developed, both by individuals and through the practices and values of organisations.*

service. This is enhanced by having a clear value target that describes what a 'good' outcome is.

4.1 Learning power

Responding productively to the flow of information and the intra and inter-personal energy that confronts each of us over time is a critical challenge for human society in the digital age. It is no longer possible for a single individual to maintain a sufficient stock of knowledge to achieve a purpose beyond the simple and mundane. Knowledge is increasingly about 'flows' and 'networks' rather than 'stocks' of information (Seely Brown 2015) and in some cases the shelf-life of newly-learned industrial skills and knowledge has been argued to be as low as 5 years. Human agency and its manifestation in decision-making takes place at the nodes of information networks, directing and re-directing the flow of information. Learning power

enables the human being to regulate this flow of energy and information over time – how a person identifies, selects, collates, manipulates and responds to data of any sort – in order to achieve a purpose that matters to them. People are complex systems in their own right and learning power is an embodied and relational process – brain, mind and body are inter-dependent and interact with their environment and their history (Siegel 2010, Siegel 2012).

A recent analysis of 15 years of data covering how people describe themselves as learners suggest that learning power consists of three distinct structures. First, a set of 'active' dimensions which include 'mindful agency' as a core factor that is predictive of creativity, curiosity, sense-making and hope.
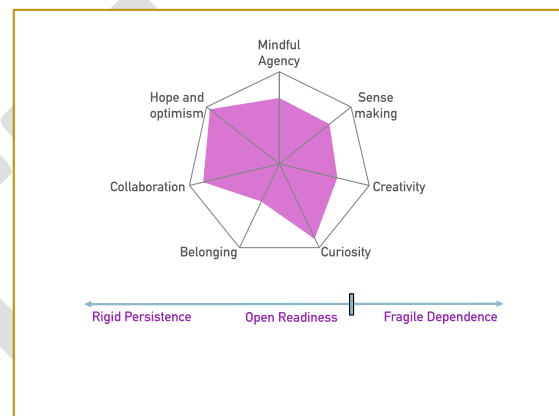
Secondly a relational component – a sense of belonging to a team or a social network and the capacity to collaborate with others in solving problems; thirdly, an orientation towards risk and uncertainty, in which one is open and ready to engage, evaluate and adapt, rather than being either dependent and fragile on the one hand or rigidly persistent on the other (Deakin Crick, Huang et al. 2015).

5   Learning power and the Learning Organisation

The sheer complexity of 21c life and digitisation mean that the capacity to learn – to identify and adapt profitably to overwhelming flows of data in conditions of risk, uncertainty and
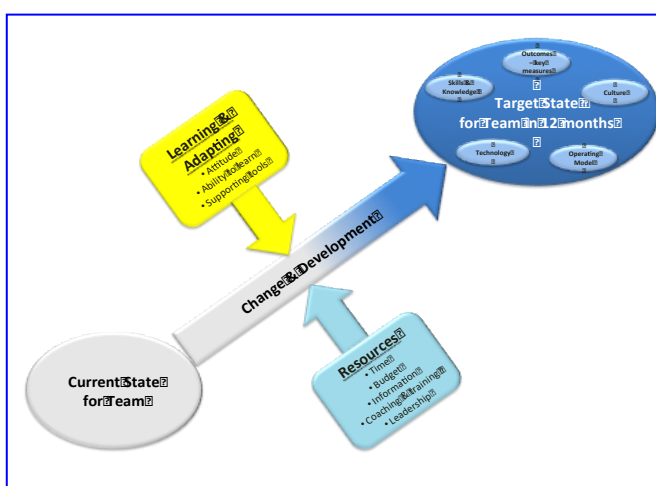
challenge – is a critical skill to human survival and for leadership. For an organisation, it follows that the more stakeholders at all levels are able

generate learning power, the greater the learning synergy that will emerge at an organisational level and thus the greater likelihood of the organisation's ability to respond profitably to change and uncertainty. There is evidence to suggest that learning power has a multiplier effect in an organisation – the whole is greater than the sum of the parts.

