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Exploring the Power of Collaborative Value Architectures: Combining Knowledge Products to Innovate and Create New Value

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Abstract

This paper introduces a technique for integrating knowledge-based services and products to create new value and potentially change the behaviour of the consumer.

The Collaborative Value Architecture approach was developed as part of strategic knowledge management consulting work to explore developing practice in Open Innovation, but has subsequently been applied to managing the behaviours of young drivers and crafting value propositions in connected health.

Three examples will be introduced, illustrating the potential for applying creative move-test-break thinking for crafting new value within legacy infrastructures by novel thinking and new connective technologies.

This research will be of interest to innovators, including healthcare strategists interested in reducing social and economic costs, and entrepreneurs aiming to develop synergistic business models through connective technologies.

1. Introduction to Connected Serendipitous Innovation

All strategies are knowledge strategies based upon selected forms of knowledge about the past and the future. Organisations live in a tension between the future and the past, in a tension between optimising strategies that deliver efficiencies based upon past innovations, and the construction of strategies that deliver new

value through effectiveness within a potential future market. Survival involves developing an investment management portfolio of both types [1].

The way knowledge is managed about the past and future, about efficiency and new forms of effectiveness determines survival and the form that innovation can potentially take when different types of Knowledge Product are manipulated and integrated [2]. An obvious example is Apple's integration of iTunes as a digital, virtual marketplace and the use of Apple MP3 players as an initially-closed means of accessing iTunes media, with a closed business model that reinforced the value of connected Apple products using classic Strategic Knowledge Management techniques of aggregation, disintermediation, and bottleneck hubs to exclude competitors and their products. The current Apple applications approach is a continuation of this closed business strategy.

Building on the "Medici Effect" [3] and the power of focusing on intersections or spaces where different forms of knowledge meet and can be integrated, 3 forces (or dimensions) for intersectional innovation are specified: "the movement of people, the convergence of science and the leap of computation" offering the potential in a connected world for designing knowledge combinations which can lead to new forms of value. Essentially this "Medici" or combinatorial potential new value effect can be connected with Synectics' creative methods for exploring problem states and generating ideas via creative analogy [4], the use of random combinations to trigger novel solutions, and Newman's "Move, Test, Break and (Re-form) innovation thinking methodology as applied in the Pfizer Pharmamatrix (PMX) project to operationalize the potential serendipitous value of legacy drugs being applied to new diseases by constructing a searchable database to enable the identification of alternative applications of existing drugs, an innovation triggered by the example of Viagra (Sildenafil Citrate) shifting its focus from blood pressure to erectile dysfunction [5].

All these ideas were constructively integrated as a prototype methodology by the appearance of COIN (Collaborative Innovation Networks) methodologies based upon Bonabeau's 1st and 4th complementary properties of "swarm intelligence" of self-organising groups solving complex tasks: that positive feedback reinforces desired behaviour, and amplification of interactivity [can have] a positive outcome [6].

2. Origins of Collaborative Value Architectures (CVA)

CVAs were the inadvertent product of exercises conducted with the Knowledge Anarchist group supported by The Welding Institute at Cambridge, SME entrepreneur development at Sittingbourne triggered by Gloor's account of COIN, and exploratory L-KILN (London Knowledge Innovation and Learning Group) workshops led by the author at the University of Greenwich.

These workshops involved unpacking Chesborough's Open Innovation concept [7] to identify core success principles through reverse visualisation, modelling them to explore the dynamics of constructing artificial Open Innovation collaborating companies through random force-fit of capabilities and customers to identify unmet needs and new services. This in turn, led to the construction of a demonstration prototype to illustrate emergent design principles for what became known as Collaborative Value Architectures "where complementary technologies can be aligned to form a virtuous reinforcing loop of complementary value" [8] that is very likely to have influenced Bayer's suite of personal data management tools for diabetes management.

This CVA prototype has been very influential in subsequent workshops for freeing-up traditional corporate thinking from legacy mindsets toward creating propositions that offer new value as opposed to merely adding value, and has been successfully adopted in several contexts to craft innovative value propositions using current technologies in novel configurations designed to modify customer behaviour.

