

A Blueprint for the Next Generation Organisation: Reconciling agility, efficiency, and purpose

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This is a working paper

Why this paper might be of interest to Alliance Partners:

Today, many CEOs recognise that their companies face three opposing pressures simultaneously: to re-organise to become more agile while at the same time maintaining relentless focus on efficiency and remain true to a consistent purpose that engages and motivates their people.

In order to look for answers to this problem this paper reminding us what the 21st Century organisation needs to deliver in order to achieve superior performance. It highlights that today's organisational solutions, whether they are traditional bureaucracies, matrix structures, "ambidextrous" organisations, or the customer focused company don't seem to be delivering on the two key demands of the 21st Century business environment: efficient integration and flexible adaptation. The authors discuss the benefits of moving towards an organisation that looks more like a network of partnerships – a business ecosystem – recreated inside the company. This means viewing your organisation not as a machine, but as a set of species with different capabilities and knowledge and designing structures and incentives that encourage connections between them; connections that can be constantly reconfigured. But to make it happen leaders need to reassess their roles and styles to succeed in a post-bureaucratic world. And these new ecosystem organisations will not get off the starting blocks without the energy that comes from common purpose and compelling vision of the future to propel them forward.

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A Blueprint for the Next Generation Organisation: Reconciling agility, efficiency, and purpose

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Soon after its IPO in May 2012, Facebook realised in that its unstructured, “Move Fast and Break Things” organisation wasn’t working. It restructured in an attempt to funnel the energy of its people into focused technical teams and product groups reporting to six “area leaders” (read “division heads”). The aim was to make its product development process faster and less erratic and have a chance of meeting the demands of its new public shareholders. But organisations made up of traditional “boxes and wires” don’t seem to provide the right answer to today’s challenges either. Witness the fate of Hostess Brands Inc. – maker of iconic products including Wonder Bread and Twinkies – whose “procedural and by-the-book” organisation was long hailed as a paragon of efficiency and long-term consistency. With roots going back to 1921, it had survived and prospered through a string of booms and slumps, including the Great Depression of 1929. But its organisation was unable to cope with the kinds of volatility the new century threw at it: the resurrection of the Atkins diet, the consumer reaction against additives such as extended shelf-life enzymes, and innovative business models such as Krispy Kreme doughnuts. Hostess Brands filed for bankruptcy in 2004, re-emerged in a slimmed-down incarnation backed by GE Capital in 2009, and was eventually liquidated with the loss of most of its 18,500 staff on 29th November 2012.

Today, many CEOs we talk to recognise that their companies face three opposing pressures simultaneously: to re-organise to become more agile while at the same time maintaining relentless focus on efficiency and remain true to a consistent purpose that engages and motivates their people. They have an uneasy feeling that their organisations aren’t up to this challenge. In fact this frustration shouldn’t come as a surprise because existing models of work and organisation offer an unpalatable choice: either adopt an essentially mechanistic organisation based on top-down decision-making, rigid hierarchies, a high division of labour and formal rules, policies and procedures optimised for an industrial, mass-production age: or choose to embrace and “organic” model based on loose networks of empowered ‘experts’, few boundaries, high informality, horizontal interaction across flat structures that aligns around values to fit the new, “knowledge economy”. Since neither seems to offer the silver bullet, companies risk “flip-flopping” between these extremes in endless rounds of re-organisation.

The 21st Century Organisational Challenge: Integration and Flexible Adaptation

In looking for answers to these questions we began by reminding ourselves what the 21st Century organisation needs to deliver in order to achieve superior performance. Boiled down to fundamentals, today’s organisation has to be capable of two things: *integration* (efficiently bringing together products, services, people, knowledge, materials and operational activities) and *flexible adaptation* (responding to varied and fast-changing customer needs, ideas, technologies and business conditions). But what does such an organisation look like? And how does it reconcile the uneasy bedfellows of efficiency, consistency, flexibility and