For example, take the marketing function of a large energy company where the dividend of improved individual and team learning on a business transformation project could be significant. There may be over 300 professional staff and a significant annual spend on professional development a high percentage of which is discretionary. It has a campaign-based environment with a wide range of performance possibilities for each campaign and an imperative to learn continually from each campaign and do the next one better. Greater individual and team learning power, identifying meaning and adapting profitability to flows of data and information can have a tangible impact on the 'bottom line'.

However, professional learning is all too often an 'add on' to core business processes rather than embedded in real time work and companies often lack a language for planning and improving learning or objectively measuring learning outcomes and outputs aligned to business strategy. Typically, training budgets are underspent because people are 'too busy with real work'. The term 'Learning' is tarnished and devalued by top down, mandatory courses done in the name of 'learning' (Heffner et al 2011).

The real difficulty in innovation in any business lies not in developing new ideas, but in escaping from the old ones. An acquisition-oriented approach to learning and development that focuses on logical, 'objective' knowledge generally fails to contribute to organisational transformation. Learning has to be seen and enacted as a 'silo busting' (Tett G. 2015) collaborative journey that departs from the status quo and leaps to a new, formerly unknown state, through the application of individual and corporate mindful agency.

6   What is a Learning journey?

A learning journey is a metaphor to describe the process of changing and adapting profitably in moving towards a specific purpose or outcome. It is a dynamic whole

Figure 1 Single Loop Learning Journey

with four distinguishable and measureable sub-processes:

- Forming identity and purpose
- Generating Learning power
- Structuring Information
- Producing value

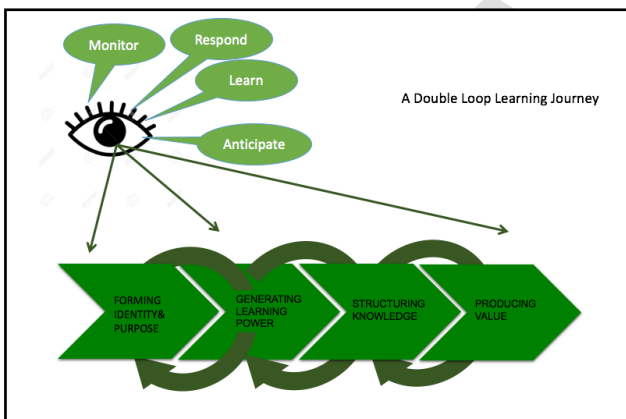A learning journey has a natural lifecycle and it can be collaborative as well as individual,

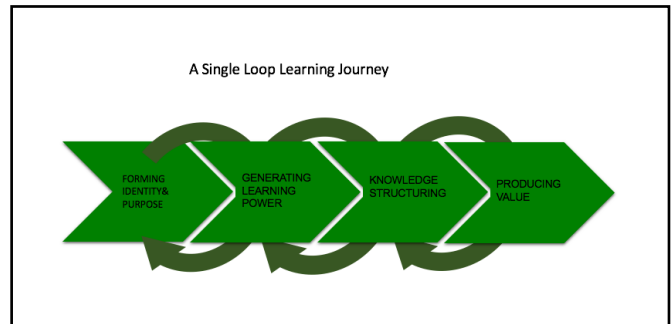

Figure 2 Double Loop Learning Journey

personal as well as public. Learning journeys happen all of the time at different levels and stages. The more we are able to become aware of learning as a journey and able to design for it intentionally as a basic way in which we develop as individuals,

organisations and communities, the more likely we are to achieve our purpose and to flourish. A single-loop learning journey contains the psycho-social processes which inform change in any domain. This can take place without any real understanding or meta-reflection on the process by the person undertaking the journey. However, when individuals engaged in a learning journey become reflexively aware at a 'meta level' about how and why they learn and use that information to improve their processes and outcomes through informed decision making, they are engaging in double-loop learning. They are 'doing' the learning *and* they are 'learning how to learn' at the same time. This is more effective and efficient because the
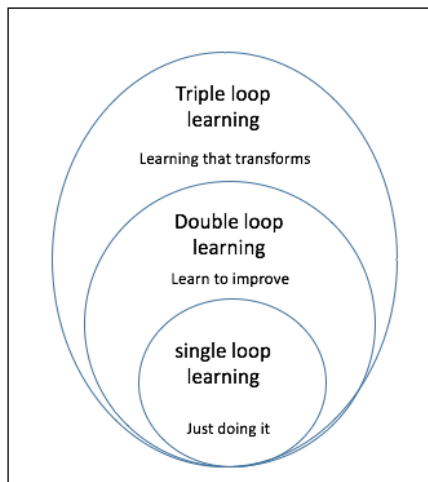
Figure 3 A Triple Loop Learning