3. The Prototype CVA

The core of a CVA is always the customer with an unique problem or opportunity that is met by the uniqueness of its architecture. The purpose of the prototype was to construct a CVA with the ability to anticipate and take out the social, economic and emotional impact of a predisposition to immune system collapse (either acquired through accident, surgical intervention or genetic) in key workers by introducing new value to personal health insurance propositions.

Customers or patients in such scenarios have reduced certainty of survival or ability to anticipate illness and take timely preventive action, and such patients have dependents and financial commitments to meet. Their employer wants continuity and the ability to access a key worker with specialist knowledge in an enterprise at any time, regardless of their condition.

Once the potential value has been described, further steps are taken to experiment with artificial Knowledge Product combinations to explore potential benefits, and develop potential new value. Each Knowledge Product or component is individually audited in terms of current assets of their service in terms of current capability and capability gaps to identify complementary value.

3.1 Knowledge Product Audits: The CVA Prototype Components

A. Health Insurers who have data on how expensive certain patient types and conditions are, but haven't got the ability to modify medical treatment to

minimize cost and maximize value, and would love to be able to offer lower premiums to patients who are willing to modify their behaviours to reduce exposure to risk.

B. Doctors/ GPs who have delegated budgets and the potential to aggregate buying power, but don't have the ability to anticipate immune system decay that leads to hospitalization with expensive drug and surgical interventions, and also cannot enforce patient disciplines around regular immune system testing and dosage/ treatment disciplines.

C. Mobile Telecoms Operators who have under-utilized network capacity involving technology for easily relaying data and aggregating it around customers, but would love to create new families of transactions that could move them up the value hierarchy, away from commodity services.

D. Clinical Real-Time Diagnostic Tools or new, transdermal diagnostics and software tools which can be triggered by mobile phones to regularly invite vulnerable patients to apply a diagnostic tool that's connected to their mobile, and which then sends data to an individual patient database that has a reporting sequence with in-built statistical upper and lower control limits (as in an SPC run-chart) that can trigger an email/ mobile message to the GP alerting them of a potential risk scenario, while simultaneously sending a message to the patient to select an appointment with the GP to manage an emerging situation.

E. Pharmaceutical Suppliers who have products and the money for research around specific system issues and dosage regimes, but who haven't got real-time data monitoring and analysis around key conditions, and who would love to set up service-level agreements based upon guaranteeing the supply of high-value drugs at attractive prices to the contracting GP, shifting their business from merely product to add service differentiation. The service could even involve GPS proximity capability to send a Nurse Practitioner directly to the patient to deliver the first dose at their current location.

By integrating all of the above skills and aligning the Knowledge Product capabilities, it becomes possible to manage the patient's immune system decay in real-time and engineer pre-medication before the patient becomes seriously ill (and has to consume expensive hospitalization) as a completely new service.

3.2 The Prototype CVA Patient Scenario

The targeted patient is offered and buys a special insurance with low premiums (in spite of their condition) for managing their health that requires a commitment to automated, regular data collection via their mobile phone and a transdermal device. This is done by sending them regular message texts to connect the transdermal device to their mobile and their body, and pressing “send” to download data to a personal spreadsheet with safety upper and lower control limits as to their condition, which triggers an email alert to their GP that the patient is about to, or is likely experience an adverse event in the near future. Simultaneously, a signal is sent to a nurse-practitioner with the authority to pre-medicate the patient at work (locating them through the GPS in their original mobile device).

The only component that’s not included here is that of the gymnasia/ spa/ personal fitness providers like Bannatynes or David Lloyd which while they have facilities for promoting exercise, haven’t got the ability to create new services around specific customer groups for whom immune-system maintenance or targeted conditions could be a new focus for complementary therapies and utilising current venues in new value services.

This CVA example has obvious applications for managing chronically-ill patients, the emergence of diabetes 2 and those with multiple conditions.

4. Other CVA Applications

Consultancy work since 2007 led to multiple CVAs being constructed in different fields for different types of customer and patient. A particularly interesting CVA was developed for influencing the behaviour of young male car drivers, constructed initially to control and then to influence driving via GPS, mobile phones, and “black box” telematics devices. Similar CVAs for manufacturers and licencing organisations were also developed to explore the potential for removing the problem of uninsured drivers’ high accident-rate and the problem of dangerous cars on the road, through lack of maintenance or tyre-wear, physical driver state based on alertness, driving styles and energy efficiency, and remote tolls replacing road tax.