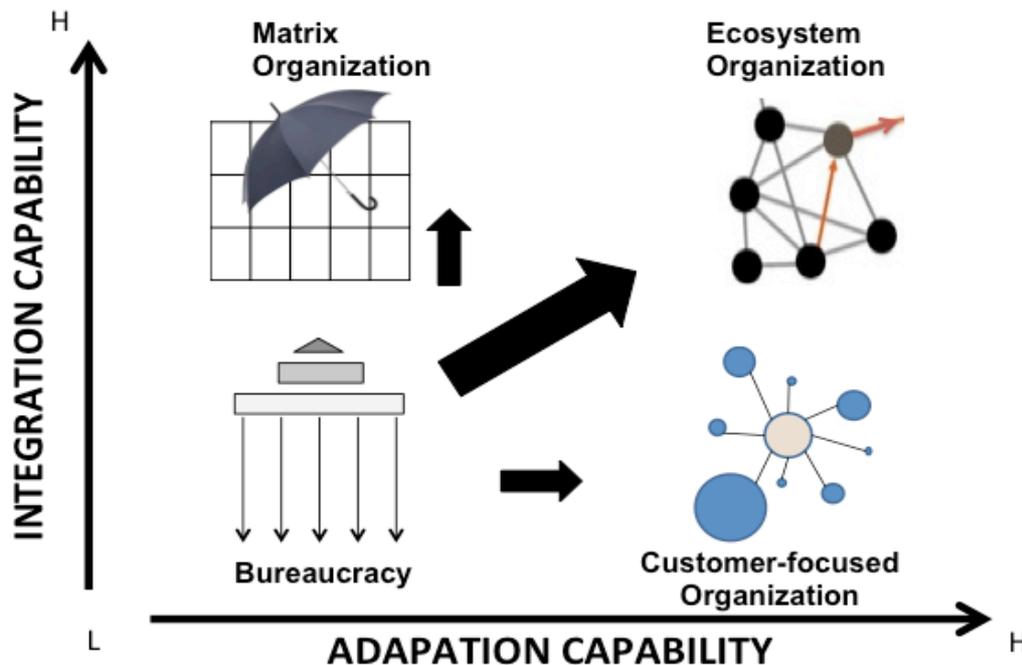
creativity at large scale? “How to ‘do both?’” as Inder Sidhu, Senior Vice President of Strategy and Planning for Worldwide Operations at Cisco Systems, puts it.

Competing in a world of standardised, mass-produced goods and services may have involved integrating enormous volumes, but the “bill of materials” could be specified and the diversity of the elements was containable. Adaptability, meanwhile, usually meant managing a set product launches or upgrades on regular timetable determined by the company. Take the example of Rolls Royce Aero Engines. Producing a jet engine involves integrating as many as 25,000 parts. Innovation is also key: each major new airframe sees the launch of a new engine design and then a succession of improvements over decades. But today Rolls Royce needs to sell its customers “power by the hour”. Instead of purchasing an engine, they buy units of thrust from Rolls Royce to power their fleets of aircraft over a contracted period of time. This shift demands a step-change in Rolls Royce’s capabilities for both integration and flexible adaptation. It now needs to integrate diverse capabilities in maintenance, customer service and inventory management with a deep knowledge of how the customer runs its own business as well as the 25,000 parts. It also needs to be able to flexibly adapt to the business models of different customers, their route structures, flying schedules and internal processes. It is all designed to make life easier for the customers, but it means that the pressures on the Rolls Royce organisation have risen dramatically.

Or consider Microsoft. It has long had to integrate millions of lines of code and knowledge of an army of specialist IT engineers. It has always had to adapt its product, launching a series of new versions and a continuous flow of security updates and patches for its PC users. But today Microsoft has to integrate into its offerings the needs of a diverse set of customers using a range of devices from mobile handsets and tablets through to game consoles and television screens. It also has to adapt its product much faster than ever before as the PC market declines and a myriad of new interfaces including voice, touch, even eye movement, emerge.