individual (or team) is able mindfully to 'stand back', monitor, respond, learn, anticipate – and therefore improve the learning process as they engage in it (Bruno et al 2015). They are developing the 'resilient agency' which empowers them to navigate change intentionally through a double-loop learning journey. They have the capacity, individually and together, to respond, adapt and strengthen themselves even in the face of adversity, shock, risk or challenge. When learning journeys cumulatively mature over time such that the individual, team or organisation is transformed in terms of identity, behaviour and performance, then this is described as 'triple loop learning'

Learning power is the process through which we regulate the flow of energy and information over time in the creation of value. A Learning journey is the process of directing that energy to manifest value through the transformation of purpose into performance. A learning journey, fuelled by learning power is an embodied and relational process, which can be aligned and integrated at all levels in an organisation, linking purpose with performance and connecting the individual with the collective. Many enquiry cycles, such as Plan Do Study Act (PDSA) or production cycles such as Systems Architecting or Production Processes mirror learning journeys but focus on the steps of the journey – what to do next in a particular domain. The Learning journey turns the focus onto the psycho-social correlates to those steps as a means of engaging in double and triple loop learning – making the invisible visible. It also facilitates a wider consideration of overall purpose.

6.1 Forming Identity and Purpose

Learning is framed by a purpose, an intention or desire that provides the 'lens' through which the individual or team can identify and focus on the information that matters. Articulating purpose is the first stage of the 'meta language' of learning or change. Without purpose, learning lacks direction and discipline and it is difficult to select from a welter of data the information that really matters and shape responses into an innovative solution to a particular problem. In complex systems there are frequently conflicting purposes and the task of distinguishing and negotiating between these is a critical leadership function.

Characteristics of Identity and purpose

- Provide a source of energy for individuals and teams
- Provide a reason for doing things
- Define the boundaries of a system
- Link together - this is who we are, this is what we do
- Provide a frame of reference for measurement & evaluation
- Can be individual as well as corporate
- Can be 'aligned' at different levels of an organisation or team

6.2 Generating Learning power

The personal learning power of individuals and teams converts the potential energy of shared purpose into learning and improvement and facilitates the process of

> *Learning power is the process of regulating energy and information in the creation of value. A Learning journey is the process of directing that energy to manifest value through the transformation of purpose into performance*

identifying, selecting, collecting, curating and constructing knowledge in order to create value and achieve a shared outcome. The pyscho-social dimensions of learning power are, first, a set of 'active' dimensions which include '*mindful agency*' as a core factor that is predictive of '*creativity*', '*curiosity*', '*sense-making*' and '*hope*'. Secondly a relational component – a sense of '*belonging*' to a team or a social network and '*collaboration*' with others in solving problems; thirdly, an orientation towards risk and uncertainty, in which one is *open and ready to engage*, evaluate and adapt, rather than being either dependent and fragile on the one hand or rigidly persistent on the other (Deakin Crick et al. 2015).

Characteristics of Learning power

- Learning is a relational and embodied process through which we regulate the flow of energy and information over time in the services of a purpose of value
- Learning power embodies the values, attitudes and dispositions that enable a person to move from purpose to performance
- We can strengthen and develop learning power
- Learning power can be used to reflect on identity and purpose
- Learning power can be used in knowledge structuring processes
- We can design systems to support and strengthen learning power
- Learning power makes invisible learning visible
- Learning power supports and strengthens industry specific competences – such as Engineering Habit of Mind
- Learning power can be measured

6.3   Knowledge Structuring

The third core process of a learning journey is the structuring and re-structuring of the knowledge, data, information and experience necessary to achieve a particular purpose or solve a particular problem. Learning power helps with this. For example, curiosity is a necessary quality for generating questions – while the quality of questions asked is likely to be indicative of the quality of the solution.   Specific problem structuring methods, such as hierarchical process modelling, mind mapping, statistical analysis, rich pictures or knowledge cartography are just some of the ways in which we structure and re-structure data for particular purposes. The process of knowledge structuring is used at all stages of a Learning journey – often described as an enquiry cycle such as Plan Do Study Act (Deming 2000). Each discipline or domain of practice has its own tried and tested methods.