It was interesting to note that small insurers led the way in terms of exploiting these prototypes and that only recently have the big insurers followed the lead of pioneers like Mike Brockman of “Insurethebox” [9] through the use of integrated GPS, and telematics in real time. Sadly, no insurer has adopted the preferred behavioural reinforcement of rewarding compliant behaviour with daily discounts in

insurance premiums since this would potentially involve developing new real-time transactional capability which would involve a smarter, agile business model.

5. Towards An Emergent Methodology

At its simplest and most robust, an emergent CVA methodology relies on several key elements of strategic knowledge management thinking: the aggregation of transactions and the use of bottleneck "hubs" in order to identify key elements in the form of behavioural patterns and their related costs to the individuals or the economy); connectivity (involving key elements like the internet, and mobile devices which enable aggregation of transactions); a population of patients or customers with problems (or opportunities) whose behaviour needs to be influenced (even "nudged) to reduce elements of costly risk that need to be mitigated; and a system of rewards for positive (less costly, risk-reducing) behaviours.

The methodology begins with an examination of Patients/ Subjects and Related Social Costs. The target is explored by examining a patient/ customer group with a problem or condition (this could be chronic heart disease, patients requiring combination therapies, young drivers, potential terrorists, alcoholics, drug abusers, A&E nurses, civil airline pilots, long-distance truck drivers, servicemen with PTSD, academics with repetitive theme syndrome) the side-effects of whose less-than-competent performance under certain conditions, when aggregated in terms of post-accident financial systemic ripple-effect or costs of failure, through being unable to mitigate these currently, become interesting to legislators, and governments. It is the quantification of the associated costs of failure that makes the next stage interesting to investors.

Prototype CVAs are constructed with differing elements, generally involving mobile devices to either provide continual real-time data and/ or to act as mediating devices for sampling based on key event analysis assuming a generic behavioural model around a specific condition. In the case of PTSD mitigation, this could be based on pre-sleep routines, especially on Saturday nights, when the patient could be sent a simple diagnostic test on their iPhone to capture their mental state, and then be delivered simple EMDR (Eye Movement Desensitisation and Reprogramming) exercises to reduce the likelihood of early morning re-awakening within a repressed trauma state facilitated by alcohol consumption.

6. Conclusions

The field of connected or virtual health offers great potential as the mediating technologies for diagnosis and communication become simpler and more robust. The prototype CVA anticipated the recent McKinsey's 3 principles of Connected Health [10]:

I. *Predictive Medicine* which comes before the medicine: devices, software applications, information, and instrumentation that identify and target the right protocols for care of an individual patient or patient sub-population.
II. *Personalized Care* which comes after the medicine: devices and services to monitor and deliver more cost-effective patient care.
III. *End-to-End Solutions* for biopharma customers, which are services that help deliver desired outcomes to payors, employers and patients.

It is interesting to note how remote monitoring devices for locating and measuring performance of sportsmen [11] in team games and British soldiers in combat are offering major, new opportunities for connectivity and oversight sources of continuous data-collection around conditions instead of mere "pin-prick" data-points within managed programmes of testing.

These new fields of potentially "big" data have the potential to revolutionise the understanding of diseases in terms of event-triggers and the generation of new longtitudinal disease models instead of the almost snapshot-based data fields based around clinical intervention events. This new knowledge could transform our understanding of conditions and patterns of illness and disease within patients. The potential exists for improved, targeted medication and disease management without the use of theoretically-possible but as yet impractical genotype categorisation of patients (although this technology is getting cheaper every year).

CVAs offers a slightly dystopian parental future world for human: system interaction, a world where new products and technologies do more than record transactions but have reporting capability on the line of NFC (Near-Field Communication) to capture the emotional states of populations moving through environments. It is likely that future products and environments will be integrated to manage emotions and behaviours. What is even more interesting will be the way individuals adapt to thwart the purpose of embedded CVAs, and what happens when individuals become affected by contradictory designs.

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