When companies such as Rolls Royce and Microsoft could thrive by integrating a well-defined set of elements and adapting through a linear sequence of launches and updates, a traditional bureaucratic organisation served them pretty well. Let’s not forget that while “bureaucracy” is now frequently used as a term of derision, it proved highly successful over centuries in delivering standardised products and services at large scale more efficiently than individual artisans. Even today a certain element of bureaucracy has its place in an organisation – McDonalds, for example, couldn’t deliver a Big Mac at the price and speed it does if it relied on a bunch of creative prima-donnas with no rules and no procedures. The problem is that, even at its best, bureaucracies constrain your company to “product leadership”, down at the lower left quadrant of the chart below.

What Kind of Organisation Do You Need?



Faced with the challenge of integrating a more diverse set of products, services and knowledge, companies developed matrix organisations. The matrix was effective in bringing together different divisions across a company so that customers in the same industry or country could be offered an appropriate bundle of products and service to meet their common needs. Unfortunately the downsides of the matrix quickly became obvious: endless rounds of internal negotiation and compromise, lack of accountability, and a danger that, in the process of corporate co-ordination and consensus, the customer is all but forgotten.

Other companies instead focused on trying to improve their capability to flexibly adapt to the needs of individual customers and keeping up with changing customer expectations. They created a new generation of "customer-led" organisations where supply chains or back-office operations were re-structured to align with end-customer demands. This was fine, so long as customers could articulate what they valued. But in many industries customers had little idea what the new technologies out there could deliver and what kinds of innovations would be possible by bringing together new types of capabilities and knowledge. Customers for cell phones, for example, had little idea that texting or Twitter would be a boon before they actually had the chance to try it. Customer-led organisations weren't the answer when the customer wasn't sure where to go.

Despite innovations in organisation design, the challenge posed by the 21st Century business environment remains unsolved: the challenge is finding a model of organisation that can handle both complex integration and flexible adaptation to deliver innovative customer solutions on a sustainable basis.

Ecosystem Thinking Inside And Out

We believe a big part of the answer to this dilemma is to move to an organisation that looks more like a network of partnerships – a business ecosystem – recreated *inside* the company. The idea of drawing competitive advantage from an external networks of partner firms, institutions and individuals and can harness complementary capabilities and know-how in a flexible way is gaining increasing currency. Procter and Gamble’s “open innovation” initiativesⁱ, the partner network behind ARM Holdings plc (now the world’s leading semiconductor intellectual property supplier) in its battle with Intel for low-power chipsⁱⁱ, Coca-Cola’s “fan first” interactionsⁱⁱⁱ and Apple’s iTunes are all examples of harnessing the potential of an external partner ecosystem. The trick to making these business ecosystems work is to harness diversity, co-learning and flexibility in an efficient way so that the benefits aren’t outweighed by the costs of transacting, monitoring and control. Via ecosystems, so the logic goes, firms are able to capitalise a variety of resources residing across multiple partners. When aligned behind a common purpose, these resources can be configured and flexibly reconfigured rapidly according to complex and changing customer requirements. Today, that same set of opportunities and challenges is replicated *inside* the organisation as well. So isn’t it time to take leaf out of the ecosystem playbook to solve the re-organisation dilemma in our post-bureaucratic business environment?

The Chinese telecommunications equipment company Huawei is one example of such an ecosystem organisation. Despite the political controversy it has attracted in the US, Huawei is now the second largest maker of telecoms equipment in the world after Sweden’s Ericsson, with \$35 billion of sales, 66% outside China, and operations in 140 countries. When we interviewed one of the many Western expatriates who now work for Huawei, he recalled that on his first day with the company he asked to see an organisation chart. He was stunned by the answer: there wasn’t one. At first he thought the privately-owned company was just being secretive. But over the coming months he came to realise that Huawei really didn’t have an organisation chart in the usual sense.

Sure there was a hierarchy, in fact much of the direction was very top down and for many employees the boss’s word was proverbial law. And there were units with different capabilities and specialisations such as manufacturing, product development, sales or finance. But these capabilities were continuously being reconfigured around projects or problem solving. When a new customer opportunity was identified a team from across the company would be marshalled. When one of the top dozen leaders of the company agreed a new product initiative with their peers, a team would be put together to take it from idea, through product development and manufacturing, to final installation and service, often involving hundreds of people from within Huawei’s global operations. People would be added or reallocated through the lifecycle of that initiative, flexing the capability set and capacity as required. The same process was applied to making improvements in Huawei’s processes and support systems.