Characteristics of Knowledge Structuring

- Knowledge Structuring is how we identify, select, collect, curate, map, model, construct & communicate information to serve a communicative purpose
- The data we need to achieve a purpose is 'out there' – we have to locate it and collect it
- Problem structuring methods enable us to organise and make sense of relevant information for example, mindmapping, systems dynamic modeling, agent based modeling, fishbone diagrams, dialogue mapping, hierarchical process modeling etc.
- Harnessing and re-presenting collective intelligence is a collective form of knowledge structuring

6.4   Producing Value

Lastly, the outcome of a learning journey is the final process – the production and evaluation of the performance or outcome that fulfils the purpose and creates the value. This takes many forms and manifest at many levels – from the successful production of the London 2012

Olympic Games, to the 'go live' stage of a new technology project or at a personal level, the presentation of a thesis or the successful transition of an individual through a redundancy process into a new career. Determining the value of outcomes is complex and must include evaluation of the processes through which the outcome was derived, since each 'performance' will have been pursued in fulfilment of a unique purpose in a particular context. Quality outcomes, and the standards used to evaluate them, form part of the feedback loops in a learning journey and should be designed to support improvement, rather than solely end product accountability. In complex systems one size simply does not fit all and responding to failure, safely and constructively is a key part of learning. Davies et al (2011) define value as the relationship between outcomes delivered to stakeholders and the resources consumed to realise these outcomes. This is expressed as a value equation: Value= Outcomes-Inputs. They also frame value explicitly in the context of effectiveness and efficiency – 'doing the right things and doing things right'.

Characteristics of Producing Value

- The production of value is the end point of a Learning journey – the output and the outcome.
- The production of value is the point for reflection on and quantification of success or failure
- Designing outcome measures and standards fit for purpose is key to the production of value
- Value Management is the process through which value is produced: a learning journey
- The production of value means measuring what matters – not measuring just for external regulatory purposes
- The production of value requires a learn fast, fail fast and improve protocol
- Rapid prototyping is a good way to produce value because it allows for learning

7 Effective learners and self-organising systems

Human beings can tolerate ambiguity and make relatively reliable decisions in a way which is not yet achievable by machines. We have a wide range of sensing systems that are

> John Lewis Partnership UK: a grounded theory study demonstrated that what makes it a great and effective place to work is the degree of participation each employee feels as Partner, the high levels of trust between all stakeholders and the accommodation of individual employees' purposes with the Partnership vision. (Tracy 2012)

constantly collecting data about the environment, other people and ourselves. We are

constantly deriving information from data, communicating its meaning and storing this

meaning as memories. We think in patterns and stories through which we anticipate and

interpret events. This use of sophisticated feedback loops for processing data, from

ourselves, others and our environment, has developed through evolution and mostly works

outside our awareness. An effective learner becomes more aware of these sensing systems

and utilises, modifies regulates and improves

them through reflexive adaptation and learning

in authentic contexts – where and when it

matters most. The problem is that many

> Bacs is using learning journeys to build and test an Agent Based Model of customer account switching behaviour so as to understand and improve competition in the current account market and more accurately design communications and marketing to align with users as storied human beings engaged in learning journeys with the context of Value management (Davies et al 2015).

organisations today have inherited a 20th Century worldview that sees learning, planning and

implementing as separate systems and activities. This inevitably creates information gaps and

longer time lags in feedback loops for learning and response. Furthermore, when people who

interpret the data for decision making are separated from people who collect it for

accountability purposes, a limit is placed on the kinds of data that can be collected reliably. It

is rather like a person depending only on cognitive and logical intelligence, at the expense of

intuitive, experiential and emotional intelligence or a manufacturer who takes no account of

customer feedback in design or build processes.