The pattern was also repeated at the coalface: within each bid team, product development project or improvement initiative. When a problem needs to be solved the project team, often under intense pressure from above, gathers together anyone from within the company that can help them in the mode of “huddle and act” until a solution is arrived at. The company

is, therefore, strong on vertical hierarchy, but extremely flexible at all levels horizontally, reconfiguring itself continually to serve the next customer demand, back new initiatives, solve problems as they arise, and maximise knowledge exchange and joint learning.

An interesting reflection of this ecosystem *modus operandi* is that when you receive a business card from a Huawei employee it lists their expertise under their name (such digital signal engineer or chip designer), but nowhere is there any reference to a department or business unit to which in most other organisations they would belong. Why? Because what counts is that they are a resource with particular capabilities and experience that can be flexibly deployed according to the emerging needs of the business. This concept applied right to the top of the company. Even the of Chief Executive Officer (CEO) isn't a fixed position in Huawei. In 2011 the company introduced what it called a "rotating CEO system under the leadership of the Board of Directors". This system provided for rotating "acting CEOs" to take turns leading the company for six months. After the rotational period is over, the non-acting rotating CEOs remained part of the company's decision-making nucleus^{iv}. Likewise, other senior employees had to re-apply for new jobs every three years. These mechanisms aimed to avoid complacency and maintain ambition and dynamism in what was a fast-moving industry. Huawei's founder, Ren Zhengfei points out that: "A rotating system for leaders is nothing new. In times when social changes were not so dramatic, emperors could reign for several decades and create periods of peace and prosperity. Such prosperous periods existed in the Tang, Song, Ming, and Qing dynasties. The rotational period for each emperor lasted several decades. Some companies in traditional industries rotated their CEOs every seven or eight years, and these CEOs experienced some prosperous times in their industries."^v

According to Ren's thinking, the connections between different capabilities, and therefore people, shouldn't be fixed in the way that a traditional boxes-and-wires organisation chart demands. Other companies, while not going quite as far as Huawei, have moved much closer to an ecosystem model. Rolls Royce, for example, has invested heavily in transforming its organisation into a network for creative problem solving. It has opened up a massive number of new connections between its business units, functions and country-based units by initiating projects that depend on collaborative working and knowledge exchange, backed by peer-to-peer monitoring of quality and performance. A Rolls Royce executive summed up the benefits this way: "We get the whole organisation engaged in meeting new objectives. Hitherto they were seen as management problem to solve. Now we get the minds and intellect of the whole organisation into solving our problems."^{vi} Meanwhile, ARM – whose RISC architecture has become the de-facto global standard - organises itself as a large number of project teams interacting as a single network across each its five divisions. The divisions themselves are embedded in a corporate structure that prevents them from becoming silos. Members of the senior executive team also sit on the boards of each division to ensure that both the corporate and divisional objectives are considered in any strategic initiative and a cross-division, cross-function Product and Project Approval Team decides on the projects ARM undertakes.

Of course some of this thinking isn't new. Many professional services firms, such as law firms, business consultancies or investment banks work in a similar fashion. Construction companies also share some of the same features with people and resources moving between different projects as required. But such organisational models are almost never applied to

manufacturing industries or in industrialised services such as retail banking, telecommunications or on-line entertainment.

Ecosystem thinking also takes the familiar project-based organisation to a new level. Rather than viewing the organisation as a set of activities, ecosystem thinking starts with pools of different capabilities as its fundamental building block. Rather than hard-wiring the organisation, an ecosystem approach focuses on creating structures and incentives that encourage the formation of flexible connections between these capability pools that can be constantly reconfigured. Finally, rather than being driven by traditional reporting lines, the ecosystem organisation is propelled forward by the energy that comes from grasping opportunities and solving problems within the context of the common purpose. All successful business ecosystems, whether a network of external partners or an internal network of people and resources, embody these three key principles. Inevitably adopting this model of a 21st Century organisation requires a degree of traditional managerial discretion and control to be surrendered in exchange for greater flexibility and learning potential. But that doesn't mean an ecosystem organisation can't be designed and led.

Building an Organisational Ecosystem

Designing an ecosystem organisation begins with putting into practice the three key principles above. First, an ecosystem must bring together different *species*. In an external ecosystem the species are different kinds of partners such as customers, end users, complementors, institutions, influencers and so on. The species in an internal ecosystem are capability and knowledge pools made up of different kinds of people.

Second, the *connections* between species in the ecosystem must be designed to flexibly integrate knowledge, and not as traditional reporting lines. The purpose of these connections is to bring together complementary capabilities and knowledge and to promote joint learning and creation.

Third, the *energy* that powers the ecosystem forward must come from shared purpose and values, not from pure command and control. In an external ecosystem the lead firm can't command obedience from its independent partners. Instead it has to set a compelling direction where the potential upside is clear to all and shape the incentives such that partners align and propel the ecosystem forward out of self-interest. For the most part the same holds true for the leaders of the internal ecosystem that will form the next generation corporate organisation.

Attracting the right species

An effective ecosystem organisation needs different types of people. They don't all need to be well rounded or ambidextrous. But they do need to have distinctive capabilities that define their species.

The first species required are *efficient executors* – people who enable plans to be turned into action efficiently. They need the capability to deliver reliable quality with minimum errors at maximum efficiency. Efficient executors are sometimes in short supply. When Rolls Royce set up its new \$565 million advanced manufacturing facility in Singapore to produce its most

advanced products – Trent 900 and 1000 engines for the Airbus A380 and Boeing 787 Dreamliner, and 6,000 titanium fan blades per year – they needed to recruit and train over 450 technicians capable of performing to stringent quality control requirements and maintaining absolute manufacturing consistency. The pool of seasoned aerospace technicians in Singapore was extremely limited. So Rolls Royce decided to slice its manufacturing process into smaller chunks than it used at its home base in England where it had efficient executors with 30 or 40 years of experience building engines. This enabled them to re-define the capability requirements of their efficient executors to emphasise ‘depth not breadth’; so they could develop technicians’ capabilities faster through more repetitions of a narrowly defined task in any given month. However as we discuss below, to make this new, more specialised internal ecosystem work they needed to integrate them through better connections and knowledge sharing between technicians trained to execute a narrow range of jobs reliably. Similarly Huawei and ARM need large pools of people with efficient execution capability who also need to be connected with others throughout the ecosystem organisation.

The second species an ecosystem organisation needs is the *creative generalist*. Their key role is to integrate capabilities and knowledge draw from throughout the internal ecosystem to deliver for a customer, push a project forward or solve a problem. They need to have the ability to span multiple organisational boundaries, both internal and external, and provide a bridge for knowledge exchange. As ‘T-shaped’ talent, they typically have in-depth knowledge of one domain, but also broad knowledge of other areas. Much of ARM’s early success was built on its “partner managers” who acted as creative generalists. The partner managers were the “eyes and ears” of ARM in their external partners. But other important parts of their job were to represent a partner internally within ARM and provide feedback to ARM teams including engineering, marketing, and management regarding partners’ technical and business requirements so that ARM could develop and reconfigure its capabilities to serve the emerging needs of the market. One of ARM’s most successful partner managers in Korea exemplifies the skills required: he had worked for many years with a large computer hardware company in Korea, then founded his own systems-integration start-up, giving him a very broad knowledge of both technologies and the industry. His counterpart in Huawei had completed his PhD in Germany, had worked for a telecom equipment components company in the USA and then in R&D for a large Chinese telecoms components company.