To encourage people in the work place powerfully

to process all types of data and synthesise it in

meaningful ways which achieve the

organisational purpose, we need an enabling

organisational infrastructure. Beckford (2015)

describes this as bolting-on capability for

> Kodak – accounted for 90 per cent of film sales and 85 per cent of camera sales in the US in 1976 and produced the first prototype digital camera in 1975. However, its digital imaging division was under pressure to create synergy between traditional film and digital images. They failed to understand the emerging need of digital photography and thus "escape" from old ideas and ways of doing business. The company also fell short of integrating its internal knowledge with external knowledge in response to the changing needs they foresaw. In other words, they failed to engage in 'triple loop' learning and mature quickly enough in the new context of digital imaging.

adaptation and he shows the potential of an intelligent organisation to modify itself in order

to manage its present, create its future and maintain alignment between its purpose, its people

and its processes. A self-organising business is a learning system where individuals, teams

and leaders learn together at all levels.

8   Applications of Learning journeys in Infrastructure Industries

Learning journeys provide a way of understanding, generating and resourcing learning so that

it can be integrated with the flow of daily 'work' or 'business as usual'. In other words, the

metaphor provides the components for the sort of learning architecture which can interface

with social and technical systems to enhance the processes of learning and innovation.

Humans as decision-makers are situated at the nodes of information flow and exchange in

complex socio-technical systems, so tuning the social and virtual arrangements and relationships to support human learning is crucial.

UK highways authorities used a novel systems thinking approach drawing on the measurement of softer issues such as business culture and customer perceptions as well as the traditional hard measures. This helped to establish a common language of performance in highways maintenance and management, foster collaboration with suppliers and demonstrate continuous improvement (Harding, Godfrey et al, 2003).

The individual or team participates in defining purpose, problem structuring and generating

new knowledge to solve authentic challenges – participation, access to resources and learning

are developed through networks of networks and relationships.   The virtual learning

resources need to serve the human learning journey. It is inadequate simply to provide

information via technology without the domain specific tools and frameworks which support

sense-making in the movement between purpose and performance.

There are at least three distinct reasons for applying the principles of the Learning journey in

the work place

1. To develop a learning and leadership infrastructure for an organisation or industry so that individuals and teams become more agile, responsive and able to react productively to change and innovation and thus impact on the 'bottom line'.
2. To design virtual models which explore and explain stakeholder behaviour in order more effectively to communicate with stakeholder communities as participants in the service and delivery of wider outcomes.

3. To develop a digital learning infrastructure to support self-directed learning and behaviour change, at scale, in particular domains i.e. mass education in climate change or financial competence, the circular economy or resilience to flooding.

9 Lifecycles of Learning journeys and Rapid Prototyping

As we have shown, Learning journeys have differing lifecycles and operate at personal, interpersonal and organisational levels. They are critical to a rapid prototyping approach to organisational improvement where improvement protocols are designed on the basis of a careful, stakeholder inclusive analysis of the system and the identification of a shared improvement aim. Both the fail-fast learn-fast imperatives of rapid prototyping and wide stakeholder engagement require employees with high levels of learning power and meta-learning capability.

A learning journey has many stages which can be modelled and enhanced through digitisation: a start event, a finish event and multiple transition events in between. It is iterative and cumulative. It is focused on a domain-specific stakeholder or customer task and is ideally aligned to organisational target outcomes. Each stage has many 'next best actions' and interactions and is framed by the meta-movement between purpose and performance. Stakeholders use personal learning power and knowledge structuring tools to navigate their journey. Stages almost always have transition rules and interaction rules and stakeholders can be on many journeys at the same time. A journey can be collaborative or individual, simple or complex, high value or low value. Journeys follow stakeholders across whatever channels they choose (face to face, social media, email, pen and paper) and they are adaptive to individual behaviour. They cover different territories with domain specific-sets of knowledge and know-how and they integrate knowing, doing and being.

10 Learning infrastructure for Living Labs: Practical Resources and Toolkits for Learning journeys

To be resourced at scale within infrastructure industries, learning journeys require a social and digital network infrastructure which accesses information and experience from a wide range of formal and informal sources within and beyond the organisation. This socio/digital network can support and enhance each process of the learning journey as and when it is needed in a specific business context, through tools, apps, data, information and next best action messaging. Individual decision-makers are nodes in this socio/digital network with its flows of information and social energy. The individual or team relates to all of these in identifying, selecting and curating what they need in terms of content and 'how to go about' solving complex business problems as learning journeys. This network infrastructure is part of a wider ecosystem with platforms that scaffold these relationships drawing on Cloud technology, Mobile technology, Social Learning and Curating, Learning Analytics for rapid feedback, 'Big Data' and Badges – to name just some of the key analytic genres.

Providing and servicing this Learning infrastructure is a specialist task which is arguably the purpose of a 'Living Lab' or a 'Network Hub' in an improvement community. The network (social and organisational relationships) and the ecosystem (technical resources to scaffold these relationships) provide an infrastructure with permeable boundaries between research, policy, practice and commercial enterprise, facilitating engaged, transdisciplinary and carefully structured improvement prototypes which is quite the opposite of the siloed and balkanised systems in most of our current systems. The challenge that most companies struggle with is balancing the need for some form of structure that provides manageable blocks of prototyping activity but which allow such networks to develop. The need is for the worth of the network to be related to wider purpose in a way that line management can see how the network contributes to their goals and objectives. Ultimately this appears to be a cultural challenge. Such a 'hub' is sometimes described as a 'Living Lab' the purpose of which is to integrate engaged and user-driven improvement research with technology, professional learning and the

wider R&D community. It provides and researches core Hub functions and expertise in partnership with the

enterprises needed to scale and deliver learning services.

Supporting such a Learning infrastructure requires sustained attention to different types of

expertise and resource development:

- The personal and social relationships, capabilities and mindsets necessary for facilitating and leading learning journeys
- The organizational and 'political' arrangements which support learning journeys as a modus operandi for improvement
- The architecture of space (virtual and embodied) within the relevant domain of service (i.e. the aerospace industry or financial services.)
- The technologies and tools which support the processes of learning journeys through rapid feedback of personal, organisational and environmental data for stimulating change, defining purpose, knowledge structuring and value management.
- The digital ecosystem that will facilitate and enhance participatory learning relationships and data flows across the project/s at all levels – users, practitioners and researchers, inside and outside of the organisation.

11 A Transition in Thinking

The idea of a Learning journey is simple and intuitive. The metaphor facilitates an

understanding of learning as a dynamic process. However it does represent a fundamental

shift in how we understand knowledge, learning, identity and value. Knowledge is no longer

a 'Stock' which we protect and deliver through relatively fixed canons and genres. It is now a

'Flow' in which we participate and generate new knowledge, drawing on intuition and first

hand experience. Knowledge is not static – even without attention to learning infrastructures

it is combining and re-combining in an additive process that increases value and continually

adapts. Its genres are fluid and institutional warrants are less valuable (Seeley Brown 2015).

Learning power is the way in which we regulate that flow of energy and information over

time in the service of a purpose of value – rather than simply receiving and remembering

'fixed' knowledge from experts. Identity for 'millenials' is found not in ownership and

control, but in creating, interpreting, sharing and 'remixing' – in agency, impact and

engagement. Value is generated in the movement between purpose and performance.

Leadership is about learning our way forward together.

12 What Next?

Many of the ideas and practices discussed in this White Paper have been developed and

applied in different contexts already, including some of the core technologies. What is

required next is a way of integrating these ideas and practices in an authentic and grounded

context, such as a Living Lab or a Collaboratory, focusing on how the whole fits together.

This will require a business model for all stakeholders which makes collaboration – not

competition – the basic modus operandi. It will require all stakeholders to abandon 'silos' in

favour of networks, and be willing to 'learn a way forward together' which inevitably also

means permission to fail.   In short, these ideas form a starting point for the resourcing of a

Living Lab or Network Hub, supported by a partnership of core providers from academia, the

infrastructure industry and the business world of 'learning professionals'. They form the basis

for operational platforms from which to deliver learning journeys at industrial scale on issues

of strategic, social significance.

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