The third species required to underpin an ecosystem organisation are *flexible specialists*. At their core, flexible specialists have deep knowledge of a particular domain, but they also need the adaptability necessary to apply this knowledge to different opportunities, projects or problems, shifting between them in different timescales. Huawei, for example, has a team of over 40 photonics technologists and scientists in eastern England, many of them with advanced degrees. They need the capability to switch between developing prototypes for products that would be rolled out in the near term and next generation technology with a gestation of between three and ten years. Likewise flexible specialists in the Rolls Royce organisation need to be comfortable with lending their expertise to the ramping-up of production of existing engine designs to meet near-term demand and then moving to long-term projects pushing the boundaries of aerospace technology.

Establishing the right types of connections

In any ecosystem organisation all of these species need strong capabilities to connect with others – even those with very different skills and ways of working. They not only need to be good at learning, but also able to share that learning across the internal ecosystem and sometimes also with external partners, customers and end users. Ecosystem organisations need to incorporate proficiency to make connections into their recruitment criteria.

To enable this to happen smoothly an ecosystem organisation also needs the right types of connections between the species within it. Rather than traditional reporting lines, these connections reflect where knowledge needs to flow within the organisation to deliver results.

Key to promoting these connections is to establish a set of “magnets” that can pull together the relevant capabilities and knowledge that can produce results through exchange and interaction. As we have already noted, these can be customer opportunities, product or technological projects, or problems that need to be solved. These magnets, each of which has its own lifecycle, are the fundamental “work units” of the ecosystem organisation. For administrative purposes individuals may belong to a particular capability pool, but their day-to-day activities are part of the opportunity, project, or problem they are working on at any particular time. An ARM executive explained the ways these magnets and connections work: “How do you integrate and communicate the multiple strands of information coming from the OEMs, partners and different internal specialists? Part of the answer lies in keeping the ultimate objective constantly in view: in our case to develop a technology roadmap that was what might be termed ‘the highest common denominator’ between different partners’ requirements. The ultimate prize is to develop IP on new designs and architectures that can be licensed globally to a wide range of semiconductor partners”.

Providing the right sources of energy

Generating alignment behind a common purpose is a necessary condition for maintaining an effective ecosystem organisation. In the absence of traditional command and control, there are increased risks of entropy and conflicts between the different capability species in the internal ecosystem. Entropy dissipates energy and undermines performance as Facebook discovered. A key role of senior management in an ecosystem organisation, therefore, is to define and communicate a common purpose that gives both focus and energy to the network. The ecosystem organisation needs to know “what do we exist to achieve?” (purpose) and “Where are we going?” (a vision of the future and what success looks like). Early in its history, for example, ARM’s then newly appointed CEO, Sir Robin Saxby, posed a brutal questions to his senior team: “Should we strike out for something, or just be in the hand-to-mouth chip design consulting business?” With Saxby’s enthusiasm and the founding engineers’ belief in their technology, they decided ARM’s purpose and vision would be to “become the global standard for RISC chips with a target of embedding ARM designs into 100 million chips by the year 2000.” Last year ARM partners shipped over eight billion ARM Powered chips and its were used in more than 95% of the world's mobile phones and increasingly designed into a wide range of other digital electronic products.

Ecosystem organisations also ask a lot of their people in terms of commitment the overall goals of the company rather than just their immediate unit, and in terms of adaptability and willingness to live with ambiguity. In return those working with in these structures expect a

lot from the companies they work for. To devote this kind of energy in the face of the uncertainty of an ever-changing role in the internal ecosystem, people demand their leaders establish a set of rules they can buy into and respect. That won't happen unless they perceive the rules and distribution of value, in whatever form it may take from income, promotion or opportunity, to be fair.

Leading an Ecosystem Organisation

Ecosystem organisations need to be led differently from traditional structures. To see how, consider the genesis of one of the iconic products in ARM's history, codenamed the ARM 9E. The project began with ARM looking for new application areas beyond cell phone and after brainstorming by a group of its product managers they alighted on disk drives. The product manager of the existing offering most closely adjacent to this new market, John Rayfield, took up the challenge. He proposed a joint development project with a leading customer to co-develop the new product. When that customer chose a competing solution he went to second prospect; it also refused. Eventually he identified a partner, Cirrus Logic, who was interested in adding an ARM design to complete its product offering. The ARM product manager convinced an ARM technical specialist to contribute and together with Cirrus they went to pitch to Western Digital. This also ended in pushback from the potential customer, but this time they received the go ahead to come back with an improved specification. At next meeting with Western Digital's senior management in California he asked Robin Saxby, then ARM's CEO, to attend. During the meeting Saxby declared "I want your business, what do I need to do?". On hearing the list of deficiencies in ARM's existing proposal he said "Alright we'll fix it".

Even with the CEO's commitment, completing the project in ARM's ecosystem organisation wasn't a *fait accompli*. Rayfield "spent a lot of corridor time" bouncing the ideas off his colleagues and getting input from people with both technical and international experience. He then put this together in a proposal that he circulated to 15 people scattered across the company, chosen for the specialist skills and experience. Rayfield received a huge response, some of which stunned him. Although, as he commented, "I felt I had thought things through very well ... these guys tore the ideas to pieces, pointing out things I had never thought of." But through this process, Rayfield was able to assemble a team with diverse capabilities who were able to develop the specifications into a workable blueprint. He took it back to the customer who subsequently contacted his boss, Saxby to congratulate ARM on the new initiative. CEO Saxby's response to Rayfield was telling: "I'm glad they like it, but John, what exactly is it?" Shortly afterwards the 9E graduated to become a full-fledged product development and Rayfield was able to extend his team to draw on the full capabilities available within the ARM organisation. The final product turned out to be an important driver of the company's growth with applications in audio devices as well as storage and Rayfield later became Director of Research.

This experience demonstrates a number of the ways successful leaders at different levels within an ecosystem organisation need to think and act. First, they need to think in terms of the capabilities they require in order to win in the unfolding competitive environment, and how those capabilities are best built and sustained, rather than in terms of boxes and wires. Second, they have to accept less control and predictability about the way their organisations

respond to opportunities and tackle problems and behaviour that generally asks forgiveness rather than permission. Third, they need to embrace the idea that integrating different capabilities and winning commitment from within an ecosystem organisation will be an entrepreneurial, iterative process.

Organising for the 21st Century

Today's organisational solutions, whether they are traditional bureaucracies, matrix structures, "ambidextrous" organisations, or the customer focused company, don't seem to be delivering on the two key demands of the 21st Century business environment: efficient integration and flexible adaptation. Maybe its time for a fundamental re-think inspired by business ecosystems: the external networks of partners that leading firms are shaping to promote their own success? This means viewing your organisation not as a machine, but as a set of species with different capabilities and knowledge and designing structures and incentives that encourage connections between them; connections that can be constantly reconfigured. The title on an individual's business card will capture his or her key capability or knowledge rather than a unit to which they "belong". The boxes and wires made up of activities or functions will need to give way to a network of teams, each focused on a customer opportunity, a product or improvement project or on finding solutions to problems that arise. And these teams will need to constantly evolve over the lifecycle of their projects, be disbanded and reformed. Companies such as Huawei, Rolls Royce and ARM Holdings have already moved decisively in this direction. But to make it happen leaders need to reassess their roles and styles to succeed in a post-bureaucratic world. And these new ecosystem organisations will not get off the starting blocks without the energy that comes from common purpose and compelling vision of the future to propel them forward.

ⁱ <http://www.pgconnectdevelop.com>

ⁱⁱ Williamson, P. J. & De Meyer, A., 2012, 'Ecosystem Advantage: How to Successfully Harness the Power of Partners' in *California Management Review*, Vol 55, No. 1 (Fall) , 24-46.

ⁱⁱⁱ <http://www.fastcompany.com/3003448/when-co-creation-becomes-beating-heart-marketing-companies-win>

^{iv} <http://www.huawei.com/en/about-huawei/corporate-info/annual-report/annual-report-2011/LetterfromtheCEO/> Accessed 4th April 2013.

^v <http://www.huawei.com/en/about-huawei/corporate-info/annual-report/annual-report-2011/LetterfromtheCEO/> Accessed 4th April 2013.

^{vi} Trevor, J (2007), GHRRA Case Study Report, Rolls Royce Plc, Cambridge University